

FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Tuesday, January 24, 2023 — 1:15 to 4:15 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.nysed.gov/state-assessment/high-school-regents-examinations> 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.nysed.gov/state-assessment/high-school-regents-examinations> on Tuesday, January 24, 2023. 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.

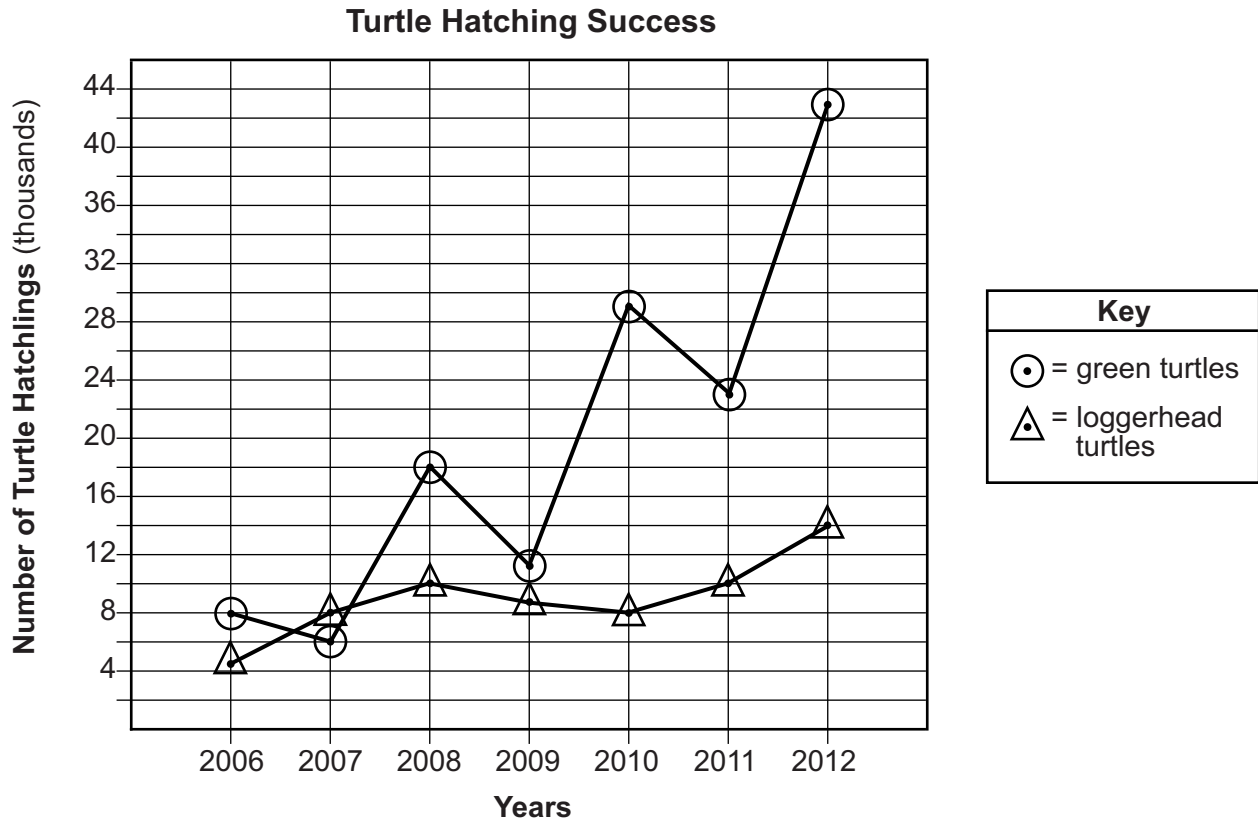
Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

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 correctly plotting the data for green turtles on the grid provided, connecting the points, and surrounding each point with a small circle.
- 45 [1] Allow 1 credit for correctly plotting the data for loggerhead turtles on the grid provided, connecting the points, and surrounding each point with a small triangle.

Example of a 2-credit graph for questions 44-45:



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

Do *not* allow credit for plotting points 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.

- 46** [1] Allow 1 credit for green turtles and supporting the answer. Acceptable responses include, but are not limited to
- The green turtles have increased from 8000 to 43,000 in six years while the loggerheads only increased by 9500.
 - The green turtles increased greatly (35,000 more) while loggerheads only went up 9500.
 - The green turtle population increased much more than the loggerhead population.

Note: Allow credit for a correct answer not written in thousands (e.g., 8 to 43).

47 MC on scoring key

- 48** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The population had reached the ecosystem’s carrying capacity, and there were small changes due to predation/competition/disease.
 - Factors such as food availability/limiting factors caused small variations in the population each year.
 - The birth and death rates varied from year to year.

49 MC on scoring key

50 MC on scoring key

- 51** [1] Allow 1 credit for selecting *one* of the fish species and describing one way a temperature increase from 20°C to 25°C could affect the growth rate of that species. Acceptable responses include, but are not limited to:
- Largemouth bass:
- The growth rate of the bass population would increase because their growth rate increases up to about 30°C.
- Rainbow trout:
- The growth rate would not be affected because it is already at zero.
- Yellow perch:
- The yellow perch growth rate would decrease in that temperature range.

- 52** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Peacocks with the largest tail-feather displays attract more females, mate, and produce more offspring.
 - Males with the biggest, most colorful tail feathers are more likely to pass their genes to the next generation.
 - While the individual male with the biggest display may not live as long, he reproduces more often/leaves more offspring.
 - It is a favorable adaptation for having more offspring.
- 53** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Proteins must be digested to become small enough to enter cells.
 - Proteins must be broken down into amino acids.
 - Large protein molecules must be broken down.
- 54** [1] Allow 1 credit for ribosome.
- 55** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The shape of a protein determines its function.
 - Protein function is determined by its three-dimensional structure.
 - A protein will only react with specific molecules due to its shape/sequence of amino acids.

Part C

Note: The student's response to the bulleted items in question 56–58 need *not* appear in the following order.

- 56** [1] Allow 1 credit for describing the specific kinds of changes that occur when ecological succession takes place. Acceptable responses include, but are not limited to:
- During ecological succession, the types of plants that are most common are replaced over time by other types of plants.
 - During succession, a grassy field can eventually become a young forest. The change is in the types of plants common to the area at any given time.
 - The types of plants present change over time.
- 57** [1] Allow 1 credit for describing *one* way that a population of red foxes could be affected as a result of ecological succession in its environment. Acceptable responses include, but are not limited to:
- As ecological succession changes the types of vegetation in an area, the foxes there may no longer have what they need to survive, so they may move away or die off.
 - Ecological succession changes an area over time, so foxes may no longer be able to live there.
 - Succession may result in an environment becoming more favorable for foxes to live there.
- 58** [1] Allow 1 credit for describing *one* way that a population of red foxes could be changed as a result of evolution. Acceptable responses include, but are not limited to:
- Evolution can result in more foxes in a population having a trait that makes them better able to survive.
 - As a result of evolution, the fox species may contain a larger number of individuals with favorable traits, such as being able to run faster or see better.
 - Foxes with mutations that may be beneficial to the fox population, such as protective coloration or better hearing, would increase as a result of evolution/natural selection.
 - Those with unfavorable traits would be eliminated or the percentage present in the population would decrease.
- 59** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- *S. lugdunensis* can cause infections of the heart, joints, skin, and eyes.
 - It can cause other infections/harmful side effects.
 - *S. lugdunensis* may also kill beneficial bacteria.

- 60** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Normally, antibiotics are formed by soil bacteria and fungi.
 - Lugdunin is produced by a bacterium that infects humans.
 - It does not show signs of MRSA becoming resistant to it.
- 61** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Swabs of noses showed that *S. lugdunensis* and *S. aureus* were rarely found together.
 - Lugdunin prevented MRSA from growing in Petri dishes and/or on the skin of mice infected with MRSA.
 - MRSA shows no sign of antibiotic resistance to lugdunin.
- 62** [1] Allow 1 credit for identifying *one* life function that lysosomes help the cell carry out and describing how they help the cell perform this function. Acceptable responses include, but are not limited to:
- Digestion:
- The lysosomes are involved with digestion as they break down large molecules/materials/ cell organelles into smaller materials.
- Excretion:
- The lysosomes break down materials, allowing them to be released from the cell.
- Regulation:
- The lysosomes are involved with the cell’s maintenance of homeostasis by sensing how well-nourished the cell is.
 - Lysosomes can send signals to other parts of a cell, prompting it to produce specific enzymes.
- Reproduction:
- Lysosomes can prompt the cell to divide, making more cells.
- Note:** Do *not* accept homeostasis, as this is not a life function.
- 63** [1] Allow 1 credit for identifying *one* additional cell structure and describing how the selected structure interacts with the lysosome to carry out a specific cell function. Acceptable responses include, but are not limited to:
- Cell membrane: allows broken-down materials or wastes produced by the lysosome to be excreted.
 - Vacuole: stores materials that the lysosome breaks down.
 - Mitochondrion: releases energy that a lysosome can utilize.
 - Ribosome: synthesizes enzymes when prompted by lysosomes.
 - Nucleus: prompts the cell to begin cell division.

- 64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- HIV attacks and weakens the immune system/T cells, allowing other pathogens to grow and spread.
 - The individual infected with HIV can't fight off other organisms/pathogens that may harm them.

- 65 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- parts of the HIV pathogen
 - proteins from the virus
 - antigens from HIV
 - a weakened form of the virus
 - RNA specific to HIV proteins

Note: Do *not* accept “a little bit of the disease” or “a small amount of the virus.”

- 66 [1] Allow 1 credit for identifying *one* substance that the blood transports to organs and tissues of the body and explaining why this is necessary for organs and tissues to continue to function. Acceptable responses include, but are not limited to:

Substance: oxygen

Why necessary:

- need for cellular respiration
- needed for production of ATP

Substance: glucose

Why necessary:

- needed for cellular respiration
- a source of energy

- 67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The hunting response periodically sends blood to the fingers, providing them with the materials required for functioning.
 - The response lets oxygen and glucose get to the muscle cells some of the time, enabling them to carry out life processes.
 - The blood vessels temporarily widen, bringing materials to the muscle cells and removing wastes.
 - The response sends blood to the fingers every once in a while.

- 68** [1] Allow 1 credit for describing *one* possible long-term result of frostbite and explaining why it can happen. Acceptable responses include, but are not limited to:
- Some cells/tissues may die when blood can no longer get to them when the vessels permanently constrict.
 - A part of the body may need to be amputated, as lack of blood flow will cause the tissues to die.
 - When the vessels constrict for good, circulation to the extremities is permanently stopped.
- 69** [1] Allow 1 credit for describing *one* role of the sea urchin population in the kelp forest ecosystem and supporting the answer. Acceptable responses include, but are not limited to:
- It is preyed on by sea otters/sea stars.
 - Sea urchins are consumers of kelp.
 - Sea urchins are herbivores that consume kelp.
- 70** [1] Allow 1 credit for describing how a *decrease* in the number of sea urchins would affect the population of large fish and supporting the answer. Acceptable responses include, but are not limited to:
- The number of large fish would most likely decrease because sea otters would eat more of them.
 - The population of large fish would decrease. Sea otters would consume more large crabs, which serve as food for the large fish.
 - It might increase because there would be more kelp for the large crabs to eat.
 - It might not affect the large fish population, because their diet doesn't consist of sea urchins or the organisms that depend on sea urchins.
- 71** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The sea stars eat sea urchins. With the sea stars gone, the remaining sea urchins will not be eaten by sea stars.
 - Only fishing and sea otters would be removing sea urchins, not predatory sea stars, so the ecosystem would remain stable.
 - The sea urchins now only have one predator, so the population may increase/remain stable.
- 72** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The kelp ecosystem would be destroyed. Snails would increase out of control since the only animal eating them was the sea stars.
 - The snails and sea urchins would consume the kelp.
 - The sea otters would be feeding more on large crabs since there are no sea stars. Soon, sea otters would run out of food.
 - If sea stars are removed, the organisms in the other populations present will be affected. All of these populations are linked either directly or indirectly. With the sea stars gone and a reduced number of sea urchins, the ecosystem will be out of balance and likely disappear.

Part D

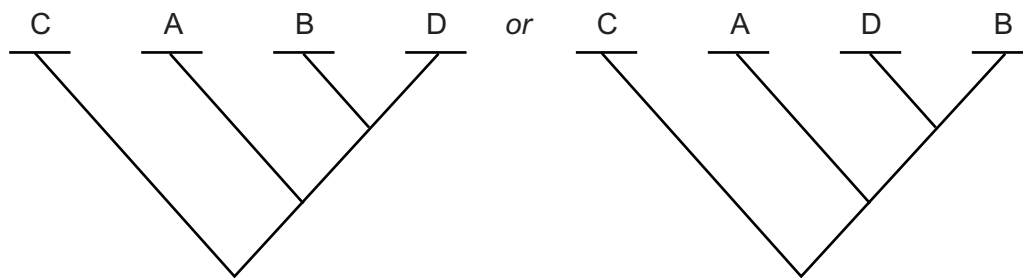
73 MC on scoring key

74 MC on scoring key

75 MC on scoring key

76 MC on scoring key

77 [1] Allow 1 credit for completing the diagram as follows:



78 [1] Allow 1 credit for 18.

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

- A heart rate of 71-80 beats per minute is the most common range in the class.
- Not all students have the same heart rate.
- Few students have a pulse rate of 51 or less.
- Few students have a pulse rate of 90 or more.

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

- The liquid level rises on the left side because the water moves from an area of high concentration to an area of low concentration.
- Water molecules move from the right side to the left, since there was a higher water concentration on the right side at the start.
- Only water can go through the membrane so it moves from the area with the higher concentration.
- The diffusion of distilled water occurred across the membrane.

81 MC on scoring key

82 MC on scoring key

83 [1] Allow 1 credit for no and supporting the answer. Acceptable responses include, but are not limited to:

- The student will not go on because the average = 12.
- No, the average is not 13 or more.

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

- They may eat different-sized seeds/different plants.
- The cactus finch has a probing bill, unlike the sharp-billed ground finch, which has a crushing bill.
- They live on different islands.
- Their beaks are different.

85 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- One finch lives on the ground, the other in trees.
- They might be active at different times of day.
- They might not be eaten by the same predators.

The *Chart for Determining the Final Examination Score for the January 2023 Regents Examination in Living Environment* will be posted on the Department’s web site at: <http://www.nysed.gov/state-assessment/high-school-regents-examinations> on Tuesday, January 24, 2023. 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.nysed.gov/state-assessment/teacher-feedback-state-assessments>.
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

January 2023 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		41, 43		59, 60, 61
Key Idea 2				
Key Idea 3		42	44, 45, 46, 50	
Appendix A (Laboratory Checklist)				
Standard 4				
Key Idea 1	1, 2		53, 54	62, 63, 66, 67, 68, 69, 70
Key Idea 2	5, 26, 30	36, 37, 38, 39, 40		
Key Idea 3	10, 11, 22, 23, 27		52	57
Key Idea 4	14, 19, 21, 24, 29			
Key Idea 5	7, 9, 12, 17, 20, 28	31, 32, 33	55	64, 65
Key Idea 6	4, 6, 15	34, 35	48, 49	56, 58
Key Idea 7	3, 8, 13, 16, 18, 25		47, 51	71, 72

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