

# FOR TEACHERS ONLY

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

## LIVING ENVIRONMENT

Tuesday, January 23, 2024 — 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: <https://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 a correct response to each item.

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: <https://www.nysed.gov/state-assessment/high-school-regents-examinations> on Tuesday, January 23, 2024. 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.**

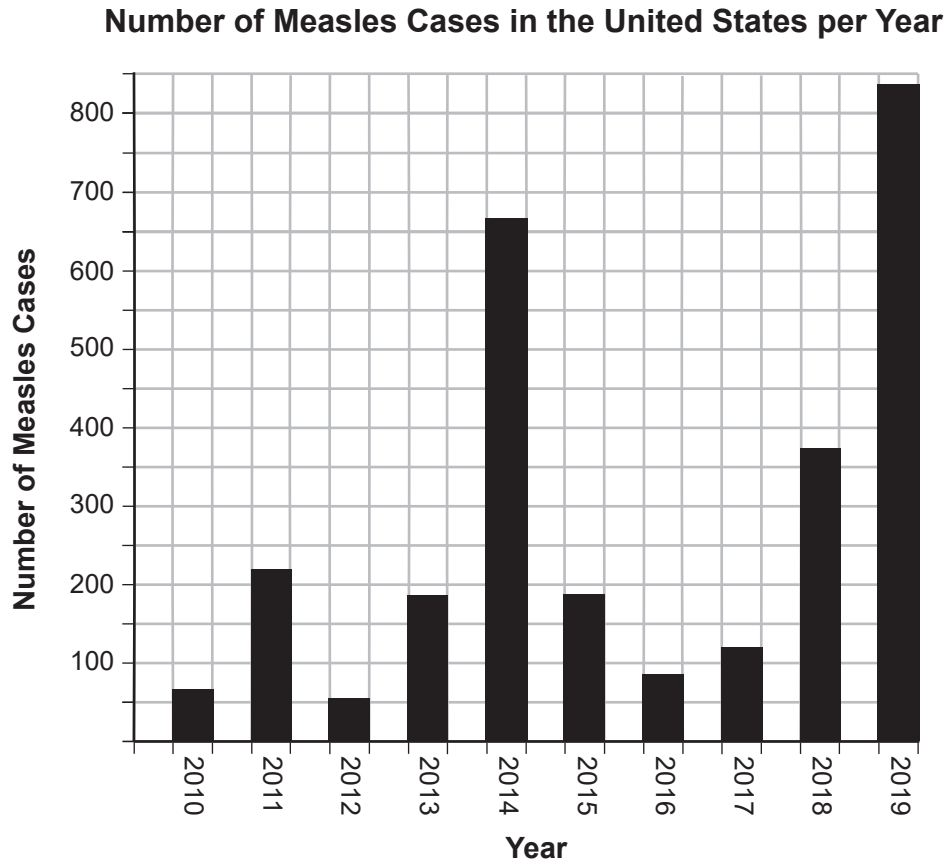
Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student’s final score.

**Part B–2**

44 [1] Allow 1 credit for marking an appropriate scale on the axis labeled “Number of Measles Cases.”

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

45 [1] Allow 1 credit for constructing vertical bars to correctly represent the data.



**Note:** Allow credit if the correct data are clearly represented, even if the bars are *not* shaded.

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.

46 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The immune system remembers the antigens/spiked proteins on the virus.
- The measles virus doesn't change/change shape every year.
- The immune system remembers the virus.
- The immune system produces antibodies that remain present in the body.
- Some white blood cells remain that are able to fight off invaders many years later.

47 1

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

- Measles hasn't been eliminated in other places in the world, so people can still get measles.
- Vaccinating most people reduces the chances of it spreading.
- There is still a chance of catching measles from unvaccinated individuals.
- Measles hasn't been totally eliminated/is still a problem.

49 4

50 2

51 [1] Allow 1 credit for identifying the week women should have the optimum amount of folic acid in their diet as week 3 or 4 and supporting the answer. Acceptable responses include, but are not limited to:

- Women should have the optimal amount of folic acid in their diet by week 4 because the neural tube begins to develop at this time, and folic acid is necessary for proper neural tube formation.
- Women should have the optimal amount of folic acid by week 4 because that's when the neural tube develops.
- Women should have the optimal amount by week 3 or before week 4 because the neural tube begins to develop in week 4.

52 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- grasses
- trees
- flowering plants

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

- With fewer mice the grasshoppers may increase and eat more grass since more would be available, so the rabbits may not have more food after all.
- If the mouse population decreases, there would be more grasses available for the rabbits, but the snakes would eat more of the rabbits.
- The snakes would eat more rabbits.
- The rabbit population would probably not increase, since they would be hunted more frequently by snakes.

- 54** [1] Allow 1 credit for identifying *one* specific process carried on by plants that requires relatively large amounts of water and supporting the answer. Acceptable responses include, but are not limited to:
- Photosynthesis requires large amounts of water, which is a raw material in the process.
  - Transport of materials/diffusion within the plant requires water to dissolve the materials being transported.
  - Transpiration is the loss of water out of the leaves/movement of water through the plant.

- 55** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Oxygen is used in the process of respiration, during which ATP is produced. ATP is required for active transport to occur.
  - Active transport requires energy. Oxygen is required for the process of respiration, which releases energy.
  - Oxygen is required to release energy, and energy is required for active transport.

## Part C

**56** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They grow faster and larger than fish in the wild.
- There can be an increase in the amount of food available for the world population.
- Fish populations in natural environments can return to normal numbers.
- They are easier to obtain (catch) than by fishing.

**57** [1] Allow 1 credit for identifying *one* concern that individuals might have as the number of fish farms increase and supporting the answer. Acceptable responses include, but are not limited to:

- Sea lice are spreading in the fish farms and in the natural waterways.
- If the larger fish escape, they can outcompete wild salmon.
- Waste products of fish in the farm could pollute the water.
- Escaping fish could have negative effects on ecosystems.

**58** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The chemicals that control life functions in the other organisms in the ecosystem may not work if the temperature changes.
- Aquatic organisms are adapted to specific environmental conditions, and they might not be able to survive if a factor like temperature changed.
- A changed environment may affect the genes/reproduction times of certain organisms.
- Certain genes may not be expressed in organisms if a factor such as temperature changes.
- Their enzymes might not work.
- Raising the temperature might reduce the amount of oxygen available.

**59** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The weed killers kill milkweed and the other flowering plants necessary for the survival of the monarchs.
- The glyphosate kills milkweed. Without milkweed, the monarchs have nowhere to lay their eggs, and the caterpillars have no food source.

**60** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Mature adult monarchs feed on flower nectar. Without flowers, the monarchs would not have the food needed to provide energy for their migration and reproduction.
- Without the energy that the monarchs derive from flower nectar, they would not be able to migrate and reproduce.
- They need the plants for food/energy.

61 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The larvae eat the milkweed, ingesting the toxic chemicals. When the larvae undergo metamorphosis, the chemicals remain.
- The monarch caterpillars ate the milkweed. They took in the toxic chemicals, and the chemicals remained in their bodies when they became adults.

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

- If the freshwater runoff is reduced, then the amount/height of *Phragmites* would be reduced.
- The extra fresh water added by the storm drains was the reason *Phragmites* was taking over.
- The added sediments kept the salty seawater from reaching the marsh.
- If salty conditions return, the marsh will be restored.
- Native plants will return if salty conditions return.
- If the salt concentration increases, then the *Phragmites* population decreases.

**Note:** Do *not* allow credit for a hypothesis written in the form of a question.

63 [1] Allow 1 credit for describing the pattern in the data of the Average Height of *Phragmites* and explaining a cause for the pattern, including numerical data from the chart to support the answer. Acceptable responses include, but are not limited to:

- The average height went down from about 280 cm to about 120 cm because the *Phragmites* doesn't grow as tall in salty water.
- The average height decreased to around 120 cm. During the restoration project, the height varied, but gradually decreased in the salty water.
- The average height decreased from around 280 cm in 1999, since there was less freshwater runoff each year due to the restoration project.

64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The *Phragmites* population went from 60% in 2008 to 0% in 2015.
- The frequency of the invasive grass decreased after 2008.
- The population went from about 36% in 1999 to 0% in 2015.

- 65** [1] Allow 1 credit for identifying *one* abiotic factor mentioned in the passage that could be causing the red tides and describing how this factor may be leading to an increase in the algae population and supporting the answer. Acceptable responses include, but are not limited to:
- Heavy rainwater could be washing nutrients into the ocean, resulting in increased algae growth.
  - Warmer waters could produce environments where algae grows quickly.
  - An increase in the use of fertilizers could increase the amount of fertilizer present in the water. Fertilizers provide nutrients that can increase algae growth.
- 66** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Their neurotoxins could be dangerous to the nervous system.
  - Eating contaminated fish could make us sick.
  - The toxin could limit cellular respiration.
  - People swimming in contaminated water could be affected by the toxins released.
  - It could reduce the availability of food for humans.
- 67** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The shellfish could spread the algae toxins to new environments.
  - When other organisms eat the shellfish, the toxin from the algae could kill them.
  - As other organisms eat the shellfish, the toxins are spread to those organisms.
- 68** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- It requires less energy than quickly flying away to avoid being eaten.
  - It is a passive type of defense mechanism and requires less energy.
  - Having the fur and scales does not require the moths to react quickly to predation; they merely go undetected.
  - The bat sounds are absorbed, so the bats can't find the moths.
- 69** [1] Allow 1 credit for predicting how the frequency of the trait for sound-absorbing wings might change over time and supporting the answer. Acceptable responses include, but are not limited to:
- The frequency of the trait might decrease. These moths do not have ears that might help them avoid other predators and dangers in their environment.
  - The frequency of the trait might remain the same. The advantage could be canceled out by the disadvantage of having no ears.
  - It could decrease over time if bats evolved a new ultrasound frequency that is not absorbed by the fur and scales.
  - It might remain the same because they are currently well-adapted to avoid predators.
  - The frequency of the trait might increase because it helps them evade the bats.



**70** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Since the quoll was a predator, its prey populations may increase and reduce the number of individuals in the species the prey populations fed on.
- Other organisms in the ecosystem that preyed upon quolls might have a hard time finding enough food and could die out or their populations could become much smaller.
- If it fed on herbivores, there may be fewer plants in the ecosystem as the herbivore population increased.
- The loss of the quolls could cause many disruptions in the food webs in the ecosystem.
- Its predators would decrease in number.

**71** [1] Allow 1 credit for stating whether saving the quolls will help solve the problems associated with the spread of the cane toads and supporting the answer. Acceptable responses include, but are not limited to:

- No, saving the quolls will not solve the cane toad problem, since the quolls would not be interacting with the toads and would not affect them significantly.
- Yes, saving the quolls could solve some of the problems with the cane toads, if the animals that the quolls feed on are the same as some of the animals the toads eat. This competition may slow the spread of the toads in Australia.
- No, the toads will not be affected, since the cane toads will still poison many other native species and not be negatively affected by the presence of the quolls that do not eat them.

**72** [1] Allow 1 credit for stating whether the offspring coming from these fertilized eggs would be able to mate and produce offspring that would not try to eat the cane toads and supporting the answer. Acceptable responses include, but are not limited to:

- Yes, they could pass on the gene to offspring. The genetic material would be present in all of the quolls' cells, including their sex cells.
- Yes, because the gene would be present in their sex cells, so it would be passed on.
- Yes, their eggs or sperm would all have the gene.
- Maybe. If the trait is recessive you would need both parents of the offspring to have that gene.

## Part D

73 4

74 3

75 3

76 1

77 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- In both cases, many species evolved from a common ancestor.
- Both finches and bats had many different feeding adaptations that reduced competition.
- Different sources of food in the environment permitted many different types of bats/finches to be successful.

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

- The concentration of water inside the model cell was less than in the beaker, so water diffused in.
- Water diffused into the cell due to the differences in water concentration inside and outside of the cell.
- Water diffused into the cell due to osmosis.

79 [1] Allow 1 credit for 80% and supporting the answer with data from the table. Acceptable responses include, but are not limited to:

- The concentration in the original cells was 80% because the mass of the model cell was the same as it was at the start.
- The same amount of water diffused into and out of cell in the 80% concentration.

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

- An increased pulse rate delivers more oxygen and nutrients to muscle cells.
- An increased pulse rate allows for wastes to be removed from cells more quickly.

81 4

82 2

- 83** [1] Allow 1 credit for identifying how many other plants most likely produce this unique protein and supporting the answer. Acceptable responses include, but are not limited to:
- Four other lanes all have a band that traveled the same distance in the gel as the band labeled **X**.
  - The DNA injected into lanes 2, 5, 7, and 9 all have a band in the same location and the same size as the band labeled **X**.
- 84** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The banding patterns in lanes 2 and 9 appear to be the same.
  - It looks like the DNA bands are from the same plant in two of the lanes.
- 85** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Waste product level will decrease because waste is transported to lungs or kidneys for excretion.
  - Levels will increase because cells produce more waste as they increase activity.

# Map to Core Curriculum

## January 2024 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			47	71
Key Idea 2		31		62
Key Idea 3		34		63, 64
Appendix A (Laboratory Checklist)			44, 45, 50, 51	
Standard 4				
Key Idea 1	1, 5, 7, 14, 15, 19		52	60, 61, 67, 70
Key Idea 2	3, 4, 8, 21	32, 33, 38		72
Key Idea 3	2, 11, 12, 29	35		68, 69
Key Idea 4	17, 22, 30	39, 40, 41		
Key Idea 5	13, 23, 24, 26, 28	42	46, 48, 49, 54, 55	
Key Idea 6	6, 9, 16, 20, 25, 27	43	53	65
Key Idea 7	10, 18	36, 37		56, 57, 58, 59, 66

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

## Regents Examination in Living Environment

January 2024

### Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

**The *Chart for Determining the Final Examination Score for the January 2024 Regents Examination in Living Environment* will be posted on the Department's web site at: <https://www.nysed.gov/state-assessment/high-school-regents-examinations> on Tuesday, January 23, 2024. 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 <https://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.