NCDC
NATIONAL CURRICULUM DEVELOPMENT CENTRE

End of Year Sample

ASSESSMENT ITEMS FOR S.1 AND S.2

BIOLOGY

2022

Senior 1 and Senior 2 Biology Sample Items

Duration: 1hour 30mins

Instructions

Three **compulsory** short response items

Two extended response items**. Answer One ONLY**

Guidance to teacher

- The end of year assessment consists of both short response items and extended response items.
  Short Response Items Require learners to construct a response that is concise and focused. It may be factual, interpretive, or a combination of the two. The short response items focus on the learner's mastery of knowledge, understanding, and skills used to perform a task or solve a problem. The scoring guide for these items should include the criteria/indicators for each score awarded.
  Extended Response Items are derived from an integration of knowledge, understanding, and skills used to perform a task or solve a problem. The integration can cut across topics and subjects with related concepts. The item must have a context/problem/situation, instruction/expected output, and may include support/stimulus material. The item should focus on tasking the learner to provide a solution to a problem. The scoring guide for these items should include a grid that has relevance, coherence, accuracy, and excellence criteria with their respective indicators
- The emphasis of the test items is to promote higher-order thinking skills.
- Refer to the teaching syllabus as a guide on what to assess in terms of the skills, knowledge, values, and understanding defined by the intended learning outcomes. Use the LO(s) to develop test items.
- The marking guide should clearly describe what a learner must do to meet the set criterion as evidence of achievement of the LO(s).

Item 1 was developed from the following Los.

- identify and describe the common observable characteristics and give examples of organisms from phylum Arthropoda including its classes.
- appreciate the useful and harmful effects of a housefly, cockroach, mosquito, bee, and butterfly.

Item 2 was developed from the content of primary integrated science and the following LO

- Know the different methods of controlling the harmful stages of a housefly, cockroach, mosquito, and butterfly.

Short response item (S1)

A group of learners visited a demonstration farm to learn about living organisms. They came across the organisms shown below.

a) Classify the organisms based on their external features. Give a reason for classifying different organisms together. (4 scores)

Name(s) of Organisms	Reason

b) Choose any two organisms from the list above and explain the importance of that organism to a farmer (2 scores)

i) Organism 1:

……
……
……

ii) Organism 2:

……
……
……

Short response item (S2)

In an experiment, mashed cooked potatoes were placed in five separate test tubes. Fresh saliva was poured over the potatoes in the test tube. The test tubes were then placed at different temperatures i.e., 0°C, 20°C, 30°C, 35°C, and 63°C. A sample from each tube was

tested for starch using iodine solution and the time it took for the colour to change was recorded as shown in the table below.

Temp (°C)	**Average time for the colour to change**
0	120
20	58
30	100
35	16
63	500

Explain the results at the following temperatures (2 scores each)

a) At 0°C

b) At 35°C

c) At 63°C

Extended response item (S1)

Communities that live near freshwater bodies in Uganda usually suffer from diseases caused or transmitted by organisms that live in or near water. The common diseases in such communities are Malaria and Bilharzia. The Ministry of Health would like to start a vector and disease control programme targeting people living near water bodies. Prepare a short essay advising the Ministry on how to control any one of the diseases mentioned using the knowledge of the life cycles of the organisms.

Extended response item (S2)

Three farmers have gardens growing maize in the same area. As part of your study, you visited the gardens of each farmer and made the following observations as shown in the table below:

Farmer	Colour of maize leaves	Maize intercropped with groundnuts	Cocks and hens are in the maize garden	Maize yield
A	Green	Yes	Yes	High
B	Yellow	No	No	Low
C	Green	Yes	No	Average

As a learner with knowledge of biology, write an essay explaining the crop yield of the three farmers.

SCORING GUIDE

Short response item (S1)

A group of learners visited a demonstration farm to learn about living organisms. They came across the organisms shown below.

a) Classify the organisms based on their external features. Give a reason for classifying different organisms together. (4 scores)

Name(s) of Organisms		Reason
Snake and Lizard		***Their bodies are completely covered with scales***
Bee and Termite		***The body is divided into distinct head, thorax, and abdomen OR Have six legs/3 pairs of legs***

(4 scores)

Scores 4 if places two correct organisms in each of the two groups and give a reason for each.
Scores 3 if places two correct organisms in each of the two groups and give a reason for one of the groups.
Scores 4 if places two correct organisms in one of the groups and give a reason.
Scores 1 if places two correct organisms in one group.

b) Choose any two organisms from the list above and explain the importance of that organism to a farmer (2 scores)

Snake - eats rats/rodents/birds that destroy farmers crops
Bee - pollinates the farmers crops
Lizard - eats/controls insect pests e.g. ants, aphids, grasshoppers, wasps
Termite - chicken feed/ aeration of soil/improve soil fertility by breaking down plant material

Scores 2 gives a reason that is useful to the farmer and corresponds to the organism
Scores 1 if gives a reason that is useful to the farmer

Short Response Item (S2)

In an experiment, mashed cooked potatoes were placed in five separate test tubes. Fresh saliva was poured over the potatoes in the test tube. The test tubes were then placed at different temperatures i.e., 0°C, 20°C, 30°C, 35°C and 63°C. A sample from each tube was tested for starch using iodine solution and the time it took for the colour to change was recorded as shown in the table below.

Temp (°C)	Average time for colour to change
0	120
20	58
30	100
35	16
63	500

Explain the results at the following temperatures (2 scores each)

a) At 0°C
b) At 35°C
c) At 63°C

Possible Responses

At 0°C

The temperature is low making the enzymes in the saliva inactive and therefore it took some time for the colour to change (for the enzyme to catalyse the conversion of the starch)

At 35°C

This is the optimum/suitable temperature. Enzymes are fully activated and act on the food/starch very fast, which is why it took a very short time for the colour to change.

At 63°C, the temperature is too high. The enzymes are destroyed/denatured and can no longer catalyst the reactions, therefore it takes a long time for the colour to change.

Possible responses in summary

Basis	0°C	35°C	63°C
Interpretation of temperature	Low (1)	Optimum (1)	High (1)
Effect on enzymes	Inactive (1)	Active (1)	Destroyed (1)
Time taken to change colour	Sometime taken because the enzymes are inactive (1)	Very short because the enzymes act very fast (1)	No change in colour because the enzymes are destroyed (1)

Score 3 if learner has correctly interpreted all the temperatures, explained the effect of all temps on the enzymes correctly and explained how this affects the time it takes to change colour for at least 1 of the temperatures – (7-9)
Score 2 if learner has correctly interpreted all the temperatures, explained the effect of at least 1 temperature on the enzymes correctly or explained how this affects the time it takes to change colour for at least 1 of the temperatures – (4-6)
Score 1 if the learner has been able to only interpret the temperatures, or the effect of the temperature on enzymes or the effect on change of colour (1-3)

Extended response item (S1)

Communities that live near freshwater bodies in Uganda usually suffer from diseases caused or transmitted by organisms that live in or near water. The common diseases in such communities are Malaria and Bilharzia. The Ministry of Health would like to start a vector and disease control programme targeting people living near water bodies. Prepare a short essay advising the Ministry on how to control any one of the diseases mentioned using the knowledge of the life cycles of the organisms.

Possible responses

Malaria	Bilharzia
Malaria is caused by plasmodium and spread by an infective female anopheles mosquito. The mosquitoes can be controlled by: - introducing fish into the water body that feed on the egg/larvae stage. - using larvicides/chemicals to kill the larvae. - pouring oil on water body to suffocate the larvae. - spraying insecticides to kill the adults. - cutting bushes or destroying the resting areas of the adult mosquitoes. - use mosquito nets to prevent adult mosquitoes from biting humans.	Bilharzia is caused by schistosomes and spread by water snail and human beings. It can be controlled by: - introducing fish into the water body that feed on the snails. - using larvicides/chemicals to kill the larvae. - using molluscicides to kill the snails - proper sanitation by humans to prevent eggs from entering water bodies (stop defecating and urinating in water bodies). - taking medication/drugs that kill the larvae of the parasite - boiling drinking water to kill the larvae of the parasite - avoid swimming/bathing in water that has snails that host the eggs of the parasite

Assessment grid

Output	Basis of evaluation	Relevance (3)	Accuracy (3)	Coherence (3)	Excellence
An essay advising the ministry of health	Advice on Prevention/ control of disease based on the life cycle of the vector.	Score 3 if the learner states 5-6 relevant methods and stages they control.	Score 3 if the learner identifies 5-6 correct methods and stages they control.	Score 3 if the logically presents 5-6 correct methods and stages they control.	Score 1 if the learner highlights environmental effects associated with the methods
		Score 2 if the learner states 3-4 relevant methods and stages they control.	Score 2 if the learner identifies 3-4 correct methods and stages they control.	Score 2 if the learner logically presents 3-4 correct methods and stages they control.	
		Score 1 if the learner states less than three relevant methods and stages they control.	Score 1 if the learner identifies less than three correct methods and stages they control.	Score 3 if the logically presents less than three correct methods and stages they control.	

Extended Response Item (S2)

Three farmers have maize gardens growing in the same area. As part of your study, you visited the gardens of each farmer and made the following observations as shown in the table below.

Farmer	Colour of maize leaves	Maize intercropped with groundnuts	Cocks and hens are in the maize garden	Maize yield
A	Green	Yes	Yes	High
B	Yellow	No	No	Low
C	Green	Yes	No	Average

As a learner with knowledge of biology, write an essay explaining the crop yield of the three farmers

POSSIBLE RESPONSES

Farmer A

Yield is high because the leaves are green therefore plant is able to make a lot of food that is stored in several maize cobs. Green leaves indicate that the plants are growing in soil that has a lot of nutrients/nitrates/manure. The soil is rich in nutrients because the garden has legumes (groundnuts) that fix nitrogen in the soil and also the poultry droppings are a good source of nitrates/nutrients/manure.

Farmer B

Yield is low because the leaves are yellow therefore plant is not able to make enough food therefore only a few maize cobs are formed. Yellow leaves indicate that the plants are growing in soil that lacks nutrients/nitrates/manure. The soil lacks nutrients because the garden does not have legumes (groundnuts) that fix nitrogen in the soil and does not have poultry droppings that are a good source of nitrates/nutrients/manure.

Farmer C

Yield is average because leaves are green therefore the plant is able to make food that is stored in a number of maize cobs but not as many as those for farmer A. Green leaves indicate that the plants are growing in soil that has a basic amount of nutrients/nitrates/manure. The soil is basic in nutrients because the garden has legumes (groundnuts) that fix nitrogen in the soil.

Since there is no poultry, the soil is therefore not as rich in nutrients as that for farmer A and that is why the yield is average.

Output	Basis of evaluation	Relevance (3)	Accuracy (3)	Coherence (3)	Excellence (1)
Essay advising farmers	Relation between maize yield and nutrients/leaf colour	score 3 if relates leaf colour/ nutrients to yield in all cases (three farmers)	Score 3 if states the source of the nutrients and effect on the leaf colour/yield in all three cases	Score 3 if the presents any 5 to 6 aspects in the following order: Yield/ stored food/number of cobs/leaf color/ /amount of nutrient in soil/source of nutrient	Learners' response specifically mentions aspects of the nitrogen cycle or nitrates used in the making of food.
		score 2 if relates leaf colour/ nutrients to yield in two cases (two farmers).	Score 2 if states the source of the nutrients and effect on the leaf colour/yield in two cases.	Score 2 if the presents any 3 to 4 aspects in the following order: Yield/ stored food/number of cobs/leaf colour/ /amount of nutrient in soil/source of nutrient.	