

# FOR TEACHERS ONLY

The University of the State of New York  
REGENTS HIGH SCHOOL EXAMINATION

## LIVING ENVIRONMENT

Wednesday, August 14, 2019 — 12:30 to 3:30 p.m., only

### RATING GUIDE

**Directions to the Teacher:**

Refer to the directions on page 2 before rating student papers.

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: <http://www.p12.nysed.gov/assessment/> and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

## Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Living Environment. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the Part B–2, Part C, and Part D open-ended questions on a student’s paper. Each of these teachers should be responsible for scoring a selected number of the open-ended questions on each answer paper. No one teacher is to score more than approximately one-half of the open-ended questions on a student’s answer paper. Teachers may not score their own students’ answer papers.

Students’ responses must be scored strictly according to the Rating Guide. For open-ended questions, credit may be allowed for responses other than those given in the rating guide if the response is a scientifically accurate answer to the question and demonstrates adequate knowledge as indicated by the examples in the rating guide. Do not attempt to correct the student’s work by making insertions or changes of any kind. On the student’s separate answer sheet, for each question, record the number of credits earned and the teacher’s assigned rater/scorer letter.

Fractional credit is *not* allowed. Only whole-number credit may be given for a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the box labeled “Total Raw Score.” Then the student’s raw score should be converted to a scale score by using the conversion chart that will be posted on the Department’s web site at: <http://www.p12.nysed.gov/assessment/> on Wednesday, August 14, 2019. The student’s scale score should be entered in the box labeled “Scale Score” on the student’s answer sheet. The scale score is the student’s final examination score.

**Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.**

Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student’s final score.

**Part B–2**

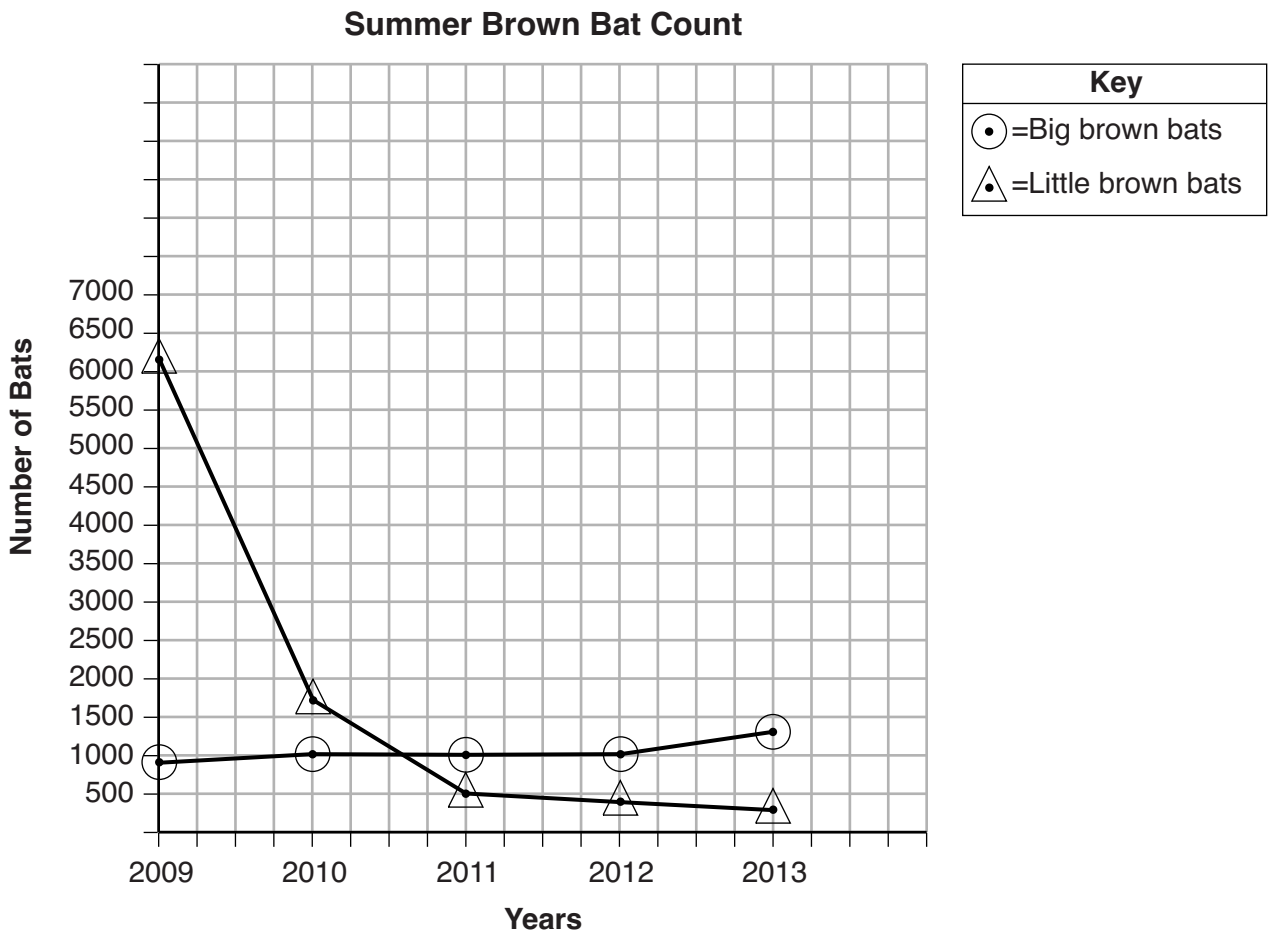
- 44 [1] Allow 1 credit for marking an appropriate scale, without any breaks in the data, on the axis labeled “Number of Bats.”

**Note:** Do *not* allow credit if the grid is extended to accommodate the scale.

- 45 [1] Allow 1 credit for correctly plotting the data for big brown bats, connecting the points, and surrounding each point with a small circle.

- 46 [1] Allow 1 credit for correctly plotting the data for little brown bats, connecting the points, and surrounding each point with a small triangle.

**Example of a 3-credit response for questions 44–46.**



**Note:** Allow credit only if circles and triangles are used.

Do *not* assume that the intersection of the  $x$ - and  $y$ -axes is the origin (0,0) unless it is labeled. An appropriate scale only needs to include the data range in the data table.

Do *not* allow credit if points are plotted that are not in the data table, e.g., (0,0), or for extending lines beyond the data points.

Do *not* deduct more than 1 credit for plotting points that are not in the data table or for extending lines beyond the data points.

**47 MC on scoring key**

**48** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The bat houses are more easily monitored than the natural bat habitats and the sick bats could be removed or treated.
- The factors of temperature and humidity could be better controlled.
- The bat houses can be sterilized and the disease will be less likely to be transmitted.
- The degree of contact between members of the bat population would be less, slowing the spread of the disease.
- keeps bats away from infected areas/infected bats

**49 MC on scoring key**

**50 MC on scoring key**

**51** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Biomass is continually being produced by plants and animals.
- More plants or trees can be grown to replace those used for fuel.
- Humans will always be generating food wastes and garbage.
- Biomass is an energy source that is quickly replaced by natural processes.

**52** [1] Allow 1 credit for *one* specific advantage and *one* specific disadvantage of the use of biofuels as an energy source. Acceptable responses include, but are not limited to:

Advantage:

- Fossil fuel use will decrease.
- less waste or garbage in the landfills
- less use of gasoline
- It is renewable.
- It can be used to power cars and generate electricity.

Disadvantage:

- fewer crops for food
- There will still be some pollution.
- Burning the wood and plant matter produces some air pollution.
- Transporting it can be costly.

53 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- carbon dioxide/ $\text{CO}_2$
- water/ $\text{H}_2\text{O}$

**Note:** Do *not* accept sunlight. Sunlight is a form of energy, not a raw material.

54 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Photosynthesis provides the raw materials for cell respiration.
- A product of photosynthesis is glucose/other energy-containing compounds that heterotrophs use for food.
- It is the source of stored energy for the ecosystem.
- Photosynthesis produces oxygen.

**Note:** Do *not* accept “photosynthesis makes energy.” It stores, transfers, or transforms energy.

55 [1] Allow 1 credit for identifying *one* abiotic factor present in the pond ecosystem and explaining how this abiotic factor would affect the frogs in the pond. Acceptable responses include, but are not limited to:

Abiotic factor: Sun

Effect: The Sun provides energy to the plants so they can perform photosynthesis to produce oxygen/food for the frogs.

Abiotic factor: Oxygen

Effect: Frogs use oxygen for respiration.

Abiotic factor: pH/temperature

Effect: If the pH/temperature of the water is too high or low, the frogs could die.

Abiotic factor: Soil

Effect: It anchors the plants where frogs hide and tadpoles eat.

Abiotic factor: Water

Effect: The frogs need the water for their habitat.

## Part C

- 56** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The TR4 fungus interferes with the transport of water and other materials within the banana plant.
  - The fungus that attacks the banana plant interferes with the plant's normal functions and the plant basically dies of thirst.
  - The fungus prevents water from reaching the leaves, preventing photosynthesis.
  - The plant cannot get nourishment from water and nutrients.
- 57** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- All of the banana plants are genetically identical.
  - There is no diversity among the most common type of bananas that people consume.
  - Without genetic variation, the banana plants are more likely to be killed by the fungus.
  - The crop is grown in monoculture, so all plants are susceptible.
  - The fungus is easily transferred.
- 58** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Look for a biological control that would attack the fungus.
  - Genetically engineer the bananas so that they are not affected by the fungus.
  - Do not allow people to bring contaminated boots to new areas.
- 59** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- If there is a high amount of calcium in the diet, it is less likely that lead will be used in the formation of enzymes.
  - Having a lot of calcium and iron available in the cells will make it more available when enzymes are synthesized.
  - A greater concentration of iron and calcium will make it more likely to move from the blood (high concentration), through the channels in the cell membrane, and into the cells.
  - When more calcium moves into cells, less lead can go in.
- 60** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Lead would give the enzyme a different shape/molecular structure. Enzymes work based on their shape.
  - If lead replaces calcium or iron in the enzyme molecule, the enzyme will not have the right shape to do its job.
  - The enzyme changes shape.

- 61** [1] Allow 1 credit for identifying *one* type of cell that would be expected to have numerous calcium channels and supporting the answer. Acceptable responses include, but are not limited to:

Type of cell: Nerve or brain

- Lead enters cells through calcium channels. Nerve or brain cells are damaged; therefore, they likely contain numerous calcium channels.

Type of cell: Muscle or nerve

- because children with lead poisoning suffer from poor coordination/learning problems

Type of cell: Bone

- Calcium is needed for healthy bone growth.
- Children with lead poisoning have poor bone growth.

- 62** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Manx genes cause abnormalities in the number and/or shape/size of bones in the spine.
- The mutation causes the spine to be shorter, so there could be too few or smaller tail bones formed.
- It interferes with the development of the spine.

- 63** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- If a kitten gets one mutated gene from one parent, it will have a short tail or no tail.
- If it gets a normal gene from each parent, it will have a normal tail.
- Each parent has a Manx gene and a normal gene, so kittens will be born with Manx tail traits or normal traits, depending on whether they inherit one or two normal genes.

**Note:** The student's response to the bulleted items in question 64–66 need *not* appear in the following order.

- 64** [1] Allow 1 credit for identifying the initial event responsible for the new sweet-sensing gene as a mutation/change in the genetic code.
- 65** [1] Allow 1 credit for explaining how the presence of the sweet-sensing gene increased in the hummingbird population over time. Acceptable responses include, but are not limited to:
- Birds selecting for sweeter nectar survived and produced many offspring with the trait.
  - Sweeter nectar provided more energy, increasing the birds' chance to survive and reproduce.
  - It was an adaptation that increased the birds' ability to survive and reproduce.
- 66** [1] Allow 1 credit for describing how the fossil record of hummingbird ancestors might be used to learn more about the evolution of food preferences in hummingbirds. Acceptable responses include, but are not limited to:
- Changes in the shape of hummingbird beaks could be followed. Beaks adapted for eating insects would probably be different from those adapted to drinking nectar.
  - Fossils might allow scientists to learn more about the environment that hummingbirds lived in. This would provide information about the plants and insects present.
  - Different beak shapes could indicate different food preferences.
- 67** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Early in pregnancy, folic acid promotes the normal development of the brain and spinal cord.
  - It is essential for normal development.
  - The brain and spinal cord form early during pregnancy. Folic acid helps them develop normally.
  - Folic acid prevents the risk of developing neural tube defects.
- 68** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Materials diffuse from the mother's bloodstream into the blood of the fetus.
  - Materials diffuse/are transported across the placenta.
  - Essential materials are exchanged between the mother and the fetus within the structure of the placenta.
  - through the placenta

**Note:** Simply stating “through the umbilical cord” by itself is *not* an acceptable answer, because the umbilical cord is only fetal tissue.



- 69** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- genetic mutations
  - mother’s use of drugs/alcohol/tobacco during pregnancy
  - mother’s exposure to environmental toxins
  - infections during pregnancy
  - The mother does not eat a healthy diet.
- 70** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Folic acid is essential for normal growth and development of cells.
  - More individuals will get folic acid, an important vitamin for cell growth and development.
  - Fewer people will suffer from a deficiency of folic acid.
- 71** [1] Allow 1 credit for yes and supporting the answer. Acceptable responses include, but are not limited to:
- *A* and *B* share a more recent common ancestor than do *A* and *D*.
  - *A* and *B* evolved from *H*; *D* evolved from *G*.
  - *A* and *B* evolved from *H*.
- 72** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Species *E* was not fit for its environment.
  - Species *E* could not successfully compete in the environment.
  - The environment changed, and species *E* was not adapted to this change.
  - lack of food/resources

## Part D

73 MC on scoring key

74 MC on scoring key

75 MC on scoring key

76 MC on scoring key

77 [1] Allow 1 credit.

- the time it takes to row a specific distance
- time
- the speed at which they complete the course

**Note:** Do *not* accept just “performance.” The type of data must be measurable.

78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The student squeezed the clothespin less the second time because the muscles in his hand began to fatigue.
- The student squeezed the clothespin fewer times because his muscles had less oxygen.
- The student squeezed the clothespin less the second time because waste products were building up in his cells.

79 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- It helps lower the level of carbon dioxide in the bloodstream.
- Increased blood flow helps to maintain homeostasis.
- Muscles require more nutrients and oxygen, which must be delivered by the circulatory system.

80 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Excess water would diffuse into the freshwater paramecium, but the saltwater organism would lose water.
- The saltwater organism would lose water to its environment/dehydrate instead.
- In freshwater organisms, the higher water concentration outside causes water to enter cells. This is the opposite of what happens in saltwater organisms.

**81 MC on scoring key**

**82 MC on scoring key**

**83** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- It could indicate if the water moved into the potato cells.
- A change in mass would indicate a change in water content of the potato cells.
- If the mass changes, then water moved.

**84** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

Row 1:

- These systems work together to take in and move oxygenated blood to the muscles for use.
- The respiratory system takes in oxygen, which is passed into the circulatory system, which then takes it to the muscles.
- The respiratory and circulatory systems work together to remove carbon dioxide from the muscles.

Row 2:

- Muscle cells produce wastes and circulatory transports wastes to excretory organs to be excreted.

Row 3:

- Digestive breaks down food into nutrients and circulatory transports nutrients to muscle cells for energy.

**85** [1] Allow 1 credit for stating *one* way that the bag or its contents will have changed by the next day and supporting the answer. Acceptable responses include, but are not limited to:

- The bag will become smaller because the water will diffuse from inside the bag to outside the bag.
- Water will move from higher concentration inside the bag to lower concentration outside the bag.
- The membrane bag will decrease in size due to osmosis of the water out of the bag.
- The size of the bag will become smaller due to water loss.
- The salt concentration inside the bag will have increased as water moved out of the bag.
- The salt concentration in the bag will increase because the salt will move from high concentration to low concentration.

**The *Chart for Determining the Final Examination Score for the August 2019 Regents Examination in Living Environment* will be posted on the Department's web site at: <http://www.p12.nysed.gov/assessment/> on Wednesday, August 14, 2019. Conversion charts provided for previous administrations of the Regents Examination in Living Environment must NOT be used to determine students' final scores for this administration.**

### **Online Submission of Teacher Evaluations of the Test to the Department**

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to <http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm>.
2. Select the test title.
3. Complete the required demographic fields.
4. Complete each evaluation question and provide comments in the space provided.
5. Click the SUBMIT button at the bottom of the page to submit the completed form.

# Map to Core Curriculum

## August 2019 Living Environment

Standards	Question Numbers			
	Part A 1–30	Part B–1 31–43	Part B–2 44–55	Part C 56–72
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1		33		58, 59
Key Idea 2		36		
Key Idea 3				
Appendix A (Laboratory Checklist)		31, 32	44, 45, 46	
Standard 4				
Key Idea 1	4, 7, 8, 17, 20, 22, 23	35, 38		61, 70
Key Idea 2	11, 12, 14, 19	37, 39		62, 63
Key Idea 3			47	57, 64, 65, 66, 71, 72
Key Idea 4	16, 26, 28	34		67, 68, 69
Key Idea 5	5, 10, 13, 15, 25, 27, 30		53, 54	56, 60
Key Idea 6	1, 2, 3, 9, 18	41, 43	49, 55	
Key Idea 7	6, 21, 24, 29	40, 42	48, 50, 51, 52	

Part D 73–85	
Lab 1	73, 76
Lab 2	77, 78, 79, 84
Lab 3	74, 75
Lab 5	80, 81, 82, 83, 85