

7.0 SCIENCE

The KCPE Science Syllabus consists of concepts in Agriculture, Science, Home Science and Emerging issues like environment and HIV/AIDS. The 2015 questions were sampled from all the topics in the syllabus and all cognitive levels were tested.

7.1 GENERAL PERFORMANCE OF CANDIDATES

The table below gives a summary on the candidature, mean raw mark and standard deviation in Science for the year 2015. The years 2010, 2011, 2012, 2013 and 2014 are also included for comparison.

Table 17: Performance of Candidates

YEAR	2010	2011	2012	2013	2014	2015
Number Sat	739,620	766,712	811,706	837,722	879,361	927,111
Mean Raw Mark	29.82	33.63	32.02	30.91	33.00	27.74
Standard Deviation	8.94	9.11	9.51	8.54	9.39	8.44

From the table, the year 2015 KCPE Science performance was lower compared to the last five years (2014, 2013, 2012, 2011 and 2010). The performance is however closer to that of the year 2010 in terms of the mean raw mark and the standard deviation. The candidature increased by **5.12%** (879,361 candidates in 2014 to 927,111 candidates in 2015).

7.2 SYLLABUS COVERAGE

Table 18: Syllabus coverage in the year 2015 KCPE Science

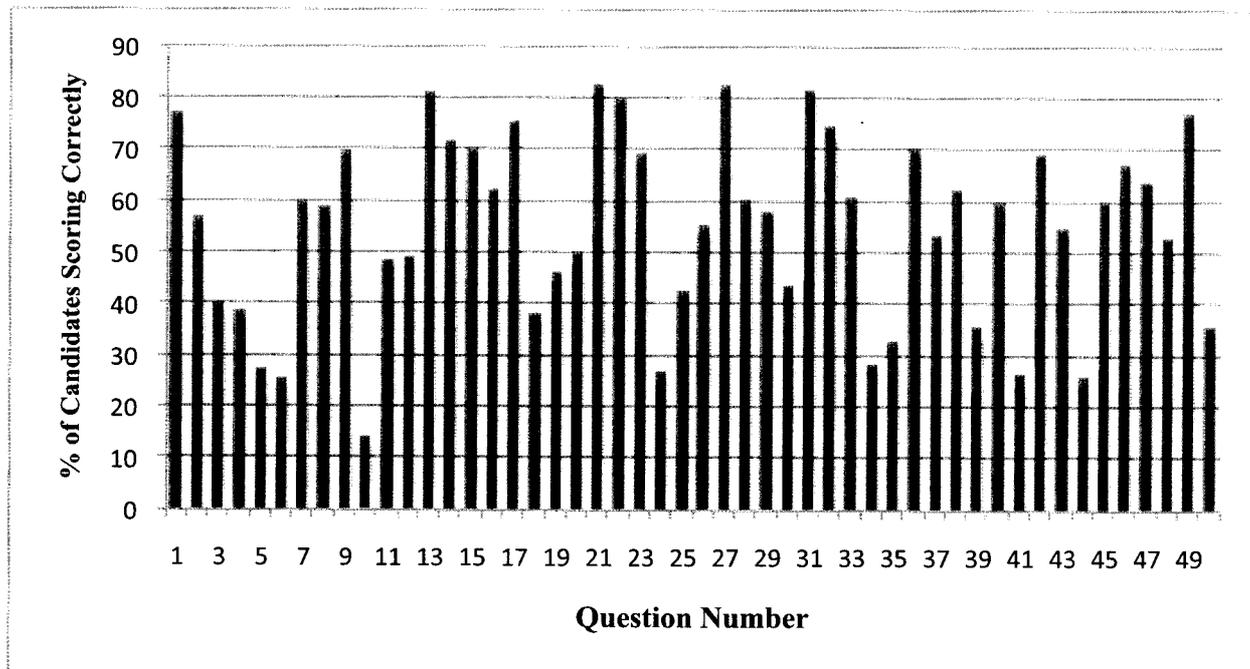
NO.	TOPIC	NO. OF ITEMS	PERCENTAGE
1.0	Human Body	5	10
2.0	Health Education	7	14
3.0	Weather and Astronomy	2	4
4.0	Plants	5	10
5.0	Animals	4	8
6.0	Water	3	6
7.0	Making Work Easier	3	6
8.0	Properties of Matter	4	8
9.0	Energy	7	14
10.0	Food and Nutrition	3	6
11.0	Environment	4	8
12.0	Soil	3	6
TOTAL		50	100

The number of items per topic is determined by the number of specific objectives allocated to each topic in the Primary Science Spiral Syllabus.

7.3 ANALYSIS OF PERFORMANCE IN SCIENCE ITEMS

The figure below shows the facility index of each of the 50 items offered in 2015 KCPE Science.

Figure 9



From the graph, four items (13, 21, 27 and 31) were popular to the candidates. More than 80% of the candidates scored correctly on these items. The popularity of the items could be attributed to adequate instruction by teachers or high difficult index of the items. These popular items combined well with a set of seventeen items which were scored correctly by less than 50% of the candidates.

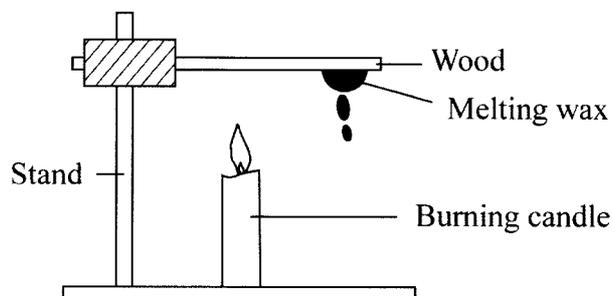
However, any item scored by 30% and below of the candidates is considered as having been poorly performed and hence unpopular to the candidates. In the 2015 KCPE Science, seven items (05, 06, 10, 24, 34, 41 and 44) had a facility index below 30%. These items and the percentage of candidates choosing the correct response are shown in the table below followed by a brief discussion on the response patterns.

Table 19: Question with a facility Index below 30% and below

Question Number	05	06	10	24	34	41	44
% of candidates choosing the correct response	26.97	25.04	13.84	26.75	28.24	26.18	25.68

Question 5

The diagram below represents a set-up that can be used to demonstrate a certain aspect of heat energy.



The aspect that can be demonstrated is

- A. radiation and convection
- B. expansion and conduction
- C. convection and conduction
- D. expansion and radiation.

Response Patterns

OPTION	A*	B	C	D	No Answer
% Choosing the option	26.97	28.62	29.92	12.88	1.53
Mean Mark in other Questions	29.85	27.37	27.66	24.67	24.47

The item tested the candidate's knowledge on heat transfer. The syllabus requires candidates to investigate conduction, convection and radiation as methods of heat transfer. Conduction in the options B and C could have attracted candidates who did not know that wood is a poor conductor. However, the key was chosen by the bright candidates as indicated by their high mean in the rest of the items.

Question 06

Which one of the following is a compound fertilizer?

- A. Muriate of potash
- B. Triple Super Phosphate
- C. Sulphate of Ammonia
- D. Mono Ammonium phosphate

Response Patterns

OPTION	A	B	C	D*	No Answer
% Choosing the option	15.47	23.95	33.82	25.04	1.65
Mean Mark in other Questions	27.76	26.49	26.76	30.41	25.42

The item was from the topic soil fertility. The syllabus requires learners to classify fertilizers into straight and compound fertilizers. Some candidates were not able to identify a compound fertilizer. The classification of fertilizers may not have been fully understood by the learners during instruction. Option C attracted more candidates because of sulphur which the candidates may have confused for a fertilizer element. However, the key was chosen by candidates who has the highest mean in the rest of the items.

Question 10

The importance of fibre in the human diet is to help in the

- A. digestion of food
- B. movement of food
- C. absorption of water
- D. absorption of nutrients.

Response Patterns

OPTION	A	B*	C	D	No Answer
% Choosing the option	44.80	13.81	09.80	30.02	1.50
Mean Mark in other Questions	30.07	32.82	24.98	22.97	24.48

Most of the candidates went for option A, an indication that they could not distinguish between digestion and movement of food along the alimentary canal. The role of fibre in the human diet is to facilitate the movement of food in the gut. Instruction in schools should target the objective which clearly states that the candidates are required to state the importance of fibre in the diet. However, the key was chosen by the bright candidates as indicated by their high mean in the rest of the items.

Question 24

Which one of the following methods will **mainly** conserve soil and **not** water?

- A. Mulching.
- B. Terracing.
- C. Cover crops.
- D. Gabions.

Response Patterns

OPTION	A	B	C	D*	No Answer
% Choosing the option	19.18	14.19	28.30	26.75	1.52
Mean Mark in other Questions	25.95	27.07	27.11	30.43	24.55

The question was from the topic Environment. The syllabus requires learners to describe soil conservation methods. Some candidates did not understand how the various methods of soil conservation work. Gabions are porous to trap soil and allow water to pass through. The other methods hold both water and soil. The key was chosen by the bright candidates as indicated by their high mean in the rest of the items.

Question 34

The following are some characteristics of plants:

- (i) thin cuticle
- (ii) silvery hairs
- (iii) flexible stems
- (iv) more stomata on lower leaf surface
- (v) air sacs

Which pair of characteristics is for plants adapted to wet areas?

- A. (ii) and (iv)
- B. (i) and (v)
- C. (iii) and (iv)
- D. (i) and (ii)

Response Patterns

OPTION	A	B*	C	D	No Answer
% Choosing the option	12.55	28.24	48.52	9.04	1.60
Mean Mark in other Questions	24.75	31.66	26.54	26.58	23.94

The question was developed from the topic Plants. Learners are required to explain how plants are adapted to dry and wet areas. The response patterns of the candidates indicate that they may not have understood how the adaptations vary between plants in wet and dry areas. However, the key was chosen by the bright candidates.

Question 41

Which one of the following is a way of maintaining simple tools?

- A. Cleaning before use.
- B. Storing in a safe place.
- C. Using a tool for several purposes.
- D. Oiling.

Response Patterns

OPTION	A	B	C	D*	No Answer
% Choosing the option	8.73	55.02	08.45	26.18	1.56
Mean Mark in other Questions	22.31	28.35	20.99	30.60	24.45

The Question was from the topic, **Making work easier**. The syllabus requires learners to describe how

to maintain simple tools. Many candidates went for safe storage. Safe storage is not the same as proper storage. Different tools have different storage requirements e.g. under shade, in a tool box (rack), etc, not necessarily safe storage. The key was chosen by the bright candidates.

Question 44

To model the solar system, the following materials can be used:

- (i) soft board
- (ii) clay
- (iii) pins
- (iv) glue
- (v) manila paper.

Which one of the following materials would be **most** suitable to use instead of the pins?

- A. Wax.
- B. Plasticine.
- C. Pieces of barbed wire.
- D. Pieces of cello tape.

Response Patterns

OPTION	A	B	C*	D	No Answer
% Choosing the option	32.21	14.50	25.68	25.91	1.63
Mean Mark in other Questions	27.35	28.03	29.08	26.91	24.57

To model a solar system using the materials provided, soft board will form the base, glue will stick the manila paper on the board, clay will be used for planets and pins will attach the planets on the board. Therefore, the suitable replacement for pins is pieces of barbed wire. The key was also chosen by the bright candidates.

7.4 GENERAL COMMENTS

In 2015, the mean raw mark for females was 26.62. The one for males was 28.86. Teachers should strive to bridge this gap by using approaches that motivate female pupils towards sciences at an early stage in learning. The gap should be adequately addressed so that it is not transferred to the next level of learning.