

# FOR TEACHERS ONLY

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

## LIVING ENVIRONMENT

Thursday, August 17, 2023 — 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: <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 Thursday, August 17, 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.

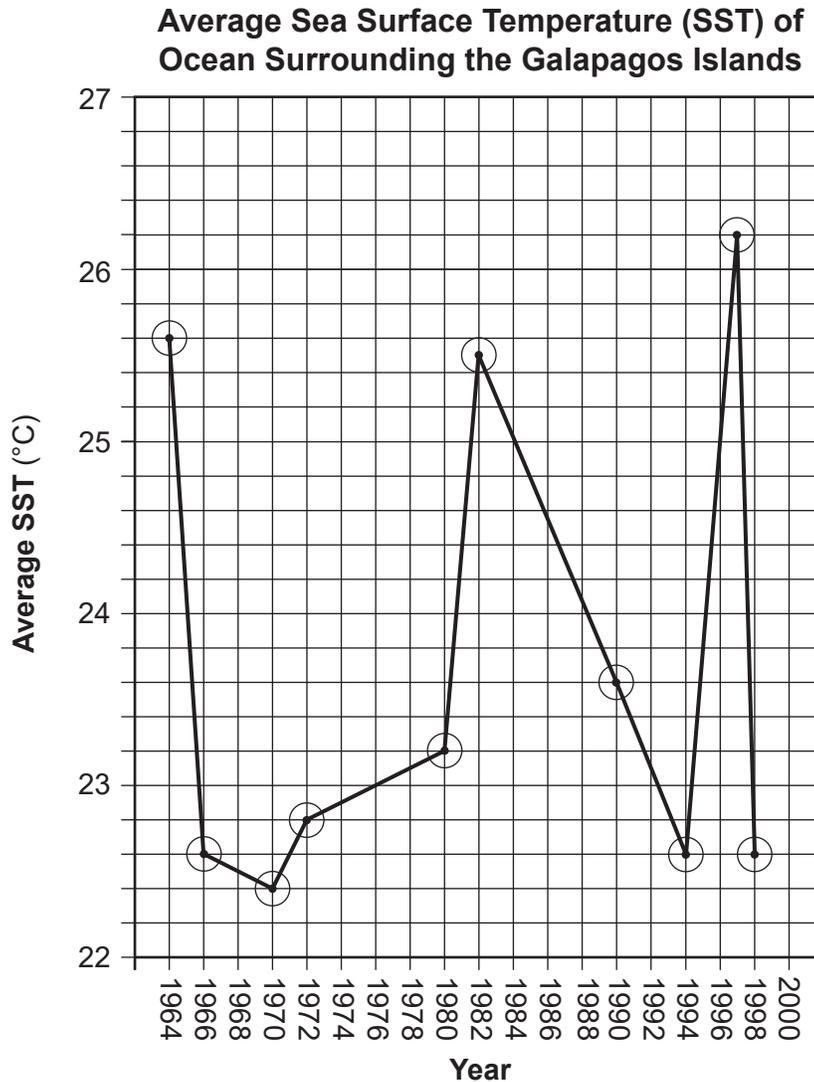
**Part B–2**

- 44 [1] Allow 1 credit for marking an appropriate scale, without any breaks in the data, on the axis labeled Average SST (°C).

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

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

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



**Note:** Allow credit if the points are plotted correctly, but not circled.

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.

- 46** [1] Allow 1 credit for what additional data could help explain the annual variation in the penguin population and explaining the reasoning.

Number of predators

— Predators would reduce the population.

Timing of storms

— Storms during egg-laying could destroy eggs.

Available food

— Penguins need a constant supply of food.

**47 MC on scoring key**

- 48** [1] Allow 1 credit for describing the overall trend in the size of the penguin population between 1970 and 2000 and supporting the answer with numeric data from the graph. Acceptable responses include, but are not limited to:

— The population size has decreased between 1970 and 2000. In 1970 and 1971, the size of the population was about 1600 and 1800. The population was never that large again.

— The population decreased from a high of about 1800 in 1971 to about 900 in 2000.

— The primary trend was that the overall size of the population decreased from 1800 to 900 penguins.

**49 MC on scoring key**

**50 MC on scoring key**

- 51** [1] Allow 1 credit for indicating that the change would be present and supporting the answer. Acceptable responses include, but are not limited to:

— Yes, because body cells produce new cells by copying the DNA, so the change would be in the new cells.

— Yes, because the cells go through mitosis/mitotic cell division.

— Yes, because the altered gene (DNA) can be passed on to every cell that develops from it.

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

— Predators of mosquitoes are eaten by other predators. The microplastics in their bodies are then passed to other organisms in the food chain.

— Any organisms that eat other prey with microplastics in them will have microplastics in their bodies.

— When the mosquitoes bite, they might inject the microplastics along with their saliva.

— If microplastics are in the environment, other organisms can ingest them from water or soil.

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

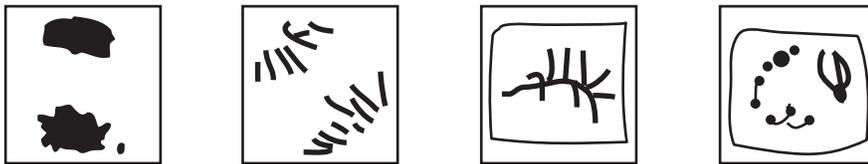
- Essential organs/tissues are forming at that time.
- Organ development occurs in early stages of pregnancy.

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

- UV radiation/light
- sunlight
- certain chemicals
- cigarette smoke
- error in DNA replication

**Note:** Do *not* allow credit for just “radiation” without indicating a type.

55 [1] Allow 1 credit. Acceptable responses include, but are not limited to:



## Part C

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

- Fertilizer from farms and sewage from homes caused the algae to grow, blocking sunlight for sea grasses. This caused a decrease in plants, and photosynthesis was greatly reduced.
- As development took place, nitrogen buildup caused an increase in algae, which blocked sunlight, reducing photosynthesis.
- An increase in water pollution caused sea grasses and plants to die, and there was less food available in the ecosystem.

**57** [1] Allow 1 credit for identifying *one* abiotic factor that most likely contributed to the decrease in submerged aquatic vegetation (SAV) in the Chesapeake Bay and supporting the answer. Acceptable responses include, but are not limited to:

- Graph 1 shows that from 1994 to 2003, the nitrogen level in the bay was high and the amount of vegetation was low.
- The presence of nitrogen in the bay kept the amount of bottom vegetation low from 1994 to 2002 because it promoted algae growth on the surface.
- Graph 2 shows that, when nitrogen/phosphorus levels were high from 1978 to 1994, there was very little vegetation in the bay.
- The wastes containing nitrogen and fertilizer promoted algae growth, which blocked sunlight.

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

- Since nitrogen and phosphorus levels have been reduced through water treatment, as shown in graph 2, continued improvements in water treatment should continue to reduce the nitrogen and phosphorus levels.
- Since the goals set for 2025 for water improvement have been reached and passed, continued improvements in water treatment should remove more pollutants and continue to keep the water clean.
- The graphs show that the use of the water treatment plants has improved the water quality by reducing the amounts of phosphorus and nitrogen in the bay.
- The use of upgraded water treatment plants resulted in decreased nitrogen/phosphorus and an increase in SAV, as shown in the graphs.

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

- Protect endangered animals to preserve biodiversity in ecosystems.
- Decrease air pollution to reduce the effect of acid rain in rivers and lakes, which helps local wildlife.
- Pass laws to reduce air pollution issues.
- Pass laws to limit the killing of endangered animals.
- Demonstrations/marches could be held to encourage solving environmental problems such as climate change.

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

- Change the patient’s blood cells by incorporating proteins unique to these cancer cells.
- Alter white blood cells by adding cancer cell proteins.
- White blood cells are grown with proteins from cancer cells.
- Genetic engineering could alter white blood cells to produce cancer proteins.

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

- Some white blood cells could engulf the cancer cells.
- Cells could produce antibodies that attack the cancer cells.
- Cells could be produced that remain and fight off cancer cells in the future.
- The immune system could attack the cancer cells.

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

- Since the vaccine is made from the patient’s cells, the immune system won’t treat them as foreign.
- Most of the components of the cancer vaccine are common to the patient.
- The proteins in the vaccine, other than those unique to cancer cells, are already in the patient’s cells, so the patient shouldn’t have a negative reaction.

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

- Both vaccines contain proteins/antigens that stimulate the immune system.
- Both contain proteins/RNA that prepare the body to fight harmful cells.
- Both contain antigens.

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

- These algae use energy from the Sun to make food, which provides energy for the other organisms in the food web.
- Autotrophs make food by using sunlight (photosynthesis). Without this food, other organisms would not have a source of energy to keep them alive.
- In this food web, the kelp provide the food that supplies energy/matter directly or indirectly to other organisms in the food web. Without this, none of the other organisms could survive.
- They produce oxygen needed for respiration.
- They convert light energy into the chemical energy of food.

**65** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The sea otters feed on many of the organisms in this food web. Without them, the other populations could increase and disrupt the entire web.
- The sea otters keep the sea urchins under control. Without the otters, the sea stars may not be able to keep the urchins from increasing significantly, so much of the kelp may be eaten and the entire ecosystem could be destroyed.
- The only remaining control of the sea urchins would fall to the sea stars, but if the urchin population grows too quickly, they could destroy all of the kelp and the food web could be totally disrupted.

**66** [1] Allow 1 credit for decomposer and explaining its importance in an ecosystem. Acceptable responses include, but are not limited to:

- Molecules are broken down by decomposers. This process provides plants with nutrients.
- Fungi are decomposers that recycle nutrients.

**67** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- A mutation could have resulted in a smaller, less colorful sunfish.
- sexual reproduction that led to new traits
- the recombination of genes from sexual reproduction
- a mutation

**68** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- They trick the other males into thinking that they are female, so they can sneak by and fertilize the eggs, thereby passing on their genes.
- The mimics fertilize the eggs before the colorful, aggressive males can fertilize them.
- They increase the number of offspring that carry their genes.

**69** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- A silent cricket wouldn't be able to attract mates, since it can't chirp a mating call.
- If there are no flies for the crickets to avoid, there is no advantage to being silent.
- Without predators or parasites, there is no selection against chirping.

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

- The number of silent crickets will increase because they can avoid an attack by the flies and reproduce. More silent crickets would be produced. The chirping crickets would slowly die off.
- Silent crickets can avoid a predator attack, so they are more likely to survive, reproduce, and pass on this advantageous trait.

**71** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Deer and humans are both mammals and share many genes in common due to common ancestry.
- In the distant past, humans and deer probably shared a common ancestor.

**72** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Growing antlers is similar to human bone growth, so the rapid growth of the antlers could give scientists ways to speed up healing in humans who have broken bones.
- Healing broken bones takes a lot of time. Scientists could learn from the processes that antler growth uses to help repair bones injured through disease.
- Understanding how these antlers grow so rapidly could provide scientists with ways to speed up human bone repair.

## 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. Acceptable responses include, but are not limited to:

- The claim may not be accepted because the student did not take pulse rates before the game started.
- The claim would not be accepted because the student used a small sample size of only six individuals.
- The claim would not be accepted because the student didn't repeat his experiment, in order to have a larger sample tested.
- Not all the friends showed a large difference in heart rate.
- All variables were not controlled.

**78 [1]** Allow 1 credit for AAA CCC GGG TAT.

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

- add stain to the slide
- adjust the light
- adjust the focus
- clean the lenses

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

- Some groups lacked traits that would have made them better adapted.
- Some were unsuccessful at getting food for their young.
- Some groups were not able to escape predators successfully.
- Some had beaks that could not break open the kinds of seeds available.
- Some died from disease.

**81 MC on scoring key**

**82 MC on scoring key**

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

- Competition for food occurred when the seeds became scarce, as in the second round.
- Several students competed when they tried to get food/seeds out of a small dish.

**84** [1] Allow 1 credit for *B* and supporting the answer. Acceptable responses include, but are not limited to:

- When cells are placed in a high salt concentration solution, they lose water and shrink.
- When the skin cells are placed in a high salt concentration, water will leave the cell and go into an area with less water concentration, so the skin cell shrinks.
- because cell *B* shrank
- because plasmolysis took place

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

- Experiments/studies need to be replicated because this process can verify that appropriate experimental procedures were used.
- It will further verify that the conclusion is correct.
- Scientists need to obtain data to further support the conclusion.
- Multiple trials provide additional data for reaching a more valid conclusion.

## Regents Examination in Living Environment

August 2023

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

**The *Chart for Determining the Final Examination Score for the August 2023 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 Thursday, August 17, 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 <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.

## Map to Core Curriculum

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

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