

## 6.0 SCIENCE

The KCPE Science Syllabus consists of concepts in Agriculture, Science, Home Science and Emerging issues like environment and HIV/AIDS. 2012 was the seventh time the Syllabus was being tested. The questions were sampled from all the topics in the syllabus with all cognitive levels tested.

### 6.1 GENERAL PERFORMANCE OF CANDIDATES

The table below gives a summary on the candidature, mean raw mark and standard deviation in Science for the years 2007, 2008, 2009, 2010, 2011 and 2012.

**Table 12** *Performance of Candidates*

YEAR	2007	2008	2009	2010	2011	2012
<b>Number Sat</b>	698,367	688,049	719,376	739,620	766,712	<b>811,706</b>
<b>Mean Raw Mark</b>	29.72	27.62	29.96	29.82	33.63	<b>32.02</b>
<b>Standard Deviation</b>	9.20	7.40	8.69	8.94	9.11	<b>9.51</b>

From the table, the year 2012 KCPE Science performance was slightly lower compared to the year 2011. However, there was an improvement in the standard deviation compared to the years 2011, 2010, 2009, 2008 and 2007. This is an indication that the paper fairly discriminated the different abilities of the candidates. The candidature increased by 5.87% in 2012 compared to a 3.66% increase in 2011.

### 6.2 SYLLABUS COVERAGE

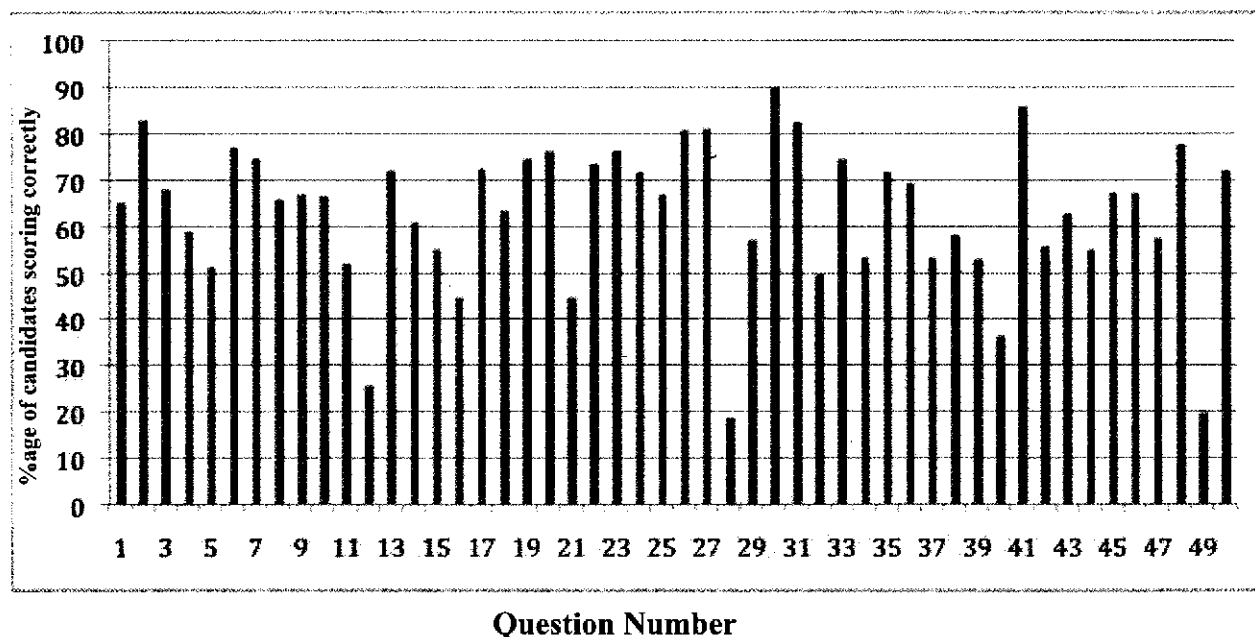
**Table 13** *Syllabus coverage in the year 2012 KCPE Science*

Sn	Topic	No. of Items	Percentage
1.0	Human Body	3	06
2.0	Health Education	2	04
3.0	Weather and Astronomy	2	04
4.0	Plants	4	08
5.0	Animals	6	12
6.0	Water	3	06
7.0	Making Work Easier	4	08
8.0	Properties of Matter	8	16
9.0	Energy	8	16
10.0	Food and Nutrition	4	08
11.0	Environment	2	04
12.0	Soil	4	08
<b>TOTAL</b>		50	100

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

### 6.3 ANALYSIS OF PERFORMANCE IN SCIENCE ITEMS

The figure 6 below shows the facility index of each of the 50 Questions offered in 2012 KCPE Science.



Any item scored by 30% and below of the candidates is considered as having been poorly performed. In the 2012 KCPE Science, three items had a facility index below 30%. The three questions and the percentage of candidates choosing the correct response for each are shown in the table below.

**Table 14** Question with a facility Index of 30% and below

Question Number	12	28	49
% of candidates choosing the correct response	25.58	18.75	19.85

#### Question 12

The following are statements about how different simple machines make work easier.

- (i) Making the slope gentle.
- (ii) Reducing the effort applied.
- (iii) Changing direction of the force applied.
- (iv) Reducing friction.

Which of the statements apply to a single fixed pulley?

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

### Response Patterns

OPTION	A	B	C	D*	No Answer
% Choosing the option	7.52	7.83	57.83	<b>25.58</b>	1.19
Mean Mark in other Questions	22.64	25.19	33.05	<b>34.78</b>	26.36

Single fixed pulleys are taught in class eight under the topic Making Work Easier (Sub-topic Simple Machines). Learners are required to investigate how single fixed pulleys make work easier. A single fixed pulley only makes work easier by changing the direction of the force applied. It is easier to pull the load downwards than upwards because of the force of gravity. The effort applied is equal to the load if friction is completely eliminated at the axle. Otherwise more effort than load is applied if some friction exists in the pulley.

Many candidates went for an incorrect response (option C) although (ii) (reducing the effort applied) makes the option wrong. The effort applied in an ideal pulley is equal to the load.

In the key (option D), (iv) (reducing friction) is correct because the pulley rotates at the axle with the main aim of eliminating friction. Fewer candidates (25.58%) chose the correct response but those who selected it were the very bright with a raw mean mark of 34.78.

Instruction in schools should target the objective which clearly states that the candidates are required to know the principle on which a single fixed pulley works. Performance on this item indicates that the objective may not have been adequately addressed during instruction.

### Question 28

Which of the following practices will **NOT** result in a person getting an electric shock?

- A. Touching sockets with wet hands.
- B. Putting pencils in sockets.
- C. Overloading the sockets.
- D. Putting iron nails in sockets.

### Response Patterns

OPTION	A	B	C*	D	No Answer
% Choosing the option	7.16	61.82	<b>18.75</b>	11.01	1.2
Mean Mark in other Questions	23.79	33.22	<b>32.87</b>	29.71	26.94

The Question was from the topic Energy (sub-topic Electricity). Learners are required to investigate good and poor conductors of electricity, and describe safety measures when dealing with electricity. Many candidates also went for an incorrect response (option B) including the very bright ones as indicated by the high raw mean mark of 33.22 compared to 32.87 of those who selected the correct response (option C). Most pencils are made of wood and graphite. Wood is a poor conductor while graphite is a good conductor. Most candidates could have looked at a pencil as wood and ignored graphite leading to the selection of the incorrect response.

On safety measures, the learner is required to describe safety measures when dealing with electricity. One of the safety measures is not to put pencils into sockets. The likely description to accompany it is that it can cause electric shock and damage the socket.

Candidates may have missed these details during instruction and this could have led to the observed performance on the item.

#### Question 49

Which one of the following statements is **TRUE** about manures? They

- A. increase the growth of weeds
- B. release specific nutrients to the soil
- C. destroy micro-organisms in the soil
- D. cause pollution of the soil.

#### Response Patterns

OPTION	A*	B	C	D	No Answer
<b>% Choosing the option</b>	<b>19.85</b>	68.5	7.82	2.43	1.34
<b>Mean Mark in other Questions</b>	<b>36.03</b>	32.06	24.94	23.58	26.90

The Question was from the topic Soil (sub-topic Manures). Most candidates (68.5%) went for an incorrect response (option B). Manures do not release specific nutrients. They release a variety of plant nutrients that are not specific. This is the main difference between manures and inorganic fertilizers which should be emphasized during instruction. However, the correct response was chosen by the bright candidates.

#### 6.4 GENERAL COMMENTS

Generally 2012, KCPE Science was well done with a Mean raw mark of 32.02 out of the possible 50 marks. The Mean raw mark for females was 30.30 compared to 31.99 in 2011. The one for males was 33.67 compared to 35.55 in 2011. 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 at this level to ensure that it is not carried to the next levels of learning.

## 7.0 SOCIAL STUDIES

The number of candidates that sat for the 2012 KCPE social studies increased from 766,355 in 2011 to 811,688 in 2012.

### 7.1 Candidates General Performance

*Table 15: candidates' performance for the last four years*

Year	Candidature	Maximum mark	Mean	Standard Deviation
2012	811,688	60	37.32	10.13
2011	766,355	59	33.13	9.12
2010	724,388	60	38.88	9.74
2009	719,712	59	37.46	9.80

The following observations are made from the table below:

- There was a 5% increase in candidature in 2012.
- The standard deviation increased from 9.12 in 2011 to 10.13 in 2012, meaning there was a larger spread of scores ( performance).
- The mean has increased from 33.13 in 2011 to 37.32 in 2012, an indication of a better performance.

### 7.2 2012 Syllabus coverage

*Table 16: KCPE Social Studies Syllabus Coverage in 2012*

Sn.	Content area	No of Items	Percentage
1.0	Physical Environment	11	18%
2.0	People and Population	6	10%
3.0	Social relations and Cultural activities	4	7%
4.0	Resources and Economical activities	19	32%
5.0	Political developments and Systems	8	13%
6.0	Citizenship	2	3%
7.0	Democracy and Human Rights	2	3%
9.0	Law, Peace and Conflict Resolution	4	7%
10.0	The Government of Kenya	4	7%
	<b>Total</b>	60	100%

The above table shows that the distribution of items according to the weighting of each topic in the syllabus was good. The three main topics covering a significant proportion in the syllabus were well represented: **Resources and Economical activities** (32%), **Physical Environment** (18%) and **Political developments and systems** 13%. Topics that are short and less emphasized in the syllabus have been given low representation: **Citizenship** (2%) and **Democracy and Human rights** (2%).

### 7.3 Distribution of Cognitive Skills

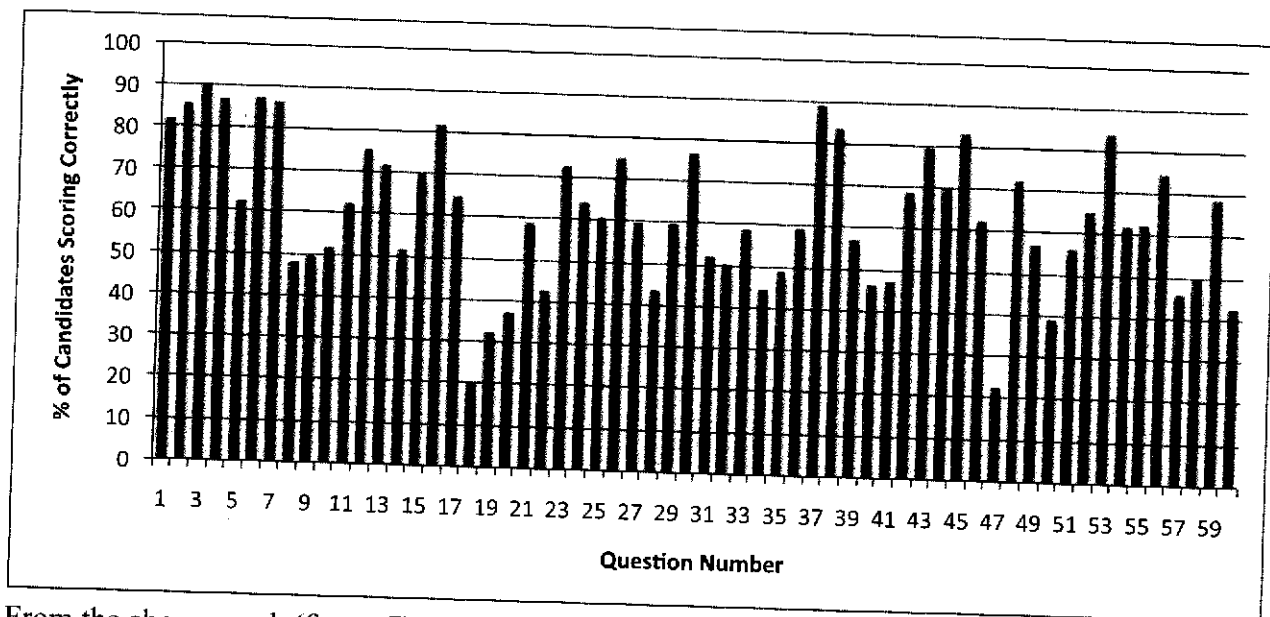
*Table 17: Distribution of Cognitive Skills in the 2012 KCPE Social Studies*

Skills Tested	No of Items	Percentage
Knowledge	6	10%
Comprehension	12	20%
Application	14	23%
Analysis	16	27%
Synthesis	6	10%
Evaluation	6	10%
<b>Total</b>	<b>60</b>	<b>100%</b>

As shown in the table above, all levels of cognitive domain were tested. The distribution of the cognitive skills was even, based on the levels. The middle level skills had more questions; **Application** 23% and **Analysis** 27%. The low level and high level skill had fewer questions, **10%** of the total syllabus coverage.

### 7.4 Analysis of Performance per Item

*Figure 7: KCPE 2012 performance per Item*



From the above graph (figure 7), the general performance per item was good. Only **three** items had a facility index of **below 35%**. Any item where the candidate scoring was below 35% was perceived as poor performance. These items are: **18**(19.78%), **19**(31.80%), **47**(21.88%).

### 7.4.1 Questions with a facility index of 35 % and below

The items that performed poorly as per the facility index are discussed below. The discussion will focus on ideas, skills and thinking processes that the candidate might have gone through to come up with the answer. The asterisks \* denotes the correct response.

#### Question 18:

Who among the following members of a school management committee ensures that money is used properly?

- A. The chairperson.
- B. The sponsor.
- C. The head teacher.
- D. The treasurer.

#### Response Pattern

Option	A	B	C*	D
% Choosing pattern	35.82	3.91	19.78	39.19
Mean mark	37.29	32.51	36.94	38.18

This was an analysis question that tested understanding of the various function of the school committee. The candidates confused the role of usage of the school finances with that of the treasurer as the custodian of money. Majority of the candidate chose the treasurer, while the correct answer was **C (The Head teacher)**. Most probably the teachers have not concentrated on the depth of this topic hence most of the candidates might have guessed the answer.

#### Question 19:

Which one of the following statements is **true** about the policy of assimilation used by the French in Senegal?

- A. Africans became citizens of France.
- B. The French were made to learn African languages.
- C. The French appointed Africans to rule Senegal.
- D. Africans were refused to vote in general elections.

#### Response pattern

option	A*	B	C	D
% Choosing pattern	31.80	20.23	24.69	22.01
Mean mark	43.72	32.35	34.83	35.72

The question was an analysis and it required the candidate to have knowledge on the French policy of assimilation in Senegal in order to pick the correct answer. This topic is taught in class 7. Though the bright candidates were able to give the correct answer **A (Africans become citizens of French)**, the other candidates were unable to distinguish assimilation policy from other systems of colonial administration. Teachers must have concentrated in various types of colonial administration and not the in-depth description of the various systems.

### Question 47

The **main** reason why petroleum products are transported using a pipeline is that it

- A. reduces the number of heavy vehicles on roads
- B. costs less than using other forms of transport
- C. protects the petrol from being stolen
- D. ensures that petrol is safe from fire.

### Response pattern

Option	A	B*	C	D
% Choosing pattern	19.35	21.88	10.89	46.57
Mean mark	40.39	38.84	35.46	35.90

This was an evaluation question, which required candidates' to make judgment on the most correct answer. Most students chose **D, (Ensures that petrol is safe from fire)**. This may have been attributed to the frequent cases of fire outbreak caused by tankers. However even the brighter candidates still went for **A (reduces the number of heavy vehicles on roads)**, while the correct answer was **B (Costs less than using other forms of transport)**. Teachers should put more emphasis on Pipeline as a mode of transport.

### 7.5 General comments

- 7.5.1 The general performance of the paper was good, most items behaved well in performance. Only **five** items were scored above **85%** and **five** items were scored below **40 %**.
- 7.5.2 There was an improvement in performance (mean 37.32) as compared to 2011(mean 33.13) despite the increase in candidature.
- 7.5.3 Teachers should keep up the good work and encourage the candidates to read questions carefully to avoid getting mixed up.
- 7.5.4 Teachers should discourage rote learning, only questions that required a higher level of cognitive skills were performed poorly.