Targeter

CBC Tracker

Grade 9

Answer Booklet

Volume 2

Targeter Publishers Ltd
Wings of Excellence

COMPETENCY BASED CURRICULUM

CONTENTS

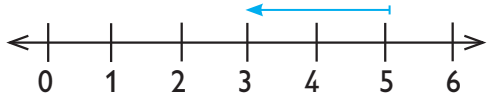
MATHEMATICS

1.0 NUMBERS

1.1 Integers

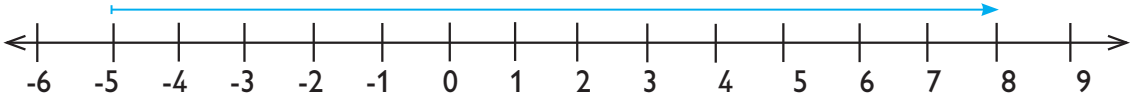
Practice Exercise 1

1. (a)



+5+(-2) = 3

(b)

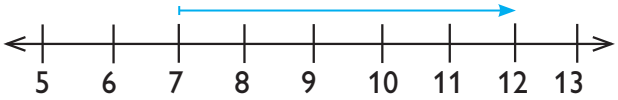


(-5) + (+13) = 8

(c)

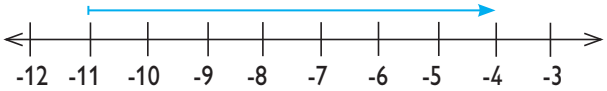
(-9) + 5 = -4

(d)



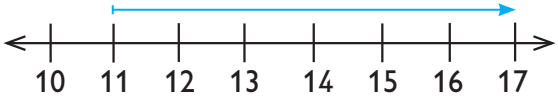
(+7) + (+5) = 12

(e)



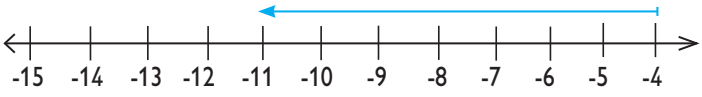
(-11) + (+7) = -4

(f)



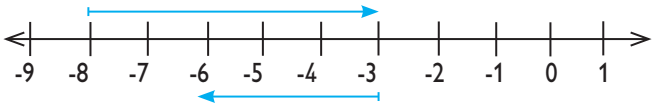
(+11) + (+5) = 16

(g)



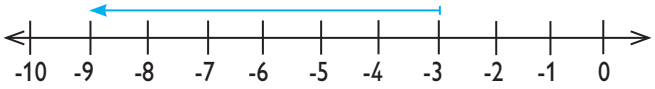
(-4) + (-5) + (-2) = -11

(h)



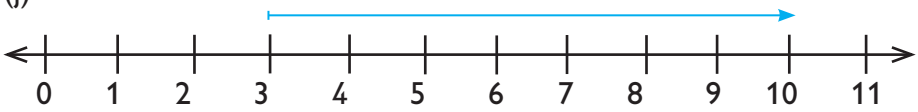
(-8) + (+5) + (-3) = -6

(i)



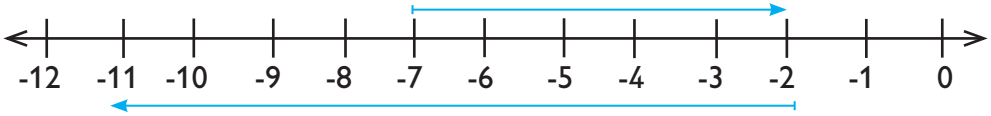
(-3) + (-3) + (-3) = -9

(j)



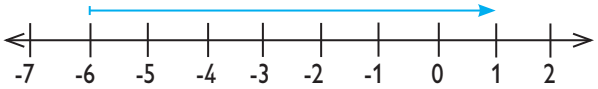
(+3 + 2 + 5 = 10

(k)



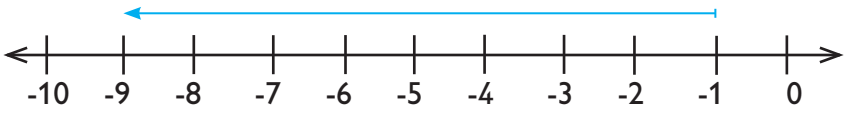
(-7) + (+5) + (-9) = -11

(l)



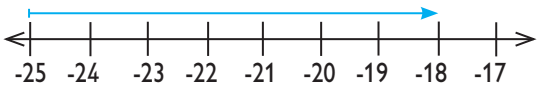
-6+6+1 = 1

(m)



(-1) + (-8)=-9

(n)



(-25) - (-7) = -18

2. (a) +7 - 5 = 2
   (b) -9-5 = -14
   (c) -6-(+5) = -11
   (d) -8-(-5) = -3
   (e) (+2) -(+7) = -5
   (f) (-10) -(-3) = -7
   (g) (+13) - (-3) = -10
   (h) (-3) - (+5) = -8
   (i) (-9) - (+3) = -12
   (j) -7-(-7) = 0
   (k) (+8) - (+9) = -1
   (l) + 12 - (-2) = 14
   (m) (+1) - (-9) = 10
   (n) (-5) - (-6) = 1
   (o) (-2) - (-7) = 5
   (p) (+9) - (-3) = 12
   (q) (+7) - (-2) = 9
   (r) -5-2-0 = -7

3. (+35) - (-10) = 45^0

Practice exercise 2

1. -41
2. -25
3. -51
4. 20
5. -76
6. -17
7. -18
8. -20

Practice exercise 3

1. -100
2. 24
3. -72
4. -100
5. 42
6. 900
7. -60
8. -57
9. 35
10. 700
11. 78
12. 44
13. 198
14. 529
15. 48
16. 108
17. 120
18. 360
19. -600

Practice exercise 4

1. 38÷19=2
2. 256÷8=32
3. 121÷11=11
4. 57÷19=3
5. 1311÷23=57
6. −63÷9=−7
7. −784÷28=−28
8. −300÷15=−20
9. −912÷48=−19
10. −570÷30=−19
11. −42÷−7=6
12. −112÷−56=2
13. −270÷90=−3
14. −2247÷−7=321
15. −4860÷−60=81

Practice exercise 5

1. 72
2. 45
3. 1829
4. 20
5. 33
6. 23
7. 9
8. -139
9. 175
10. 24
11. 88
12. 2
13. -41
14. 48
15. 8
16. (a) 2
    (b) -14
    (c) -12
17. (a) -2
    (b) $^{-19}/_{12}$

Practice exercise 6

1. 5 floors
2. 61 years

3. 17°C increase
4. 2600g
5. -16°C
6. sh 130 debt left
7. sh 8400 difference

1.2 Cubes and Cube Roots

Practice exercise 1

1. Work Out the Cubes of Each Number

(a) 12167
(b) 1771561
(c) 0.015625
(d) 4913
(e) 15625000
(f) 729

2. Evaluate the Following:

(a) 4096
(b) 1.953125
(c) 218.1672
(d) 0.000000015625
(e) 91125
(f) 0.000042875

3. Find the Cubes of the Following Fractions:

(a) $^{27}/_{125}$
(b) $^{125}/_{1728}$
(c) $^{125}/_{729}$
(d) $49^{8}/_{27}$
(e) $144^{45}/_{64}$
(f) $86^{293}/_{343}$

4. Evaluate the Expressions:

(a) 5832
(b) 46656
(c) -343
(d) $^{1}/_{8}$
(e) 46656
(f) 16003008

5. Algebraic Cubes:

(a) $64n^3$
(b) $91m^3$
(c) t^3s^3

Practice exercise 2

1. **(a)** 512.0
(b) 250.0
(c) 84.03
(d) 10.207
(e) 347.11
(f) 758.29
(g) 27.000

2. **(a)** 59.115
(b) 251.13
(c) 26.965
(d) 78.51
(e) 636.1
(f) 131.156
(g) 997.0

Practice exercise 3

1. **(a)** 46,660
(b) 47,050,000
(c) 2,042,000,000
(d) 145,530
(e) 105,108,000
(f) 1.3292×10^{10}

2. **(a)** 103,820
(b) 4,742,000
(c) 1.3563×10^{10}
(d) 377,900
(e) 33,202,000
(f) $7,358 \times 10^{6}$

Practice exercise 4

1. **(a)** 0.10382
(b) 0.79126
(c) 0.00005316
(d) 2.4642×10^{-8}
(e) 1.756×10^{-10}
(f) 5.7105×10^{-14}
(g) 7.409×10^{-11}

2. **(a)** 95,964,344
(b) 0.0008264
(c) 1262.37

3. 0.000012167

4. 0.05065

5. 0.00768

Cube roots

Practice exercise 1

1. Find the Cube Roots Using Factor Method

(a) **Cube root of 1331**

Prime factorization:

$1331=11\times11\times 11$

$=11$

(b) **Cube root of 46656**

Prime factorization:

$46656=2^3\times2^3\times3^3\times3^3$

$2\times2\times 3\times3 = 36$

(c) **Cube root of 21952**

Prime factorization:

$21952=2^3\times2^3\times7^3$

$2\times2\times7=28$

(d) **Cube root of 3375**

Prime factorization:

$3375=3^3\times5^3$

$3\times5=15$

(e) **Cube root of 0.027**

0.3

(f) **Cube root of $16^1/_{64}$**

Since 161 is not a perfect cube so we have $16^1/_4$

2. Evaluate Using Factor Method

(a) **175763**

$17576=2^3\times13^3$

$2\times13=26$

(b) **106483**

$10648=2^3\times11^3$

$2\times11= 22$

(c) **911253**

$91125=3^3\times3^3\times5^3$

$3\times3\times5=45$

(d) **2160003**

$216000= 2^3\times2^3\times3^3\times5^3$

$2\times2\times3\times5=60$

(e) **0.000216**

$0.000216= 0.2^3\times0.3^3$

$0.2\times0.3=0.06$

(f) **0.008**

$0.008=(0.2)^3 = 0.2$

3. Find the Side Length of the Cube

The side of the cube is **45 cm**.

4. Find x Given $x^3=9261$

x = 21

5. Evaluate cube root of 64/729

$= {}^4/_9$

6. Simplify the Expressions

(a) 7x

(b) $6a^2b$

(c) 7a

Practice exercise 2

1. a) 14.09 b) 21.43 c) 18.45 d) 16.09 e) 20.30

2. a) 0.1951 b) 0.2533 c) 0.9276 d) 0.0684 e) 0.3279

3. a) 15.84

Practice exercise 3

Evaluating using a calculator

(a) $57^3=185,193$

(b) $9.3^3=812.17$

(c) $132.6^3=2,331,473.976$

(d) $({}^3/_7)^3={}^{27}/_{343}$

(e) $(2^3/_7)^3=14\ {}^{111}/_{343}$

(f) $(1^3/_{11})^3=2^{82}/_{1331}$

(g) $0.027^3= 0.000019683$

(h) $0.0011^3= 0.000000001331$

Finding the cube root using a calculator

(a) 2913 = 14.28

(b) 804357 = 93

(c) 7358 = 19.45

(d) 0.8754 = 0.957

(e) 0.0381 = 0.3365
(f) 0.148877 = 0.525

Cube roots of fractions

(a) 1.546
(b) 0.182
(c) 19
(d) 0.702

Practice exercise 4

1. The length of the side of the cube is **14.0 cm**.
2. The volume of the solid copper cube is **13.0 cm³**.
3. The length of one side of the cube is **21.1 cm**.
4. The length of the cube is **14.23 cm**.
5. The length of the cube is **16.43 cm**.

1.3 Indices and Logarithms

Practice exercise 1

1. Express each in index form:
   (a) $3\times3\times3=3^3$
   (b) $2\times2\times2\times2\times2=2^5$
   (c) $13\times13\times13\times13\times13\times13=13^6$
   (d) $8\times8\times8=8^3$
   (e) $n\times n\times n\times n\times n\times n\times n=n^7$
   (f) $34\times34\times34\times34\times34=3^{20}$

2. Write in simplest index form:
   (a) $216=6^3$
   (b) $1331= 11^3$
   (c) $49= 7^2$
   (d) $81=3^4$
   (e) $128= 2^7$

3. Write in expanded form:
   (a) $15^3=15\times15\times15$
   (b) $9^5=9\times9\times9\times9\times9$
   (c) $2^5=2\times2\times2\times2\times2$
   (d) $3^4=3\times3\times3\times3$
   (e) $6^5=6\times6\times6\times6\times6$

4. Counting the number of factors:
   4(a) **7** has **1 factor**
   4(b) **11^{13}** has **13 factors**.
   4(c) **3^7** has **7 factors**

Practice exercise 2

1. $5^2\times5^2=5^4$
2. $2^3\times2^3\times2^2=2^8$
3. $6^2\times6^0\times6^1=6^3$
4. $m^5\times m^3\times m^2=m^{10}$
5. $p^{-2}\times p^2\times p^3=p^3$
6. $a^3\times a^2\times a^4\times a^1=a^{10}$
7. $3^2\times3^2\times3^2\times3^2=3^8$
8. $7^2\times7^3=7^5$
9. $10^3\times10^2\times10^1=10^6$
10. $5t^3z^2\times3t = 15t^4z^2$
11. $6a^5b^2c^3\times5a^2b^3c^5 = 30a^7b^5c^8$

Practice exercise 3

1. $9^5\div9^3= 9^2$
2. $7^{20}\div7^{10} =7^3$
3. $2^9\div2^7= 2^2$
4. $3^6\div3^{-1} = 3^7$
5. $4^{23}\div4^{20} = 4^3$
6. $2^{11}\div2^9= 2^2$
7. $a^m\div a^n = a^{m-n}$
8. $a^9\div a^6 = a^3$
9. $16a^5\div2a^3 = 8a^2$
10. $\dfrac{32a}{8a} = 4$
11. $\dfrac{8x^3y^6}{4x^2y^4} = 2xy^2$
12. $\dfrac{28a^{11}b^9c^5}{7a^9b^7c^3=4a^2b^2c^2}$
13. $\dfrac{12x^4y^5}{6x^3y^2} = 2xy^3$
14. (a) $9^3x^{10}\ y^6\ z^{10}$
    (b) $9x^2y^4z^2$
    (c) $9^4x^{12}y^{10}z^{12}$
    (d) $9^2x^8y^2z^8$

Practice exercise 4

1. $(a^5)^2\times a^3 = a^{13}$
2. $(x^6y^5)^3/(x^5y^3)^2 =x^8\ y^9$
3. $a^8\times(a^3)^2 = a^{14}$
4. $(3a^2b^{-3})^2\times9a^3b^4 = 81a^7b^{-2}$
5. $(16x^3y^2)^4/8x^8y^8= 8192x^4$
6. $(25xy)^0 = 1$
7. $100^0 = 1$
8. $5^9 = 1953125$
9. $a^0\times(50a^3)^4 = 6250000\ a^{12}$

10. $(20\times20\div2^{-2})^{-2} = {}^{1}/_{2560000}$
11. $(54)^0 = 1$
12. $(25x)^0 = 1$
13. $(1000a5)^0+4 = 5$

Practice Exercise 5

1. a^{-2}
2. a^{12}
3. $5y^{-5}$
4. p^5
5. $x^{-4}\ y^{-6}$
6. 2
7. 1
8. ${}^{9}/_{16}$
9. ${}^{1}/_{49}$
10. ${}^{1}/_{7}$
11. 2
12. 0.2
13. $a^{-2}\ b^{-2}\ c^{-2}$

Practice Exercise 6

1. 9
2. 16
3. 2
4. 27
5. 6
6. 7
7. 64
8. 25
9. ${}^{1}/_{8}$ or 0.125
10. ${}^{1}/_{4}$ or 0.25
11. ${}^{1}/_{125}$ or 0.008
12. ${}^{1}/_{125}$
13. ${}^{1}/_{49}$
14. ${}^{1}/_{4}$ or 0.25
15. ${}^{1}/_{9}$
16. ${}^{1}/_{9}$
17. 216
18. 100
19. ${}^{1}/_{121}$
20. 28
21. ${}^{2}/_{9}$
22. 2
23. ${}^{-639}/_{6400}$
24. 1
25. 2
26. ${}^{1}/_{3}$
27. 2
28. 2
29. 1
30. 6

Practice Exercise 1 pg 17

1. $10^3 = 1000$
2. $10^5 = 100000$
3. $5^4 = 625$
4. $2^7 = 128$
5. $a^c = b$
6. $2^9 = 512$
7. $x^z = y$
8. $4^6 = 4096$

Logarithm form

1. $\log_3 19683 = 9$
2. $\log_2 4096 = 12$
3. $\log_2 16 = 4$
4. $\log_3 81 = 4$
5. $\log_{10}{}^4 = m$
6. $\log_B A = C$
7. $\log_5 125 = 3$
8. $\log_A 1 = 0$

Powers of 10 and logarithms

1. $100=10^2, \log_{10} 100=2$
2. $10000 = 10^4, \log_{10} 10000 = 4$
3. $10000 = 10^5, \log_{10} 100000 = 5$
4. $1 = 10^0, \log_{10} 1 = 10$
5. $0{:}00001 = 10^{-5}\ \log_{10} 0.00001 = -5$
6. $0{:}00000001 = 10^{-8}, \log_{10} 0.00000001 = -8$

Powers of 4 and logarithms

1. $1 = 4^0, \log_4 1 = 0$
2. $16 = 4^2\ \log_4 16 = 2$
3. $64 = 4^3 + \log_4 64 = 3$
4. $256 = 4^4, \log_4 256 = 4$
5. $1024 = 4^5\ \log_4 1024 = 5$
6. $4096 = 4^6\ \log_4\ 4096 = 6$

Practice Exercise 1 pg 19

1. a) 0.7951
   b) 0.7006
   c) 0.5978
   d) 0.9988
   e) 0.8715

2. a)0.4188
   b) 0.9215
   c) 0.7798
   d) 0.2526
   e) 0.6413
3. a) 0.7480
   b) 0.8722
   c) 0.7951
   d) 0.9551
   e) 0.9537

Number in powers of 10

4. a)$10^{0.7218} = 5.27$
   b) $10^{0.8698} = 7.41$
   c) $10^{0.5817} = 3.817$
   d) $10^{0.9675} = 9.28$
   e) $10^{0.8989} = 7.924$
5. a) $10^{0.2720} = 1.871$
   b)$10^{0.79776} = 6.275$
   c) $10^{0.0107} = 1.025$
   d) $10^{0.6478} = 4.444$
   e) $10^{0.7161} = 5.201$
6. a) $10^{0.6129} = 4.1011$
   b) $10^{0.8001} = 6.312$
   c) $10^{0.06724} = 4.703$
   d) $10^{0.5415} = 3.479$
   e) $10^{0.0047} = 1.011$

Practice Exercise 2

	Characteristic	Mantissa
a)	1	0.7559
b)	2	0.1732
c)	3	0.3782
d)	1	0.9504
e)	2	0.8321

1. 2.7875
2. 1.8573
3. 2.4716
4. 2.6431
5. 3.6812
6. 6.7174
7. 3.8088
8. 4.3183
9. 2.5041
10. 4.6109
11. 1.2304
12. 2.0000

Powers of 10

1. 3.9511
2. 5.0346
3. 4.7243
4. 1.5315
5. 2.3212

Logarithms of numbers

a)0.504 b) 1.7307
c) 2.9965 d) 3.8504
e) 4.7483 f) 5.0257

Practice Exercise 3

1.	$\bar{1}$.5653	2.	$\bar{1}$.1367
3.	$\bar{1}$.9996	4.	$\bar{2}$.6599
5.	$\bar{2}$.4541	6.	$\bar{3}$.7955
7.	$\bar{4}$.6859	8.	$\bar{4}$.8371
9.	$\bar{3}$.7191	10.	$\bar{1}$.8345
11.	$\bar{3}$.6974	12.	$\bar{4}$.5599
13.	$\bar{3}$.9062	14.	$\bar{4}$.3701
15.	$\bar{2}$.9759	16.	$\bar{5}$.7230
17.	$\bar{2}$.2848	18.	$\bar{1}$.2467
19.	$\bar{2}$.6495	20.	$\bar{3}$.5992
21.	$\bar{4}$.6847	22.	$\bar{5}$.4999

1.4 Compound Proportions and Rates of Work

Practice Exercise 1

1. First: = sh 36,000
   Second: = sh 16,000
2. Kamau: = sh 80,000
   Mutuku: = sh 200,000
   Ongeri: = sh 280,000
3. First: = 18,000 cartons
   Second: = 45,000 cartons
   Third: = 63,000 cartons
4. Shares → 1,500, 2,250, 3,000
   Difference = 3,000 - 1,500 = sh 1,500
5. X:Y:Z = 9:12:14
6. sh. 45,750 ← Largest
7. Shares:
   - Carol: 19,800
   - Anne: 39,600
   - Betty: 39,600

8. x = 4
9. sh 4,000

Practice Exercise 2

1. 768 uniforms
2. sh 8,640
3. 150 teachers
4. 1,512 litres
5. 3:2:4
6. 115 metres
7. 8 cows
9. 4.8 days

Practice Exercise 3

1. 180 litres/hour
2. 2 minutes 24 seconds
3. 4 days 4 hrs 48 mins
4. 10 more men
5. 6 hours/day
6. 10 hours to fill
7. 12 more workers
8. 15 more women
9. 7.5 days = 7 days and 12 hours

Practice Exercise 4

1. 6 days working together
2. 3 minutes 26 seconds
3. X and Z finish the work in approx. 7.14 minutes → Y doesn't even need to help
4. (a) A + B: 1 hour 20 minutes
   (b) A + B - C: 2 hours 24 minutes

5. 54 girls
6. Betty = 96, Alex = 48
7. 20% of the work
8. Michael = 400, Tom = 2400, John = 1200
9. y:x

2.0 ALGEBRA

2.1 Matrices

Practice Exercise 1

1. a)

	Cast votes	Valid votes	Spoilt votes
Mavindini	237	200	37
Kathonzweni	289	250	39
Kanzokeani	168	154	14
Muusini	203	197	6

b) Matrix $\begin{pmatrix} 237 & 200 & 37 \\ 289 & 250 & 39 \\ 168 & 159 & 14 \\ 203 & 197 & 6 \end{pmatrix}$

2. $\begin{pmatrix} 2 & 1 & 1 & 0 & 4 \\ 2 & 1 & 0 & 1 & 3 \\ 1 & 0 & 0 & 0 & 0 \end{pmatrix}$

3. $\begin{pmatrix} 5 & 3 & 2 & 6 \\ 7 & 2 & 3 & 4 \\ 2 & 1 & 2 & 5 \end{pmatrix}$

4. a)

	Morning mass	Evening mass
Church A	6.30am	5.00pm
Church B	6.50am	6.45pm
Church C	7.05am	5.55pm
Church D	6.00am	6.25pm

b) $\begin{pmatrix} 6.30 & 5.00 \\ 6.50 & 6.45 \\ 7.05 & 5.55 \\ 6.00 & 6.25 \end{pmatrix}$

Practice Exercise 2

1. a) 1 x 3
   b) 1 x 1
   c) 3 x 4
   d) 3 x 5
   e) 4 x 1
   f) 3 x 3
   g) 3 x 3
   h) 2 x 3

2. Matrix $\begin{pmatrix} 12 & 15 & 18 \\ 9 & 11 & 7 \\ 8 & 17 & 10 \\ 2 & 5 & 9 \end{pmatrix}$

order 4 x 3

3. Matrix $\begin{pmatrix} 6 & 2 \\ 3 & 1 \\ 4 & 3 \end{pmatrix}$ order 3 x 2

Practice Exercise 3

1. a) Element 2 is in row 1 and column 1 M11
Element 0 is in row 1 and column 2 M12
Element 2 is in row 1 and column 3 M13
Element 1 is in row 1 and column 4 M14
Element -5 is in row 2 and column 1 M21
Element 3 is in row 2 and column 2 M22
Element 7 is in row 2 and column 4 M23
Element 4 is in row 2 and column 4 M24

b) Element 3 is in row 1 and column 1 M11
Element 5 is in row 1 and column 2 M12
Element 4 is in row 1 and column 3 M13
Element 1 is in row 2 and column 1 M21
Element 9 is in row 2 and column 2 M22
Element 8 is in row 2 and column 3 M23

c) Element -4 is in row 1 and column 1 M11
Element 6 is in row 1 and column 2 M12
Element 2 is in row 1 and column 3 M13
Element 5 is in row 1 and column 4 M14

d) Element 3 is in row 1 and column 1 M11
Element -8 is in row 1 and column 2 M12
Element 3 is in row 2 and column 1 M21
Element 4 is in row 2 and column 2 M22
Element 6 is in row 3 and column 1 M31
Element 5 is in row 1 and column 2 M32

e) Element 10 is in row 1 and column 1 M11
Element -9 is in row 2 and column 1 M21
Element 1 is in row 3 and column 1 M31
Element 7 is in row 4 and column 1 M41

f) Element 8 is in row 1 and column

g) Element 2 is in row 1 and column 1 M11
Element 6 is in row 1 and column 2 M12
Element 8 is in row 1 and column 3 M13
Element -1 is in row 2 and column 1 M21
Element 7 is in row 2 and column 2 M22
Element 5 is in row 1 and column 3 M23
Element 3 is in row 3 and column 1 M31
Element 9 is in row 3 and column 2 M32
Element 8 is in row 3 and column 3 M33
Element 2 is in row 4 and column 1 M41
Element 0 is in row 4 and column 2 M42
Element 6 is in row 4 and column 3 M43

2. $\begin{pmatrix} 7 & 5 & 3 \\ 9 & 4 & 2 \end{pmatrix}$

Element 7 is in row 1 and column 1 M11
Element 5 is in row 1 and column 2 M12
Element 3 is in row 1 and column 3 M13
Element 9 is in row 2 and column 1 M21
Element 4 is in row 2 and column 2 M22
Element 2 is in row 2 and column 3 M23

3. $\begin{pmatrix} 8 & 6 & 23 \\ 9 & 5 & 12 \\ 10 & 7 & 34 \end{pmatrix}$

Element 8 is in row 1 and column 1 M11
Element 6 is in row 1 and column 2 M12
Element 2 is in row 1 and column 3 M13
Element 3 is in row 1 and column 4 M14

Element 9 is in row 2 and column 1 M21
Element 5 is in row 1 and column 2 M22
Element 1 is in row 2 and column 3 M23
Element 2 is in row 2 and column 4 M24
Element 10 is in row 3 and column 1 M31
Element 7 is in row 3 and column 2 M32
Element 3 is in row 3 and column 3 M33
Element 4 is in row 3 and column 4 M34

Practice Exercise 4

P and R, Q and S, V and M, W and Z

1. Compatible
2. Not compatible
3. Not compatible
4. Compatible

5. Not compatible
6. Not compatible
7. Compatible
8. Not compatible
9. Compatible
10. Not compatible
11. Matrix P (1 x 4)
    Matrix Q (2 x 4)
    Not compatible

Practice Exercise 5

1. a) $\begin{pmatrix} 5 & 12 \\ -3 & 10 \end{pmatrix}$

   b) $\begin{pmatrix} 11 & 11 & 13 & 12 \\ 10 & 1 & 8 & 9 \\ 7 & 10 & 5 & 4 \end{pmatrix}$

   c) $\begin{pmatrix} -3 & 13 & 2 \\ 12 & 7 & 15 \\ 12 & 10 & 1 \end{pmatrix}$

2. a) $\begin{pmatrix} 1 & 4 & 3 \\ -6 & 5 & 1 \\ 3 & 2 & 5 \end{pmatrix}$

   b) $\begin{pmatrix} 5 \\ -2 \\ 2 \\ 2 \end{pmatrix}$

   c) $\begin{pmatrix} 4 & 5 \\ 1 & 3 \end{pmatrix}$

3. a) $\begin{pmatrix} 5 & 15 & 13 \\ 0 & 5 & 8 \\ 6 & 7 & 4 \end{pmatrix}$

   b) $\begin{pmatrix} 16 & 9 \\ 3 & 19 \end{pmatrix}$

   c) (-3 9 11 4)

   d) $\begin{pmatrix} -1 & -3 & -3 \\ 0 & -1 & -2 \\ -4 & 3 & 4 \end{pmatrix}$

   e) $\begin{pmatrix} 2 & 4 \\ 9 & 3 \end{pmatrix}$

   f) (-13 -1 1 - 2)

   g) $\begin{pmatrix} 2 & 8 & 10 \\ 2 & -3 & 3 \\ 4 & -1 & 1 \end{pmatrix}$

   h) $\begin{pmatrix} & \\ -8 & 6 \\ -4 & 5 \end{pmatrix}$

   i) $\begin{pmatrix} -1 & -4 & 0 \\ -10 & -7 & -3 \\ 2 & -11 & -7 \end{pmatrix}$

   j) $\begin{pmatrix} 10 & 16 \\ 8 & 27 \end{pmatrix}$

4. $\begin{pmatrix} 5 & 1 \\ 13 & 5 \end{pmatrix}$
5. x = 13, y = 7, z = 5
6. a) Term 1 (25 15 30)
      Term 2 (27 23 30
      Term 3 (25 15 15

   b) Maize = 25 + 27 + 25 = 77bags
      Beans = 15 + 23 + 15 = 53bags
      Rice = 30 + 30 + 15 = 75bags

2.2 Equations of straight line

a) $^{2}/_{5}$
b) 1
c) $^{1}/_{2}$
d) 3
e) 0
f) $^{2}/_{7}$
g) infinity
h) 2.5

Practice Exercise 2

1. a) $\frac{12 - 4}{9 - 5} = \frac{8}{4} = 2$

Let (x, y) be on the same line using (5,4) and x,y)

Gradient $\frac{y - 4}{x - 5} = 2$

$y - 4 = 2x - 10$
$y = 2x - 6$

b) Gradient $= \frac{10 - 8}{2 - -8} = \frac{2}{10} = \frac{1}{5}$

$\frac{y - 8}{x-(-8)} = \frac{1}{5}$
$\frac{y - 8}{x + 8} = \frac{1}{5}$

$5y - 40 = x + 8$
$5y = x + 48$

$y = \frac{x}{5} + \frac{48}{5}$

c) Gradient $= \frac{-7-(-3)}{3 - 2} = \frac{-4}{1}$

$\frac{y-(-3)}{x - 2} = -4$

$y + 3 = -4x + 8$
$y = -4x + 5$

d) $y = x + 4$
e) $y = -2x - 5$
f) $y = {}^{2}/_{3}x + 5$
g) $y = 3x + 2$
h) $y = -{}^{1}/_{3}x + 1$
i) $y = {}^{1}/_{3}x + {}^{19}/_{3}$

2. $y - 3 = 0$
$y = 3$

3. $y = -{}^{3}/_{2}x + 27$

Practice Exercise 3

1. a) $y = 2x - 4$
b) $y = -3x - 12$
c) $y = {}^{2}/_{3}x + {}^{5}/_{3}$
d) $y = {}^{-4x}/_{3} + {}^{43}/_{3}$
e) $y = 4x + 17$
f) $y = {}^{-1}/_{3}x + 4$
g) $y = 3x - 13$
h) $y = -2x + 13$
i) $y = {}^{2}/_{5}x - {}^{51}/_{5}$

Practice Exercise 4

1. a) $y = 2x - 6$
b) $y = {}^{1}/_{5}x + {}^{48}/_{5}$
c) $y = -4x + 5$
d) $y = x + 4$
e) $y = -7x$
f) $y = {}^{2}/_{3}x + 5$
g) $y = 3x + 2$
h) $y = -{}^{1}/_{3}x + 1$

2. a) $y = -3x + 5$
b) $3y = -4x + 10$
$y = {}^{-4}/_{3} + {}^{10}/_{3}$
c) $3y = 2x - 18$
$y = {}^{2}/_{3}x - 6$
d) $3y = -4x + 2$
$y = {}^{-4x}/_{3} + {}^{2}/_{3}$
e) $y = -x + 4$
f) $y = 2x - 5$
g) $2y = 2x - 10$
$y = x - 5$
h) $5y = -3x + 30$
$y = {}^{3}/_{5}x + 6$
i) $3y = -4x + 2$
$y = {}^{-4x}/_{3} + {}^{2}/_{3}$
j) $2y = -6x + 32$
$y = -3x + 16$

3. $y = 3x + 13$
4. $y = {}^{7}/_{4}x - {}^{27}/_{4}$
5. $y = {}^{2}/_{3}x + {}^{37}/_{3}$
6. a) $y = {}^{-3x}/_{2} + 27$
b) $y = {}^{2}/_{3}x + {}^{5}/_{3}$
c) $y = -x + 6$
d) $y = 2x - 10$
e) $y = -2x + 5$
f) $y = -8$

Practice Exercise 5

1. $g = -2$, $y = 9$, coordinates $(0,9)$
2. $g = {}^{-2}/_{3}$, $y = 4{}^{1}/_{3}$, coordinates $(0, 4{}^{1}/_{3})$

3. g = $^{-1}/_{4}$, y = 2, coordinates (0,2)
4. g = $^{-2}/_{3}$, y = 2, coordinates(0,2)
5. g = $^{5}/_{2}$, y = $^{-5}/_{2}$, coordinates(0, -2.5)
6. g = 3, y = 1, coordinates(0,1)
7. g = $^{-2}/_{3}$, y = 1, coordinates(0, 1)
8. g = 3.5, y = 4, coordinates(0, 4)
9. g = 3, y = -2, coordinates(0, -2)
10. g = -2, y = 10, coordinates(0, -10
11. g = 4, y = 2, coordinates(0, 2)

Practice Exercise 6

1. x = 3.5, y = 7
2. x= 5, y = -2.5
3. x = $^{4}/_{5}$, y = -5
4. x = -5, y = 1
5. x=3, y = 3
6. x = 3, y = -3

	x-intercept coordinates	y - intercept coordinates
7.	(4, 0)	(0, $^{3}/_{3}$)
8.	($^{5}/_{9}$, 0)	(0, $^{2}/_{3}$)
9.	(-1, 0)	(0, $^{-4}/_{9}$)
10.	($^{-8}/_{7}$, 0)	(0, 4)
11.	(40, 0)	(0, -20)
12.	($^{4}/_{5}$, 0	0, $^{2}/_{3}$)

13. a)y = 3x - 38

b) y = - 38

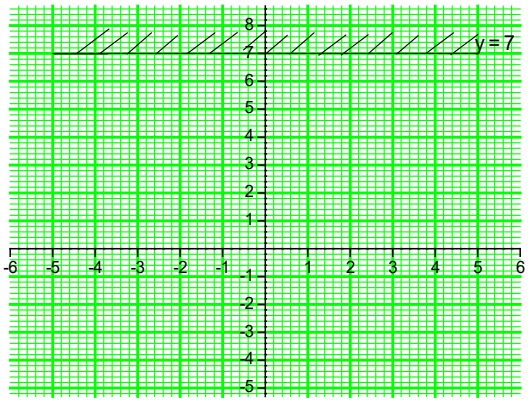
2.3 Linear equalities

Practice Exercise 1

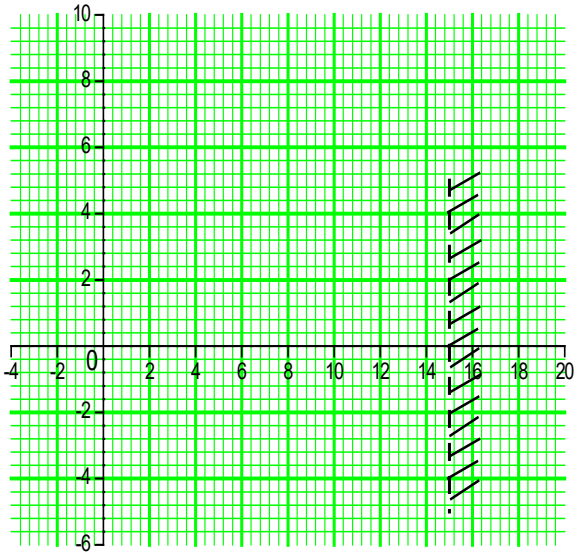
1. x < 4
2. x > 9
3. x ≥ 7
4. x ≤ 6
5. x ≤ 32
6. y ≥ 5
7. p > $^{1}/_{8}$
8. x < $^{25}/_{7}$
9. x < -2
10. x ≥ -3$^{1}/_{3}$
11. x < 7
12. t ≤ 800

Practice Exercise 2

1.



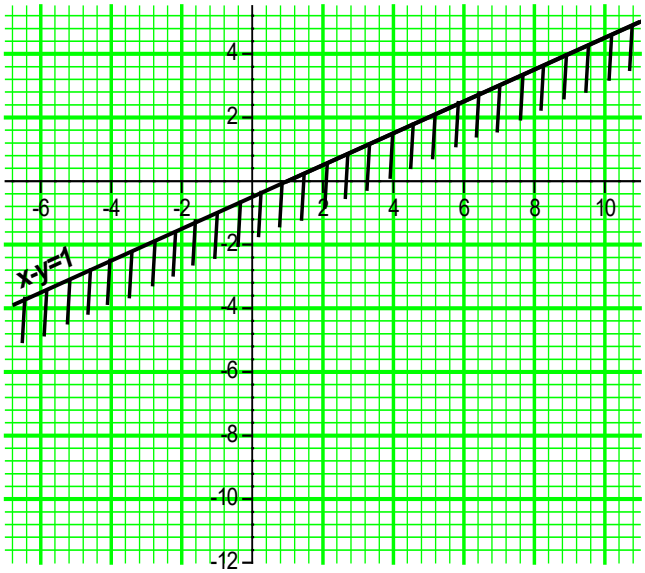
2.



3. For 3 to 15 learner to draw and represent the inequalities graphically

Practice Exercise 3

1.



2. For 2 to 15 learner to draw and represent the inequalities graphically

Practice Exercise 4

1. $3x + 6x \leq 9000$
2. $A \leq$ sh.10, $B \leq$ sh. 60
3. $x \leq 6$
4. $x \geq 27^{1}/_{12}$
5. $5x + 7y \leq 20$
6. $2x + 3y \leq 72$
7. $3x + y \geq 1400$

3.0 MEASUREMENT

3.1 Area

Practice Exercise 1

1. a) $240cm^2$
   b) $92.4cm^2$
   c) $181.65cm^2$
   d) $161.2cm^2$

Practice Exercise 2

1. a) $584.55cm^2$
   b) $841.86cm^2$
   c) $249.36cm^2$
   d) $93.6cm^2$
2. $903.72cm^2$
3. $744cm^2$
4. 13cm
5. $405cm^2$
6. 1000tiles

Practice Exercise 3

1. $222cm^2$
2. $446.6cm^2$
3. $353.92cm^2$
4. a) $2740cm^2$
   b) $199.2cm^2$
   c) $1632cm^2$
5. 63362

Practice Exercise 4

1. a) $398cm^2$
2. a) $616cm^2$ b) $511.52cm^2$
   c) $478.97cm^2$ d) $565.02cm^2$
3. a) $542.208cm^2$ b) $1056cm^2$
   c) $2100cm^2$ d) $319cm^2$
4. $110.851cm^2$
5. $208.226cm^2$
6. 8cm

Practice Exercise 5

1. a) $678.672cm^2$
   b) $4524.48cm^2$
   c) $1099.82cm^2$
   d) $942.6cm^2$
   e) $301.632cm^2$
   f) $593.838cm^2$
2. $1206.528cm^2$
3. $3344cm^2$
4. a) $3268^{5}/_{7}cm^2$
   b) $52cm^2$
5. $65.47cm^2$
6. a) $5.01cm^2$
   b) $567cm^2$
7. $50.35cm^2$
8. $204.23cm^2$

Practice Exercise 6

1. a) $9856cm^2$
   b) $30184cm^2$
   c) $30184cm^2$
2. a) $339.336cm^2$
   b) $16627.464cm^2$
   c) $11546.85cm^2$
3. 10cm
4. $55.44cm^2$
5. 9.82cm
6. 5.09cm
7. 6.77cm

Practice Exercise 7

1. a) $38.4895cm^2$
   b) $538.853cm^2$
   c) $132.5749cm^2$
   d) $492.6656cm^2$
   e) $38.4895cm^2$
   f) $500.3635cm^2$
   g) $132.5749cm^2$
2. $32.08cm^2$
3. $64.68cm^2$
4. $8.49cm^2$

Practice Exercise 8

1. a) 700.28cm^2
   b) 56cm^2
   c) 232cm^2
   d) 141.12cm^2
2. 599.2cm^2
3. 9.136cm^2

3.2 Volume of solids

Practice Exercise 1

1. a) 1261.12cm^3
   b) 6000cm^3
   c) 288cm^3
   d) 3747cm^3
2. 1696cm
3. 10cm
4. a) 24cm^3
5. a) 60cm^3 b) 37.5cm^3

Practice Exercise 2

1. a) 2304cm^3
   b) 48cm^3
   c) 173.4cm^3
   d) 640cm^3
   e) 5600cm^3
2. 4m
3. 1.5m
4. a) $4^2/_3 cm^2$
   b) $3^8/_9 m$

Practice Exercise 3

1. a) 443.52cm^3
   b) 56cm^3
   c) 426.67cm^3
   d) 200cm^3
2. 108cm^2
3. 24
4. 33cm
5. a) 240cm^3
   b) 288cm^3
   c) 56.33cm^2

Practice Exercise 4

1. a) 1232cm^3
   b) 128.330cm^2
   c) 770cm^3
   d) 402.29cm^3
   e) 4106.67cm^3
   f) 154cm^3
   g) 314.29cm^3
2. 10cm
3. 4.5cm
4. 69.3cm^3
5. a) 10cm
   b) 1.59cm
   c) 9.717cm^3

Practice Exercise 5

1. a) 163.33cm^3 b) 297.33cm^3
2. 278cm^3
3. 3560cm^3

Practice Exercise 6

1. a) 179.67cm^3
   b) 1437.33cm^3
   c) 4851cm^3
   d) 3944.04cm^3
   e) 493.00cm^3
2. a) 91.96cm^3
   b) 310379.33cm^3
   c) 492870.88cm^3
   d) 61.61cm^3
3. 14
4. 179.67cm^3
5. 8.38cm^3

3.3 Mass, Volume, Weight and Density

Practice Exercise 1

1. a) 0.008464kg
   b) 8kg
   c) 0.54kg
   d) 40kg
   e) 0.06258kg
   f) 2.38kg
2. a) 4500000mg
   b) 3500000mg
   c) 39700mg
   d) 8250000mg
   e) 98200mg
   f) 37.5mg
3. a) 3.5t
   b) 0.8t
   c) 0.04t
   d) 0.00000008t

e) 6.0258t
f) 0.002138t

4. a)466.67g
   b) 4666.67mg
5. 400dg

Practice Exercise 2

1. a) 196N
   b) 36.75N
   c) 764.4N
   d) 19.6N
   e) 66.5N
2. a)24500N
   b) 42.924N
   c) 39.2N
   d) 548.8mg
   e) 7.35N
   f) 233.24N
3. 0.056N
4. a) 558.6N
   b) 93.1N
5. 7.5kg

Practice Exercise 3

1. a)0.00265g/cm^3
   b) 3.5g/cm^3
   c) 4.105g/cm^3
2. a) 250kg/m^3
   b)1180kg/m^3
   c) 25150kg/m^3
   d)1.8kg/m^3
   e)4500kg/m^3
3. 6m^3
4. 5g/cm^3
5. 5litres(5000cm^3)

Practice Exercise 4

1. 50400kg
2. 15.4125kg
3. 2.67g/cm^3
4. 0.8514g/cm^3
5. 10cm
6. 9625g

3.4 Time, distance and speed

Practice Exercise 1

1. a)10m/s
   b) 10m/s
   c) 6m/s
   d) 20m/s
2. 10m/s
3. 2m/s
4. a) 2m/s
   b) 90m
5. 10s

Practice Exercise 2

1. 50km/h
2. 279km
3. 6hrs
4. 60km/h
5. 5hrs
6. 400km

Practice Exercise 3

1. 60km/h
2. 65.45km/h
3. 74.77km/h
4. 106.67km/h
5. 3km

Practice Exercise 4

1. a) 20m/s b) 72km/h
2. 3000000m/s
3. 18m/s
4. 8m/s
5. 35
6. 360m

Practice Exercise 5

1. 2m/s^2
2. -4m/s^2
3. 2.5m/s^{2-}
4. -2.5m/s^2
5. 8s
6. 6m/s

Practice Exercise 6

1. a)34^0
   b)30^0

c) 128^0
d) 40^0
e) 30^0
f) 40^0

2. a) 4hrs
b) 2hrs
c) 10hrs
d) 1hr 52mins
e) 10hrs 56mins
f) 2hrs 28mins

3. a) Wajir b) 12mins
4. a) Karachi b) 3hrs 56mins
5. 4^0E or 9^0E

Practice Exercise 7

1. 10.00am
2. 8.00am
3. 3.00pm
4. 9.59pm
5. 4.00am
6. 120^0E

3.5 Money

Practice Exercise 1

1. a) Yen
b) The birr
c) Canadian dollar
d) The shilling
e) Dollar
f) Riyal
g) Rupee

2. a) Ksh b) £
c) $ d) R
e) ¥ f) TZS
g) Rs

Practice Exercise 2

1. a) sh. 343493
b) sh. 727050
c) sh. 156820
d) sh. 10410
e) sh. 32200
f) sh. 84497

2. a) 269.54
b) 3648.27 Dirham
c) $ 8190.04 US dollars
d) 33355.33Euros
3. Ksh. 772320
4. 2.76
5. a) 56.20 US dollars
b) 373.46 US dollars
c) 924.55 US dollars

Practice Exercise 3

1. sh. 458250
2. sh. 300000
3. sh. 71760
4. sh. 54000
5. sh. 138750

Practice Exercise 5

1. sh. 1414.40
2. sh. 791.04
3. sh. 135200
6. sh. 498.96

Practice Exercise 6

1. sh. 67500
2. sh. 12750
3. sh. 27000
4. sh. 57500
5. sh. 87400

3.6 Approximation and Errors

Practice Exercise 2

1. a) 0.05cm
b) 0.05cm^3
c) 0.10cm^3
d) 476
2. 5m2
3. 0.2km
4. 0.1m
5. 0.1L
6. 0.3m
7. 0.5g

Practice Exercise 3

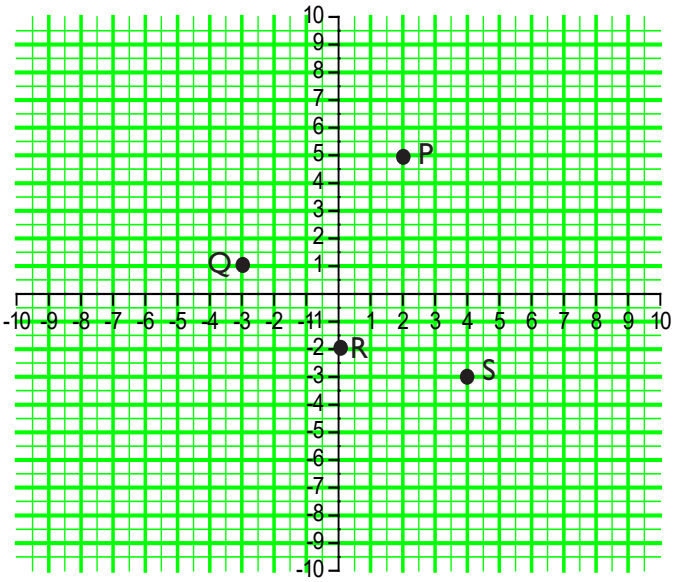
1. a) 1.37%
   b) 0.54%
   c) 9.52%
   d) 0.063%
   e) 1.49%
2. 2.469%
3. 3%
4. 4.3%
5. 0.45%

4.0 GEOMETRY

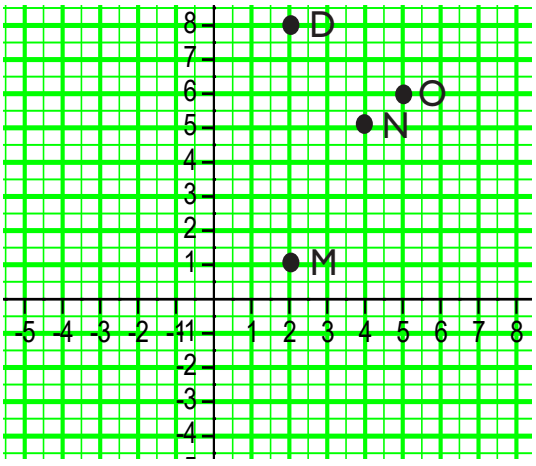
4.1 Coordinates and Graphs

Practice Exercise 1

1.

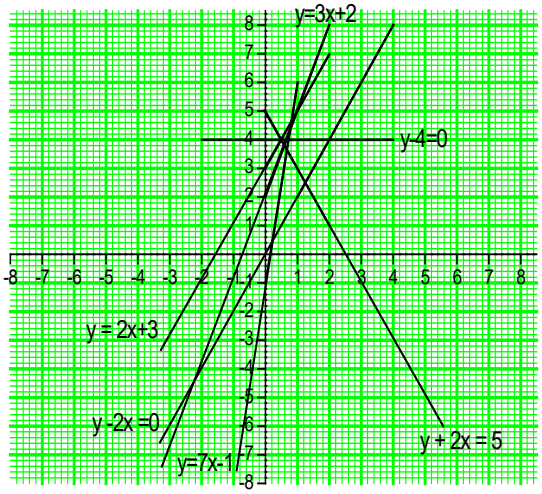


2.

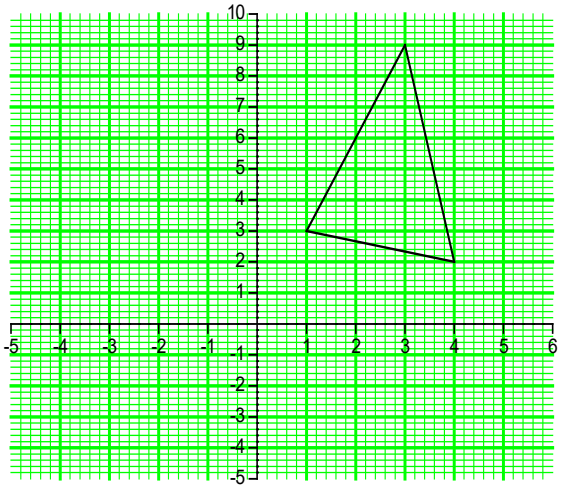


3. Learner to plot the points on a graph paper

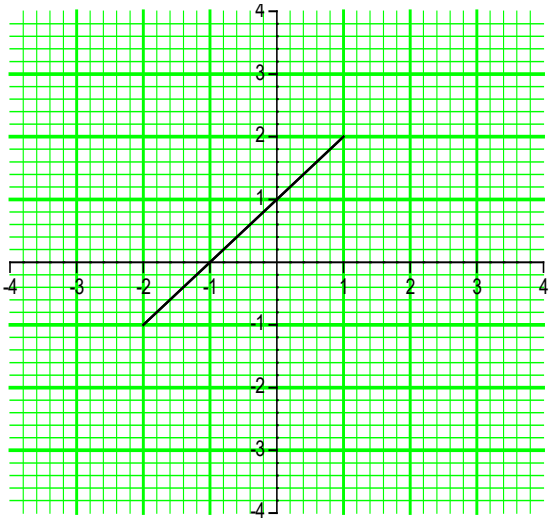
Practice Exercise 2



2. a)



b)

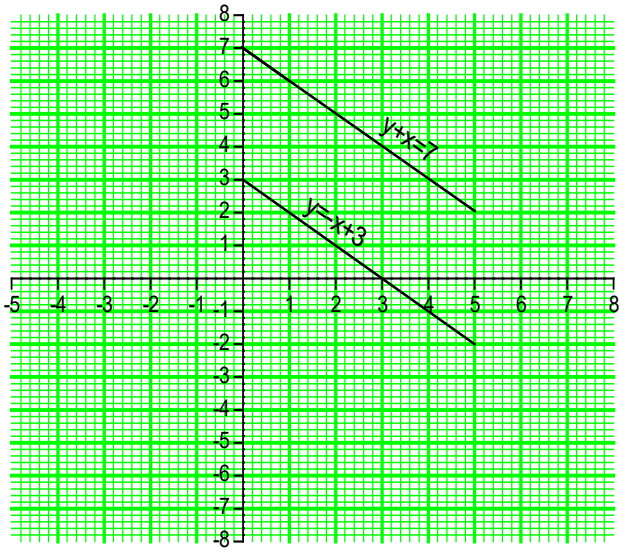


For c and d learner to plot the ordered pairs on a cartesian plane and join them with a straight line

3. i) (0,2), (2, 4), (4,6), (6,8)
   ii)

Practice Exercise 3

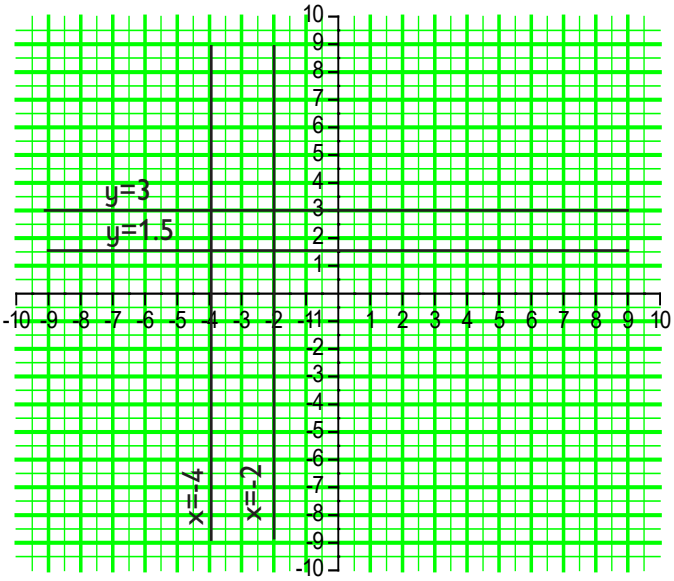
1. a)



For b and c learner to the pairs of lines on the same graph

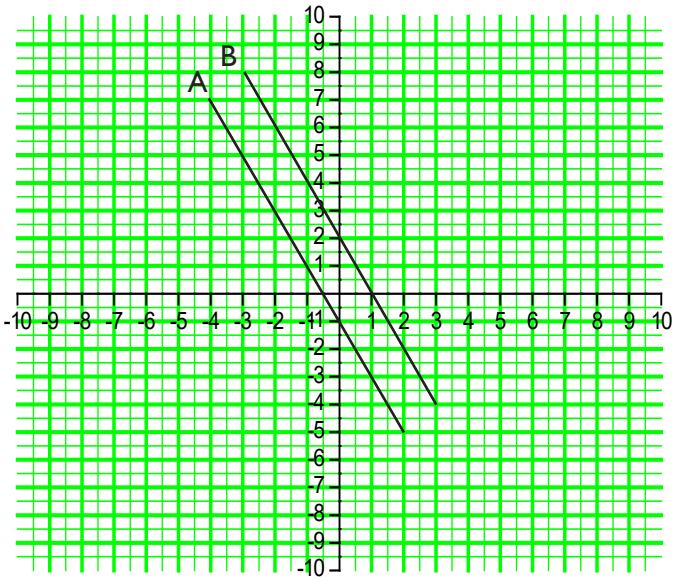
2. AB and CD, QR and IH
3. a) Not parallel
   b) Parallel
   c) Parallel
   d) Parallel

4. a) and b)



c) Learner to draw the graphs of the lines on a certian plane

5.



Practice Exercise 4

1. d) y = 1.5x + 4
2. a) y = 7 + 4x
3. a) Not parallel
   b) Parallel
   c) Parallel
   d) Not parallel
   e) Not parallel
   f) Parallel
4. 3y + x - 8 = 0
5. 2
6. PQ and SR, PS and QR

Practice Exercise 5

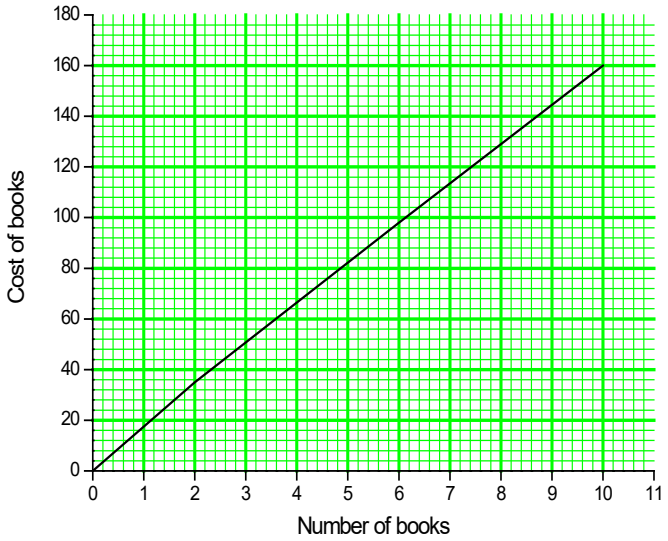
Learner to draw the graphs of the pair of lines

Practice Exercise 6

1. Perpendicular
2. Perpendicular
3. Perpendicular
4. Not perpendicular
5. Not perpendicular
6. Perpendicular
7. k = 1
8. 2y + 5x = 29
9. 5y + 3x = 28
10. a)1 b) y = x - 1

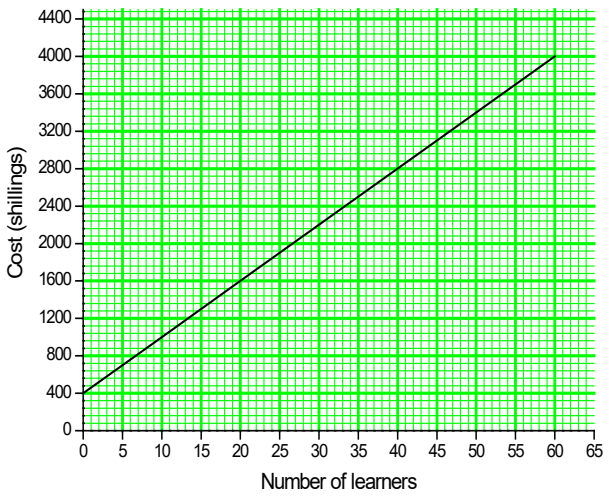
Practice Exercise 7

1.



a)sh. 128
b) 4

2. a)



b)sh. 1600
c) 40

From 3 to 9 learner to draw the graphs and answer the questions

4.2 Scale drawing

Practice Exercise 1

Learner to draw and measure the angles accurately

Practice Exercise 2

1. a)243^0
   b)074^0
   c) 322^0

2. a)548^0E
   b)N20^0W
   c)S52^0W

Practice Exercise 3

Learner to draw

Practice Exercise 5

1. Learner to draw and determine the angles of elevation

Practice Exercise 6

1. CDB, DCA

From 2 to 5 learner to draw

Practice Exercise 7

1. Leaner to draw and determine the angle of depression

Practice Exercise 8

1. a)$3150m^2$
   b)112350m
   c)169300m
   d)203850m
   e)5250m

4.3 Similarity and Enlargement

Practice Exercise 1

1. **Sides**
   AC and Pr, AB and PQ, BC and QR

   Angles
   ∠BAC and QPR, ∠ACB and PRQ, ∠ABC and ∠PQR

   Sides
   XY and YP, YZ and PQ, YZ and YQ

   Angles
   XYZ and ∠PYQ, YXZ and YPQ, ∠XZY and PQY
2. Not similar. The ratio of corresponding sides is not equal.
3. a) 25 b) 21 c) 6
4. ∠FGH = ∠LMN = 108^0
   ∠GFH = ∠MLN = 32^0
   ∠FHG = ∠LNM = 40^0
   Hence figures are similar
5. KL = 35cm; JN = 8cm

Practice Exercise 2

Learner to draw the similar figures

Practice Exercise 3

Learner to trace/draw objects and locate the centre of enlargement and determine the scale factor.

Practice Exercise 4

Learner to draw images of the figures.

Practice Exercise 5

1. a) 3 b) 2
   c) 2 d) 3
   e) 4
2. 16
3. 2
4. 2
5. 120cm and 75cm

4.4 Trigonometry

Practice Exercise 1

1. with respect to θ

Hypotenuse	Opposite	Adjacent
BC	AB	AC
PQ	RQ	PR
XZ	YZ	XY
ST	TU	SU
GF	EF	EG
KM	LM	KM
with respect to R		
BC	AC	AB
PQ	PR	RQ
VZ	XY	YZ
ST	SU	TU
GF	EG	EF
KM	KL	LM

2. Learner to identify opposite sides, hypotenuse and adjacent sides

Practice Exercise 2

1. a) $^8/_{10}$ b) $^{10}/_{26}$
   c) $^{12}/_{15}$ d) $^{36}/_{39}$
   e) $^7/_{25}$ f) $^{12}/_{20}$
   g) $^8/_{17}$ h) $^{24}/_{30}$
   i) $^5/_{13}$
2. Learner to determine the values of cos θ
3. Learner to determine the value of Tan θ
4. a) 39cm
   b) (i) $^{12}/_{13}$ (ii) $^8/_{13}$ (iii) $^{12}/_{13}$
5. a) 40cm
   b) (i) $^9/_{41}$ (ii) $^{40}/_{41}$ (iii) $^9/_{40}$

Practice Exercise 3

1. a) 0.7880
   b) 0.9951
   c) 0.4894
   d) 0.7447
   e) 0.5884
   f) 0.4101
   g) 0.3131
   h) 0.1235
   i) 1
   j) 0.9829

2. 0.5388
3. 0.7455
4. 0.9219
5. 0.5548

Practice Exercise 4

1. a)0.6934
   b) 0.5299
   c) 0.9489
   d)0.9876
   e)0.3889
   f) 0.0486
   g)0.3022
   h)0.7848
   i) 0.9999
   j) 0.9258
2. 0.9056, 0.8434, 0.9627
3. 0.7361
4. 0.2957
5. 0.6884

Practice Exercise 5

1. a)0.3719
   b)0.6142
   c) 0.9688
   d)1.2870
   e)1.8983
   f) 0.5339
   g)0.1671
   h)0.1964
   i)0.5475
   j) 1.3663

Practice Exercise 6

1. a)0.9945
   b)28.636
   c) 0.5150
   d)0.6225
   e)0.2811
   f) 0.7385
   g) 0.9065
   h) 0.7878
   i) 0.9468
   j) 0.7446
   k) 0.5370
   l) 0.1370
2. 0.4726
3. 0.9845
4. 3.0777

Practice Exercise 7

1. a)25.40^0
   b) 40^0
   c) 85^0
   d)74.45^0
   e)45.07^0
   f) 39.26^0
2. a) 74.00^0
   b)31.40^0
   c)29.92^0
   d)69.83^0
   e) 4^0
   f) 11.30^0
3. a)4.69cm
   b) 8.94^0
   c) 5.03cm
4. a) 41.8^0
   b)38.7^0
   c) 60^0
5. 4.89m
6. 22.6am
7. 58.33^0

Practice Exercise 8

1. a)75.10^0
   b)62.45^0
   c)53.60^0
   d)40.5^0
   e)15.51^0
   f) 33.47^0
2. a)36.30^0
   b)30^0
   c)16.36^0
   d)85.12^0
   e)74.46^0
   f) 56.80^0
3. a) 7.9cm
   b)6.7cm
   c) 89.2m
4. a)36.9^0
   b) 53.1^0
   c)22.6^0

5. 173.2m
6. 10am
7. 14.04^0
8. 55.77^0

Practice Exercise 9

1. a) 66.40^0
   b) 50.90^0
   c) 48.90^0
   d) 43.14^0
   e) 37.60^0
   f) 19.90^0

2. a) 8^0
   b) 20.6^0
   c) 35.65^0
   d) 43.86^0
   e) 54.42^0
   f) 66.9^0
3. a) 8.9cm
   b) 45.8cm
   c) 10cm
4. a) 53.1^0
   b) 36.9^0
   c) 61.9^0
5. 1.95m
6. 31.89^0
7. a) 11.89^0

5.0 DATA HANDLING AND PROBABILITY

5.1 Data Interpretation (grouped data)

Practice Exercise 1

1. (a) Range = **42**
   (b) Class width = **8**
2. Class width = **9**
3. Class width = **5**
4. Class width = **0.5**

5. (a) **11**
   (b) **10**
   (c) **12**

Practice Exercise 2

1. Pencil Lengths (cm)

Class Interval	Frequency
3 – 5	4
6 – 8	7
9 – 11	11
12 – 14	9
15 – 17	4
18 – 20	2

2. Patient Masses (kg)

Class Interval	Frequency
35 – 39	2
40 – 44	3
45 – 49	9
50 – 54	10
55 – 59	13
60 – 64	7
65 – 69	4
70 – 74	2
75 – 79	1

3. Water Consumption (litres)

Litres	Frequency
6	3
7	5
8	4
9	3
10	4
11	2
12	4
13	3
14	2
15	4
16	1
18	1

4. Science Assessment Marks

Range: Min = 5, Max = 98

Use 6 classes

Range = 98 - 5 = 93

Class width = 93 ÷ 6 ≈ **16**

Class Interval	Frequency
5 – 20	1
21 – 36	0
37 – 52	5
53 – 68	10

Class Interval	Frequency
69 – 84	7
85 – 100	7

Practice Exercise 3

1.

Mass (g) Range	Frequency
90–99	2
100–109	1
110–119	3
120–129	1
130–139	2
140–149	7
150–159	5
160–169	3
170–179	4
180–189	3
190–199	2

Modal class = 140–149 (highest frequency: 7)

2. Modal class = 70–79 (highest frequency: 18)
3. Modal class = 12–15 (highest frequency: 11)
4. Modal class = 45–47 (highest frequency: 16)
5. Modal class = 200–299 (highest frequency: 380)

Practice Exercise 4

1. Heights of Pawpaw Trees
   Total frequency ($\sum f$) = 101
   Total $\sum f x$ = 3762
   Mean=$\sum f x / \sum f$ = 3762/101≈37.25 cm
2. Marks Scored by Learners
   Total frequency = 25
   Total $\sum f x$ = 667.5
   Mean=$\sum f x / \sum f$ = 667.5/25=26.7
3. Masses of 100 Learners
   Total frequency = 100
   Total$\sum f x$ = 7060
   Mean=$\sum f x / \sum f$ =7060/100=70.6 kg
4. Learners in Different Schools
   Total frequency = 45
   Total $\sum f x$ = 3382.5
   Mean=$\sum f x / \sum f$ =3382.5/45=75.17
5. Ages of Learners
   Total frequency = 19
   Total $\sum f x$ = 256
   Mean=$\sum \mathbf{f}\, \mathbf{x} / \sum \mathbf{f}$ =256/19≈13.47 years

Practice Exercise 5

1. Mass of 50 Potatoes
   Median=54.5 g
2. Creative Art Assessment (47 learners)
   Median=46.0
3. Heights of 40 Plants
   Median=27.5 cm
4. Number of Goals
   Median=25.33 goals
   = 25 goals
5. Fundraising Contributions
   Median=607.64 shillings

5.2 Probability

Practice Exercise 1

1. $^1/_2$
2. $^3/_4$
3. $^1/_2$
4. $^1/_{12}$
5. $^1/_5$

Practice Exercise 2

1. If today is Tuesday:

(a) **1**
(b) **0**
(c) $^2/_7$

Practice Exercise 3

1. $^1/_3$
2. $^4/_{15}$
3. $^1/_{10}$

4. **(a)** $^7/_9$
(b) 81

5. **(a)** $^2/_3$
(b) $^2/_3$

Practice Exercise 4

1. **(a)** $^1/_8$
(b) $^1/_4$

2. **(a)** $^1/_5$
(b) $^1/_{15}$

3. $^{18}/_{35}$

4. $^1/_4$
5. $^5/_{18}$
6. (a) $^2/_{15}$
   (b) $^3/_5$
   (c) $^2/_5$

Practice Exercise 5

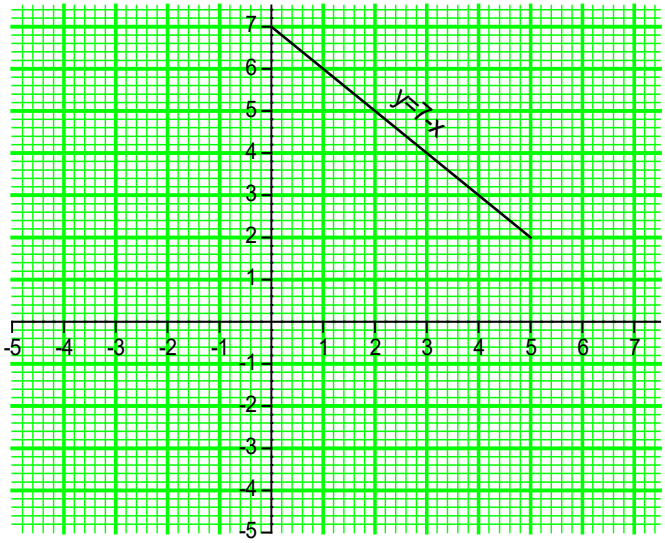
1. Possible outcomes (Sample space):
   {HH, HT, TH, TT}
2. Sample space:
   {A ($^8/_{20}$), B ($^7/_{20}$), C ($^5/_{20}$)}
3. Sample space:
   {H ($^2/_5$), M ($^3/_5$)}
4. Sample space:
   {Boy ($^2/_3$), Girl ($^1/_3$)}
5. Sample space:
   {Green ($^2/_9$), Yellow ($^1/_3$), Blue ($^4/_9$)}

Model Test Paper One

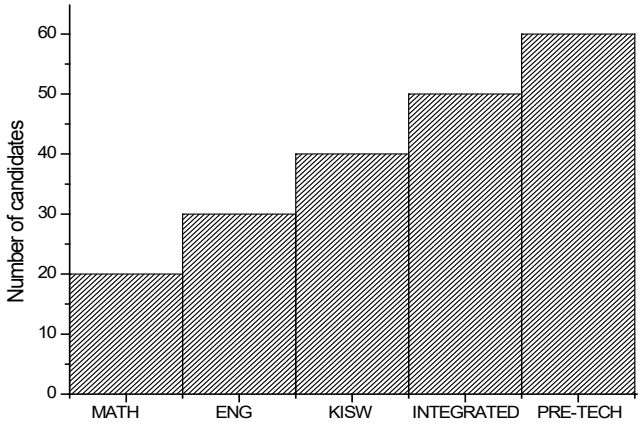
1. Eight hundred eighty-eight million, eight hundred eight thousand, eight hundred eighty-eight.
2. 110
3. -72
4. $^2/_3$, $^3/_5$, $^1/_2$, $^2/_7$, $^1/_5$
5. 7532
6. 0.417 hectares
7. 9
8. 4.81 → 5 flasks
9. 21 pieces
10. 2.4 m
11. 5k
12. x = 2, y = 3
13. 84,370,000
14. 4.8 days
15. -8°C
16. Integers: +15, 0, -9, 432
17. Learner to draw the circle and measure the radius of the circle.
18. (a)

x	0	3	5
y - 7-x	7	4	2

(b)



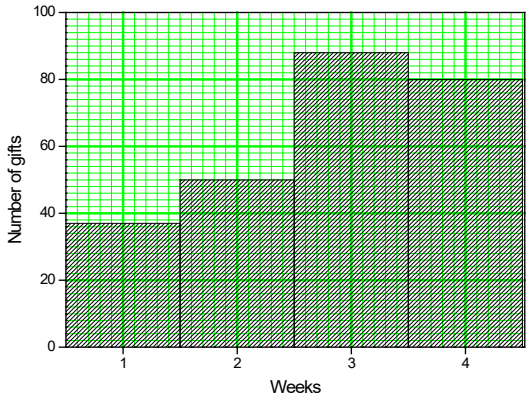
19. 1 cm represents 2.5 km
20. (a) Learner to sketch the net
    (b) 90.38cm²
21. $^5/_{12}$
22.



23. sh.15,000
24. 16.43 cm
25. 2
26. 2.7807
27. 869.6 cm²
28. 32.03 m³
29. 360,000

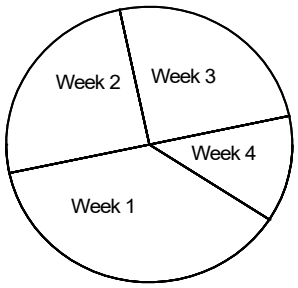
Model Test Paper Two

1. 202,222,202
2. 4
3. (a) 56 < x < 120
   (b) A number line with open circles at 56 and 120,

4. (a) 48
   (b) –2
5. 0.6 m
6. 10 hours
7. 14.22 m/s (4 s.f.)
8. 5495°C
9. x = 2
10. Ksh 47,059.60
11. 67.38 cm²
12. $^{2x}/_{m}$
13. Ksh 40,000
14. 6.57×10^{-4}
15. 0.2
16. $^{3}/_{16}$
17. 12 cm
18. x = 20, y = 50
19. 1cm rep 5m
20. (a) Learner to draw the net of the cuboid
    (b) 5.7cm
21. 

22. Data: 10, 8, 6, 6, 5, 7, 6, 4
    (a) Mode = 6
    (b) Mean = 6.5
    (c) Median: = 6
23. (a) Outcomes: {G, G, G, B, B, W, W, W, W, W}
    (b) P(Green) = $^{3}/_{10}$ = **0.3**
24. 280 cm²
25. 0.020408 m
26. Ksh 4000
27. Order: 2 × 3
28. $^{1}/_{6}$
29. x-intercept: –5, y-intercept: 1
30. x ≥ 7
31. (a) 110°
    (b) 2:40 am
32. 10.21 m/s
33. 6.939 kg
35. 181.9 m²

Model Test Paper Three

1. 10 $^{7}/_{24}$
2. 30,000
3. -2
4. (a) h = 22.9 cm
   (b) 7.222 litres
5. 85
6. 8 sides
7. 0.00431
8. (x + z) (x – y)
9. x = -1, y=2x
10. 87.45 cm
11. 1231.5 cm³
12. 24 minutes
13. 80974
14. 8.579
15. $^{2}/_{9}$
16. 

18. 126 cm²
19. 0.3607
20. 273.33 cm³
21. y = 0.5x + 4
22. x ≤ 9
23. Line 1: m = 3, Line 2: m = $^{-1}/_{3}$ ⇒ product = –1
    ⇒ Perpendicular
24. 138.56 cm²
25. 593.29 cm²
26. 13.30 %
27. 772,320 Ksh
28. 250 Ksh
29. 6 hours
30. (a) 33,280 Ksh
    (b) 233,280 Ksh

KJSEA SAMPLE PAPER

SECTION A (20 Marks)

1. B
2. B
3. A
4. A

5. D
6. B
7. C
8. A
9. D
10. A
11. C
12. D
13. B
14. A
15. B
16. C
17. C
18. A
19. D
20. B

SECTION B: (50 Marks)

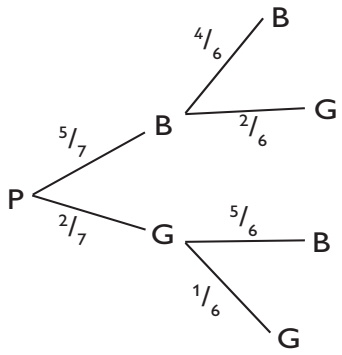
21. 50,000,000

22. (a) Total = 1,253,235 → In words: *One million, two hundred fifty-three thousand, two hundred thirty-five*

(b) Rounded: *1,300,000*

23. $^{3}/_{16}$

24. (a)

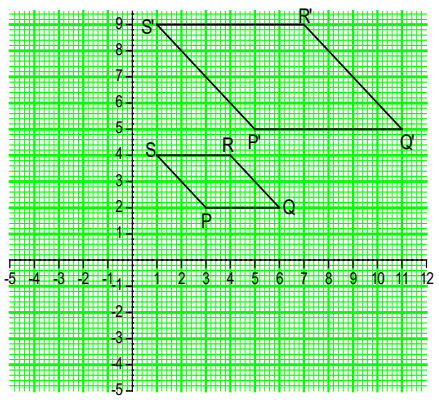


(b) P(GG) = $^{2}/_{7} \times {}^{1}/_{6} = {}^{2}/_{42} = {}^{1}/_{21}$

25. 74.5°

26. x = 10.45

27. (a)



(b) Centre: (1, -1)

(c) Scale factor = 2

28. (a) Accurate scale drawing = 4 marks

(b)(i) Distance XZ from drawing = 1 mark

(b)(ii) True bearing of Z from X = 1 mark

29. sh.26,500

30. Oranges = 20, mangoes = 25

31. 11,988.95cm³

32. 51,100 Rand

33. (a) A + B=matrix addition = $\begin{pmatrix} 3 & 7 & 11 \\ 10 & 3 & 1 \end{pmatrix}$

(b) B – A = $\begin{pmatrix} 7 & -1 & 5 \\ 2 & -1 & -11 \end{pmatrix}$

34. 98.56 cm²

35. 1.96%

36. 72 cm³

37. 2500 kg/m³

38. 42.5 m/s

39. r = 14cm

40. (a) Modal class = 40–49 (most frequent)

(b) Median class = 60–69 (middle of 60)

(c) Mean = 60.67 kg

(d) Median = 61.67 kg

41. (a) $5x + 2y \leq 50$

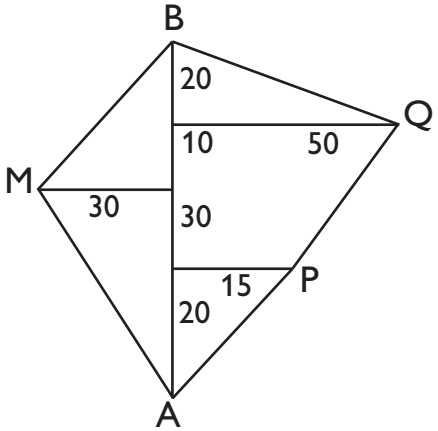
(b) Learners to draw

42. 17.80cm²

43. (a) sh. 49,000

(b) sh. 399,000

44. (a)



Not drawn to scale

(b) 0.315 ha

INTEGRATED SCIENCE

1.1 Mixtures, Elements and Compounds

1.1 Structure of an Atom

Practice Assessment:

1. What are the three main subatomic particles in an atom and where are they located?

(a) Proton – found in the nucleus

(b) Neutron – found in the nucleus

(c) Electron – found in the electron cloud/ orbiting around the nucleus

2. Describe the nucleus of an atom. What subatomic particles does it contain?

- The nucleus is the dense center of an atom.
- It contains protons and neutrons.

3. What is the charge of an electron and where is it found in an atom?

- An electron has a negative (-1) charge.
- It is found in orbitals/shells around the nucleus.

4. Define the term "atomic number" and explain its importance.

- The atomic number is the number of protons in an atom.
- It determines the identity of the element and its position on the periodic table.

5. How would you determine the mass number of a chlorine atom that has 17 protons and 18 neutrons?

Mass number = Protons + Neutrons

= 17 + 18 = 35

6. What does the mass number represent in terms of an atom's subatomic particles?

- The mass number represents the total number of protons and neutrons in the nucleus of an atom.

7. Why might two atoms of the same element have different mass numbers?

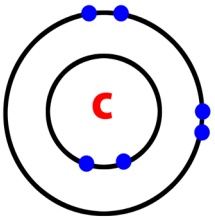
They are isotopes – they have the same number of protons but different numbers of neutrons.

8. If an atom has 19 protons and a mass number of 39, how many neutrons are in the atom?

Neutrons = Mass number – Protons

= 39 – 19 = 20 neutrons

9.



10. Look at the electron arrangement of sodium (2,8,1) and oxygen (2,6). Explain why sodium is classified as a metal and oxygen as a nonmetal.

- Elements with 1, 2 or 3 electrons in the outermost energy level are metals while those with 4, 5, 6, 7 and 8 are non metals
- Oxygen has 6 electrons while sodium has 1 electron on the outermost energy level.

1.2 Metals and Alloys

Practice Assessment Exercise:

1. What is the difference between ductility and malleability?

- Ductility is the ability of a metal to be drawn into wires.
- Malleability is the ability of a metal to be hammered or pressed into thin sheets without breaking.

2. Explain why metals are generally good conductors of electricity.

Metals have free-moving (delocalized) electrons that allow electrical current to pass through easily.

3. Explain how the high thermal conductivity of metals benefits their use in cooking utensils.

Metals quickly and evenly transfer heat, which helps in efficient and uniform cooking.

4. Describe what happens to metals when they undergo malleability.

When metals undergo malleability, they can be reshaped or flattened into sheets without cracking or breaking.

5. Compare and contrast the compositions of brass and bronze.

- Brass is an alloy of copper and zinc.
- Bronze is an alloy of copper and tin.

Both are copper alloys, but they differ in the second metal used.

6. Discuss two uses of copper in households and describe why its properties make it suitable for these applications.

- Electrical wiring – copper is an excellent conductor of electricity.
- Water pipes – copper is non-reactive with water and resistant to corrosion.

7. Describe the role of steel in construction and why it is favored over pure iron.

- Steel is widely used in construction due to its high strength, durability, and resistance to rust.
- It is favoured over pure iron because pure iron is soft and rusts easily, while steel is stronger and longer-lasting.

8. List three ways to control or prevent rusting and briefly describe how each method works:

(a) Painting – covers the metal and prevents exposure to air and moisture.

(b) Oiling or greasing – forms a protective barrier against moisture.

(c) Galvanization – coats the metal with zinc, which resists corrosion.

9. Describe the impact of rusting on the lifespan of metal structures.

- Rusting weakens metal, causes structural damage, and reduces the lifespan of metal structures.

10. How does galvanization help prevent rust and which metals are commonly used in this process?

- Galvanization protects metals by coating them with zinc, which prevents oxygen and moisture from reaching the metal surface.

Iron and steel are commonly galvanized.

1.3 Water Hardness

Practice Assessment Exercise

1. Distinguish between hard water and soft water.

- Hard water contains high levels of dissolved minerals, especially calcium and magnesium.
- Soft water has low concentrations of these minerals.

2. What are the primary minerals found in hard water?

- Calcium (Ca^{2+}) and Magnesium (Mg^{2+}) ions.

3. What health benefits might be associated with drinking hard water?

- Provides essential minerals like calcium and magnesium which support bone health and heart function.

4. List and describe the physical properties of water.

- Colourless, odourless, and tasteless
- Boils at 100°C and freezes at 0°C
- Universal solvent
- Has high surface tension and density of $1g/cm^3$ at 4°C

5. How does water hardness affect the formation of lather when using soap?

- Hard water forms scum with soap, preventing lather formation.
- The minerals react with soap to form an insoluble residue.

6. What role does water hardness play in the scaling of pipes and appliances?

- Hard water causes scale (limescale) buildup in pipes, kettles, and boilers, reducing efficiency and causing blockages.

7. **Explain how temperature changes might affect the solubility of minerals in water.**

- Higher temperatures can reduce solubility of some minerals, causing them to precipitate out and form scale.

8. **Explain how the addition of washing soda (sodium carbonate) can soften hard water. What happens chemically?**

- Washing soda reacts with calcium and magnesium ions to form insoluble carbonates, which precipitate out, softening the water.

End of Strand Assessment

1. **Differentiate between atomic number and mass number.**

- Atomic number = number of protons in an atom.
- Mass number = total number of protons and neutrons in the nucleus.

2. **Describe how electrons are arranged in energy levels around the nucleus.**

Electrons are arranged in shells or energy levels. The first shell holds up to 2 electrons, the second up to 8, and the third up to 8.

3. **Why are alloys preferred over pure metals for industrial applications?**

Alloys are stronger, more durable, and resistant to rust compared to pure metals. They can be tailored for specific properties and uses.

4. **Compare the properties of brass and steel and give one use of each.**

- Brass: corrosion-resistant, low friction – used in musical instruments.
- Steel: strong, durable – used in construction and machinery.

5. **Explain why stainless steel does not rust easily, while ordinary steel does.**

- Stainless steel contains chromium, which forms a protective oxide layer, preventing rust.
- Ordinary steel lacks this and rusts easily in moisture and oxygen.

6. **What causes temporary hardness in water and how can it be removed?**

- Temporary hardness is caused by calcium or magnesium bicarbonates.
- It can be removed by boiling, which decomposes bicarbonates into carbonates that precipitate out.

7. **Explain why hard water forms scum with soap, while soft water lathers easily.**

- Hard water reacts with soap to form scum, reducing lathering.
- Soft water lacks those minerals, so soap forms lather easily.

8. **Why is hard water beneficial for drinking but unsuitable for use in boilers?**

- It provides essential minerals for health.
- But it causes scale buildup in boilers, reducing efficiency and damaging equipment.

9. **Describe one chemical method and one physical method used to remove permanent hardness in water.**

- Chemical: Adding washing soda to precipitate calcium/magnesium ions.
- Physical: Ion-exchange method, where calcium and magnesium ions are replaced with sodium ions using a resin.

2. Living Things and their Environment

2.1 Nutrition in Plants

Practice Assessment Exercise

1. Label the parts of a leaf

- X – leaf margin
- Q – lamina
- T – petiole
- V – leaf apex
- S – network veins
- R – midrib

2. Why are leaves important for a plant's survival?

Leaves are the main site of photosynthesis, allowing the plant to make food (glucose) using sunlight, carbon dioxide, and water. They also help in gas exchange and transpiration.

3. a)What is the main role of the palisade layer in a leaf?

The palisade layer contains many chloroplasts, making it the main site for photosynthesis in the leaf.

b) How does the arrangement of cells in the palisade layer help photosynthesis?

Cells are tightly packed and arranged vertically, maximizing the absorption of sunlight.

4. How does the epidermis help the leaf in photosynthesis?

The epidermis protects inner tissues and allows light to pass through to the photosynthetic layers. The lower epidermis contains stomata for gas exchange.

5. Why is it important for leaves to have a large surface area?

A large surface area increases the amount of sunlight the leaf can capture, enhancing photosynthesis.

6. Explain why leaves have tiny holes (stomata) on their surface.

Stomata allow carbon dioxide to enter the leaf and oxygen and water vapor to exit, helping in photosynthesis and transpiration.

7. How does a leaf's waxy cuticle help in photosynthesis?

The waxy cuticle helps reduce water loss through evaporation while still allowing light to pass through for photosynthesis.

8. What adaptation allows the leaf to exchange gases during photosynthesis?

The presence of stomata and guard cells allows the leaf to open and close pores for gas exchange.

9. How does the structure of chloroplasts help them capture sunlight?

Chloroplasts contain chlorophyll, a green pigment that absorbs sunlight. Their internal membrane structure (thylakoids) increases surface area for light absorption.

10. Explain how you could set up an experiment to show that carbon dioxide is necessary for photosynthesis.

- Place two plants under similar light and temperature conditions.
- Cover one plant's leaves with a sealed jar containing sodium hydroxide (which absorbs CO_2).
- Leave the other with access to air.
- After some time, test both leaves for starch using iodine.
- The leaf without CO_2 will not turn blue-black, showing that CO_2 is necessary for photosynthesis.

2.2 Nutrition in Animals

1. Describe how a parasitic organism obtains its nutrients. Give an example.

A parasitic organism lives on or inside another organism (host) and feeds on its nutrients, often harming the host.

Example: Tapeworms absorb nutrients from the host's intestine.

2. **Define holozoic nutrition and give two examples of animals that use this mode.**

Holozoic nutrition involves ingestion, digestion, absorption, assimilation, and egestion of solid food.

Examples: Humans and dogs.

3. **Explain the advantages of a symbiotic relationship. Provide one example from nature.**

Symbiotic relationships allow both organisms to benefit and survive better than they would alone.

Example: In lichens, fungi provide structure and algae produce food through photosynthesis.

4. **What is the difference between homodont and heterodont dentition?**

- Homodont: All teeth are similar in shape and size (e.g., in fish).
- Heterodont: Teeth are of different types – incisors, canines, premolars, molars (e.g., in humans).

5. **Why do carnivores have sharper canines compared to herbivores?**

Carnivores have sharp canines for tearing meat, while herbivores do not need them as they mainly chew plant material.

6. **Explain why premolars and molars are larger and flatter than incisors.**

Premolars and molars are larger and flat to help in grinding and chewing food, unlike incisors which are used for cutting.

7. **Explain how food is broken down in the mouth. What type of digestion occurs here?**

Food is broken down by chewing (mechanical digestion) and mixed with saliva that contains enzymes like amylase for chemical digestion of starch.

8. **What role does the small intestine play in the absorption of nutrients?**

The small intestine has villi and microvilli that increase surface area to absorb nutrients into the bloodstream efficiently.

9. **What is egestion and why is it necessary for the human body?**

Egestion is the process of removing undigested food and waste from the body.

It's necessary to prevent buildup of waste and maintain a healthy digestive system.

2.3 Reproduction in Plants

Practice Assessment Exercise:

1. **What is the role of the petal in a flower?**

Petals are often brightly colored to attract pollinators like insects and birds to the flower.

2. **Explain the function of the stamen in the flower's reproductive process.**

The stamen is the male reproductive part of a flower. It produces pollen grains, which contain male gametes (sperm cells).

3. **Explain the purpose of the stigma in the process of pollination.**

The stigma is the part of the carpel that receives pollen during pollination. It is usually sticky to catch and hold pollen grains.

4. **What are the advantages of cross-pollination over self-pollination?**

Cross-pollination promotes genetic variation, which can lead to healthier, more resilient offspring and reduces the risk of inherited diseases.

5. **Describe the role of insects in the pollination process.**

Insects such as bees visit flowers for nectar. As they move from flower to flower, they transfer pollen from the anthers to the stigmas, helping in cross-pollination.

6. **Describe how the pollen in wind-pollinated flowers is adapted for dispersal.**

Pollen in wind-pollinated flowers is usually light, small, and smooth, making it easy to be carried by the wind over long distances.

7. **Describe the process of fertilization in flowering plants.**

After pollination, the pollen grain grows a tube down the style to the ovary, where the male nucleus fuses with the egg cell, forming a zygote.

8. **What part of the flower develops into the fruit?**

The ovary of the flower develops into the fruit after fertilization.

9. **Describe how seeds dispersed by water are adapted to float.**

These seeds usually have lightweight or fibrous outer coverings and air spaces that help them float on water for long distances.

10. **Explain why flowers are considered important in ecosystems.**

Flowers play a key role in plant reproduction and food production. They also support biodiversity by providing nectar and pollen to pollinators like bees and butterflies, which are vital for maintaining healthy ecosystems.

2.4 The Interdependence of Life

Practice Assessment Exercise

1. **Define the term interdependence of life.**

Interdependence of life refers to how living things depend on each other for survival, food, shelter, and reproduction.

2. **Define the term ecosystem.**

An ecosystem is a community of living organisms interacting with each other and their non-living environment.

3. **Name the two factors that make up the ecosystem.**

a) Biotic factors

b) Abiotic factors

4. **Give four examples of each of the following:**

a) Biotic components

i. Trees

ii. Insects

iii. Lions

iv. Bacteria

b) Abiotic components

i. Water

ii. Temperature

iii. Light

iv. Soil

5. **Explain the following types of interrelationships:**

a) Symbiosis

A close relationship where two species live together, and at least one benefits, e.g., clownfish and sea anemones.

b) Competition

Occurs when organisms compete for the same resources like food or space.

c) Saprophytism

A relationship where organisms like fungi feed on dead or decaying matter.

d) Parasitism

One organism (parasite) benefits while the other (host) is harmed, e.g., ticks on dogs.

e) Predation

One organism (predator) hunts and kills another (prey) for food.

6. **Distinguish between interspecific and intraspecific competition:**

- Interspecific competition is between different species.
- Intraspecific competition is between members of the same species.

7. **Lion feeding on an antelope:**

a) Prey: Antelope

b) Predator: Lion

8. **Three roles of decomposers in an ecosystem:**

- Break down dead plants and animals.
- Recycle nutrients into the soil.
- Help maintain a balanced ecosystem.

9. Effects on living things:

a) Light

- Affects photosynthesis in plants and activity patterns in animals.

b) Salinity

- Influences water balance in organisms and where aquatic life can live.

c) pH

- Affects enzyme function and survival of organisms in water or soil.

10. Give two examples of:

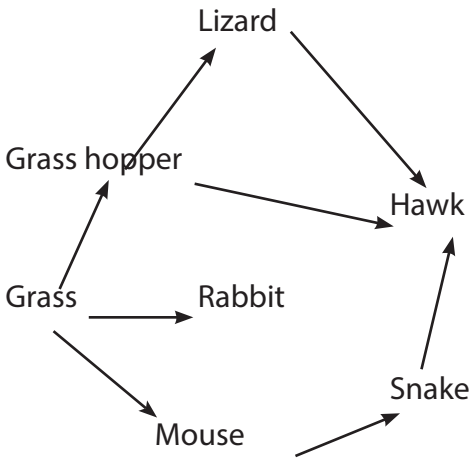
a) Food chain

(i) Grass ⟶ Grasshopper ⟶ Frog ⟶ Snake

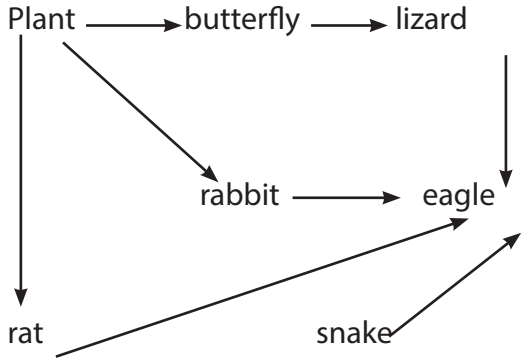
(ii) Phytoplankton ⟶ Fish ⟶ Bird

b) Food web

(i)



(ii)



End of Strand Assessment

1. Three structural adaptations of a leaf for photosynthesis:

- Large surface area to capture more sunlight
- Thin for easy gas exchange
- Chloroplasts with chlorophyll to absorb light

2. Why do most leaves have a broad and flat surface?

To maximize the surface area for light absorption and efficient gas exchange.

3. Four conditions necessary for photosynthesis:

a. Sunlight

b. Carbon dioxide

c. Water

d. Chlorophyll

4. Why is photosynthesis important to both plants and animals?

It produces oxygen for breathing and glucose for energy; it forms the base of the food chain.

5. Difference between saprophytic and parasitic nutrition:

- Saprophytic: Organism feeds on dead matter (e.g., mushroom).
- Parasitic: Organism feeds on a living host, harming it (e.g., tapeworm).

6. Role of bile in digestion:

Bile helps emulsify fats, breaking them into smaller droplets for easier digestion by enzymes.

7. How carbohydrates are broken down and absorbed:

Carbohydrates are broken down by enzymes like amylase into glucose, which is absorbed into the bloodstream in the small intestine.

8. Four parts of a flower and their functions:

a) Petal – Attracts pollinators

b) Stigma – Receives pollen

c) Anther – Produces pollen

d) Ovary – Contains ovules and becomes the fruit

9. Why are petals brightly colored in some flowers?

To attract insects and birds for pollination.

10. Difference between self-pollination and cross-pollination:

- Self-pollination: Pollen from the same flower or plant fertilizes the ovule.
- Cross-pollination: Pollen is transferred between different plants, increasing variation.

11. How energy flows through a food chain:

Energy flows from the sun to producers, then to primary consumers, secondary consumers, and finally top predators. Energy decreases at each level.

3. Force and Energy

3.1 Curved Mirrors

Practice Exercise

1. Give characteristics of image formed when an object is placed between the principal focus and the pole.

- The image is virtual
- The image is upright
- The image is magnified (larger than the object)
- The image is formed behind the mirror

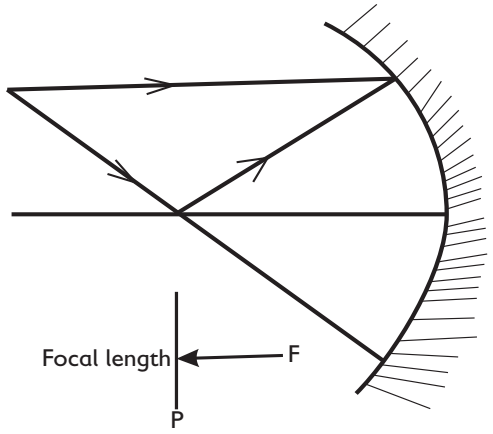
2. State two applications of curved mirrors.

- Concave mirrors are used in shaving mirrors or makeup mirrors because they magnify images.
- Convex mirrors are used as side mirrors in vehicles because they give a wider field of view.

3. State the characteristics of images formed by convex mirrors.

- The image is always virtual
- The image is always upright
- The image is always diminished (smaller than the object)
- The image is formed behind the mirror

4. Draw a diagram that shows how to determine the focal length of a concave mirror.



5. State the meaning of the following terms as they are used in curved mirrors.

a) Principal focus

- The point on the principal axis
- Where parallel rays of light either meet or appear to meet after reflection
- In a concave mirror, rays converge at the principal focus; in a convex mirror, rays appear to diverge from it.

b) Focal length

- The distance between the pole of the mirror and the principal focus
- It is half the radius of curvature
- It determines how strongly the mirror converges or diverges light.

c) Principal axis

- The straight line that passes through the center of curvature and the pole of the mirror
- It is perpendicular to the surface of the mirror at its pole
- All ray diagrams are drawn with respect to this axis.

3.2 Waves

Practice Assessment Exercise

1. What is a wave and how is it generated in a medium?

- A wave is a disturbance that transfers energy from one point to another.
- It is generated when a source creates vibrations in a medium, such as air, water, or solid.

2. How are sound waves generated and why do they need a medium to travel?

- Sound waves are generated by vibrating objects, which cause surrounding particles to vibrate as well.
- They need a medium (like air, water, or solids) to travel because they are mechanical waves that rely on particle interaction.

3. What factors influence the speed of a wave in a medium?

- The type of medium (solid, liquid, or gas)
- The density and elasticity of the medium
- The temperature of the medium

4. Define a longitudinal wave and give an example.

- A longitudinal wave is a wave where particles of the medium move parallel to the direction of the wave.
- Example: Sound waves in air.

5. Define a transverse wave and give an example.

- A transverse wave is a wave where particles of the medium move perpendicular to the direction of the wave.
- Example: Light waves or water waves.

6. How do particle movements differ in longitudinal and transverse waves?

- In longitudinal waves, particles move back and forth in the same direction as the wave.
- In transverse waves, particles move up and down or side to side, perpendicular to the wave direction.

7. Classify sound waves as either longitudinal or transverse and explain your answer.

- Sound waves are longitudinal.
- This is because the particles of the medium vibrate in the direction of wave travel, forming compressions and rarefactions.

8. Define wavelength and explain how it is measured in a wave.

- Wavelength is the distance between two successive crests or troughs in a transverse wave, or compressions in a longitudinal wave.
- It is usually measured in meters.

9. What is wave speed and how is it calculated?

- Wave speed is the rate at which a wave travels through a medium.
- It is calculated using the formula:

  Wave speed = Frequency × Wavelength

10. What is meant by wave reflection and how does it apply to sound waves?

- Wave reflection is when a wave bounces off a surface and changes direction.
- For sound waves, this results in echoes.

11. Define remote sensing and describe its main purpose.

- Remote sensing is the process of gathering information about an object or area from a distance using sensors.
- Its main purpose is to monitor and collect data without direct contact.

12. Explain how electromagnetic waves are used in remote sensing to gather information about the Earth.

- Satellites use electromagnetic waves (like infrared or microwave) to scan Earth's surface.
- These waves carry data back to sensors, which is used to produce images and measurements.

13. List three examples of remote sensing applications and briefly describe each.

(a) Weather monitoring – Satellites collect cloud and temperature data for forecasts.

(b) Disaster management – Remote sensing helps track floods, earthquakes, and wildfires.

(c) Agriculture – Monitors crop health and land use patterns using satellite imagery.

14. Describe how satellites use remote sensing to monitor environmental changes.

- Satellites capture images and data over time to detect changes in forests, ice caps, and oceans.
- This helps track climate change, deforestation, and pollution.

15. Explain the importance of remote sensing in weather forecasting.

- It provides accurate and up-to-date atmospheric data.
- This helps meteorologists predict weather patterns, storms, and rainfall more precisely.

End of Strand Assessment

1. Define the following terms as used in curved mirrors:

a) Principal focus

- The point where parallel rays converge (concave) or appear to diverge (convex) after reflection.

b)Centre of curvature

- The center of the sphere from which the mirror segment is taken.

c) Focal length

- The distance from the mirror's pole to the principal focus.

2. Why are concave mirrors used in solar concentrators and car headlights?

- They focus light to a single point (solar concentrators) or project a beam of light forward (headlights).

3. Explain why convex mirrors are preferred for use as side mirrors in vehicles.

- They provide a wider field of view and help drivers see more area behind them.

4. Differentiate between wave speed and wave strength.

- Wave speed is how fast the wave travels.
- Wave strength (amplitude) is the size or energy of the wave.

5. Differentiate between mechanical and electromagnetic waves, giving one example of each.

- Mechanical waves need a medium (e.g., sound waves).
- Electromagnetic waves do not need a medium (e.g., light waves).

6. Define the following parts of a wave:

a) Crest

- The highest point of a transverse wave.

b) Trough

- The lowest point of a transverse wave.

c) Wavelength

- The distance between two crests or two troughs.

d) Amplitude

- The height from the rest position to the crest or trough.

7. How does the frequency of a wave relate to its wavelength and speed?

- Frequency = Wave speed ÷ Wavelength
- Higher frequency means shorter wavelength if speed is constant.

8. What is meant by the term remote sensing?

- Collecting data about an object or area from a distance using sensors, often on satellites or aircraft.

9. Waves can be classified into mechanical **and** electromagnetic **waves.**

10. How is ultrasound technology used in the medical field?

- It is used to create images of internal body parts (e.g., pregnancy scans, organ diagnosis).

11. Explain how radio waves are used in communication systems.

- Radio waves carry signals over distances to enable radio, TV, and mobile communications.

End of Term Assessment Papers

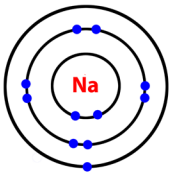
Term 1 Assessment

1. An atom is made up of three subatomic particles:

- Protons – positively charged, found in the nucleus
- Neutrons – neutral, found in the nucleus
- Electrons – negatively charged, orbit the nucleus

2. Mass number = Protons + Neutrons = 8 + 8 = 16

3.



4.

- **Calcium is a metal** – it is malleable and conducts electricity
- **Sulphur is a non-metal** – it is brittle and a poor conductor

5. Ductility is the ability of a metal to be drawn into wires.

Examples: Copper and Aluminium

6.

- Metals are malleable – they can be hammered into sheets
- Metals are good conductors of electricity

7. Bronze is made of copper and tin-

Used in making statues, medals or coins

8. Rusting is caused by exposure of iron to oxygen and water

Prevention methods:

- Painting or oiling to block air and moisture
- Galvanization (coating with zinc)

9.

- Water is colorless and odorless
- It has a boiling point of 100°C
- It is a universal solvent

10.

- Hard water forms little or no lather with soap
- Soft water forms lather easily

11.

- Boiling – removes temporary hardness by precipitating calcium carbonate
- Adding washing soda – replaces calcium/ magnesium ions with sodium ions

12. (a) Supplies useful minerals (like calcium)

(b) Tastes better due to minerals

(c) Causes scaling in pipes and kettles

13. Label external parts of a leaf

X – Leaf Margin

Q – Lamina

T – Petiole

V – Leaf apex

S – Network veins

R – Midrib

14.

- Broad surface area for maximum light absorption
- Presence of chlorophyll to trap light energy

15. The stroma is the fluid in chloroplasts where the light-independent reactions of photosynthesis take place

16. Light provides the energy needed to split water molecules and drive photosynthesis

17.

- Parasitic nutrition: organism feeds on a living host (e.g., tapeworm)
- Saprophytic nutrition: organism feeds on dead/decaying matter (e.g., fungi)

18.

- Herbivores have broad molars for grinding
- Carnivores have sharp canines for tearing flesh

19. Identified tooth: Premolar

Function: Crushing and grinding food

20. Absorption is the process by which digested food is taken into the bloodstream via the walls of the small intestine

21. (a) Receives pollen grains

(b) Transports pollen to the ovary for fertilization

22.

- Self-pollination: Pollen from same flower or plant
- Cross-pollination: Pollen from a different plant

23. **Adaptation:** Brightly colored petals to attract insects

24. **Fertilization** is the fusion of male (pollen) and female (ovule) gametes in the ovary

25.

- Wind dispersal – e.g., dandelion
- Animal dispersal – e.g., mango

26. **Simple food chain:**

Grass ⟶ Grasshopper⟶ Frog⟶ Eagle

27. (a) Temperature – affects growth and activity of organisms

(b) Light – needed by green plants for photosynthesis

28. Symbiosis is a close relationship between organisms of different species

Example: Lichen (fungus + algae)

29. Habitat destruction leads to loss of biodiversity and disruption of food chains

30. **Convex mirrors** are used on roads because they provide a wide field of view, allowing drivers to see around bends or corners.

Term 2 Assessment:

1. **Define atomic number and its significance in identifying an element.**

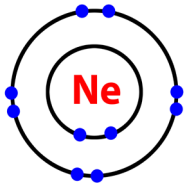
- The atomic number is the number of protons in the nucleus of an atom.
- It uniquely identifies an element

2. **Calculate the mass number of an atom with 15 protons, 16 neutrons, and 15 electrons.**

Mass number = Protons + Neutrons

= 15 + 16 = 31

3. **Draw a cross diagram to represent the electron arrangement of neon (atomic number 10).**



4. **Classify aluminum and oxygen as metals or non-metals, citing their properties.**

- Aluminum is a metal; it's shiny, malleable, and conducts electricity.
- Oxygen is a non-metal; it's a gas at room temperature and does not conduct electricity.

5. **Define malleability as a property of metals and name two metals with this property.**

Malleability is the ability of a metal to be hammered or rolled into thin sheets.

Examples: Gold and Aluminum

6. **Describe the thermal conductivity of metals and give two examples of its applications.**

Metals conduct heat efficiently.

Applications: Cooking utensils and Radiators

7. **List the composition of stainless steel and state its primary use.**

(a) Iron, chromium, and carbon

(b) Used for kitchen utensils and surgical instruments due to its rust resistance

8. **Explain the effects of rusting on iron structures and suggest two preventive measures.**

Rusting weakens iron, leading to structural damage.

Preventive measures:

- Painting or coating with oil
- Galvanization

9. **Compare the boiling points of water and ethanol as a physical property.**

- Water boils at 100°C, while ethanol boils at 78.5°C.

- This shows ethanol has a lower boiling point.

10. **Explain why hard water is unsuitable for use in boilers.**

Hard water forms scale (mineral deposits), reducing efficiency and damaging the boiler.

11. **Describe the process of boiling as a method of softening hard water.**

Boiling removes temporary hardness by precipitating calcium/magnesium bicarbonates.

12. Outline two disadvantages of using soft water.

(a) It may taste flat or salty.

(b) It can corrode metal pipes over time.

13. **Name the labelled parts of the chloroplast.**

(Assuming diagram is present. Based on standard chloroplast diagrams)

- A – Stroma
- B – Inner membrane
- C – Outer membrane
- D – Inner membrane
- E – Starch grain
- F – Granum

14. Explain the function of stomata in photosynthesis.

Stomata allow gas exchange, letting in carbon dioxide and releasing oxygen.

15. Describe the structure and role of grana in chloroplasts.

Grana are stacks of thylakoids containing chlorophyll; they capture light for photosynthesis.

16. State three conditions necessary for photosynthesis to occur.

(a) Light

(b) Carbon dioxide

(c) Water

17. Explain the term holozoic nutrition and give one example of an animal that exhibits this mode of nutrition.

Holozoic nutrition involves ingestion, digestion, and absorption of solid food.

Example: Humans

18. Define heterodont dentition and mention its significance in humans.

Heterodont dentition means having different types of teeth (incisors, canines, molars).

It allows humans to chew and digest a variety of foods efficiently.

19. State the function of incisors in humans and give one example of their use.

Incisors are used for cutting food, e.g., biting into an apple.

20. Outline the process of ingestion in the human digestive system.

Ingestion is the intake of food through the mouth, followed by chewing and swallowing.

21. State one function of the stamen in a flower.

The stamen produces pollen, which contains male gametes.

22. Mention one adaptation of wind-pollinated flowers and explain its importance.

They have light, dry pollen to be easily carried by wind, ensuring wide dispersal.

23. Differentiate between water and animal dispersal of seeds, giving an example of each.

- Water dispersal: Seeds float, e.g., coconut
- Animal dispersal: Seeds stick to fur or are eaten and excreted, e.g., berries

24. Explain the importance of seed dispersal in plants.

It prevents overcrowding, reduces competition, and helps colonize new areas.

25. Describe one role of flowers in maintaining ecological balance.

Flowers attract pollinators like bees, supporting biodiversity and food chains.

26. Define competition as a biotic component of the environment and provide one example.

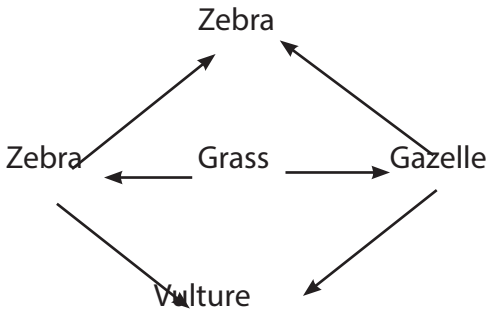
Competition is the struggle between organisms for resources.

Example: Plants competing for sunlight

27. **Explain how temperature affects aquatic ecosystems.**

High or low temperatures can affect oxygen levels, metabolism, and species survival.

28. **Draw a food web with at least five organisms.**



29. **Outline the impact of introducing invasive species into an ecosystem.**

They may out compete native species, disrupt food chains, and cause biodiversity loss.

30. **Mention one application of concave mirrors in daily life and justify its use.**

Used in shaving mirrors because they magnify the image, helping see details clearly.

Term 3 Assessment:

1. **What is photosynthesis and why is it important in nature?**

Photosynthesis is the process by which green plants use sunlight, carbon dioxide, and water to make their own food (glucose) and release oxygen. It is important because it provides food and oxygen for most living organisms.

2. **How does photosynthesis contribute to the oxygen cycle?**

Photosynthesis releases oxygen into the atmosphere, which is used by animals and humans for respiration.

3. **Explain how photosynthesis helps in maintaining the balance of carbon dioxide in the atmosphere.**

Plants absorb carbon dioxide from the air during photosynthesis, helping to reduce its amount and balance the atmosphere.

4. **What would happen if photosynthesis stopped occurring on Earth?**

There would be no oxygen for animals and humans to breathe, and food chains would collapse due to lack of plant-based food.

5. **How do plants store the energy they obtain from photosynthesis?**

Plants store energy as glucose, which is later converted into starch for storage.

6. **Name the main organs involved in human digestion.**

(a) Mouth

(b) Stomach

(c) Small intestine

7. **What is the function of saliva in digestion?**

Saliva moistens food and contains enzymes that start breaking down starch into simpler sugars.

8. **How does the stomach contribute to digestion?**

The stomach uses acid and enzymes to break down food into a semi-liquid form called chyme.

9. **Describe the role of the small intestine in digestion and absorption.**

The small intestine completes digestion with the help of enzymes and absorbs nutrients into the bloodstream.

10. **What is peristalsis and why is it important in digestion?**

Peristalsis is the wave-like movement of muscles that pushes food through the digestive system. It is important for moving and mixing food.

11. **Name the four main parts of a flower and their functions.**

(a) Petals – attract pollinators

(b) Sepals – protect the flower bud

(c) Stamens – male part, produce pollen

(d) Carpels – female part, contains ovary

12. **What is the function of the stigma in a flower?**

The stigma receives pollen during pollination.

13. **How do petals contribute to pollination?**

Petals attract pollinators like bees and butterflies with their color and scent.

14. **What is the role of sepals in a flower?**

Sepals protect the developing flower before it opens.

15. **Explain the function of the ovary in plant reproduction.**

The ovary contains ovules, which develop into seeds after fertilization.

16. **Define pollination and state two types of pollination.**

Pollination is the transfer of pollen from the anther to the stigma. The two types are self-pollination and cross-pollination.

17. **What are the main agents of pollination?**

Insects, wind, water, and animals.

18. **Describe the process of fertilization in plants.**

After pollination, the pollen travels down the style to reach the ovary and fuses with an **ovule to form a zygote.**

19. **How does a fertilized ovule develop into a seed?**

The fertilized ovule undergoes changes and forms a protective coat, developing into a seed.

20. **Explain the process of fruit formation in plants.**

After fertilization, the ovary grows and becomes a fruit, enclosing the seed(s).

21. **Name four main modes of seed dispersal and give an example of a plant for each.**

(a) Wind – Dandelion

(b) Water – Coconut

(c) Animals – Mango

(d) Explosion – Pea

22. **How does wind help in seed dispersal?**

Wind carries light seeds with wings or fluffy structures to new locations.

23. **What adaptations do water-dispersed seeds have?**

They are light and waterproof, allowing them to float (e.g. coconut).

24. **Explain how animals help in seed dispersal.**

Animals eat fruits and excrete seeds elsewhere, or seeds stick to their fur and fall off later.

25. **Why is seed dispersal important for plant survival?**

It reduces competition for resources and helps plants colonize new areas.

26. **What are abiotic components in an ecosystem?**

Abiotic components are non-living parts like sunlight, water, and soil.

27. **Give three examples of abiotic components and explain their importance in the environment.**

(a) Sunlight – provides energy for photosynthesis

(b) Water – essential for all living organisms

(c) Soil – provides nutrients and support for plant growth

28. **What is the difference between a convex mirror and a concave mirror?**

A convex mirror curves outward and gives a wide view. A concave mirror curves inward and can focus light.

29. **Give two real-life applications of concave mirrors.**

(a) Shaving mirrors

(b) Reflecting telescopes

30. **Explain why convex mirrors are used as side mirrors in vehicles.**

They give a wider field of view, allowing drivers to see more area and avoid accidents.

31. Hard water has properties that distinguish it from soft water.

a) Define hard and soft water.

Hard water contains dissolved minerals like calcium and magnesium. Soft water has low concentrations of these minerals.

b) Name two methods used to soften hard water and explain how they work.

i. Boiling – removes temporary hardness by precipitating calcium carbonate.

ii. Ion exchange – replaces calcium and magnesium ions with sodium ions.

c) Describe one advantage and one disadvantage of hard water.

Advantage: Provides essential minerals for health.

Disadvantage: Causes scale build-up in pipes and appliances.

32. Pollination is essential for fertilization in flowering plants.

a) Define pollination and state two types of pollination.

Pollination is the transfer of pollen from the anther to the stigma. Types: self-pollination and cross-pollination.

b) Explain the adaptations of flowers to insect pollination.

Bright colors, scent, nectar, and special structures to trap insects.

c) Describe the process of fertilization in plants.

Pollen reaches the ovule via the pollen tube, and the male gamete fuses with the female gamete to form a zygote.

KJSEA SAMPLE PAPER

SECTION A (30 Marks)

1. B.
2. A.
3. A.
4. A.
5. C.
6. A.
7. C.
8. A.
9. B.
10. A.
11. B.
12. A.
13. A.
14. B.
15. B.
16. A.
17. B.
18. C.
19. A.
20. B.
21. B.
22. B.
23. C.
24. B.
25. C.
26. C.
27. B.
28. C.
29. D
30. C.

SECTION B (40 Marks):

31. (a) Two basic science skills used:

- Observation
- Measuring (using instruments accurately)

(2 marks)

(b) SI unit for volume:

- Cubic meter (m^3) (1 mark)

32. (a) Method of separation:

- Filtration (1 mark)

(b) Two heterogeneous mixtures separated by filtration:

- Sand and water
- Chalk and water (2 marks)

33. (a) Recovering water from salty seawater:

- Distillation – heat the mixture to evaporate water, then condense the vapor into pure water (2 marks)

(b) Recovering iron filings from sand and iron filings:

- Magnetic separation – use a magnet to attract and remove the iron filings (2 marks)

34. (a) Preparing a beetroot acid-base indicator:

- Chop beetroot into small pieces
- Boil the pieces in water for a few minutes
- Let it cool and filter to obtain the colored solution
- Use the solution to test substances: it changes color in acids and bases (4 marks)

(b) Purpose of adding lime to acidic soil:

- Lime neutralizes the acid in the soil, improving pH and making nutrients more available to plants (2 marks)

35.(a) (i) Lungs: Carbon dioxide

(ii) Kidneys: Excess salt and water

(2 marks)

(b) **(i) Two early symptoms of HIV/AIDS:**

- Fever
- Weight loss / fatigue (2 marks)

(ii) Two ways to prevent HIV/AIDS:

- Using protection (condoms)
- Avoid sharing sharp objects / use sterilized equipment (2 marks)

36. **(a) (i) Process demonstrated:**

- Osmosis (1 mark)

(ii) Changes in the potato:

- Water moved out of the potato cells into the sugar solution, causing the potato to shrink or become limp (2 marks)

37. **(a) Likely agent of pollination:**

- Insects (1 mark)

(b) Two other adaptations observed:

- Brightly colored petals
- Presence of nectar / scent (2 marks)

38. How hair products affect skin's excretory function:

- Hair products may clog skin pores, reducing the skin's ability to excrete sweat and waste substances, which may lead to skin irritation or acne (2 marks)

39. (a) Two other sources of sound waves:

- Guitar / musical instrument
- Human voice / clapping (2 marks)

40. (a) Definition of an atom:

- The smallest unit of matter that retains the properties of an element (1 mark)

(b) Positively charged particle of an atom:

- Proton (1 mark)

(c) Two physical properties of metals:

- Good conductors of heat and electricity
- Malleable and ductile (1 mark)

41. (a) Definition of an alloy:

- A mixture of two or more metals, or a metal and another element, to improve properties (1 mark)

(b) Composition and use of stainless steel:

- Made from iron, carbon, and chromium
- Chromium makes it resistant to rust and corrosion, which is why it is ideal for surgical instruments (2 marks)

PRACTICAL PAPER:

Question One

Table Completion:

Solution Tested	Observation	Conclusion
Orange juice	Colour changed to pink	Acidic
Limewater	Colour changed to blue	Basic
Solution P	Colour changed to pink	Acidic
Solution Q	No colour change	Neutral
Solution R	Colour changed to blue	Basic
Solution S	Colour changed to pink	Acidic
Solution T	No colour change	Neutral

(i) Name one solution that could be used in place of:

(a) Orange juice: Vinegar or lemon juice (1 mark)

(b) Limewater: Soap solution or sodium hydroxide solution (1 mark)

(ii) Three basic science skills necessary for this practical: (4 marks)

- Observation
- Measuring
- Recording data
- Interpreting results

(iii) Three safety precautions to take: (3 marks)

- Wear safety goggles to protect your eyes from splashes
- Do not taste or directly smell any chemical
- Clean spills immediately and dispose of waste properly

(iv) Four laboratory instruments necessary for the practical: (4 marks)

- Measuring cylinder
- Test tubes
- Dropper or pipette
- Test tube rack

Question Two

(a) The type of physical quantity represented by diameter and height:

- Length (or distance) (1 mark)

(b) Reason:

- They are measurements of size or spatial dimensions (1 mark)

(c) Volume of the cylinder:

Radius= $\frac{5.0}{2}$ = 2.5 cm

Volume = $\pi r^2 h$ = $3.14\times(2.5)^2\times10$= $3.14\times6.25\times10$=196.25 cm^3

Answer: 196.25 cm^3 (3 marks)

(d) Density in SI units (convert cm^3 to m^3):

1 cm^3 = 1 × $10^{-6}m^3$

So volume in m^3 = 196.25 × 10^{-6}

= 1.9625 × 10^{-4} m^3

Density= $\frac{1.57kg}{1.9625}\times10^{-4}m^3$ =7997.45 kg/m^3

Answer: 7.997 × 10^3 kg/m^3 (3 marks)

(e) **Type of physical quantity represented by density:**

- Derived quantity (1 mark)

(f) Reason:

- It is obtained from dividing one base quantity (mass) by another (volume) (1 mark)

AGRICULTURE

1. Conservation of Resources

Practice Assessment page 229

1. What is conservation?

Conservation is the careful management and prevention of natural resources from being lost or wasted.

2. What do we mean by conserving forage?

Conserving forage refers to the practice of preserving plant material (grass, legumes, or other plants) to be used as animal feed during dry seasons.

3. Outline three ways of conserving forage.

a. Baled hay making.
b. Standing forage.
c. Stacking.

4. **Grade 9 learners of St. Peter's school visited a farm. They saw the farmer carrying out the activity shown below.**

a. Name the type of forage crop shown above.

Maize

b. **Name the method used to conserve the forage crop shown above.**

Stacking method

5 **A farmer wanted to conserve forage using box baling hay.**

a. List materials and tools he needs to make the baling box.

i. Wood or pieces of timber.
ii. Hammer.
iii. Nails.
iv. Saw.

b. **Explain the process he would follow when conserving the forage by box baling hay.**

i. Cut and dry the forage as you turn it regularly.
ii. Put the forage into a pile or row for easy collection.
iii. Put the forage in the baling box and compress it.
iv. The bales with sisal rope and store them in a dry, place.

6. Describe the following processes used in conserving forage.

a. Stacking.

It involves piling forage into heap or stack.

b. Baled hay making.

Baled hay making involves cutting and drying forage and then compressing it into bales. After the forage is dried to a specific moisture level the forage is compressed into bales.

The bales are then tied with sisal rope and stored in a dry area.

7. Grade 9 learners were using digital devices to search for qualities of forage used in making hay. List what they found.

a. High moisture content.
b. Good nutritional value.
c. Good drying ability.

Practice Assessment page 231

1. **What do you understand by the term 'leftover foods'?**
Leftover foods refer to any food that remains uneaten after a meal often stored for future use instead of being thrown away.

2. **Leftover foods should be**
Stored properly in airtight containers to prevent contamination.
Reheated within a safe time frame to avoid spoilage.
Consumed within a reasonable time to maintain their quality and safety.

3. **What is the importance of conserving leftover foods?**
Conserving leftover foods helps reduce food wastage, saves money, and ensures that the food is used efficiently.

4. **Leftover foods can be prepared for consumption through various methods. Name two such methods**
a. Reheating
b. Preparing another recipe

5. **Choose a leftover food of your choice and explain how you would reheat the said food.**

6. **Leftover foods can be used to prepare new dishes using new recipes.**
a. Name three new dishes that can be prepared using leftover foods.
(i) Fried rice (using leftover rice and vegetables)
(ii) Stew (using leftover meat and vegetables)
(iii) Casserole (using leftover pasta, meat, and cheese)

b. Outline the recipe of one of the meals mentioned in (a) above indicating the ingredients and the procedure.
Dish: Fried Rice
Ingredients:

Practice Assessment page 235

1. **Define the term 'Integrated farming'**
Integrated farming is an agricultural system that combines different agricultural practices such as crop production, livestock farming, poultry, fish farming, and agroforestry, to enhance productivity and sustainability, while making efficient use of resources.

2. **Mention five components of integrated farming**
a. Crop production
b. Livestock farming
c. Poultry farming
d. Fish farming
e. Agroforestry

3. **Grade 9 learners of Angels school visited an integrated farm in their neighbourhood. Identify the components shown below that they saw in the farm.**
a. Agroforestry
b. Fish farming

4. **Draw a sketch or a design of an integrated farm with not less than three components.**

5. **Write the benefits of the following components of integrated farming.**
a. Poultry farming
(i) Source of eggs and meat – Poultry farming provides a reliable source of protein for household consumption and sale.

(ii) Manure production – Chicken manure can be used as fertilizer for crops, reducing the need for artificial fertilizers.

b. Rabbit farming

(i) Source of meat – Rabbits breed quickly, providing a steady supply of meat.

(ii) Source of income – Rabbits are highly efficient at converting feed into meat, making them a cost-effective source of protein.

(iii) Source of manure to crops

c. Crop production

(i) Source of food – Crop production provides essential food for the household and for sale, contributing to food security.

(ii) Income generation – Surplus crops can be sold at local markets for profit.

d. Livestock farming

(i) Source of milk, meat, and leather – Livestock farming provides essential animal products for consumption and sale.

(ii) Manure for crops – Manure from livestock is an excellent natural fertilizer that can improve soil fertility for crop production.

e. Agroforestry

(i) Soil conservation – Trees in agroforestry systems help prevent soil erosion and maintain soil health.

(ii) Additional income – Trees can provide products like fruits, timber, or fuel, offering another source of income.

6. **Write three importance of Integrated Farming.**

a. Helps to conserve the environment.

b. Helps to reduce cost of production

c. Provides different sources of income.

End of strand Assessment page 236

1. **List three methods of conserving forage.**

a. Hay making

b. Stacking

c. Standing forage

2. **What is forage?**

Forage refers to plants, such as grasses or legumes, that are used as food for livestock.

3. **A cattle farmer wants to make hay for his cattle. State the steps he should follow when making hay.**

Cut the forage at the right stage of growth, especially during flowering stage.

Dry the forage by spreading it out in the sun, turning it regularly to ensure even drying.

Put it in a baling box and compress

Remove from the baling box and store in a dry and ventilated place.

4. **Differentiate between standing forage and stacking forage.**

Standing forage refers to forage that is still growing in the field, not yet harvested.

Stacking forage involves gathering harvested forage and forming it into piles (or stacks) for storage to preserve it for later use.

5. **Describe how you can conserve hay by box baling.**

(i) Cut the forage and put it in the field to dry as you turn it regularly.

(ii) Tie the cut forage in a baling box using sisal rope.

(iii) Compress and store in a dry and ventilated place.

6. **Give two reasons for conserving leftover foods at home.**

a. To reduce food wastage and make use of all the food prepared.

b. To save money by using food that would otherwise be thrown away.

7. **List two methods of preparing leftover food for your consumption.**

a. Reheating

b. Preparing another recipe

8. **Write down how you can reheat leftover rice.**

(i) Add a little water in the rice

(ii) Heat using moderate heat

9. **Grace wants to prepare beef curry from leftover fried beef.**

a. List requirements and ingredients she will need to have:

(i) Leftover fried beef

(ii) Onion,

(iii) Curry powder

(iv) Wheat flour

(v) Tomatoes

(vi) Cooking oil

b. Write the procedure she will follow:

(i) Heat oil in a pan and add chopped until brown.

(ii) Add the curry powder or paste and cook for a minute.

(iii) Add the chopped tomatoes and cook until they soften.

(iv) Mix wheat flour with water then stir.

(v) Add the mixture into the pan

(vi) Add the leftover fried beef and cook for a few minutes.

10. **Your family prepared boiled cassava for supper and some remained after supper. Describe how you can prepare deep-fried cassava wedges from the boiled cassava.**

a. List requirements and ingredients you will need:

(i) Leftover boiled cassava

(ii) Cooking oil for frying

(iii) Salt and other seasonings (optional)

b. Outline the procedure you will follow:

Cut the leftover boiled cassava into wedges or strips.

Heat oil in a deep frying pan or pot.

Fry the cassava wedges in the hot oil until golden brown and crispy.

Remove and drain excess oil on a paper towel.

11. **What is integrated farming?**

It is a technique of farming which involves combining several components of farming on the same piece of land.

12. **List 4 components of integrated farming.**

a. Crop production

b. Livestock farming

c. Poultry farming

d. Fish farming

13. **Your class intends to design and make a model of integrated farming.**

a. List materials you need to make the design:

(i) Cardboard

(ii) Glue or tape

(iii) Clay

b. Describe how you will make the model:

- Collect the materials required
- Make a sketch of the model.
- Cut the cardboard into the desired shape and size for the base.
- Use the materials to make the components according to the sketch.
- Place the components into sections according to the sketch

14. Write 4 importances of integrated farming in conserving resources.

a. Helps in conservation of the environment
b. Helps farmers to adapt to climate change
c. Lead to increased food security
d. Minimizes use of external farm inputs.

2. Food Production Processes

Practice Assessment page 239

1. What is organic gardening?

It is a method of gardening that avoids use of agrochemicals

2. **Grade 9 learners were told to research on organic gardening practices. Mention four farming practices they came across.**

(i) Use of organic manure.
(ii) Use of organic pesticides.
(iii) Use of organic foliar feeds.
(iv) Use of mechanical weed control methods.

3. Below is an example of some activities carried out in the farm. Under which organic gardening practice does it fall?

Mechanical weed control method

4. List four locally available materials that can be used to prepare organic manure.

(i) Animal dung
(ii) Kitchen waste
(iii) Grass and leaves
(iv) Crop residues

5. Grade nine learners of Jafran school visited a farm and saw some activities being carried out. Identify the activities.

(a) Uprooting weeds
(b) Digging out weeds

6. Which organic gardening practice is demonstrated by the activities shown in pictures a and b above?

Mechanical weed control

7. What is organic foliar feed?

Organic foliar feed is a liquid fertilizer that is applied directly to the leaves of plants. It is made from natural ingredients such as seaweed, mexican sunflower, cowdung, poultry droppings and urine from animals such as rabbit and cows.

8. Farmers are advised to apply organic manures instead of artificial fertilizers. List three types of organic fertilizers.

(i) Farmyard manure
(ii) Compost manure
(iii) Green manure

9. **Mutesi is a farmer. He applies mechanical weed control in his farm to remove weeds. List three ways of applying mechanical weed control.**
(i) Mulching
(ii) Uprooting (handweeding)
(iii) Digging out

10. **List two examples of plants that can produce organic pesticides.**
(i) Neem
(ii) Pepper

11. **Mr. Mkulima wants to prepare green manure. List three materials he requires.**
(i) Leguminous plants (e.g., beans or peas)
(ii) Cover crops like clover or vetch
(iii) Grass or other organic plant materials

12. **Outline three importance of organic gardening.**
(i) Reduces environmental pollution by avoiding agro chemicals.
(ii) Improves soil health and structure by increasing organic matter.
(iii) Lowers cost of production.

Practice Assessment Exercise page 244

1. **Why should crop produce be stored properly?**
Crop produce should be stored properly to prevent spoilage, reduce loss due to pests and diseases, maintain the nutritional value, and ensure that it remains in good condition for later consumption or sale.

2. **Grade 9 learners were discussing about different storage structures that are used to store crop produce. Mention four structures that they discussed.**
a. Granary
b. Storage bag
c. Storage room
d. Container

3. Identify the storage structures shown below.
a. Plastic containers
b. Storage bags
c. Modern granary

4. **There are several practices that are carried out in preparing storage structures in readiness for storing crop produce. List five such practices.**
a. Cleaning the storage structures to remove dirt and old crop residues.
b. Treating the structures with pesticides or insecticides to prevent pest infestations.
c. Ensuring proper ventilation to prevent moisture build-up.
d. Checking for structural damages and repairing them.
e. Installing pest control systems such as traps or nets.

5. **Grade 9 learners were assigned the role of managing the stored crop produce in their school food store. Outline the ways in which they managed the produce.**
a. Regularly inspecting the stored produce for signs of spoilage or pests.
b. Ensuring that the storage area is dry, cool, and well-ventilated.
c. Checking moisture content.
d. Controlling rodents.
e. Disposing spoilt produce.

Practice Assessment Exercise page 249

1. What is a flour mixture?

A flour mixture is a combination of flour and other ingredients such as water, fats, sugars, which are mixed together to form a dough or batter that can be used to prepare various baked products.

2. Mention two types of flour mixtures that are commonly used in food production.

a. Dough.
b. Batter.

3. Identify the flour mixtures shown below.

(a) Thick batter.
(b) Dough.

4. Wanja wanted to prepare some pancakes for breakfast.

(a) Outline the procedure she followed to prepare batter for the pancakes.

1. Measure the flour and place it in a mixing bowl.
2. Add sugar, baking powder, and a pinch of salt to the flour.
3. Mix the dry ingredients together.
4. Add eggs, milk, to the dry ingredients.
5. Stir the mixture until smooth, forming a thick but pourable batter.

(b) Write the procedure she would follow to prepare the pancakes from the batter.

1. Heat a frying pan over medium heat and add small amount of oil.
2. Pour a small amount of the pancake batter onto the pan to form a round shape.
3. Cook for 1-2 minutes until bubbles form on the surface of the pancake.
4. Flip the pancake and cook for another 1-2 minutes until golden brown.
5. Remove the pancake from the pan and serve.

5. List 3 foods that can be prepared using dough.

a. Mandazi.
b. Chapati.
c. Doughnuts.

6. Grade 9 learners are planning to prepare mandazi from flour mixtures.

(a) List the ingredients they need to collect.

(i) Wheat flour.
(ii) Sugar.
(iii) Baking powder.
(iv) Warm water.
(v) Salt.

(b) Write the steps they will follow to prepare dough for making mandazi.

(i) Sieve the wheat flour and baking powder in a mixing bowl.
(ii) Add salt and sugar then mix then add water.
(iii) Knead the dough for a few minutes to make dough.
(iv) Cover the dough and let it rise for 1-2 hours in a warm place.

(c) List the requirements they will need to make the mandazi.

(i) Sufuria.
(ii) Cooking oil.
(iii) Rolling pin.
(iv) Roling board.
(v) Source of heat.
(vi) Mandazi dough.

(d) Write the procedure they will follow when making the mandazi.

1. After the dough has risen, punch it down and turn it onto a floured surface.
2. Roll out the dough to a thickness of about 1cm.
3. Cut the dough into desired shapes (usually triangles or squares).
4. Heat oil in the sufuria.
5. Fry the mandazi pieces in the hot oil until golden brow.
6. Remove the mandazi from the oil and drain.
7. Serve according to your desire.

7. Differentiate between batter and dough.

Batter is a liquid or semi-liquid mixture of flour, liquid (such as water or milk), and other ingredients, which is pourable.
It is used to make products like pancakes or cakes.

Dough is a thicker, firmer mixture of flour, water and other ingredients that is kneaded and used to make products like mandazi and chapati.

8. List two examples of products that can be made from the following types of mixtures.

(a) Dough.
- Mandazi.
- Doughnut.

(b) Batter.
- Pancakes.
- Muffins.

9. Identify the type of flour mixture that can be used to make the following products.
(a) Doughnuts - Dough.
(b) Drop scones - Batter.
(c) Queen cakes - Batter.

End of Strand Assessment page 250.

1. Define the term organic gardening.

Organic gardening is a method of gardening that avoids the use of agrochemical such as artificial fertilizers and pesticides.

2. List three examples of short-season crops that can be grown using organic gardening practices.

a. Lettuce.
b. Radishes.
c. Spinach.

3. List 4 organic gardening practices in crop production.

a. Use of organic pesticides.
b. Use of organic manure.
c. Use of mechanical weed control methods.
d. Use of organic foliar feeds.

4. Describe organic foliar feed.

Organic foliar feed is a liquid fertilizer that is applied directly to the leaves of plants. It provides essential nutrients, such as nitrogen, phosphorus, and potassium, which are absorbed through the plant's leaf surface for quick nourishment.

5. Write three ways of carrying out mechanical weed control.

a. Mulching.
b. Uprooting.
c. Digging out.

6. Name three plants that can be used to provide organic pesticides.
a. Neem.
b. Pyrethrum.
c. Garlic.

7. Name three types of organic manures.

a. Farm yard.

b. Compost.
c. Green manure.

8. Grade 9 learners of Green Light Junior School want to grow some vegetables using organic gardening practices. Outline how they will grow the vegetables.

(a) They will prepare the soil by adding organic compost and manure to improve soil fertility.
(b) They will choose appropriate crops for their climate and soil conditions.
(c) They will plant seeds or seedlings in well-spaced rows to allow proper growth.
(d) They will use mulching to retain moisture and suppress weeds.
(e) They will regularly monitor the crops for pests and use organic pesticides when necessary.

9. Give three importance of organic gardening in the production of healthy foods.

a. Organic gardening reduces exposure to harmful chemicals, ensuring safer food.
b. It promotes soil health and biodiversity, contributing to long-term food security.
c. It improves the nutritional value of crops by enhancing soil quality.

10. Write 4 ways of preparing storage structures before storing crop produce.

a. Clean the storage structure thoroughly to remove dirt and pests.
b. Treat the structure with insecticides or fungicides to prevent pest infestation.
c. Ensure the structure has proper ventilation to avoid moisture buildup.
d. Check and repair any damages or cracks in the structure.

11. List three examples of storage structures used to store crop produce.

a. Granary.
b. Containers.
c. Storage room.

12. List three examples of crop produce that can be stored in the storage structures.

a. Maize.
b. Millet.
c. Beans.

13. Name three common types of storage bags used to store crop produce.

a. Gunny bags.
b. Polythene bags.
c. Synthetic bags.

14. **Describe the steps you can follow to prepare a store room in readiness for storing crop produce.**

- Clean the store room thoroughly, removing any old produce or debris.
- Inspect for pests and apply necessary pest control measures.
- Ensure the room has adequate ventilation to prevent moisture buildup.
- Repair any holes or cracks in walls or windows to keep pests out.
- Set up appropriate storage bins or shelves for organizing the produce.

15. Stephen visited his grandparents. He found out that they use a traditional granary to store millet after harvesting. Write how Stephen can prepare the granary in readiness for storing the millet.

- Clean the granary thoroughly to remove any old crop residues and dirt.

- Treat the granary with a natural pesticide like neem to prevent insect infestation.
- Ensure the granary has proper ventilation to reduce moisture and prevent mould.
- Check the granary for any holes or cracks and repair them to keep pests out.

16. State and explain ways of managing and maintaining stored crop produce to reduce spoilage.

Regular inspection: Check stored produce regularly for signs of spoilage, pests, or diseases.

Maintaining proper temperature and humidity: Store produce in cool, dry places to prevent mold and decay.

Proper ventilation: Ensure storage structures have good airflow to reduce moisture buildup.

Use of natural pest control: Apply organic methods, such as neem or diatomaceous earth, to protect stored produce from pests.

17. List two types of flour mixtures.

a. Dough.

b. Batter.

18. List two types of batter.

a. Thick batter.

b. Thin batter.

19. State how you can prepare a flour mixture for making dough for mandazi.

Mix flour, sugar, and a pinch of salt in a large bowl.

Add yeast to warm water and mix it into the dry ingredients.

Gradually add water or milk and knead the mixture to form dough.

Let the dough rise for about an hour in a warm place.

20. Name three food products that can be made from various flour mixtures.

a. Bread.

b. Pancakes.

c. Scones.

3. Hygiene Practices

Practice Assessment Exercise page 255

1. Name three waste disposal facilities

a. Waste bins.

b. Sink.

c. Open drains.

2. It is important to ensure that waste disposal facilities are kept clean. Give four importance of keeping them clean.

a. Prevents the spread of diseases and pests.

b. Reduces foul odors.

c. Ensures the environment remains safe and hygienic.

d. Minimizes environmental pollution.

3. Mary was tasked by her mother to clean the waste bin in their home. Outline the procedure she followed to clean the bin.

a) First, Mary removes the trash bag from the bin and disposes of it properly.

b) She then uses water and detergent to wash the inside and outside of the bin.

c) After cleaning, she rinses the bin with clean water.

d) Finally, she wipes the bin dry using a clean cloth or paper towel before placing a new trash bag inside.

4. Why should a waste bin be lined with a trash bag?

A trash bag helps to contain the waste securely, making it easier to dispose of and preventing spills or leaks from the bin. It also

helps maintain the cleanliness of the bin and reduces bad smell.

5. Outline five requirements needed to clean an open drain.

a. Gloves.
b. Face mask.
c. Long-handled broom or brush.
d. Bucket or container for collecting waste.
e. Water and disinfectant.

6. Hassan wants to help his mother clean their kitchen sink.

(a) List the materials he will need for the activity:

(i) Liquid soap
(ii) Scrub brush or sponge.
(iii) Hot water.
(iv) Cloth or towel.
(v) Baking soda or vinegar (optional).

(b) State the steps he will follow to clean the sink:

a. First, he removes any food debris from the sink.
b. He then applies liquid soap to the sink and scrubs it with a brush or sponge.
c. After scrubbing, he rinses the sink thoroughly with hot water to remove any soap residue.
d. If necessary, he can sprinkle baking soda or apply vinegar for extra cleaning power.
e. Finally, he dries the sink with a clean towel or cloth.

7. **As grade 9 learners, you have been asked to clean open drains in the locality.**

(a) List the protective gear you will require to wear during the activity:

i. Gloves
ii. Face mask
iii. Gumboots
iv. Apron.
v. Safety goggles.

(b) Write the procedure you will follow when cleaning the open drains:

i. Put on protective gear such as gloves, face mask and gumboots.
ii. Remove any large debris or solid waste from the drain using a rake or shovel.
iii. Use a broom or brush to scrub the sides of the drain to remove stuck dirt.
iv. Pour water into the drain to wash away any remaining waste.
v. Finally, disinfect the area to prevent bacteria buildup.

8. In case your kitchen sink blocks, write the steps you can follow to unblock it.

- First, use a plunger to try and dislodge the blockage.
- If that doesn't work, pour boiling water down the drain to loosen grease or soap remains.
- Use a drain cleaner or baking soda and vinegar to clear the pipe.
- If the blockage persists, use a plumbing snake or auger to remove the obstruction.
- If all else fails, call a professional plumber to fix the issue.

9. The technician in charge of repairing blocked sink is known as a plumber.

Practice Assessment Exercise page 259

1. What is the meaning of the term 'disinfecting'?

Disinfecting refers to the process of cleaning and sanitizing an article to kill or remove harmful microorganisms, to prevent the spread of diseases.

2. **Name some of the clothing and household articles that need to be disinfected.**

a. Towels

b. Aprons

c. Handkerchiefs

d. Dustcoats

3. **Grade 9 learners learnt about different methods of disinfecting household articles. Mention five of them.**

a. Using salt

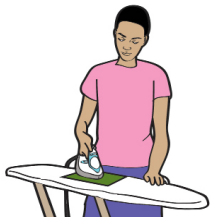
b. Ironing

c. Boiling

d. Using disinfectant

e. Sun-drying

4. **Identify the methods of disinfecting clothing and household articles shown below:**



a. Ironing

b. Sundrying

c. Using disinfectant

5. **Outline the procedure you would follow when disinfecting a pair of socks using salt.**

(a) First, dissolve a few tablespoons of salt in warm water.

(b) Submerge the socks into the solution and let them soak for 30 minutes.

(c) After soaking, remove the socks and rinse them thoroughly with clean water.

(d) Dry the socks in direct sunlight for effective disinfection.

6. **Koech's father works in a company where he uses a dust coat. Koech intends to disinfect his father's dust coat.**

(a) Name the methods he can use to disinfect the dust coat:

i. Boiling

ii. Ironing

iii. Using disinfectant

(b) List materials or requirements Koech needs to disinfect the dust coat:

i. Disinfectant

ii. Water

iii. Basin for soaking

iv. Iron box

(c) State the steps Koech can follow when disinfecting the dust coat:

i. Fill a basin with warm water and add the disinfectant.

ii. Submerge the dust coat in the solution and let it soak for 15-20 minutes.

iii. After soaking, remove the coat and rinse it with clean water.

iv. Hang the coat to air dry or iron it for additional disinfection.

7. **What is the importance of disinfecting clothing and household articles?**
   a. Prevents the spread of infectious diseases and bacteria.
   b. Helps to maintain a clean and hygienic living environment.
   c. Protects the health of individuals in the household by eliminating harmful pathogens.

End of strand Assessment page 260

1. **Name three waste disposal facilities used in the locality.**
   a. Sinks
   b. Waste bins
   c. Open drains

2. **Write three importances of cleaning waste disposal facilities.**
   a. Prevents the spread of diseases.
   b. Keeps the environment clean and free from bad smell.
   c. Reduces the risk of attracting pests like rodents and insects.

3. **Identify the following waste disposal facilities.**
   a. Open drain
   b. Sink
   c. Waste bins

4. **Grade 9 learners want to go and clean open drains in the market.**
   a. Name protective gear they should wear for the activity.
   i. Gloves
   ii. Gumboots
   iii. Face mask
   b. List two tools they will use during the activity.
   i. Shovel
   ii. Rake

5. **Write the procedure you will follow in your group when cleaning an open drain.**
   a. Wear protective gear (gloves, gumboots and face masks).
   b. Clear debris and blockages from the drain using shovels and rakes.
   c. Use water to wash out the accumulated dirt and debris.
   d. Ensure the drain is flowing freely and is not clogged.
   e. Dispose of the waste properly, either in a compost pit or waste bin.

6. Highlight the steps to be followed when cleaning a stainless steel sink.
   a. Rinse the sink with warm water to remove loose dirt and debris.
   b. Apply a non-abrasive cleaner or liquid soap to the surface.
   c. Scrub the sink with a soft sponge or cloth, focusing on any stains.
   d. Rinse thoroughly with water to remove any cleaner residue.
   e. Dry the sink with a clean cloth to prevent water spots.

7. **Mrs. Wahome uses a stainless steel sink in her kitchen. Write how she cares for the sink to avoid blockage.**
   a. Avoid disposing of food scraps and grease in the sink.
   b. Use a sink strainer to catch solid waste.
   c. Regularly clean the sink to prevent build-up of food particles.
   d. Rinse the sink with hot water to prevent grease accumulation.

8. Grade 9 learners want to clean plastic waste bins in their school.

a. List the materials and tools they will require.

i. Disinfectant
ii. Sponge or scrubbing brush
iii. Water
iv. Gloves

b. Write the steps they will follow when cleaning the waste bins.

i. Put on gloves to protect hands.
ii. Empty the contents of the bin into the appropriate disposal area.
iii. Scrub the inside of the bin with a sponge or brush using water and disinfectant.
iv. Rinse thoroughly with water to remove any residue.
v. Dry the bin before using it again.

9. Explain what you will do in case a sink used at your home gets blocked.

a. Try to remove any visible debris or food particles manually.
b. Pour hot water down the drain to loosen any grease build-up.
c. Use a plunger to attempt to dislodge the blockage.
d. If the blockage persists, use a drain cleaning solution or contact a professional plumber.

10. List 4 methods used to disinfect clothing and household articles at home.

a. Boiling
b. Using disinfectants
c. Sun-drying
d. Using salt

11. Give five examples of clothing and household articles that need to be disinfected.

a. Towels
b. Bed sheets
c. Handkerchiefs
d. Dust coats
e. Gloves

12. Describe how you can disinfect a white cotton dust coat by boiling.

a. Fill a large pot with water and heat it to boil.
b. Add a suitable disinfectant or bleach to the boiling water.
c. Immerse the white cotton dust coat into the boiling solution for 10-15 minutes.
d. Remove the coat, rinse it with cold water, and let it air dry.

13. Caroline wants to disinfect her handkerchief.

a. List the materials she needs to collect for the work.

i. Water
ii. Disinfectant or soap
iii. Basin or container
iv. Salt

b. Write the procedure she will follow.

(i) Soak the handkerchief in cold salty water
(ii) Wash the handkerchief in warm soapy water
(iii) Rinse the handkerchief thoroughly with clean warm water.
(iv) Hang the handkerchief to dry in direct sunlight.

14. Explain how you can disinfect an overall using a chemical disinfectant.

a. Fill a basin with water and add a suitable chemical disinfectant to it.
b. Immerse the overall in the disinfectant solution for 10-15 minutes.

c. After soaking, rinse the overall thoroughly with clean water to remove any chemical residue.

d. Hang the overall to air dry.

15. Write three importances of disinfecting clothing and household articles.

a. Prevents the spread of harmful germs and bacteria.

b. Helps to maintain a clean and hygienic environment.

c. Protects family members from infections and diseases.

4. Production Techniques

Practice Assessment Exercise page 264

1. What is grafting as a method of plant propagation?

Grafting is a method of plant propagation where a portion of one plant (the scion) is attached to a different plant (the rootstock) to grow together as one.

2. Name the three parts of a grafted plant.

a. Scion – the upper part of the graft that contains the desired variety.

b. Rootstock – the lower part of the graft, which provides the root system.

c. Graft Union – the point where the scion and rootstock join together.

3. Grafting as a method of crop propagation is carried out for various purposes.

a. Outline four purposes.

i. To produce plants with improved qualities such as better fruit yield.

ii. To propagate plants that do not grow true to seed.

iii. To overcome soil-borne diseases by using disease-resistant rootstocks.

iv. To combine the best qualities of two different plants.

b. Identify the purposes shown below:

i. For aesthetic purpose

ii. For improvement.

iii. For rejuvenation.

4. For the grafted plant to have a successful reunion, it is important to carry out some practices to take care of them. Mention four such practices.

a. Keep the graft union clean and free from pests.

b. Ensure proper watering to maintain hydration in the scion and rootstock.

c. Protect the grafted area from extreme weather conditions.

d. Use grafting tape or wax to secure the graft and prevent desiccation.

Practice Assessment Exercise page 267

1. Name five vegetables that are grown in your locality.

a. Spinach

b. Kales

c. Tomatoes

d. Cabbage

e. Carrots

2. Grade 9 learners were taught on methods of preserving vegetables. Mention one method that can be used to preserve vegetables at home.

Sun drying

3. Name the equipment drawn below:

Home-made sun dryer

4. **You have been asked to collect materials you will need to sketch and make a design of sun dryer. List three materials you will collect:**

a. Pencil
b. Ruler
c. Manilla paper

5. Grade nine learners were taken through the process of constructing a homemade sun dryer.

a. List the materials required to make a homemade sun dryer:

i. Wooden frame or pieces of timber
ii. Wire mesh
iii. Polythene sheet
iv. Nails or screws
v. A saw and hammer for cutting and assembling the frame

b. Outline the procedure they followed when making the homemade sun dryer:

i. Prepare the wooden frame by cutting the wood into desired lengths for the base and sides.
ii. Attach wire mesh to the base of the frame, ensuring it is tightly secured for vegetables to be placed on.
iii. Cover the frame with clear plastic or another transparent material to create a greenhouse effect, allowing sunlight to reach the vegetables.
iv. Assemble the structure by joining the frame components using nails or screws, ensuring stability.
v. Place the sun dryer in a sunny spot, preferably with good ventilation, to ensure effective drying.

6. How should vegetables be dried on a homemade sun dryer?

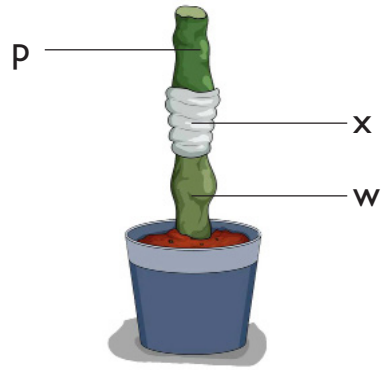
Vegetables should be washed, cut into appropriate sizes, and spread evenly on the mesh or trays inside the sun dryer. They should be turned regularly to ensure even drying. The sun dryer should be placed in a sunny location to allow the vegetables to dry thoroughly while being protected from pests and dust.

End of Strand Assessment page 267

1. What is grafting as a method of plant propagation?

Grafting is a method of plant propagation in which a piece of a desired plant (the scion) is attached to the rootstock (the base plant) of another plant.

2. The diagram below shows a grafted plant. Name the parts labelled P, X, and W.



P: Scion
X: Graft union
W: Rootstock

3. State three purposes for carrying out grafting in plants.

a. For aesthetic purpose.
b. For improvement
c. For rejuvenation

4. Write 4 ways of caring for grafted plants to ensure successful growth.

a. Ensure proper watering to keep the grafted area hydrated, but avoid over watering.
b. Protect the grafted plant from pests by using natural repellents or insect nets.

c. Prune excess growth to allow the graft union to heal properly.
d. Provide appropriate sunlight and temperature conditions for optimal growth.

5. List three materials needed to carry out grafting.

a. Sharp knife or grafting tool
b. Grafting tape or rubber bands
c. Rootstock and scion (parts of the plant to be grafted)

6. Collins intends to carry out grafting in a plant. Write the steps he will follow to practice grafting.

a. Choose a healthy rootstock and a compatible scion for grafting.
b. Prepare the grafting tools by sterilizing them to prevent disease.
c. Make a clean cut on the rootstock and scion, ensuring they fit together perfectly.
d. Join the scion to the rootstock, making sure the layers of both plants align.
e. Secure the graft with grafting tape or a rubber band.
f. Seal the graft union with wax to prevent infection and water loss.
g. Monitor the grafted plant for signs of successful union, such as new growth.

7. Grade 9 learners want to sketch a design of a sun dryer. List three materials they will need.

a. Manilla paper
b. Ruler
c. Pencil

8. List five materials and tools required when making a sun dryer.

a. Wooden frame
b. Wire mesh
c. Clear plastic sheet
d. Screws or nails
e. Saw and hammer

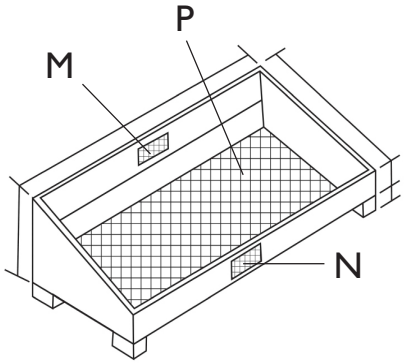
9. Name three types of crops that can be preserved using a sun dryer.

a. Kales
b. Spinach
c. Spinach

10. Your class is planning to construct a sun dryer. Write the procedure you will follow when making the sun dryer.

a. Cut the wood to the desired size for the frame of the sun dryer.
b. Assemble the frame using screws or nails to form a rectangular or square structure.
c. Attach the wire mesh to the base of the frame to provide a surface for drying the crops.
d. Cover the frame with a clear plastic sheet to protect the crops from dust and pests while allowing sunlight to pass through.
e. Place the sun dryer in a sunny spot, preferably with good ventilation, to ensure efficient drying.

The diagram below shows a sun dryer. Name the parts labelled M, N, and P.



M: Outlet vent
N: Inlet vent
P: Drying tray

12. Explain the steps you will follow to

use a homemade sun dryer to dry vegetables.

a. Clean the vegetables thoroughly and cut them into appropriate sizes for drying.
b. Arrange the vegetables evenly on the mesh or trays of the sun dryer, ensuring they are not overcrowded.
c. Cover the vegetables with a transparent plastic sheet to shield them from dust and insects while allowing sunlight to reach them.
d. Check the vegetables regularly and turn them to ensure even drying.
e. Remove the dried vegetables once they are fully dried and store them in an airtight container.

End of Term Assignments

Term 1 Assessment

1. Define the following terms:

a) Conservation

Conservation is the careful management and protection of natural resources to prevent their depletion and degradation.

b) Hay

Hay is grass or other plants that are cut, dried, and stored for use as animal feed during times when fresh forage is not available.

c) Animal feeds

Animal feeds are substances or mixtures provided to animals to supply necessary nutrients for growth, reproduction and health.

2. Mr. Kamau, a teacher of Agriculture asked his grade 9 learners to source for information on methods of conserving forage for future use. List three places where the learners could access the information from.

a. Agricultural extension officers
b. Local agricultural offices or extension centers
c. Agricultural books or research publications

3. State four methods that a farmer in Machakos county may apply to conserve hay for use during drought.

a. Baling hay
b. Putting in baling box
c. Storing in dry and well-ventilated place

4. Grade 9 learners of Bidii school carried out the activity below in their school farm. Name the activity.

Baled hay.

5. A farmer wanted to construct a wooden baling box to use in conserving hay. List 4 materials that he needed.

a. Wooden planks
b. Nails or screws
c. Hammer
d. Hinges (if applicable for closing the box)

6. During a lesson, learners of grade 9 discussed locally available materials that can be used to make forage. What are some of the locally available materials a farmer may conserve as forage?

a. Maize stalks
b. Grass
c. Leguminous plants
d. Sweet potato vines

7. Outline leftover foods at home.

a. Rice
b. Vegetables

8. Write the methods in which Mercy can

use to prepare leftover foods.

a. Reheating

b. Preparing another recipe

9. During a workshop, Sara was tasked to teach the participants how to embrace leftover food management as a lifestyle. What key points should she highlight?

a. Proper storage of leftovers

b. Preparing leftovers into new meals

c. Avoiding food wastage by planning portions

d. Reheating leftover

e. Using leftovers creatively for nutritious meals

10. During a school project, Ali demonstrated how to reduce food wastage by repurposing leftovers. What steps should he include in his presentation?

a. Identify common leftover foods (e.g., rice, bread, vegetables).

b. Demonstrate how to store leftovers properly (in airtight containers, refrigerate or freeze).

c. Show examples of how to repurpose them , vegetables into soups).

d. Encourage mindful portioning to prevent wastage.

11. Which crops can a farmer grow specifically for forage during the rainy season and conserve them for use during the dry season?

a. Lucerne (Alfalfa)

b. Napier grass

c. Clover

d. Guatemala grass

12. Define the term integrated farming.

Integrated farming refers to a system where a farmer combines crop production, livestock farming, and sometimes other agricultural activities (such as fish farming) on the same land to optimize the use of resources and enhance sustainability.

13. Mutua wants to start integrated farming on his plot of land.

a) List the components he may include in his farm.

i. Crop production

ii. Livestock farming

iii. Fish farming)

b) Explain their interdependence.

The crops can provide feed for the animals, while the livestock can produce manure that enhances soil fertility for the crops.
The waste from fish can be used as fertilizer, contributing to crop growth.

14. Learners of grade 9 at Bidii school were asked by their teacher to discuss how integrated farming contributes to conservation of resources. What were some of their points they presented?

a. Reduced soil erosion through the use of crop residues as ground cover.

b. Improved soil fertility through the use of animal manure.

c. Efficient use of water through crop and livestock integration.

d. Enhanced biodiversity by maintaining different types of farming activities.

15. Define the term organic gardening as used in food production.

Organic gardening refers to the practice of growing plants without the use of artificial or chemical.

16. Use the picture below to answer

questions that follow. Name the practice above

Integrated farming model

17. **Apart from conserving resources, list other three importance of carrying out the practice above.**
    a. Improves soil fertility.
    b. Diversity income.
    c. Adapting climate change

18. **Grade 9 learners were discussing organic gardening practices carried out in growing crops. Mention the practices they discussed.**
    a. Composting organic pesticides
    b. Using organic manure
    c. Use of mechanical weed control
    d. Use of organic foliar feeds

19. **What are the benefits of growing short-season crops organically?**
    a. Increases food availability in a short period.
    b. Reduces dependency on chemical pesticides.
    c. Enhances soil health through natural processes.
    d. Provides higher nutritional value as organically grown crops have fewer chemicals.

20. **Mrs. Juma, a teacher of Agriculture, asked her learners to name the facilities a farmer may use to store cereals after harvesting. List three examples of facilities her learners mentioned as their responses.**
    a. Granary
    b. Storage rooms
    c. Storage containers

21. **List five management practices carried out on crop produce storage structures to ensure produce doesn't spoil or get damaged.**
    a. Regular inspection of storage structures for pests and moisture
    b. Cleaning and drying the storage structure before use
    c. Proper ventilation
    d. Sealing cracks and holes to prevent pest entry
    e. Maintaining a low temperature in the storage area to reduce spoilage

22. **State three key safety precautions that a farmer must observe while handling stored crop produce.**
    a. Wearing protective gear (e.g., gloves, masks)
    b. Ensuring proper ventilation to prevent respiratory issues
    c. Proper handling to avoid injury

23. How can you prepare leftover ugali to avoid food wastage?
    a. Reheat it and serve with vegetable stew or any other stew.
    b. Repurpose it into ugali crumbs for making porridge or other dishes.

24. Michael visited his grandmother in the village. He observed that his grandmother's granary was dusty and had tiny holes. Describe the ways he can help his grandmother prepare the granary in readiness for storage of fresh produce.
    1. Clean the granary thoroughly to remove dust and any mold.
    2. Seal the holes to prevent pests from entering.

3. Ensure proper ventilation by making sure there is adequate airflow.
4. Apply a natural pesticide to prevent insect infestations.

25. Name two methods used to conserve forage.

a. Bale making
b. Staking

Term 2 Assessment

1. During a class discussion, learners mentioned the ways of controlling weeds. What is the importance of mechanical weed control in organic farming?

Mechanical weed control is important in organic farming because it reduces the need for chemical herbicides, helps preserve soil health, and minimizes environmental pollution.

2. What is the reason for drying cereals before storing them?

Drying cereals before storing them is crucial to prevent mold growth and reduce the risk of pests. It also helps in preserving the quality and nutritional value of the cereals for long-term storage.

3. Mr. Njuguna took his learners to visit a nearby farm. They observed that their host had prepared hay using the baling method. State three key benefits of this method of forage conservation.

a. It reduces wastage by compacting the hay into manageable, bundles.
b. It makes transportation easier due to the compact form of the bales.
c. It preserves the nutritional value of the forage by protecting it from moisture and pests.

4. Name three digital resources that learners may use to learn about forage conservation.

a. Smartphone
b. Computer
c. Tablets

5. Grade nine learners of St. Paul's academy were asked by their teacher to identify types of flour mixtures used in food production. What were some of their responses?

a. Dough
b. Batter

6. During a practical lesson, grade nine learners carried out the activity shown below. Identify the activity.

Making dough

7. List three different types of food products that can be prepared by the method above.

a. Bread
b. Pancakes
c. Mandazi

8. Describe the steps involved in preparing mandazi using flour mixtures.

a. Mix flour, sugar, and a raising agent (such as baking powder).
b. Add water or milk to form a smooth dough.
c. Knead the dough until it is soft and elastic.
d. Roll the dough into small balls or flatten into discs.
e. Deep fry the dough pieces until golden brown and crispy.

9. During a lesson, a teacher asked her learners to name examples of waste disposal facilities. Give three examples

of types of facilities they gave?

a. Waste bins

b. Sinks

c. Open drains

10. **What is the importance of cleaning a dustbin regularly?**

Cleaning a dustbin regularly prevents the buildup of unpleasant smell, reduces the risk of pest infestation, and ensures hygienic conditions in the environment.

11. **During a field study at a laundry shop, grade 9 learners were informed about the ways of disinfecting clothing. What are the ways of disinfecting clothes at home?**

a. Boiling

b. Using disinfectant

c. Drying clothes in the sun

d. Ironing

e. Salting

12. When grafting a plant, the upper part is known as scion.

13. **In a school, what is the importance of grafting a plant?**

Grafting is important in school as it helps in the propagation of superior plant varieties, improves fruit quality, and teaches students agricultural skills and techniques that can be applied in real-life farming.

14. **Mark, a grade nine learner was asked by his teacher to describe how he would disinfect his handkerchief using the boiling method. Which steps did he mention?**

a. Boil water.

b. Submerge the handkerchief in the boiling water.

c. Boil for about 10-15 minutes to kill germs.

d. Remove the handkerchief and let it dry in the sun.

15. **Name three vegetables that can be grown in the kitchen garden while observing the organic gardening practices.**

a. Spinach

b. Tomatoes

c. Lettuce

16. **Describe the steps you would follow in preparation of chapati using flour mixtures.**

a. Mix flour, salt, and water to form a smooth dough.

b. Knead the dough until soft and elastic.

c. Divide the dough into small balls.

d. Roll each ball into a thin circle.

e. Heat a pan and cook each chapati on both sides until golden brown.

17. **Name two methods of preparing leftover foods for consumption at home.**

a. Reheating

b. Repurposing into a new dish or preparing a new recipe.

18. **Grade nine learners were asked by their teacher to name examples of structures that a farmer may use for storage of pulses and cereals. List some of the structures.**

a. Granary

b. Storage room

c. Storage bins

d. Containers

19. **How does ironing contribute to the disinfection of clothing?**
Ironing at high temperatures kills germs and bacteria on clothing.

20. **Name three household articles that require regular disinfection.**
a. Kitchen towels
b. Gloves
c. Baby clothes

Grade 9 learners were seen carrying out the activity shown below. Use it to answer questions 21-23.

21. **Name the structure they were cleaning**
Open drain

22. **List some of the safety precautions they were to observe while carrying out the exercise.**
a. Wear protective gloves
b. Use non-toxic cleaning chemicals
c. Not inhaling chemicals
d. Use the tools safely

23. **Name the protective gear the learners are likely to use.**
a. Gloves
b. Face masks
c. Aprons

24. Describe the importance of cleaning open drains in a school environment.
Cleaning open drains prevents blockages, reduces the risk of waterborne diseases, eliminates bad smell and promotes a cleaner, healthier school environment.

25. **What precautions should be taken when handling cleaning chemicals at home?**
a. Wear gloves and goggles
b. Ensure the area is well-ventilated
c. Follow the instructions on the product label carefully

Term 3 Assessment

1. A farmer harvested and stored maize from his farm. However, he noticed pests infesting in his granary. What steps should he take to manage the pests and protect his produce?
- The farmer should first inspect the granary thoroughly to identify the pests.
- Remove any infested maize and dispose of it properly to prevent further infestation.
- Clean the granary by sweeping it to remove any debris or leftover produce.
- Use natural pest control methods such as placing neem leaves in the granary.
- Seal cracks and openings in the granary to prevent pests from entering.
- Use traps or insecticides (approved for food crops) to eliminate remaining pests.

2. **Describe the steps Teresia should follow to construct a homemade sun dryer.**
a. Collect materials such as wood, wire mesh, and nails.
b. Construct a rectangular frame using the wood to create the base of the dryer.
c. Attach a wire mesh to the frame for airflow and to support the drying materials.
d. Place the frame in an area with ample sunlight and ensure proper ventilation.

e. Secure a cover or roof (like transparent plastic or netting) to protect the produce from rain and pests while still allowing sunlight to pass through.

3. **During drought, David's livestock struggled to find food.**

a) What measures should he take to ensure that his livestock has food all through?

- David should conserve forage by drying grass and other plants for future use.
- He should grow drought-resistant forage crops and store them.
- Create a feed storage plan to ensure he has enough feed during drought periods.
- Establish a water conservation system to provide a steady supply of water to his livestock.

b) List examples of feeds he may conserve for future use.

i. Silage
ii. Hay
iii. Crop residues (e.g., maize stalks, grass)

4. **Linda observed that her vegetables were infested with pests and planned to use organic pesticides to control the pests. What natural materials can she use to prepare the organic pesticide?**

- Garlic
- Neem leaves
- Chili pepper

5. **Define the term grafting.**

Grafting is a propagation technique where parts of two different plants are joined together to grow as one. The upper part, called the scion, is joined to the lower part, called the rootstock, to combine desirable traits from both plants.

6. **During a field study lesson at Kinyua's farm, Grade nine learners were taught about the reasons for grafting in plants. Name four of the reasons.**

a. To improve plant resistance to diseases and pests.
b. To enhance fruit quality and size.
c. To propagate superior varieties of plants.
d. To speed up the growth of plants.

7. **What is plant propagation as used in production techniques?**

Plant propagation is the process of growing new plants from seeds, cuttings, grafting, or other methods to ensure continued production of specific plant varieties.

Grade nine learners saw the structure below at Jane's farm. Use it to answer questions 8-10.

8. Sun dryer

9. **List the locally available materials that a farmer may use to construct the structure above.**

a. Wood
b. Hammer
c. Nails
d. Wire mesh or netting

10. Describe the importance of the structure above.

The structure is essential for preserving crops produce.

11. Tonny visited his grandfather in the village who is a farmer. He noticed that his grandfather's granary is poorly ventilated.

a) How can they improve the ventilation?

i. They can install ventilation holes or windows on the walls of the granary to allow proper airflow.

ii. They can use wire mesh or netting to cover the ventilation openings to prevent pests from entering.

b) What is the importance of good ventilation in storage of crop produce?

Proper ventilation helps prevent moisture buildup, which can lead to mold and fungal growth.

It ensures air circulation, which helps in preserving the quality of the stored produce.

12. Write down the steps you will follow when drying vegetables in a home made sun dryer.

a. Prepare vegetables by washing them thoroughly and cutting them into small pieces.

b. Arrange the vegetables in a thin layer on the wire mesh inside the sun dryer.

c. Ensure the sun dryer is placed in a sunny area with good airflow.

d. Cover the vegetables with a transparent polythene sheet to protect them from pests and dust.

e. Check the vegetables regularly and rotate them to ensure even drying.

13. Ruth is a farmer and rears fish as well as growing vegetables. This practice is known as integrated farming.

14. Linda observed that her grafted fruit trees were not growing well. Describe two potential causes for this and how she can resolve them.

a. Cause: Poor graft union – The graft may not have properly fused, preventing the tree from growing well.
Resolution: Linda should check the graft for proper connection and ensure that the grafting technique was correctly followed.

b. Cause: Inadequate care or watering – The grafted tree might not be receiving enough water or nutrients.
Resolution: Linda should ensure the tree receives consistent watering and proper fertilization.

15. During a practical lesson, grade 8 learners were to prepare flour mixtures for chapati. What precautions should they take to ensure food safety?

- Wash hands thoroughly before handling the ingredients.
- Use clean utensils and surfaces for preparing the dough.
- Store ingredients like flour in a cool, dry place to prevent contamination.
- Ensure that the cooking area is clean and the food is cooked at the correct temperature.

16. Name three household articles that should be disinfected regularly.

a. Gloves

b. Towels

c. Bedsheets

17. David plans to use grafting to repair a damaged small avocado tree. What

are the main caring practices he must carry out after the grafting?

a. Water the tree regularly to keep the graft area hydrated.
b. Cover the grafted area with a plastic bag to maintain humidity.
c. Protect the grafted tree from strong winds and direct sunlight.
d. Monitor for any pest infestations.

18. When constructing a sun dryer, grade 9 learners painted the inside black. Give one reason for this.

The black colour helps to absorb more heat, which accelerates the drying process.

19. Apart from the use of disinfectants, list three other ways of disinfecting household articles.

a. Boiling
b. Sun drying
c. Soaking in saltwater or vinegar solution

20. Name one example of organic pesticide used in the farm.

Neem oil, ash

21. Name three methods of conserving forage for future use during drought.

a. Haymaking
b. Standing forage
c. Stacking

22. Describe the process of grafting in plants.

a. Select a healthy rootstock and scion.
b. Make a clean cut on both the rootstock and scion to match the cuts together.
c. Join the scion and rootstock tightly, ensuring good contact.
d. Tie the union with grafting tape or a similar material to hold them together.
e. Seal the graft to prevent infection and dehydration.
f. Ensure proper care by watering and protecting the grafted plant.

23. Sara's kitchen sink is clogged due to oil and food remains. Describe how she would unclog and clean it.

a. Remove large debris from the sink manually (e.g., food scraps).
b. Pour hot water down the drain to help loosen oil.
c. Use a mixture of baking soda and vinegar to break down the oil and grime.
d. Flush the drain with hot water after some minutes.
e. If still clogged, use a plunger or plumbing snake to clear the blockage.

24. Describe the process of preparing batter using flour mixtures.

a. Mix the flour, salt, and other dry ingredients in a bowl.
b. Slowly add water to form a smooth and thick batter.
c. Stir the mixture to remove any lumps.
d. Let the batter rest for a few minutes before use.

25. Project; with the help of your teacher of Agriculture use locally available materials to make a functional vegetable sun-dryer.

- Collect materials such as wood, mesh/netting, transparent plastic, and nails.
- Construct a frame to support the mesh for ventilation.

· Ensure the structure is positioned in a sunny area and can be easily covered to protect the produce from pests.

KJSEA Sample Paper

SECTION A: 30 MARKS

1. C
2. A
3. D
4. B.
5. A.
6. C
7. B
8. B
9. A
10. B
11. B
12. A
13. B
14. A
15. D
16. B
17. B
18. C
19. D
20. C
21. D
22. D
23. A
24. C
25. B
26. A
27. A
28. D
29. C
30. B

SECTION B: 40 MARKS

1. Conserving resources involves taking care of the things we use in our day-to-day lives.

a. Name two methods of conserving forage in coping with drought. (2 marks)

i. Hay making

ii. Standing storage

b. Mention two importance of conserving leftover foods at home. (2 marks)

i. Prevents wastage

ii. Saves money

c. There are two ways of conserving leftover foods. Name them. (2 marks)

i. Reheating

ii. Preparing new recipe

2. Grade 8 learners were learning about preparation of animal products. They visited a fish processing factory and were taken through how fresh fish is processed after being harvested from water to avoid spoilage.

a. Mention four processes that are carried out on the fish. (2 marks)

i. Cutting

ii. Scaling

b. Identify the method of dressing poultry carcass shown below. (1 mark)

Defeathering

c. Name two other methods of dressing poultry carcass. (2 marks)

i. Removal of offal

ii. Beheading

3. **During rainy season, a lot of water goes to waste. The water can be harvested and stored for farming purposes.**

a. Identify the methods of storing harvested water shown below. (2 marks)

a. Shallow water pan

b. Container

4. **Grade 8 learners in Joy School were taught about soil conservation measures. List two importance of conserving soil. (2 marks)**

i. Prevents soil erosion

ii. Improves soil fertility

5. **Food preservation is the process of preventing food from spoilage. Mention three methods used to preserve meat. (2 marks)**

i. Boiling

ii. Smoking

iii. Salting

6. **Grade 9 learners went on a field trip to learn more about integrated farming.**

a. Define Integrated Farming. (1 mark)

Integrated Farming is a system of farming where different types of farming activities such as crop cultivation and livestock rearing are carried out on the same farm.

b. List any three components of Integrated Farming they could have come across. (3 marks)

i. Crop production

ii. Livestock rearing

iii. Fish farming

7. **Grade 8 learners at Cleanliness school were learning hygiene practices. They learned methods of removing dirt from kitchen surfaces. Identify the methods shown below. (3 marks)**

a

Scrubbing

b

Wiping

c

Mopping

8. **Food security is an important aspect of a healthy society. To promote it, households should embrace kitchen gardens.**

a. Define the term 'Kitchen garden'

(1 mark)

A kitchen garden is a small-scale garden located near a home where vegetables, fruits, and herbs are grown.

b. What is the role of kitchen garden in food and nutrition security? (3 marks)

i. Provides fresh and nutritious food

ii. Reduces food costs

iii. Improves food availability

c. Innovative gardening helps maximize the small available space for crop production. Give 2 examples of innovative kitchen gardens. (1 mark)

i. Vertical gardening

ii. Horizontal gardening

9. Grade 8 learners visited a poultry rearing farm. Identify the structure below that they saw. (1 mark)

Poultry fold

10. Grade 7 learners were practising knitting during their lesson. Mention two items they could have knitted.

(2 marks)

i. Tool bags

ii. Scarfs

11. Drawn below is an example of a flour mixture.

Name two foods that can be prepared using the flour mixture shown. (2 mark)

i. Pancake

ii. Scones

12. Waste disposal facilities are structures for the safe handling and disposal of waste materials.

a. Mention two such facilities. (2 marks)

i. Waste bins

ii. Open drain

b. Give three reasons why such facilities should be cleaned. (3 marks)

i. To prevent bad smells

ii. To prevent the spread of diseases

iii. To enhance safety

PRE-TECHNICAL STUDIES

Activity 1pg 282

This are examples of raised platforms in pictures a, b, c, d, e, f and g.

Activity 2 pg 283

1. The learner to be able to use 15minutes to move around the school compound and identify the various raised platforms.
2. The group to take 2 minutes in presenting what they have identified within the 15minutes given.

Activity 3 pg 283

1. Fall Hazards

Most common risk. People can fall from the edge of a raised platform if guardrails or barriers aren't properly installed.

a) **Injury potential:** Sprains, fractures, head trauma, or even fatal injuries, depending on height.

b) **Structural Failure.**
If the platform is poorly designed, inadequately supported, or built with subpar materials, it may collapse under weight. Overloading with equipment or people beyond its weight limit can lead to sudden failure.

c) **Slips and Trips.**
Wet, uneven, or cluttered surfaces increase the chance of slipping or tripping - especially dangerous when near the edge.

d) **Improper lighting can make it worse.**
Lack of Guardrails or Edge Protection

i) Missing or inadequate guardrails make even a low platform risky.

ii) Platforms over certain heights (often 4 feet or 1.2 meters in workplaces) typically require edge protection by regulation.

e) **Access Issues**
Ladders or stairs to access the platform may be steep, unstable, or improperly placed. People can fall while climbing or descending.

f) **Electrical Hazards**

- If electrical equipment is used on or near a platform, any contact with faulty wiring or exposed components can cause shocks or fire risks.

Improper use of platforms designed for temporary use (like scaffolding) can be misused as permanent walkways or storage.

2. Falling Objects

- Tools or materials falling off raised platforms can injure people below.
- Toe boards and netting are sometimes required to mitigate this.

3. How raised Platforms cause Accidents

Trips and Falls

- When someone doesn't see the change in elevation or misjudges the height of the platform, they can easily trip or fall.

Slips

- Platforms made of smooth or wet surfaces can become slippery, especially in rainy or icy conditions.

Missteps

- If a person accidentally steps off the edge or misses a step, it can lead to ankle injuries, falls, or worse.

4. Share your discussion with the class and compare it with other groups.

Activity 4 pg. 284

1. General Safety Measures

- Conduct a Risk Assessment
  Evaluate potential hazards before starting work.
- Receive Proper Training
  Workers should be trained in platform safety and fall protection.
- Use Personal Protective Equipment (PPE)
  Hard hats or helmets.

<u>Platform Safety</u>

- Check Platform Stability
  Ensure the platform is stable and secure before use.
- Do Not Overload
  Follow the manufacturer's weight capacity, including tools and personnel.

- Inspect Before Use
  Look for damage, wear, or defects in the platform, rails and supports.
- Use Guardrails
  Guardrails or edge protection must be in place around the platform.
- Secure Tools and Materials
  Prevent falling objects by securing all items.
  Fall Protection

9. Install Toe Boards
   Prevent tools or materials from falling off the edge.

10. Use Fall Arrest Systems
    Wear harnesses and connect to secure anchor points when required.

11. Avoid Overreaching
    Move the platform rather than reaching beyond the edge.

2. This safety measures helps prevent:
- Falls.
- Slips and Trips.
- Fatal injuries.

3. Present to the class your findings and get their views and opinions.

Practice Exercise 1Pg 285.

1. a. Work platforms
   b. Ladder
   c. Ramp
   d. Work bench.

2. Safety measures when using a:

Trestle

a) Check for cracks, splits, loose rungs, or other damage.
Ensure all locking mechanisms are working properly
Place the trestle on firm, level ground.
Avoid slippery or uneven surfaces.

Steps
Inspect It First- Check for any damage like cracks, loose parts or bent steps.
Don't use it if its unstable.
Use the Right Height - Don't use a step that's too short or too tall for the job.

Workbench
Keep the area clean and organized: Cluttered work-spaces increase the risk of accidents.

Ensure stability - Make sure the workbench is stable and not wobbly before beginning any work.

Use proper lighting - Poor lighting can lead to mistakes or injuries.

Risk of Falling - People working or standing on raised platforms can fall off, leading to serious injuries.

Structural Collapse - If the platform is not well-built or overloaded, it can collapse.

Objects Falling from Height - Tools or materials might fall from the platform and injure people below.

4. Preventing Falls and Injuries:
   The most obvious risk is falling. Even a fall from a relatively low height can result in serious injuries such as fractures, head trauma, or worse. Safety measures like guardrails, harnesses and proper footwear help prevent these accidents.

· Legal and Regulatory Compliance:
  Failing to follow these can result in fines, legal liability, or shutdowns.

· Protecting Others Below:
  Tools, materials, or debris falling from raised platforms can injure people working or walking below. Using tool lanyards and toe boards helps reduce this risk.

· Structural Integrity and Stability:
  Ensuring the platform is stable and secure is vital. Overloading or improperly assembling a platform can cause collapse, endangering everyone on or near it.

· Emergency Preparedness:
Safety procedures ensure there's a plan in place in case something goes wrong ie like having a spotter, clear communication systems, or accessible emergency exits.

5. Ladder - Provides access to elevated areas
Trestle - Supports a surface for working on
Workbench - Provides support for a flat working surface
6. Preventing Falls.
Protecting Others Below
Ensuring Structural Integrity
7. Falls.
Trips.
8. Fall protection
9. Stability.
10. To prevent falls and protect people from injury.

HANDLING HAZARDOUS SUBSTANCES Pg 286.

A. Paraffin.
B. Laundry bleach
C. Poison.

Activity 3 Pg.289

1. Safe handling practices

a) Proper Storage: Store chemicals in dry, cool, and ventilated areas, ensuring incompatible materials are separated. Keep containers sealed to prevent leaks and vapors.

b) Personal Protective Equipment (PPE): Always wear appropriate PPE such as gloves, goggles, and protective clothing when handling hazardous substances.

c) Labeling and Documentation: Ensure all hazardous materials are clearly labeled, and maintain up-to-date Safety Data Sheets (SDS) for reference.

d) Training and Awareness: Regularly train all personnel on the risks associated with hazardous materials and the procedures for safe handling and emergency response.

2. Hazardous materials
Cleaning Chemicals: Disinfectants and detergents.
Fuels : Petrol, diesel and liquefied petroleum gas.
Corrosive Substances: Sulfuric acid and hydrochloric acid, often used in cleaning agents and industrial processes.

3. a) Cleaning Chemicals
Read labels and SDS before use to understand hazards and precautions.
Use in well-ventilated areas to avoid inhaling fumes.
Wear appropriate PPE, including gloves and eye protection.

b) Fuels
Store fuels in approved containers away from ignition sources.

Handle fuels in well-ventilated areas to prevent vapor accumulation.

Clean up spills immediately using appropriate absorbent materials.

c) Corrosive Substances
Always add acid to water, not water to acid, to prevent exothermic reactions.
Use chemical-resistant gloves and face shields when handling.
Store in corrosion-resistant containers with proper labeling.

4.a) Visual aids such as charts illustrating safety practices.

b) Real-life examples or case studies of hazardous material incidents and lessons learned.

c) Demonstrations of proper PPE usage or emergency response procedures

Activity 4 Pg.290

1. The learner to observe the pictures and the images and state the type of safety.
2. Wearing a mask and gloves.
   Wearing a gumboots and Overall.
3. Wearing a Mask-Prevents the farmer from inhaling chemical substances.
   Wearing gloves also prevents the farmer from direct contact with the chemical.

4 and 5. To prevent the user from direct contact with the substance.

6. Injury or Death: Accidents such as slips, falls, electrocution, or machinery mishandling can cause severe injuries or fatalities.
   Long-term Health Issues: Exposure to hazardous materials, repetitive strain, or unsafe environments can lead to chronic conditions like respiratory issues, musculoskeletal disorders or cancers.
7. Safety practices of handling Hazardous substances.

- Read Safety Data Sheets (SDS): Know the hazards *(toxic, flammable, corrosive etc)*
- Labeling: Ensure all containers are clearly labeled with hazard symbols and names.
- Training: Receive proper training on handling specific chemicals.

Activity 5 pg.290

Common Hazardous Materials in Workplaces:

Cleaning Agents:

Bleach *(sodium hypochlorite)*
Ammonia
Disinfectants

Chemicals:

Acids *(e.g. hydrochloric acid, sulfuric acid)*
Bases *(e.g.,sodium hydroxide)*
Solvents *(e.g. acetone, toluene, methanol)*
Pesticides and herbicide

Fuels and Flammable Liquids

Gasoline
Diesel
Propane
Kerosene

Gases:

Compressed air
Oxygen
Acetylene
Carbon dioxide

Industrial Materials:

Paints and varnishes
Adhesives and glues
Welding fumes
Asbestos *(in older buildings)*

Biological Hazards:

Molds.
Bacteria or viruses *(in healthcare or laboratory settings)*
Bodily fluids.

2.a) Protecting Health: Hazardous materials can cause serious health problems such as burns, poisoning, respiratory issues, or long-term diseases like cancer. Safe handling helps prevent these risks.
Preventing Accidents: Proper handling minimizes the chances of spills, explosions, fires, and other dangerous incidents.
Environmental Protection: Many hazardous substances can pollute air, water, and soil. Safe practices help reduce harm to ecosystems and wildlife.
Legal Compliance: Many laws and regulations require safe handling of hazardous materials. Failure to follow them can result in fines or shutdowns.

Workplace Safety: Ensures a safe working environment for all employees and boosts overall morale and productivity.

B. Health Risks: Exposure can lead to immediate injuries (like chemical burns) or long-term issues (like organ damage or cancer). Some effects may be irreversible.

- Environmental Damage: Spills or leaks can contaminate water sources, harm wildlife, and damage natural habitats.
- Accidents and Injuries: Mishandling can lead to fires, explosions, or toxic gas releases that injure or even kill workers and nearby individuals.

C. Proper handling of hazardous materials helps to:

Protect Workers: It reduces the risk of accidents, injuries or exposure to toxic substances that can cause serious health problems.

Protect Equipment: Proper procedures prevent damage to machinery and tools, which could result from spills, fires, or chemical reactions

Protect the Environment: It stops harmful chemicals from contaminating soil, water, and air, helping preserve ecosystems and wildlife.

D. Protection Against Physical Hazards

- Hard hats protect against falling objects.
- Safety goggles shield eyes from flying debris or particles.
- Gloves guard against cuts, abrasions or punctures.

Practice Exercise 2 Pg.291.

1. Why are hazardous substances labelled?
   To warn people about the dangers of the substance and to provide important safety information on how to handle, store, and dispose of it safely.
   To help prevent accidents, injuries, and health problems caused by improper use.
2. How are hazardous substances handled?
   They are handled using proper protective equipment (PPE), following safety instructions on the label or Safety Data Sheet (SDS) and ensuring proper storage and disposal procedures are followed.
3. List three types of hazardous substances in a workplace:
   (a) Cleaning chemicals *(e.g. bleach, disinfectants)*
   (b) Paints and solvents
   (c) Pesticides or industrial gases
4. List three types of hazardous substances and explain how each can be harmful in a workplace.

(a) Chemicals *(e.g., cleaning agents or solvents)*
-These can cause skin irritation, respiratory issues or even chemical burns if not handled properly.

(b) Asbestos - When disturbed, asbestos fibers can become airborne and inhaled, leading to serious lung diseases, including cancer.

(c) Biological agents *(e.g., bacteria or viruses)*
-These can cause infections or diseases, especially in healthcare or laboratory settings.

5. State two reasons why it is important to store hazardous substances properly.

(a) To prevent accidental exposure or spills that could harm workers or damage property.

(b) To reduce the risk of fire, explosions or chemical reactions caused by improper storage or incompatible substances being stored together.

6.

Substance	**Correct category**
Bleach	Poisonous
Gasoline	Flammable
Hydrochloric Acid	Corrosive

7. Explain two importance of wearing the following Personal Protective Equipment (PPE) when handling hazardous substances

(a) Gloves
   1. Protect the hands from direct contact with harmful chemicals, which can cause burns, irritation, or absorption into the body.
   2. Prevent the transfer of hazardous substances to other surfaces or people.

(b) Safety Goggles
   1. Shield the eyes from splashes, fumes or dust that could cause serious eye injuries.
   2. Improve visibility by keeping irritants out of the eyes, allowing the worker to safely handle the substances.

8. Describe what a *"safety label"* on a hazardous substance might include and explain how a worker can use this information.
   A safety label on a hazardous substance might include:
   - The name of the chemical.
   - Hazard symbols or pictograms.
   - Warning statements. *(e.g., "Flammable", "Toxic", "Corrosive")*
   - Instructions for safe use and handling.
   - First-aid measures.
- Emergency contact information.

A worker can use this information to identify the risks of the substance, follow correct handling procedures, use appropriate PPE and know what to do in case of exposure or an accident.

9. Which of the following substances is most likely to catch fire easily?
   (b) Kerosene
10. State two reasons why it is important to store hazardous substances properly.
   (a) To prevent accidental spills, leaks, or reactions that could harm people or the environment.
   (b) To reduce the risk of fire, explosion or contamination in the workplace.

Activity 6 Pg. 296.

Top Talents or Abilities:

1. Creative writing
2. Problem-solving
3. Public speaking

Chosen Talent: Creative Writing

1. Creative writing can lead to a potential career as a novelist, screenwriter, content creator or marketing copywriter. For example, someone who enjoys telling stories and has a strong imagination could write novels or short stories and publish them. Alternatively, this talent could be used in advertising or social media marketing, where engaging and persuasive writing is essential for connecting with an audience and promoting products or ideas.
2. Share your ideas with a partner and discuss why you think that career would be a good fit for you.
   If a learner is interested in becoming a graphic designer. I think this career would be a good fit for a learner because he/she enjoys being creative and working on visual projects. They also like using digital tools to create designs. I believe being a graphic designer would let them use their creativity every day, and they will enjoy working on different types of projects like logos, websites or posters.

Practice Exercise 3 Pg.297.

1. How are talents and abilities nurtured? State two ways.
   (a) Through education and training.
   (b) By regular practice and exposure to opportunities.
2. Why is self-exploration necessary for career development?
   Self-exploration helps you understand your strengths and weaknesses.
   identify your interests and values and make informed decisions about your career path.
3. List three talents or abilities you possess and explain how each one can be useful in a career.
   (a) Creative writing - Useful in careers like journalism, content creation or publishing.
   (b) Problem-solving - Important in careers like engineering, IT or management.
   (c) Public speaking - Beneficial for careers in teaching, law, or motivational speaking.
4. Artistic Ability - Graphic Designer
   Athletic Ability - Coach
   Communication Ability - Teacher
   Technical Ability - Engineer.
5. State two ways that understanding your abilities can impact your self-esteem.
   (a) It boosts confidence when you know what you're good at.
   (b) It helps you set realistic goals and feel proud of achievements.
6. Which of the following is an ethical practice related to using talents?
   B. Helping classmates with their projects.
7. List two challenges you might face while trying to develop your talents and suggest solutions for each.
   (a) Lack of resources - Solution: Seek scholarships, community programs, or online resources.
   (b) Fear of failure - Solution: Build confidence through small goals and learn from mistakes.
8. What is one benefit of collaborating with others who have different talents?
   C. It enhances learning and skills
9. Fill in the Blank:
   Feedback and constructive criticism are important because they help you improve your skills and talents.
10. List two examples of unethical practices related to the use of talents and explain why they are harmful.
   (a) Cheating on exams - It leads to unfair advantages and undermines true learning
   (b) Taking credit for others' work - It is dishonest and discourages teamwork and trust

2. COMMUNICATION IN PRETECHNICAL STUDIES

Activity 3 Pg.300

The learner to able to following instruction of drawing cavalier projection without instruments.

Activity 4 Pg 300

The learner to draw a cuboid without using an instruments.

Activity 5pg 300

The learners to draw a cuboid in oblique projection by following the right steps.

Practice Exercise 3 Pg.301.

1. What are oblique projections?
   Oblique projections are a type of pictorial drawing used to represent three-dimensional objects on a two-dimensional plane, where the front face is drawn in true shape and size, while the depth is represented at an angle.

2. List two types of oblique projections.
   (a) Cavalier projection
   (b) Cabinet projection

3. How are oblique drawings used in technical fields?
   Oblique drawings are used to quickly illustrate mechanical parts, furniture, and architecture in a clear and easily understandable format.

   They help in visualizing the design and dimensions without complex construction techniques.

4. Front page.

5. What size of angle has been used to create the illusion of depth in the oblique drawing?
   Typically, 45° is used in Cavalier projection and around 30° to 45° in Cabinet. Based on image.

6. If full depth, it's Cavalier; if half-depth, it's Cabinet.

7. The learner to draw an oblique sketch of a cylinder.

8. State three instruments used when drawing an oblique drawing
   (a) Ruler
   (b) Set square
   (c) Compass

9. Prism.

10. Draw an oblique projection of a phone in
    a) Cavalier projection - Full depth
    b) Cabinet projection - Depth reduced by half

Practice Exercise 4 Pg 309.

1. How are applications developed using visual programming software?
   Applications are developed in visual programming software by dragging and connecting visual code blocks that represent programming logic, rather than writing text-based code. This allows users to build programs by arranging these blocks in sequences, loops, and conditions.

2. List three code blocks found under the block palette below:
   (a) Motion block
   (b) Looks block
   (c) Control block

3. State three visual programming language applications:
   (a) Scratch
   (b) Blockly
   (c) MIT App Inventor

4. What is the importance of visual programming language? State two of them:
   (a) Makes programming easier and more accessible for beginners.
   (b) Helps learners to understand coding The function of a code block depends on its type.

5. For example, a *"move 10 steps"* block in

Scratch moves the sprite 10 steps forward.

6. In what two ways can VPL be used in real-world applications?
   (a) Creating educational games and animations
   (b) Designing mobile apps or controlling robots

7. Describe how you would create a simple animation using a visual programming tool like Scratch:
   Choose or create a sprite *(character)*.
   Add a background.
   Use motion blocks *(like "move 10 steps")* to make the sprite move.
   Use looks blocks to change costumes for animation.
   Use control blocks like "wait 1 second" to control timing.
   Add an event block like "when green flag clicked" to start the animation.

8. Identify and explain the function of at least two blocks you commonly use in Scratch:
   (a) *"When green flag clicked"* - Starts the program when the green flag is clicked.
   (b) *"Repeat 10"* - Repeats the blocks inside it 10 times, useful for loops and animations.

9. What role do events *(e.g., "when green flag clicked")* play in VPL programs?
   Events are used to start or trigger actions in a program. They help the program know when to run certain sets of instructions, like clicking a flag, pressing a key or receiving a message.

3. Materials For Production Pg.310

The learner to be able to explore and understand the various classification of Wood.

Softwood (comes from coniferous trees)

Pine
Commonly used in furniture, flooring and construction.

Cedar
Known for its aroma and resistance to decay; used in outdoor furniture and closets.

Spruce
Often used in construction and making musical instruments.

Fir
Used in building and plywood production.

Hardwood (comes from deciduous trees)

Oak
Very strong and durable; often used in flooring and fine furniture.

Maple
Hard and dense; great for cutting boards and flooring.

Mahogany
Known for its beauty and used in high-end furniture.

Walnut
Rich dark color; used in cabinets and decorative items.

Activity 5 Pg.314

The learner in groups to search the Hard and Soft wood within their school environment and record their Findings in the Table provided.

Activity 6 Pg. 315

- Carpenter
- Builds frameworks, furniture, cabinetry, and other wooden structures.
- Often works on construction sites or in workshops.

- Joiner
- Specializes in crafting wood for the interior of buildings - doors, stairs, window frames, etc.
- More precise and detailed than general carpentry.
- Cabinet maker
- Builds high-quality wood furniture and cabinets.
- Requires precision, fine joinery, and finishing skills.
- Woodworker
- Broad term for people who craft items from wood.
- Includes artisans making bowls, toys, instruments, etc.

1. Construction
- Framing: Wood is widely used for building the structural framework of houses and buildings.
- Flooring: Hardwood like oak or maple is used for durable and attractive flooring.
- Roofing: Wooden trusses and rafters support roofing materials.
- Sheathing and subflooring: Plywood or OSB *(oriented strand board)* is often used to create walls and floors.

2. Furniture Making
- Crafting furniture: Wood is used to make tables, chairs, beds, dressers and cabinets.
- Decorative carving: Softwoods and hardwoods are carved into intricate patterns for aesthetic purposes.
- Veneering: Thin layers of fine wood are applied over cheaper wood to give furniture a polished look.

3. Carpentry
- Trim and molding: Wood is shaped into baseboards, crown moldings and other decorative trims.
- Door and window frames: Custom woodwork ensures proper fit and insulation.
- Built-in units: Carpentry includes making bookshelves, cupboards and benches directly into the home.

4. Boat Building
- Hull construction: Traditionally, wood like teak or mahogany is used for building hulls.
- Decking and interiors: Wood provides both strength and a classic aesthetic for boat interiors.
- Masts and oars: Especially in smaller or traditional boats.

5. Flooring and Paneling Trades
- Wood paneling: Used in homes and buildings for aesthetic interior walls.
- Wood tiles and planks: Engineered or solid hardwoods are cut and treated for various flooring styles.

Practice Exercise 5 Pg.315

1. Why is wood important in day-to-day life? Give three reasons.
   (a) It is used to make furniture such as chairs, tables and beds.
   (b) It is used as a source of fuel for cooking and heating.
   (c) It is used in construction for building houses and other structures.
2. Which picture above shows hardwood? Give a reason.
   (Picture "a" shows hardwood)
   Picture a shows hardwood because it has a dense grain pattern and is from a broad-leaved tree.
3. Which picture shows softwood? Give a reason.
   (Picture "b" shows softwood)
   Picture b shows softwood because it has a lighter color and is from a coniferous tree with needle-like leaves.
4. State two physical characteristics of:
   a) Hardwood
      • Dense and heavy.
      • Has a complex grain pattern.
   b) Softwood
      • Light in weight.
      • Has a simple, straight grain.
5. List two methods of preparing wood
   (a) Seasoning (drying the wood).
   (b) Sawing and cutting into planks or boards.

6. Grade 9 learners visited a nearby timber yard and noted that some timber was carefully stacked outside. State two reasons for this.
   (a) To allow proper air circulation for drying.
   (b) To prevent warping and cracking by exposing it to natural conditions gradually.

7. The headteacher of Bidii Junior School bought some desks for his learners. After one month, they noticed that the desks warped and became uneven, making it difficult for the learners to write comfortably. What could have caused this?
- The wood used was not properly dried before making the desks.
- Uneven exposure to moisture or heat caused the wood to expand and warp.

8. Explain one way of drying timber before use
- Air drying: Timber is stacked in a way that allows air to flow through it freely, reducing the moisture content gradually over time.

9. Describe the main differences between hardwood and softwood. Include at least three characteristics for each type of wood.
   Hardwood:
- Comes from broad-leaved, deciduous trees.
- Denser and heavier.
- Has a more complex and attractive grain pattern.

   Softwood:
- Comes from coniferous trees (with needles).
- Lighter and less dense.
- Has a straight and simple grain.

10. List three uses of wood in different trades and explain why wood is chosen for these specific applications.
    (a) Carpentry - for making furniture because it is strong and easy to shape.
    (b) Construction - for making beams and frames because it is durable and can bear weight.

(c) Artwork and carving - for making sculptures and decorative items because certain woods are easy to carve and polish.

3.2 Handling Waste Materials.

a) Plastic Waste Material
b) Broken glass material
c) Left out Timber.
d) Cans Waste Materials
e) Broken Light Materials
f) Broken bricks.

Plastic bottles
Glass bottles
Cut out trees.
Metal cans
Metal Lights
Bricks

Proper disposal of this wastes is very important in both Home and School to avoid and reduce on injuries and making the environment untidy.

Activity 2 Pg.317

1. Safe Disposal Methods for Different Types of Waste

Plastic Waste
- Recycling: Sort plastics by type and color; recycle through local programs like Taka Taka Solutions, which transforms plastic waste into new products.
- Reuse: Repurpose containers and bags to minimize single-use plastics.

Glass Waste
- Recycling: Clean and sort glass by color; Taka Taka Solutions also recycles glass into items like tumblers.
- Reuse: Repurpose glass jars and bottles for storage or crafts.

Metal Waste
- Recycling: Separate metals *(e.g., aluminum, steel)* and take them to scrap metal dealers or recycling centers.
- Reuse: Use metal containers and tools for as long as possible before recycling.

Wood Waste
- Reuse: Repurpose wood for furniture, composting, or fuel.
- Recycling: Some facilities accept untreated wood for recycling into mulch or particleboard.

Electronic Waste (E-Waste)

- Recycling: Take old electronics to certified e-waste recyclers; avoid disposing of them in regular trash due to hazardous components.
- Donation: If functional, donate electronics to schools or community centersConstruction Waste
- Reuse and Recycling: Salvage materials like bricks, wood, and metal for future projects.
- Proper Disposal: Dispose of non-recyclable materials at designated construction waste facilities to prevent environmental contamination.

2. Strategies to Reduce Waste Generation

- Opt for Reusables: Use cloth bags, refillable bottles, and durable containers to minimize single-use items.
- Compost Organic Waste: Convert food scraps and yard waste into compost for gardening.
- Mindful Purchasing: Buy only what you need; choose products with minimal packaging.
- Repair and Repurpose: Fix broken items instead of discarding them; get creative with repurposing materials.
- Educate and Advocate: Raise awareness about waste reduction in your community and support policies promoting sustainable practices

3. Waste Management Programs in Nairobi

- Taka Taka Solutions: Offers waste collection and recycling services across Nairobi, focusing on both organic and inorganic waste.
- Community Composting Initiatives: Women's groups in informal settlements engage in composting organic waste, improving environmental conditions and generating income.
- Sustainable Waste Management Bill 2020: Provides a legal framework for solid waste management in Kenya, emphasizing collection, transport, treatment, and disposal.
- Artificial Intelligence Initiatives: Projects in the Nairobi Metropolitan Region utilize AI to enhance waste management efficiency and encourage recycling.

Practice Exercise 6 Pg.319

1. State three ways in which waste materials are handled in your locality.
   (a) Waste collection by local council or waste management services
   (b) Sorting and recycling of plastics, paper, and metals
   (c) Composting of organic waste
2. Which of the following is a type of plastic waste commonly found in a school compound?
   b) Plastic bottles
3. What is the safest way to dispose of electronic waste like old computers?
   a) Recycle them
4. Plastic bottles.
5.

Waste Type	**Disposal Method**
Plastic waste	Recycle
Food scraps	Compost
Metal Cans	Reuse
Dry leaves	Burn (if necessary)

6. The process of turning organic waste like food scraps into a nutrient-rich material for the garden is called composting.
7. Metal waste, like aluminum cans, can be safely composted.
   b) False
8. Recycle.
9. Three types of recyclable waste that can be found in a school compound:
   (a) Paper *(e.g., used notebooks, worksheets)*
   (b) Plastic bottles
   (c) Aluminum cans
10. Explanation:
    It is important to sort waste into categories like recyclable, reusable, and compostable because it helps reduce the amount of waste that ends up in landfills, conserves natural resources, and protects the environment. Recycling and reusing materials save energy and raw materials, while composting helps return nutrients to the soil, promoting a healthier ecosystem.

4.0 Tools and Production

Activity 1 Pg 321.

1. Vise (Bench Vise)
- Use: Holds workpieces steady for sawing, drilling or filing.
- Common in: Workshops, garages, metal/ woodworking stations.

2. Clamps
- Types: C-clamps, bar clamps, pipe clamps, spring clamps, etc.
- Use: Temporary hold of materials together (e.g., while glue dries or during welding).
- Common in: Woodworking, metalworking, construction.

3. Pliers
- Types: Needle-nose, slip-joint, locking (Vise-Grips).
- Use: Gripping, twisting, pulling, or holding small parts.
- Common in: Mechanical, electrical, and general repair work.

4. Tweezers and Forceps
- Use: Precise handling of small objects.
- Common in: Laboratories, electronics repair, medical fields.

5. Chucks
- Use: Hold drill bits or rotating tools in drills and lathes.
- Common in: Machines and manufacturing.

6. Collets
- Use: Secure tools or workpieces in machine spindles.
- Common in: CNC machines, lathes, milling.

7. Magnetic Holders
- Use: Hold metal objects in place without mechanical pressure.
- Common in: Welding, metal fabrication.

a) Clip
b) Clamps
c) Spanner
d) Pliers
e) Tongs.

Activity 2 Pg.323.

Paper Clip	Clamp	Pliers
Spanner	Tongs	

Activity 6 Pg.327.

1. What challenges would you face if you tried to bend wires using your bare hands instead of pliers?
Bending wires with your bare hands can be very difficult, especially if the wire is thick or strong. You might not be able to apply enough force, and the wire could snap back and hurt you. It could also dig into your skin and cause pain or even cuts.
2. Consider how difficult it would be to grip the wire and how it might hurt your hands.
Gripping a thin wire tightly can be painful because the wire presses into your skin. If it's sharp or stiff, it could cause scratches or even pierce your hand. Without the right tool, it's hard to hold the wire steady and control its movement.
3. What problems might occur if you tried to hold pieces of wood together with your hands instead of using a G-clamp?
If you try to hold pieces of wood together by hand, they can easily slip or move, especially when cutting, drilling, or gluing. This not only makes the task harder, but it can also be dangerous. You might not get a clean or accurate cut, and your hands could get too close to sharp tools.
4. If you didn't use a spanner, how would you tighten or loosen a bolt by hand?
Without a spanner, it's very hard to get a good grip on a bolt. You might not be able to turn it tight enough, or you might hurt your fingers trying. There's also a risk of stripping the bolt *(damaging the edges)* if you slip, which makes it unusable.
5. Why is it important to use blacksmith tongs when handling hot metal during forging?
Hot metal can burn your skin instantly. Blacksmith tongs let you hold and move the metal safely while keeping your hands at a safe distance. Without them, you'd be at serious risk of painful burns and injury.

6. How would your papers look if you didn't use a paper clip to keep them together?
   Without a paper clip, your papers could get mixed up, lost, or disorganized. They might fall out of order or get scattered, especially if you move them around. A paper clip keeps everything neat and in one place.

Practice Exercise 8 Pg.327

1. B
2. What is the primary function of pliers in the workplace?
   B. To cut and bend wires
3. Paper clips.
4. Tongs.
5.

Holding Tool	Use
Spanner	Tightening bolts
G-clamp	Clamping timber
Paper clip	Organizing Papers
Blacksmith Tongs	Holding hot metals

6. False - A paper clip is not strong enough to hold heavy materials together.
7. Use the correct size spanner to prevent slipping and injury.
8. Three different types of holding tools used in workshops:
   (a) Vice (b) Clamp (c) Pliers
9. The purpose of using clamps in woodworking is to hold objects together during cutting or drilling.
10. It is important to use holding tools in the workplace.
    To keep materials steady, ensure accuracy, and prevent injuries caused by slipping or movement of the work piece.

Driving Tools

Activity 1 Pg.329

a) Hammer
b) Screwdrivers
c) Punches
d) Mallet
e) Spanner
f) Drilling machine.

Hammer
Driving or pulling nails.

Screwdriver
Install or remove screws.

Punches
Making a hole.

Mallet
To knock wooden pieces together

Spanner
Used in tightening or loosening bolts.

Activity 2 Pg.330.

The learner to be able to observe how the various tools are used.

Discussion Question Pg.335

How are driving tools used in day-to-day life?
Driving tools like screwdrivers, spanners and wrenches are used daily to tighten or loosen screws, nuts and bolts. They're essential for tasks like assembling furniture, repairing appliances, fixing vehicles, or even small tasks like changing batteries in toys or remotes.

What challenges did Akinyi face when trying to tighten the bolts without a spanner?
Akinyi likely struggled to get a good grip on the bolts, making it hard to turn them tightly. Without a spanner, she might have used her hands or an unsuitable object, which could slip, hurt her hand, or fail to apply enough force.

Why was Faith's task of fixing the chair difficult without a screwdriver?
Without a screwdriver, Faith couldn't properly tighten or loosen the screws holding the chair parts together. She may have tried using a knife or coin, which wouldn't fit well and could damage the screws or cause injury.

How did the experience of using makeshift tools teach the learners about the importance of having the right tools for the job?
The learners realized that makeshift tools are often ineffective and unsafe. This experience helped them understand that the right tools make work easier, faster and safer, leading to better results and less frustration.

Practice Exercise 9Pg.336.

1. Which of the following is a driving tool used to drive nails into wood?
   b) Claw hammer

2. What is the main function of a screwdriver?
   c) To drive screws into place

3. Clawhammer.

4. To drive in and out screws.

5.

Tool	**Function**
Mallet	Shapes or flattens materials
Spanner	Tightens or loosens bolts
Claw Hammer	Drives nails into wood

6. A mallet is used to drive screws into hard materials.
   False - A mallet is generally used to strike surfaces without damaging them, not for driving screws.

7. A _____ is used to tighten bolts and nuts in a safe and secure manner.
   Spanner

8. State one safety measure to observe when using a driving tool such as a hammer or mallet.
   Always wear safety goggles to protect your eyes from flying particles.

9. List two tasks that can be performed using a screwdriver.
   (a) Tightening screws on a door hinge
   (b) Loosening screws on an electrical outlet cover

10. Explain two reasons why it is important to use the correct driving tool for each specific task.
    Using the right tool ensures efficiency and makes the work easier and faster.
    It reduces the risk of damaging the material or injuring yourself.

4.3.Project

Practice Exercise 10 Pg.339.

1. What is the first step in identifying problems in the community?
   b) Exploring the community to establish problem.

2. Which of the following is not a suggested problem in the community?
   a) Lack of market for goods.

3. Dustbin.

4. Pliers

5.

Material	**Type**
Metal sheets	Recyclable
Wood	Compostable
Plastic containers	Non-recyclable

6. True - You should prioritize safety by wearing protective gear such as gloves when constructing the waste disposal bin.

7. The problem chosen to be solved by the group is improper waste disposal in the community.

8. One challenge you might face when obtaining materials for a project is lack of funds or resources.

9. Two possible ways to raise funds for the materials needed to make the waste disposal bin:
   (a) Organize a fundraising event *(e.g., bake sale, car wash)*
   (b) Seek donations or sponsorship from local businesses.

10. The waste disposal bin designed is a suitable solution for the community's waste disposal problem because it provides a safe, organized and environmental friendly way to collect and manage waste, helping to reduce littering and improve hygiene.

5.0 Entrepreneurship.

Discussion Questions.Pg.343.

1. What common services do all financial institutions offer?

   Most financial institutions offer the following common services:

   Savings accounts - Safe place to store money and earn interest.

   Checking/current accounts - For everyday transactions like paying bills or receiving salary.

   Loans and credit - Borrowing money for personal or business use, such as car loans, mortgages, or small business loans.

   Insurance services - Protection against financial losses *(health, life, property)*.

   Money transfer services - Sending and receiving money locally and internationally.

   Investment services - Options to grow wealth like fixed deposits, mutual funds or stocks.

2. How can these services benefit individuals in your community?

   Savings accounts help people plan for the future and deal with emergencies.

   Loans enable individuals to start businesses, buy land or pay for education.

   Insurance offers security in times of illness, death or disasters.

   Money transfers make it easier for families to support each other, especially those working in cities or abroad.

   Access to credit empowers local entrepreneurs to grow, creating jobs and boosting the local economy.

3. What is the importance of savings, loans, and insurance in day-to-day life?

   Savings provide financial stability, help cover emergencies and allow for future planning *(education, retirement etc)*

   Loans offer the opportunity to access funds for important needs or investments like farming, business, housing, or education.

   Insurance protects individuals and families from unexpected financial burdens such as illness, accidents or property loss.

4. Discuss how mobile banking and digital financial services have impacted the Kenyan economy

   Mobile banking and digital financial services (like M-Pesa) have had a huge positive impact on Kenya's economy:

   Financial inclusion:

   Millions of Kenyans, especially in rural areas, now have access to financial services.

   Faster transactions:

   People can send and receive money instantly, improving business efficiency and convenience.

   Growth of small businesses:

   Easier access to microloans and payments has boosted entrepreneurship.

   Reduced cash dependency:

   Mobile money reduces theft, fraud and improves money management.

   Government revenue:

   Digital transactions make it easier to track income and improve tax collection.

Discussion Questions Pg.344

1. Why are financial services like loans important for small businesses?

   Financial services like loans give small businesses the money they need to start, grow, or sustain their operations. With access to credit, entrepreneurs can buy equipment, stock up on inventory, hire workers, or expand their business, even if they don't have enough savings.

2. How do SACCOs and banks differ in helping small entrepreneurs in Kenya?

   SACCOs *(Savings and Credit Cooperative Organizations)*: Often more community-based and easier to access for small entrepreneurs. They usually have lower interest rates and more flexible loan terms.

   Banks: Offer a wider range of financial products and may provide larger loans, but they usually require more paperwork, collateral, and have stricter lending criteria.

3. What can financial institutions do to help more small business owners like Wanjiku?
Simplify the loan application process.
Offer training on financial literacy and business management.
Provide affordable loan options with flexible repayment plans.
Create tailored products for small and micro-enterprises.

4. Why is it important to manage money well when running a business?
Good money management helps a business stay profitable and avoid debt. It ensures there's enough cash for daily operations, saves for emergencies, and allows better planning for growth. Poor money management can lead to losses or even business failure.

Discussion question Pg.345.

1. Why is it important for the government to regulate certain industries like telecommunications or energy?
Some industries are essential for the country's economy and everyday life - like energy, water, and communication. Government regulation helps to:
Make sure services are affordable and reliable for everyone.
Prevent companies from abusing power (e.g., charging too much or providing poor service).
Encourage fair competition, so no one company becomes a monopoly.
Protect public safety and the environment *(especially in energy production)*.

2. How does the government support small businesses in Kenya?
The Kenyan government helps small businesses (often called MSMEs- Micro, Small and Medium Enterprises) in several ways:
Loans and Grants: Through programs like the Uwezo Fund and Youth Enterprise Development Fund.
Training and mentorship: Organizations like Kenya Industrial Research and Development Institute (KIRDI) offer support.
Reducing taxes or simplifying business registration (like Huduma Centres).
Providing markets through public procurement policies *(giving small businesses a chance to supply goods/services to the government)*.

3. What might happen if the government did not step in to protect consumers or promote competition?
Without government oversight:
a) Big companies could take advantage of consumers by raising prices or lowering product quality.
b) Small businesses might not survive because large companies could drive them out unfairly.
c) Essential services like electricity, internet and water might only be available to the wealthy.
d) The economy could become unstable, with higher unemployment and less innovation.

4. Can you think of any local businesses that are either run by or supported by the government?
Yes! Here are a few examples from Kenya:
Kenya Power - Government-run, manages electricity distribution.
Kenya Meat Commission (KMC) - Supports the livestock industry.
Kenya Industrial Estates (KIE) - Provides small businesses with industrial space and loans.
Kenya Airways - Although partially privatized, it still receives government support.

Discussion Question Pg.345.

1. How does the government regulate businesses to ensure fair competition?
The government ensures fair competition through agencies like the Competition Authority of Kenya (CAK).
The CAK prevents big companies from taking advantage of smaller ones.
The Kenya Bureau of Standards (KEBS) also makes sure that all products meet quality and safety standards.
These regulations create a level playing field where all businesses can grow fairly.

2. In what ways does the government support small businesses in Kenya?
The government provides financial support through funds like:
Uwezo Fund
Youth Enterprise Development Fund Women Enterprise Fund
It offers training and mentorship to help business owners improve their skills.
It creates policies that make it easier for small businesses to access loans and grow.

3. What role does the government play in providing infrastructure and why is it important for businesses?
The government builds and maintains:
Roads
Railways
Electricity
Water supply
Internet services

This infrastructure makes it easier for businesses to:
Transport goods
Communicate with customers
Lower operation costs
Good infrastructure attracts investors and helps businesses grow.

4. Explain how government-owned enterprises contribute to Kenya's economy.
The government owns companies like:
Kenya Power
Kenya Railways
These companies:
Provide essential services to the public and other businesses.
Create job opportunities.
Generate income for the government through profits.
Public enterprises help the government meet important needs like transport and energy.

Activity 6 Pg.349.

1. Role of NTSA in Ensuring James's Motor Vehicle Business Operates Legally and Safely
The National Transport and Safety Authority (NTSA) plays a key role in regulating and ensuring road safety in Kenya. For James's motor vehicle business, NTSA:
Issues licenses for commercial vehicle operations (e.g., PSV licenses, driving school approvals).
Ensures compliance with road safety standards by inspecting vehicles for roadworthiness.
Registers vehicles, maintaining a record of ownership which helps in legal protection and accountability.
Enforces transport laws to reduce accidents and promote safe transport practices.
Provides driver testing and licensing, ensuring drivers employed by the business are qualified.

2. Importance of Business Registration and Licensing.
Registering and licensing a business like James's is important because:
Legal Recognition: It gives the business a formal identity, allowing it to operate legally.
Compliance with the Law: Prevents fines or closure due to illegal operation.
Access to Services: Enables access to government tenders, bank loans, and insurance services.
Consumer Trust: Customers feel safer dealing with a licensed, legitimate business.
Protection: Helps in protecting intellectual property (business name, logo) and resolving disputes.

3. Other Government Services or Agencies Involved in Supporting or Regulating Businesses in Kenya.
Kenya Revenue Authority (KRA) - For tax registration, filing, and compliance.
Business Registration Service (BRS) - Handles business name registration, company incorporation.

County Governments - Issue single business permits and regulate local operations.
NSSF and NHIF - For employee social security and health insurance contributions.
KEBS (Kenya Bureau of Standards) - Ensures products/services meet quality standards.
NEMA (National Environment Management Authority) - Regulates environmental compliance for businesses.
Kenya Industrial Property Institute (KIPI) - Handles intellectual property rights.

4. Importance of Licensing in Business
For the Business Owner:
Legitimacy: Builds credibility with customers and investors.
Access to Opportunities: Required for bidding on tenders or applying for business loans.
Protection: Shields from legal issues or penalties due to non-compliance.

Practice Exercise 11 Pg.351

1. The Competition Authority of Kenya (CAK) is responsible for ensuring fair competition and protecting consumers by regulating market practices to prevent monopolies and anti-competitive behaviour. It investigates and addresses unfair trade practices such as price-fixing, abuse of dominance and collusive tendering. The CAK also reviews mergers and acquisitions to ensure they do not harm competition. Additionally, it protects consumers by promoting transparency and fairness in the marketplace, ensuring that goods and services meet safety and quality standards.
2. The Kenya Revenue Authority (KRA) collects taxes to fund public services such as education and healthcare.
3. Standards Development
KEBS develops and promotes standards to ensure products and services meet specific requirements for quality, safety, and performance. These standards cover a wide range of sectors including agriculture, manufacturing, construction, and technology.

Product Certification
KEBS certifies products that meet the set Kenyan standards. Certified products are allowed to carry the Standardization Mark (S-Mark) or Diamond Mark of Quality, which assures consumers of the product's quality.

Inspection and Quality Assurance
KEBS inspects both locally manufactured and imported goods to ensure they comply with required standards. This includes conducting pre-export verification of conformity (PVoC) for imports.

Testing and Calibration
KEBS operates laboratories that test product samples to verify their quality and safety.
It also provides calibration services for measuring equipment to ensure accuracy in trade and industry.

Market Surveillance
It monitors goods in the market to ensure continued compliance with standards.
Substandard goods may be recalled or removed from the market.

4.a) Monetary Policy Implementation
Control inflation: CBK uses tools like interest rates and open market operations to control inflation.
Ensure price stability: Stable prices help foster economic growth.

b) Issuance of Currency
CBK is the only institution authorized to issue Kenyan currency.
Ensures the currency is secure, adequate, and meets economic needs.

c) Financial Stability and Supervision
Regulates and supervises banks and other financial institutions to ensure a stable financial system.
Licenses banks and monitors their operations.

d) Lender of Last Resort
Provides emergency funding to commercial banks facing liquidity problems to prevent financial panic.

e) Foreign Exchange Management
Manages Kenya's foreign exchange reserves.
Intervenes in forex markets when necessary to stabilize the shilling.

5.

Agency	Function
Kenya Revenue Authority	Collects taxes.
Competition Authority of Kenya	Regulates market competition.
Youth Enterprise Development Fund	Provides loans for small business.
Kenya Bureau of Standards	Ensures product safety standards.

6. a) Providing loans or grants to support startup and expansion efforts.
b) Offering training and advisory services to improve business skills and management.

7. List three reasons why the government is involved in business in Kenya.
(a) To protect consumers from exploitation and harmful products
(b) To regulate fair competition and prevent monopolies
(c) To provide essential services and infrastructure

8. Describe how the government helps promote economic stability in Kenya.
The government promotes economic stability through policies such as controlling inflation, managing interest rates, creating employment opportunities, and implementing fiscal and monetary measures to stabilize the economy.

9. Which government agency is responsible for maintaining quality standards for products in Kenya?
c) Kenya Bureau of Standards

10. Which of the following is NOT a reason for government involvement in business?
c) To discourage entrepreneurship.

Practice Exercise 12 Pg.359

1. A business plan is a written document that outlines the goals, strategies and financial projections of a business.
2. A business plan is only useful for large corporations, not small businesses.
False - Business plans are useful for both small and large businesses.
3. List three key components of a business plan:
(a) Executive Summary
(b) Market Analysis
(c) Financial Plan
4.

Executive Summary	A brief overview of the entire business plan.
Market Analysis	Analyzes market trends and competitors.
Financial Projections	Provides an overview of the business's expected earnings and expenses.
Marketing Plan	Outlines how to attract and retain customers.

5. Which of the following is NOT a component of a business plan?
Answer: c) Sales Target
Explanation: While sales targets may be discussed within a business plan, they are not typically listed as a core component. Executive Summary, Marketing Strategy, and Competitor Analysis are standard elements.
6. What is the primary purpose of financial projections in a business plan?
Answer: b) To estimate the business's financial status
Explanation: Financial projections provide forecasts of income, expenses, and profitability, helping stakeholders understand the expected financial performance of the business.
7. State the importance of the Executive Summary in a business plan.
Answer: The Executive Summary is important because it provides a concise overview of the entire business plan. It highlights the key points-such as the business idea, mission, financial highlights, and goals- and is often the first section investors or stakeholders read to decide if they want to learn more.

8. Fill in the dash.
Financial projections help businesses plan for the future and manage costs.

9.i. Clarifies Your Vision and Strategy
It forces you to define your business idea, goals, target market and value proposition clearly.
Helps turn abstract ideas into a concrete, actionable plan.

ii. Guides Decision-Making
Acts as a road map for making strategic, financial and operational decisions.
Helps prioritize activities and allocate resources efficiently.

iii. Attracts Investors and Funding
Investors and banks require a detailed business plan to evaluate the feasibility and potential return on their investment.
A strong plan increases credibility and shows you're serious.

iv. Identifies Potential Risks
Encourages you to think about market competition, financial challenges and operational issues in advance.
Helps you create backup plans *(contingency planning)*.

v. Sets Goals and Benchmarks
Outlines short-term and long-term goals with timelines.
Provides benchmarks to track progress and measure success.

10. a) Create Awareness
Let people know about your brand, product, or service.
Build recognition and visibility in a crowded market.

b) Understand Customer Needs
Research and analyze consumer behavior, preferences, and pain points.
Use insights to create better products or services.

c) Attract and Retain Customers
Develop campaigns that draw in new customers.
Build loyalty through consistent value and communication.

d) Communicate Value
Clearly explain how a product/service solves a problem or adds value.
Use messaging, visuals, and positioning to influence decisions.

e) Drive Sales and Revenue
Support the sales process with leads and demand.
Convert interest into purchases.

f) Build Brand Identity and Reputation
Shape how people perceive your brand.
Establish trust, authority, and emotional connection.

g) Stay Competitive
Differentiate your offerings from competitors.
Keep up with market trends and evolving consumer needs.

END OF TERM ASSESSMENT PAPERS Pg.360.

1. A welder wants to cut a section of a metal rod. Name one tool that the welder can use to cut it.
Angle grinder

2. During a lesson on composite materials, grade 8 learners were requested by their pre-technical teacher to make a sandpaper. List two composite materials they used.
(a) Adhesive *(glue or resin)*
(b) Abrasive particles *(such as aluminum oxide or silicon carbide)*

3. What is one reason why safety gear is essential in a work environment?
To protect workers from injuries and accidents

4. Mr. Musau asked his learners to name some ICT tools used in business communication. Please state two of them.
(a) Email
(b) Video conferencing tools (*e.g., Zoom or Microsoft Teams)*

5. Bricks
Tiles.

6. Explain two ways one can use economic resources sustainably:

(a) Recycling and reusing materials - This conserves raw materials and reduces the amount of waste produced.

(b) Using renewable energy sources - Utilizing sources like solar and wind power helps decrease reliance on non-renewable resources such as fossil fuels.

7. Safety in the workplace is crucial for enhancing productivity. Outline two safe working habits that can contribute to a safer working environment:
   (a) Wearing protective gear such as gloves, helmets, and goggles where necessary helps prevent injuries.
   (b) Maintaining a clean and organized workspace helps prevent accidents like slips, trips, and falls.
8. Bidii Junior School hired cooks to prepare meals for the learners. This helped improve labour in the school. List three characteristics of labour as a factor of production:
   (a) Labour involves human effort - both physical and mental contributions.
   (b) Labour is mobile - Individuals can relocate to different areas in search of employment.
   (c) Labour requires compensation - Workers are paid in the form of wages or salaries for their services.
9. List two types of injuries that can be caused by fire apart from burns:
   (a) Smoke inhalation - Breathing in toxic smoke can cause respiratory damage.
   (b) Fractures or bruises - These can occur while escaping or during emergency evacuations.
10. State one advantage of audio-visual communication over written communication:
    It enhances understanding by combining sound and visuals, making the message clearer and more engaging.
11. Tailors chalk.
12. A work Stage table.
    Folding work platform.
13. What safety measures should one observe when using the following raised platforms?
    i) Trestle
       - Ensure it is on a stable, level surface
       - Do not overload beyond its capacity
       - Use guardrails if available
    ii) Steps
       - Make sure steps are clean and dry
       - Use handrails while climbing
       - Wear non-slip footwear
14. Describe risks associated with working on raised platforms.
    - Falling from heights
    - Slipping or tripping
    - Platform collapse due to overloading
15. Karen has the following talents and abilities; she enjoys playing handball and skating. She also possesses problem-solving skills. What career pathway in senior school should Karen follow?
    - Sports Science or Physical Education with a focus on coaching or physiotherapy
    - Alternatively, Engineering or ICT if she wants to develop problem-solving in tech
16. Alexis wants to become a professional athlete; state two ethical practices she should exhibit in order to succeed in her career.
    (a) Discipline and commitment to training
    (b) Fair play and respect for opponents and rules
17. Gian, a grade 9 learner, discovered that her laptop was infected by a virus. State two things she should do to protect her data.
    (a) Install and run antivirus software
    (b) Backup important files to an external drive or cloud storage
18. List two Visual Programming Applications that can be used by learners during a coding lesson.
    (a) Scratch
    (b) Blockly
19. Name the fastest, biggest and most expensive computer when classifying computers according to size.
    - Supercomputer
20. State three components of the Central Processing Unit.
    (a) Arithmetic Logic Unit (ALU).
    (b) Control Unit (CU).
    (c) Registers.
21. Solid skate drive (SSD).
    Memory card
    Flashdrive
22. Four main parts of computer hardware related to processing and handling information:
    (a) Central Processing Unit (CPU)
    (b) Memory (RAM)
    (c) Storage Devices (e.g. Hard Drive, SSD)
    (d) Input/Output Devices (e.g., Keyboard, Monitor)
23. Two main categories of computer software:
    (a) System Software
    (b) Application Software

TERM 2 ASSESSMENT Pg.362.

1. State one safety measure you observe at home when using a raised platform:
   Ensure the platform is stable and placed on an even surface to prevent tipping or wobbling.

2. Name one use of the raised platform Gideon made:
   It can be used to reach high shelves or cupboards.

3. What advice would you give John to nurture his talent?
   John should continue to train regularly and work with a coach to improve his skills.
   He should also stay disciplined, maintain a healthy lifestyle, and balance his academics with sports.

4. Name two unethical practices to avoid as a talented musician.
   (a) Copying or stealing other musicians' work (plagiarism).
   (b) Taking drugs or using substances to enhance performance.

5.

Arts and sports science	**Graphic Designer**
Science, technology, engineering and mathematics (STEM)	Software Engineer

6.a) Computer Hardware
   Computer hardware refers to the physical parts of a computer system that you can see and touch, such as the monitor, keyboard, mouse, hard drive, and motherboard.

b) Computer Software
   Computer software refers to the programs and instructions that tell the hardware what to do. It includes applications and operating systems that run on the computer.

7.

System Software	**Application Software**
• Android	• Microsoft Word (word processing)
• iOS	PowerPoint (presentations)

8. Word
   Excel.

9.

Application Software	**Function**
Database management software	Used to create and manipulate databases
Spreadsheet software	Used to organize data in rows and columns
Informaton management software	Designed to administer learner enrolment and academic records

10. State two types of view in presentation of software.
    (a) Normal View
    (b) Slide Show View
11. Write a simple Excel formula that can be used to add two cells in cell B3 and C3.
    = B3+C3.
12. The learner to draw a Cavalier and Cabinet Projections in his/her exercise book.
13. Cavalier projection.
14. One difference between cavalier projection and cabinet projection is:
    In cavalier projection, the receding lines are drawn at full scale, while in cabinet projection, the receding lines are drawn at half scale.
15. Cabinet projection
16. The type of programming that uses graphics or blocks to create computer programs is called visual programming
17. State three applications of visual programming.
    (a)Game development
    (b)Educational tools *(e.g. teaching programming to beginners)*
    (c) Mobile app development
18. Esther, a Grade 9 girl in Lukenya Academy, was told by her Pre-technical studies teacher to name three visual programming applications. What answer did she give?
    Scratch, MIT App Inventor, Blockly
19. Code blocks
    Coding Area.
    Output Area.

TERM 3ASSESSMENT Pg.364.

1. Give a good reason for each of the following;
   i) Hardwoods are best in making furniture
   They are strong and durable.
   They have attractive grain patterns that enhance furniture appearance.
   ii) Softwoods are best in making paper
   They have long fibers that make strong paper.
   They are cheaper and more readily available than hardwoods.
2. State one difference between softwood and hardwood.
   Hardwood comes from broad-leaved trees, while softwood comes from coniferous trees.
3. Nora, a timber yard owner, finds that her customers prefer dry timber to wet one.
   Why do you think her customers prefer dry timber? Give two reasons.
   (a) Dry timber is lighter and easier to transport or work with.
   (b) It is stronger, more stable, and less likely to rot or warp.
4. Give a difference between conversion and seasoning as methods of wood preparation.
   Conversion is cutting logs into planks, while seasoning is drying the wood to remove moisture.
5. Write down one characteristic of softwood and one characteristic of hardwood.
   Softwood: Grows faster and is lighter in weight.
   Hardwood: Dense and more durable.
6. Mueni, a Grade 9 girl, was requested by her teacher to name three ways of disposing hazardous waste in her environment. What was her answer?
   (a) Incineration (burning at high temperature)
   (b) Proper landfill disposal
   (c) Recycling through special hazardous waste facilities
7. Name two ways of reusing plastic bottles
   (a) Using them as flower pots or garden planters
   (b) Turning them into water or storage containers
8. A farmer was spraying his crops with a pesticide using a knapsack sprayer. Name two ways he should practice to protect himself from the chemicals.
   (a) Wear protective clothing like gloves, mask, and goggles
   (b) Spray in the direction of the wind to avoid contact with chemicals
9. Clamp
   Spanner
   Pliers
10. State one use of each of the following holding tools.
    i) Blacksmith tongs - Used to hold hot metal pieces during forging.
    ii) Paper clips - Used to hold sheets of paper together.
11.

Tools	**Function**
Mallet	Used to drive a chisel to chip offwood
Hammer	Driving nails into wood
Screwdriver	Drives screws into wood
Spanner	Loosens bolt on engines

12. Kelsey wants to start a small business. Which financial institution should she visit in order to get a small loan?
    Answer: Microfinance institution or a commercial bank.
13. State two reasons as to why the government of Kenya is involved in business in Kenya.
    (a) To provide essential goods and services to the public.
    (b) To create employment opportunities.
14. Define the term business plan.
    Answer: A business plan is a written document that outlines a company's goals, strategies, target market and financial projections.
15. State three components of a business plan.
    (a) Executive summary
    (b) Marketing plan
    (c) Financial plan
16. What is the name given to a type of temporary raised platform structure in the form of timber or steel framework, elevated or suspended, that is used to support workers and materials?
    Answer: Scaffold or scaffolding.

17. State one use of each of the following raised platforms.
    a) Ladder - Used for climbing to reach high places.
    b) Trestles - Used to support planks or materials during construction or painting.
    c) Workbench - Used as a surface for working on projects such as cutting, assembling, or repairing items.
18. Njoroge, a grade 9 learner, is creative and loves working with design software. What career suits his talents and abilities?
    Answer: Graphic designer or digital animator.
19. Below are some keyboard shortcuts used when formatting a word document. What is the use of each?
    i) Ctrl + S - Saves the current document.
    ii) Ctrl + V - Pastes copied or cut content.
    iii) Ctrl + A -Selects all content in the document.
20. The learner to draw a Square brick of side 6cm in Oblique projection.

KJSEA SAMPLE PAPER Pg.366.

Section A (multiple)

1.	D	16.	B
2.	C	17.	C
3.	C	18.	A
4.	A	19.	A
5.	C	20.	C
6.	D	21.	B
7.	D	22.	D
8.	A	23.	A
9.	A	24.	B
10.	A	25.	A
11.	C	26.	C
12.	B	27.	A
13.	D	28.	A
14.	A	29.	D
15.	A	30.	A

Section B (Structered)

31. Technical drawings:
    a) Accurate and standardized.
    b) Use of specific line types and dimensions
    Artistic drawings: a) Creative and expressive.
    b) Freeform and not necessarily to scale
32. Scale 1:4
    10 m = 2.5 m on drawing
    8 m = 2 m on drawing
    Drawing dimensions: 2.5 m by 2 m
33. a) i) Head
    ii) Handle
    b) i) Driving chisels
    ii) Tapping wood joints without damaging them
34. a) i) Glass jars
    ii) Plastic bottles
    b) i) Pen holders from jars
    ii) Watering cans from bottles
35. In cabinet oblique drawing, depth lines are half actual depth.
    If depth = 5 cm x Depth lines = 2.5 cm
36. a) Furniture making
    b) Construction
    c) Fuel/firewood
37. a) Equilateral triangle
    b) Square
    c) Regular hexagon
38. a) Size of land/factory space
    b) Number of employees or machines
39.

Income Statement for Sarah:

Description		**Amount (Ksh)**
Sales		60,000
Cost of Goods Sold	(25,000)	
Gross Profit		35,000
Rent	(7,000)	
Wages	(12,000)	
Transport	(2,000)	
Net Profit		14,000

40. a) Educating consumers about their rights
    b) Reporting and regulating unfair trade practices
41. a) Demand for the product
    b) Competition in the market

42.a)

Goal	Time Frame	Amount Required	Action
Buy a laptop	6 months	20,000	Save 4,000 / month

b) i) Encourages disciplined saving

43. Answer: Projector

44.

Device	Category
Keyboard	Input
Monitor	Output

45. a) Facebook
b) Instagram (or Twitter/X, WhatsApp)

46. Correct order:
i) Press power button
iii) Wait for computer to start
iv) Use the computer
ii) Shut down computer

47. a) Teaching programming concepts
b) Creating simple animations or games

48. Cyberbullying

49. Formula: = B2 x C2
Total Cost for Item 2: 150 × 5 = 750

50. A cell is the intersection of a row and column in Excel (e.g., A1).
One function: It stores data or formulas for calculations.

CREATIVE ARTS AND SPORTS

1.1 Foundations of Creative Arts and Sports

1.1 Careers in Creative Arts and Sports

ASSESSMENT 1

1. Graphic designers, photographers, painters, book illustrators, book designers, potters, weavers, art teachers, sculptors, artists, advertisement poster artists, makeup artists, interior designers, and carpenters
2. These are the business opportunities that arise during the display and performance of creative arts and sports that earn business people money.
3. - Music festivals
   - Drama festivals
   - Art exhibitions
   - Sports days
   - Olympics competitions
   - TV shows
   - Museums
4. **Different answers for example:**

   The study of Creative Arts and Sports will help me learn and understand different swimming skills that will help me be a professional swimmer and represent my country in international games platforms such as Olympics.

ASSESSMENT 2

1. A play is a written work of literature that is in form of dialogue and is intended to be performed to an audience.
2. The elements of a play include;

- Plot: The sequence of events and actions that make up the story.
- Characters: The individuals who take part in the action of a play through their interactions, and each character has different characteristics and motivations.
- Setting: This is the time and place where the play occurs. It provides the atmosphere of the play.
- Conflict: The central problem that drives the play; it entails the issue that brings division among the characters and thus lead to opposing and supporting forces.
- Theme: The main issue being addressed in a play.

3. The ability of the human body to work properly and perform tasks, and activities without straining.
4. Physical activities that are performed to improve and maintain physical fitness.
5. Reaction time.
6. Five lines and four spaces.
7. G clef
8. The combination of both the treble staff and bass staff.
9. The left hand.
10. - Adding dots after them
    - Tying notes

ASSESSMENT 3

1. Texture
2. Harmony refers to the way different elements work together to create a unified and cohesive whole.
3. - Stippling
   - Crosshatching
   - Smudging
4. These are colours that lie next to each other on the colour wheel.
5. By mixing the colours green and yellow in equal quantities.
6. Colour mood is the emotional tone that colours and colour combinations evoke when looked at.
7. Cool colours like blue.
8. Dabbing is a painting technique where small, distinct dots or strokes of colour are applied to create texture and build form.
9. By mixing paint with water.

ASSESSMENT 4

1. a) dotted crotchet

   b) one and half beats.

   c) The dot increases the value of the crotchet by half a beat.

   d) 

2. In rhythms with 4/4 time each bar contains 4 beats, and each beat is typically a crotchet.
3. Body percussion is the practice of using the body to produce or imitate rhythmic patterns. Body percussion is executed by: clapping, snapping of fingers, stamping the feet, and tapping.
4. This is the attentive listening and correctly writing down rhythmic patterns that were heard.
5. 
6. a) crotchet

   b)The first and third notes in each bar.

ASSESSMENT 5

1. The triple jump flight phase consists of three phases:

- Hop: The athlete jumps off one foot and lands on the same foot. This phase is where the athlete uses their strength and momentum to propel themselves forward.
- Step: After landing on the same foot, the athlete steps forward onto the opposite foot.
- Jump: The final phase where the athlete jumps into the sandpit, landing on both feet. The goal is to reach the maximum distance covered in the air during the jump before landing.

2. Triple jump is considered a track and field event because it is part of the track and field field events category. Track and field events are traditionally divided into:

- Track events: The triple jump is classified as a track event since the athlete runs up in the (runway) track up to the take-off board.
- Field events; The triple jump is classified as a field event because it involves jumping over a specific distance, and it is measured from the take-off board to the landing spot in the sandpit.

3. The jump phase in triple jump;

- In the jump phase, after the athlete performs the hop and step, they attempt to land in the sandpit. The landing position involves both feet landing simultaneously.
- The athlete extends their legs and arms forward, preparing for a balanced landing.
- The athlete absorbs the impact of landing by slightly bending the knees, maintaining a balanced posture, and keeping their body upright to prevent falling forward or backward.
- The goal is to land as far as possible while maintaining stability .

4. Eliud Kipchoge is one of the most famous Kenyan long-distance runners.
5. Pacing in long-distance running refers to the control of speed throughout the race to ensure that the runner does not burn out before the finish-line.
6. To prepare for a marathon, I would observe the following;

a) Engage in daily training sessions to build up endurance, pacing and master the long distance running techniques.

b) Taking a balanced diet and ensuring that I take enough water to hydrate my body.

c) Race Day Preparation:

- Ensure that I have comfortable, weather-appropriate gear and shoes that you've already used during training.
- Get to the start line early to warm up, stretch, and mentally prepare before the gun goes off.

7. Mosaic is a picture making technique whereby individual distinct elements are combined to create a larger unified whole arrangement and organised piece of art.

8. a)Sketch on the support surface an athlete performing running or triple jump.

   b) Create the mosaic picture by sticking the materials onto the sketched area from step (a.) above.

   c) Fit in the materials and finish.

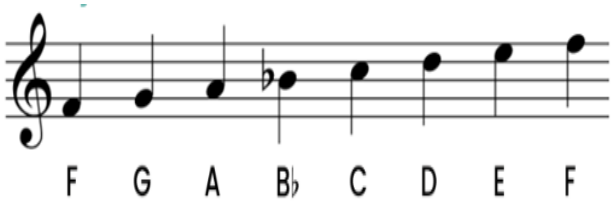
9. A mono-media mosaic is created using a single type of material to make uniform composition. For example, only using banana fibres or glass cuttings to create mosaic.

- Mono-media creates a sense of unity and harmony, emphasizing the overall design.
- Use of mono-media creates a consistent texture across the surface of mosaic.

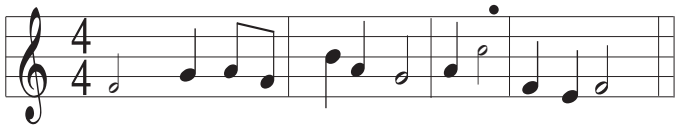
ASSESSMENT 6

1. This is the alliteration of a melody in various ways while maintaining recognizable elements.

2.



3.



4.

- Melodies are used in training to teach rhythm which helps athletes in proper timing and pacing in sports that require coordination, such as gymnastics, swimming and running.
- Melodic music increases athlete motivation, keeping athletes engaged during training and performance.
- Melodies with specific tempos energize athletes, and calmer tunes can promote focus and reduce anxiety.
- Melodies in team chants, anthems and background music unite players and fans, boosting morale and creating a shared atmosphere of excitement and support.

ASSESSMENT 7

1. By carrying, passing, or kicking the ball across the opponent's goal line or kicking the ball in between the goalposts and above the crossbar.

2.- When creating space when the defence is closing in, the basic pass is used to pass the ball to a teammate in a better position to exploit open space.

- In continuous play, the basic pass prevents the defence from settling.
- In a fast-moving attack, quick basic passes are used to maintain the speed of the game and to put pressure on the opposition.
- When drawing defenders: Pass after drawing in defenders to create overlap as the ball is passed to the teammates on the outside.

3.

4. A tee; a device that holds a ball off the ground so that a player can kick it for extra points.

5. A rugby playing technique whereby a player drops the ball by both hands and then kicks it before it hits the ground.

6. It means that the game involves physical interaction between players, often involving tackles; where players engage in direct physical contact with each other as part of the game's rules and objectives

ASSESSMENT 8

1. To keep memories of people, places, items, nature, buildings and events through images.
2. Digital camera, smartphone, tablets, drone cameras and webcams.
3. Bird's view photographs.
4. Viewpoint in photography refers to the angle and position from which a photograph is taken.
5. This is the process of adding descriptive information to a photograph.
6. - To provide context.
   - To add depth.
   - To guide the viewer's interpretation.

ASSESSMENT 9

1. To produce clear notes when playing a descant recorder, follow these key tips:

- I will make sure that my mouth is positioned correctly on the mouthpiece covering my lips over the mouthpiece to ensure free flow of air while blowing.
- I will blow a steady airflow from my diaphragm. This will help maintain consistency and clarity in sound.
- I will use my tongue to articulate notes clearly.
- I will ensure that my fingers are sealing the tone holes properly.
- I will maintain a consistent air stream by engaging my diaphragm.

2. Pinching on the descant recorder refers to slightly adjusting the breath pressure and partially covering the thumb hole on the back of the descant recorder to produce higher- notes.
3. Partially cover the back-hole using the left thumb finger

- Cover the first hole using the left index finger.
- Cover the second hole using the middle finger of the left hand.
- Cover the third finger hole using the left-hand ring finger.
- Cover the fourth hole using the right hand index finger.
- Cover the fifth hoke sing the middle finger of the right hand.
- Blow gently to produce the E1 note.

4. Ascending: F, G, A, B♭¹, C, D, E, F¹
- Descending: F¹, E, D, C, B♭¹, A, G, F.

5. It is use to indicate that the piece should be played with a gradual increase in volume.
6. It refers to the volume of sound and how it changes throughout a music piece.

ASSESSMENT 10

1. Dialogue is a conversation between two or more characters.
2. A playwright.
3. By following the stage directions indicated on the play script. The stage directions are the non-spoken words that are written in brackets to guide the actors' actions, costumes and emotions.
4. The sequence of events and actions that make up the story.
5. By practising my lines repeatedly, breaking them down into manageable sections that are easy to memorize in bits.

- By working on my voice projection and clarity.
- Experimenting with different tones and inflections.
- Learning how my character moves and carries themselves.
- Paying attention to my posture, gestures, and facial expressions.
- By engaging in consistent rehearsals and practice to help me build chemistry with other actors and strengthens my performance.
- Focusing on interactions with other characters, listening and responding realistically.
- Developing a rapport with the other characters to create a supportive and collaborative environment.

ASSESSMENT 11

1. By shooting the ball through the opponent team's hoop.
2. These are techniques applied to drive the ball between players to the aim of advancing in the court, and gain shooting chances.
3.

a) **Overhead pass:** the ball is held using both hands above the head of the player and then released by aiming at a teammate who is at a distance.

b) **Bounce pass:** is executed by bouncing the ball on the ground as it travels to the teammate, it is used when the opponents are blocking the air around the player with the ball.

c) **Chest pass:** is passed from the chest level in a straight line towards a teammate who is not tightly marked by opponents.

4. In high dribble the ball is bounced repeatedly on the ground at a higher position, around waist to chest level while in low dribble, the ball is bounced on the ground repeatedly closer to the ground at or below knee level.
5. - When a player has space and needs to cover ground quickly.
   - When a player is preparing for a shot or a pass.
   - When a player wants to maintain a defensive posture against opponents.
6. A logo is a symbol that is used to identify a Basketball team.
7. - Logos are placed on the team's playing kits, and their personal items such as caps, water bottles, and clothes to identify the basketball team.
   - Logos bring a sense of unity, pride for the team and team spirit.
   - Used to influence basketball team fan engagement.
8. - Images: Logos make use of pictures of basketballs players in action, hoops, or other basketball-related elements to convey the sport's dynamic nature.
   - **Names:** The name of the team is written using bold, and energetic fonts that reflect the spirit of the game.
   - **Colours:** Logos use a colour scheme that represents the team's identity. This is for easy recognition and loyalty among fans.
   - **Simplicity:** Effective logos are simple and memorable, making them easily recognizable.

ASSESSMENT 12

1. a) Pottery
   b) Incising
   c) Riverbeds
   - Swampy areas
   - Areas with clay soils especially where water stands after it rains.
   - Lake banks
2. Coiling is the pottery technique whereby clay is rolled up into long, thin pieces of clay, which are then stacked and joined together to shape a vessel.
3.
   - Removing impurities
   - Drying
   - Kneading
   - Wedging
4. Harden them for durability.
5. Weaving is a fabric production method whereby vertical threads are interlaced over horizontal threads.
6. A frame loom is a rectangular structure that holds warp threads rigid while allowing the weaver to interlace weft threads to create fabric or textile.
7. The 2/1 twill weaving technique is a type of weave whereby the weft yarn goes over two warp threads and under one weft thread.
8. The threads running vertically are called the warp threads, and the horizontal threads are known as the weft threads.

ASSESSMENT 13

1. Standing Dive is a water entry technique in swimming where the swimmer jumps into the water from a standing position with the head first.
2. When executing the butterfly stroke, the swimmer lies horizontal in the prone position facing the water. The swimmer's head is held straight looking down into the water. While breathing in, the swimmer slightly raises the chin to gasp air and return to position.
3. Diving is entering into a swimming pool.
4. - Breathing when the arms complete a stroke and begin to re-enter the water.
   - Breathing after every two strokes.
   - Keeping the chin in front of the forehead.
   - The head re-enters the water before your arms.
   - Turn the head back to the centre after each breath.
5. - Swim from the shallow end.
   - Do not swim alone.
   - Follow the teacher's instructions.
   - Be cautious when walking at near the pool; it may be slippery.
   - Do not run or push others near the pool.
   - Take regular breaks to allow the body to rest.
6. Knowing how to swim is a lifesaving skill since it reduces the risk of drowning. And a person who knows how to swim, can save a drowning individual.

ASSESSMENT 14

1. These are traditional recreational activities, games and sports that originate from various communities in Kenya and are part of their culture.
2. These are recreational activities that are played on a flat surface that involve moving small objects to score points.
3. Ajua
4. Learners to identify a board game played in his or her community and describe how it is played.

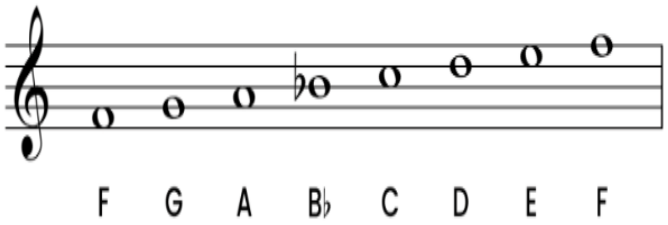
ASSESSMENT 15

1. Appreciation of Creative Arts and Sports involves recognizing, valuing and understanding the skills, effort, cultural significance and emotional impact of various forms of art and athletics performance.
2. If the performers stick to the set theme
   - If they have a clear and relevant setting
   - If the play characters face a conflict that they struggle to solve
   - I will look out if the characters have resolution to the conflict that they face
   - I will check on how the characters use their voices, and their body movements
   - I will evaluate if the audience have been involved and how they respond
   - If the props and costumes used are appropriate to the theme, setting and help in message delivery.
3. Doping is the use of banned substances to enhance performance in sports.
4. The challenges that hinder fairness, honesty and integrity during sports' competition.
5. A solo vocal piece of music
6. She will be disqualified from performing in any competition until she is clean.
7. An art catalogue is a publication that provides detailed information about artworks, that is created for an exhibition. It provides information that guides the viewers by describing the artworks and providing information about the artist.
8. The performer should perform the piece and repeat from the beginning up to the word fine.
9. Report them to the officials because it is unethical.

TERMLY ASSESSMENTS

END OF TERM 1 ASSESSMENT I

1. - Graphic design
   - Acting
   - Publishing
   - Sports management
   - Athletics
   - Football
   - Dancing
   - Teaching
2. Entrepreneurial opportunities are activities that one engages in so as to earn a living.

   Examples of entrepreneurial opportunities in creative Arts and sports include:
   - Bookshops
   - Beauty shops
   - Fashion and design
   - Decor
   - Face printing
   - Photography
   - Sports events management
3. - Power
   - Reaction time
4. - Adding a dot after a note- This extends note's duration by half of its original value
   - Using ties- A curved line is placed between two note heads of the same pitch to create a new note that is played as a single note.
5. 

6. Grand stave is a combination of both the treble staff and the bass staff and is connected using a brace.
7. Plot - This is the sequence of events and actions that make up the story.

   Resolution - This is the conclusion part of the play whereby conflict has been resolved and the characters are at peace with each other.

   Characters - These are individuals taking part in the action of a play.

   Setting - This is the time and place where the play occurs

   Language- There is the use of dramatic language that evoke strong feelings

   Conflict- This is the central problem that drives the play.

   Theme- The main idea being addressed in a play.
8. Sight reading of melodies in music is the ability to read and perform a melody from written notation without having seen or practised it before.
9. Harmony in drawing refers to the way different elements work together to create a unified and cohesive whole.
10. Blue, green, purple
11. They applied small, distinct dots or strokes of colour to create texture and build form
12. Accented beats in rhythms refer to the beats in a measure that are emphasized or stressed more than others.
13. Two minims
14. - Approach phase
    - Take off phase
    - Flight phase
    - Landing phase
15. - 5000 metres
    - 10000 metres
    - Half marathon - 21.1kilometres
    - Marathon - 42.195kilometers
16. - A colour wheel is a circular diagram that shows the relationships between different colours

Roles of a colour wheel

- Helps in choosing colour schemes
- Enables one to understand colour harmony
- Helps in mixing colours

17. 

18. Mosaic is a picture making technique whereby an individual , distinct elements are combined to create a larger unified piece of art .

19. Standing start

20. - Visual arts
    - Music and dance
    - Drama and film
    - Sports

21. - Used to motivate those participating in sports
    - Used to keep fans engaged during breaks
    - Used to create pace in sports like athletics
    - Used to alter perception and emotions of both players and funs

22. - Eliud Kipchoge
    - Paul Tergat
    - Wilson Kipsang
    - Brigid Kosgei
    - Vivian Cheruiyot
    - Beatrice chebet
    - Hellen Obiri
    - Andrew Kiptoo

23. Appreciation of Creative Arts and Sports involves recognizing, valuing and understanding the skills, effort, cultural significance and emotional impact of various forms of arts and sports.

24. a) Indigenous games are traditional recreational activities, games and sports that originate from various communities.
    b) Learner to list indigenous games from his or her community like Kiothi, ajua, shisima, bao

25. - Showering before entering swimming pool
    - Not eating while swimming
    - Avoid urinating in the pool
    - Wearing clean swim wear

END OF TERM 1 ASSESSMENT II

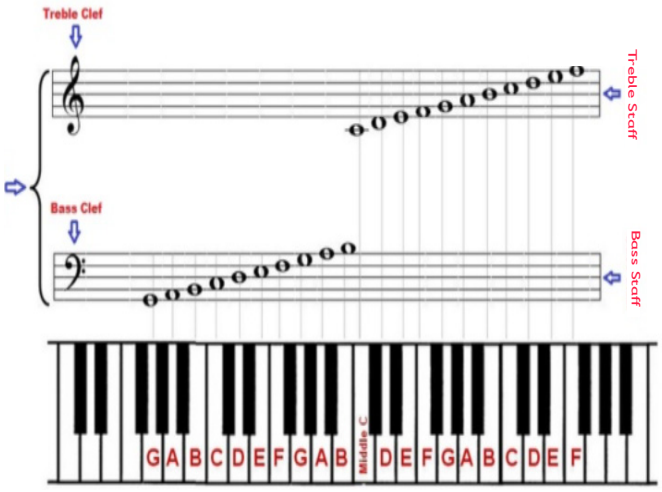
1.

	Visual Arts	Performing Arts	Sports
a)	Potter	Dancer	Footballer
b)	Painter	Actor	Athlete
c)	Sculptor	Musician	Swimmer
d)	Illustrator	Singer	Basketballer
e)	Graphic designer	Comedian	Volley baller

2. Fitness is the ability of the body to perform daily physical activities without getting tired and with enough energy left for emergencies.

3. (i) Art galleries
   (ii) Theatres
   (iii) Media houses
   (iv) Advertising agencies

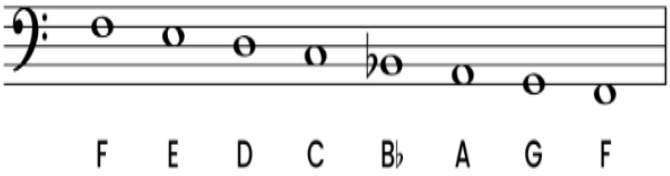
4. (i) Sprint start
   (ii) Dodging in tag games
   (iii) Catching a ball
   (iv) Hitting a moving target
   (v)Juggling
   (vi)Tennis

5. 

6. It increases the note's duration by half its original value.

7. A play is a scripted performance that tells a story through dialogue and actions, often performed on stage.

8.



9. Aural recognition is the ability to identify musical elements like pitch, rhythm, and instruments by listening.

10. Exercises are planned physical activities that improve or maintain physical health and fitness.

11. 4
4

12. Power is the ability to exert maximum force in a short period.

13. (a) Rough
(b) Smooth

14. Analogous colours are colours that are next to each other on the colour wheel and blend well together.

15. He created a green colour, which is a secondary colour.

16. (i) Smudging
(ii) Cross-hatching
(iii) Stippling

17. (i) Red
(ii) Orange
(iii) Yellow

18. A landscape painting shows outdoor scenes such as mountains, rivers, trees, and skies.

19. Monotone is when rhythms are composed using a single pitch or tone throughout.

20. 

21. Triple jump

22. Because it involves running which is a track event and jumping which is a field event.

23.
- On your marks
- Go

24. a) Tagging games are games where players chase and try to touch (tag) others to remove them or transfer roles.
b) Leaner to identify tagging game in his or her community
c) One player is chosen to be "it" and chases others. When they tag someone, that person becomes "it" and then starts chasing others

25. (a) Standing dive
(b) Body position
- When executing the butterfly stroke, the swimmer lies horizontally in the prone position facing the water.
- The swimmer's head is held straight looking down into the water. While breathing in, the swimmer slightly raises the chin to gasp air and return to position.

END OF TERM 2 ASSESSMENT I

1. (i) Visual Arts
(ii) Drama and film
(iii) Music and dance
(iv) Sports

2. The learner to identify career of his or her own choice then state its importance. For example:
Career: Artist
Importance: It helps develop creativity, technique, and self-expression needed in art.

3. Cross-hatching

4. Stippling is a drawing technique that uses dots to create texture, tone, and shading.

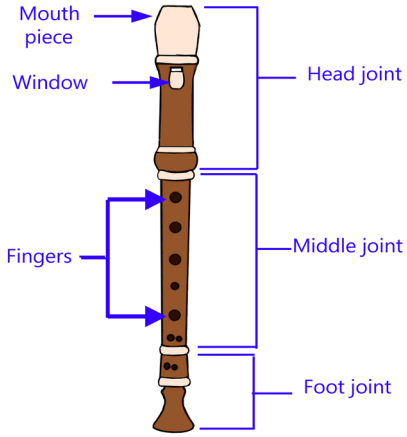
5.
- 5,000 meters
- 10,000 meters
- Marathon-42.195 kilometres
- Half Marathon-21.1 kilometres

6. Bar 1- Strong, Weak, Strong, Weak
Bar 2- Strong, Rest, Strong, Weak
Bar 3- Strong, Rest, Strong

Bar 4- Strong, Weak, Strong

7. The arms swing naturally and rhythmically close to the body to maintain balance and rhythm.
8. A melody is a sequence of musical notes that form a tune.
9. (i) Coloured paper
   (ii) Stones
   (iii) Ceramic tiles
   (iv) Shells
   (v) Banana fibres
   (vi) Broken coloured glass
10. Variation is changing a musical phrase slightly to add interest and creativity.
11. An arpeggio is a chord whose notes are played one after another instead of together.
12. Leaner to draw a short 4-bar melody and curve a line over it to show the phrase mark – like a musical sentence.
13.
- A question phrase ends in an incomplete or unresolved sound.
- An answer phrase resolves question phrase and sounds complete.

14. d r m f s l t d'
15. Hold the ball with both hands, flick your wrists while passing to create a spiral spin.
16. • Try – 5 points
    • Conversion – 2 points
    • Penalty kick – 3 points
    • Drop goal – 3 points
17. A tee is a stand used to hold the ball in place for kick-offs and place kicks.
18. (i) Camera
    (ii) Smartphone
    (iii) Tablet
    (iv) Laptop
    (v) Drones
    (vi) Webcam
19. Viewpoint is the angle or position from which a photo is taken.
20. Bird's eye view
21. (i) Recording events
    (ii) Telling stories
    (iii) Education
    (iv) Advertising
22.



23. F, G, A, B ♭, C, D, E, F
24. a)• Don't swim alone
    • Follow pool rules
    • Avoid running near the pool
    • Use floatation devices if needed
    • Do not eat while swimming
    • Do not push each other into swimming pool
    • Wear appropriate swimming costumes

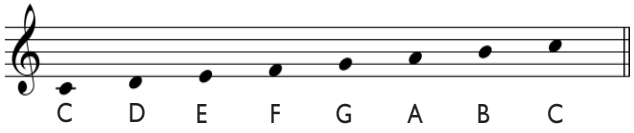
    b) Butterfly stroke

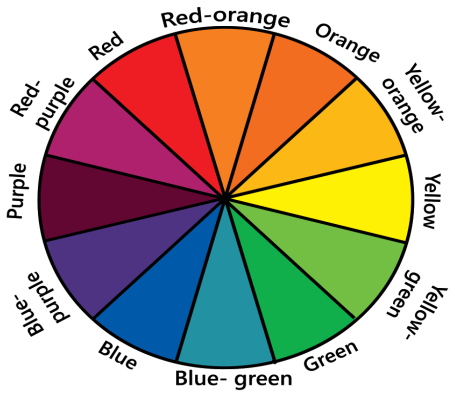
    c) Inhale quickly when head turns above water;
    exhale underwater.
25. a) Roles of indigenous tagging games:
    • Improve coordination
    • Build teamwork
    • Develop agility
    • Boost cardiovascular fitness

    b) Play in a safe open area
    Wear appropriate clothing and shoes
    No rough play
    Warm up before playing
    Set clear boundaries

    c) Learner to pick any indigenous game then describe how it is played

END OF TERM 2 ASSESSMENT II

1. (i) Music production
   (ii) Photography
   (iii) Fashion design
   (iv) Sports coaching
   (v) Sports event management
   (vi) Opening and managing an art gallery
   (vii) Beauty shops
2. The time a person takes to respond quickly to a stimulus.
3. (i) Characters
   (ii) Plot
   (iii) Setting
   (iv) Conflict
   (v) Theme
   (vi) Language
4. Ties are curved lines connecting two notes of the same pitch, combining their time values.
5. 

6. (i) Melody
   (ii) Rhythm
   (iii) Harmony
   (iv) Dynamics
   (v) Pitch
   (vi) Tempo
7. Dabbing is applying paint in small touches to create texture or highlights.
8. 

9. A seascape is a painting that focuses on the sea, ocean, or beach scene.
10. This refers to the way a painter moves the brush to apply paint and create texture or detail.
11.

Note value	Value	Rest
	$1^1/_2$ beats	
	3 beats	

12. 
13. Learners used clapping, snapping, stamping and tapping to produce rhythm.
14. (i) Mono media –It is created using a single
    type of material to make uniform composition
    (ii)Spacing of materials-This refers to the gaps left between materials stuck on the surface to create mosaic
15. (i) Choose a design
    (ii) Gather materials
    (iii) Arrange and glue pieces
16. (i) Spin pass
    (ii) Pop pass
    (iii) Basic pass
17. Normal viewpoint
18. A location with a beautiful view ideal for photography.

19. Cover thumb hole and holes 1, 2, 3, 4, and 6. Leave hole 5 open.
20. Partially covering the back hole to reach higher notes (octaves).
21. (i) Smartphone
(ii) Digital camera
(iii) Voice recorder
(iv) Computer

22. -Drug abuse
-Child labour
-Early marriages
-Bad governance
-Corruption

23. -Title
-Playwright
-Characters
-Acts
-Scenes
-Setting
-Stage directions
-Dialogue

24. a) Traditional games passed down within communities.
b) -Ajua
-Kiothi
-Shisima
-Bao

25. a)• Shower before swimming
• Avoid peeing in pool
• Don't swim when sick
• Clean pool regularly
b) Back float position
c) • Wear proper swimwear
• Warm up
• Listen to instructions

END OF TERM 3 ASSESSMENT I

1. - Musician is an example of a career in Creative Arts and Sports while owning a dance studio is an example of an entrepreneurial opportunity.
-NOTE: Leaner can use any other career or entrepreneurial opportunity to fill up the blank spaces above.

2. (i) Starting a sprint race
(ii) Catching a thrown ball
(iii) Table tennis
(iv) Dodging a fast-moving object
(v) Juggling

3. A tie is a curved line joining two notes of the same pitch to be played as one continuous sound.
4. A rest of a dotted minim lasts for 3 beats.
5. Harmony in drawing is the arrangement of elements to create a balanced and visually pleasing artwork.
6.
- Light sketch of the background
- Mix paint with water for thin consistency
- Apply light colours first
- Use different brushstrokes for texture and layering

7. Sight reading of rhythms is reading and performing rhythmic patterns without prior practice.

8. (i) Starting
(ii) Posture
(iii) Running cadence
(iv) Foot strike
(v) Arm swing
(vi) Breathing
(vii) Pacing
(viii) Hydration

9. The take-off phase in triple jump is executed by pushing off forcefully from the board to begin the hop with momentum and control.
10. Dynamics variation in melody means changing volume (loudness or softness) to express emotion.
11. 

12. (i) Drop kick
    (ii) Place kick
13. Water fall
14. **Captions** are short descriptions or explanations written below or beside photographs.

    Functions of captions

    -Provide context
    -Enhance understanding
    -Attract attention
    -Support storytelling
15 a) Crescendo – Gradually getting louder
    b) Diminuendo – Gradually getting softer
16. Stage directions are instructions in a script that tell actors how to move, speak or behave on stage.
17. Playwright
18. Bounce pass
19. A logo is a symbol used to represent a basketball team or event.
20. (i) Prepare clay
    (ii) Prepare the circular bade for your vessel
    (iii) Create coils
    (iv) Attach the first coil
    (v)Build upwards
    (vi)Smoothen the surface
    (vii) Dry the modelled vessel under a shade
21. Frame loom
22. Learner to design an art catalogue used when exhibiting an artwork like the one below:

    Gallery Name: Eronge Adventist exhibition hall.
    Artist's Name: Ivan Dhahabu Mwema.
    Title of Artwork: Kenya's pride
    Type of Artwork: Mosaic
    Medium: Glue and tesserae (small pieces of material)
    Subject Matter/Theme: Kenyan athletes' efforts to win medals and put Kenya on top of the Olympic championship list.
    Function: Educational, decorative.
23. Anti-doping is preventing the use of banned substances in sports.
24. a)Standing dive

    b) In butterfly stroke, the body stays horizontal with arms moving together and both legs kicking in a dolphin motion.
25. a) Indigenous board games are traditional games played using local materials, passed down through generations.

    b)The bao game

END OF TERM 3 ASSESSMENT II

1. Learner to name any career in Creative Arts and Sports like:

- Graphic Design
- Photography
- Teaching
- Football
- Acting
- Athletics

2. (i) Theatre
   (ii) Stadium
   (iii) Art gallery
   (iv) Music studio

3. (i) Waves
   (ii) Boats
   (iii) Clouds
   (iv) Rocks
   (v) Palm trees
   (vi) Ships
   (vii) Sea water

4. Note extensions are musical symbols that increase the duration of a note.
   Examples: A dot adds half the note's value, and a tie connects two notes of the same pitch.
5. A key signature is a group of sharps or flats placed at the beginning of a staff to show the key of a piece of music.
6. (i) Power
   (ii) Reaction time
7. The grand stave is two staves (treble and bass) joined together, used in piano music.
8. **Dabbing** is applying paint with short, quick taps using a brush or sponge to create texture on a surface.
9. Colour mood is the emotion created by a colour.
   Examples:
   Red = passion, Blue = calm, Yellow = happiness
10. 

11. They used one pitch but changed the rhythm using different note durations and rests to create patterns.
12. Mono-media means using only one type of material in making a mosaic.
13. 1. Draw the design
    2. Cut mosaic pieces
    3. Apply glue
    4. Arrange and stick the pieces of materials
14. In a drop kick, the player drops the ball and kicks it immediately after it bounces off the ground.
15. -Drone camera -Aerial camera
16. A colour wheel is a circular diagram showing colour relationships.
    It includes:
    - Primary colours (Red, Blue, Yellow)
    - Secondary colours (Green, Orange, Purple)
    - Tertiary colours (Red-orange, Yellow-green, etc.)
17. Pinching involves gently covering part of the thumb hole to help play higher notes on the recorder.
18. a) Scenes – Short sections in a play showing events at a specific time or place
    b) Acts – Larger sections of a play made up of scenes
    c) Stage directions – Instructions on movement, tone and setting for actors
19. **High dribble:** Used when moving fast in open space
    Low dribble: Used for control when closely guarded
20. Basketball logo
21. In 2/1 twill weaving, the weft thread goes over two warp threads and under one, forming a diagonal pattern.
22. 1. Wedging
    2. Kneading

23. Learner to design criteria for evaluating a play performance like the one below:

Criteria	Key enquiry	Remarks	Marks
Theme	a. Are you able to pick the theme out of the performance? b. Is the subject matter relevant to the society? c. Does it address pertinent issues in the society? d. Is the play encouraging social values and discouraging virtues? e. Does the performance bring out the theme fully? f. Are the characters communicating the message in a convincing manner?		/10
Setting	a. Where and when is the play set? b. Is the setting realistic? c. Does it bring a personal connection to the setting?		/10
Conflict	a. Are you able to tell the challenges that the actors are facing? b. What battle is the main actor facing? c. Are the actors working together to overcome the conflict? d. Is there an actor who is presenting the challenge that the main character is facing?		/10
Resolution	a. How do the actors resolve the challenges they face? b. Does the play get to a conclusive resolution?		/05
Use of voice	a. Are the voices of the actors clear and audible? b. Are the actors using correct tones, intonation and voice modifications to communicate feelings? c. Are the voices relevant to the age and gender of the characters that the actors are bringing out?		/10
Use of body movement	a. Are the actors making appropriate and swift stage movements? b. Are the body movements helping in communicating the message? c. Are the actors using intentional body movements that aid in communication such as facial expressions, gestures and proper stage management?		/10
Internalisation	1. Have the actors internalised the script in a way that they naturally reproduce the actions? 2. Is the dialogue among the actors natural?		/05
Audience involvement	a. Did the actors involve the audience through song, asking questions or pointing at them? b. Did the audience respond to jokes by laughing or sad scenes by crying? c. How did the audience respond to the end of the play? Did they clap? d. You as part of the audience, did you feel any connection to the play?		/10
Costumes	a. Do the costumes reflect the characters' lifestyle and culture? b. Are the costumes' colours complimenting the message delivery? c. Are the costumes comfortable and natural?		/10

Props	a. Are the props complimenting the theme? b. Are the props appropriate? c. Are the props aiding in bringing out the setting? d. Are the props movable? Do they change according to the setting of a scene?		/10
Overall impression	a. In your opinion, how is the play performance? b. Do the actors have chemistry? c. Did the actors achieve in creatively performing the play? d. Did the actors use props and costumes appropriately? e. Is it a good play performance? f. Will you watch it again?		10

24.

a) Start with a standing dive into the pool with arms extended. After entering, perform butterfly stroke with both arms moving together in a circular motion.

b)
- Shower before swimming
- Don't swim when sick
- Use clean swimwear
- Avoid urinating in the pool

25. a)Learner to identify any board game played in their community like Bao, ajua, kiothi, shisima

b) Leaner to describe how the game he or she has identified is played

c)
- Enhances focus
- Reduces stress
- Builds strategic thinking
- Promotes social bonding

KJSEA SAMPLE PAPER

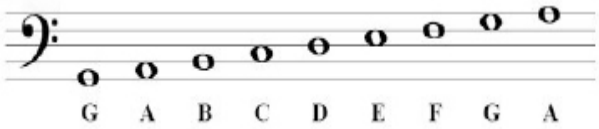
1. C
2. C.
3. B.
4. C.
5. A.
6. A.
7. C.
8. B.
9. A.
10. D.
11. A.
12. B.
13. C.
14. B.
15. B.
16. B.
17. C.
18. B.
19. A.
20. C.
21. C.
22. A.
23. C.
24. C.
25. D.
26. A.
27. C.
28. B.
29. B.
30. B.
31. B.
32. B
33. B.
34. B.
35. C.
36. B.
37. C.
38. C.
39. C.
40. C.

41. 

42. • The rhythm would be played by keeping a steady beat.
• The longer notes would be held while the shorter notes would be played quickly.

43. a) (i) Clapped loudly at the end of the play
(ii) Laughed or smiled during funny scenes
(iii) Gave a standing ovation
b)(i) Plot
(ii) Characters
(iii) Setting
(iv)Resolution
(v)Language
(vi)Conflict
(vii)Theme
c)(i) Helped define the characters
(ii) Enhanced the visual appeal and theme of the play

44. a) A career is a profession or occupation followed as one's life work.
b) (i) Actor/Actress
(ii) Musician
(iii) Dancer

45. 

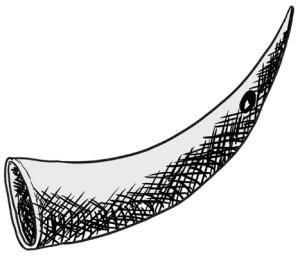
46. a)(i) Javelin throw
(ii) 100m sprint
(iii) Long jump
b) (i) Starting
(ii) Posture
(iii) Running cadence
(iv)Foot strike
(v) Arm swing
(vi) Breathing
(vii) Pacing
(viii) Hydration
c) Ethical issues in sports are actions that go against fair play, honesty, and respect, such as cheating or using performance-enhancing drugs.

47. a • Overhead pass: A passing technique where the ball is held above the head and thrown to a teammate
• Bounce pass: A pass bounced on the floor to reach a teammate.
• Chest pass: A passing technique whereby the pass is executed from the chest level
b. (i) To represent the team's identity
(ii) To market the team and merchandise

48. a) Kenyan indigenous board games are traditional games played using local materials and passed down through generations for entertainment and education.
b) Learner to identify any Kenyan board game like kiothi, ajua, shisima, bao and describe how it is played

49. a)(i) Stance
(ii) Take off
(iii) Entry
b. • The swimmer lifts the head forward during the arm pull.
• Inhales quickly before the arms recover above the water.
• Breathes every 1 or 2 strokes, then exhales underwater.

50. a) (i) Painting
(ii) Drawing
(iii) Collage
b)



c. Matting technique – This is a technique used in picture mounting where a piece of decorative board or paper called mat is placed around the artwork before framing.

51. a. Example: "Peaceful Village Life" or "Sunset in the Savannah"
b. Learner to design a category of the painting above.