FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Friday, June 14, 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 Friday, June 14, 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.

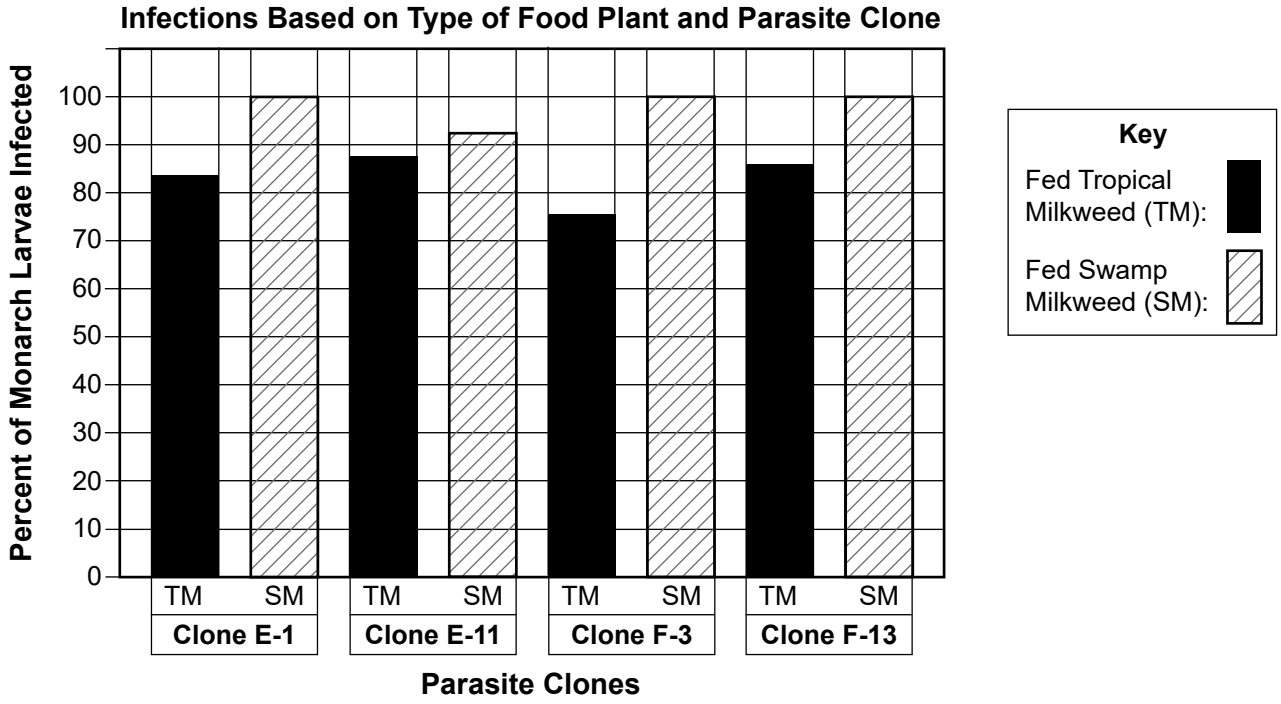
Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score.

Part B–2

44 [1] Allow 1 credit for marking an appropriate scale on the axis labeled "Percent of Monarchs Infected."

45 [1] Allow 1 credit for constructing vertical bars to represent the results for each parasite clone for the larvae grown on the two types of milkweed plants.

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



Note: Allow credit if the correct data are clearly represented, even if the bars are *not* shaded in. An appropriate scale only needs to include the data range in the data table.

46 [1] Allow 1 credit for stating whether the types of milkweed that the larvae were fed made a difference in whether or not the larvae became infected and supporting the answer. Acceptable responses include, but are not limited to:

— The larvae that ate swamp milkweed (SM) almost all became infected while those that ate the tropical milkweed (TM) had lower infection rates overall.

— Nearly all of the larvae that fed on swamp milkweed became infected, only 75% to 88% of those that ate the tropical milkweed were infected.

— The different types of milkweed did not make a large difference because the range was not significant/large.

47 3

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

— Fewer larvae in that group would have been infected, since they may not have ingested any spores.

— It would look like the F-13 clones were less able to infect the larvae because some larvae may not have eaten the spores.

— There would be fewer larvae infected by the F-13 clones than by the other three clones, since there was less chance that they would eat any of the spores as they fed on the milkweed leaves.

— The larvae may not have eaten enough of the spores of clone F-13 to get infected.

— If only a few spores are needed for infection, there may be no change.

49 2

50 2

51 [1] Allow 1 credit for identifying *one* structure in the cells of these frogs that plays a role in the rapid removal of water and absorption of high concentrations of sugar and justifying the answer. Acceptable responses include, but are not limited to:

— cell membrane, because it is responsible for the transport of substances into and out of the cell

— cell membrane, because diffusion and active transport take place there

— cell membrane, because it controls which molecules enter and leave the cell

— mitochondria, because they provide the ATP/energy for active transport

52 [1] Allow 1 credit for 4.

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

— Structure *A* produces the egg/gamete and structure *B* provides a place for the embryo/fetus to develop.

— *A*: produce eggs *B*: where fetus develops

— *A*: produces hormones *B*: where the placenta forms

54 [1] Allow 1 credit for describing the results that the student would most likely obtain if he ran the same experiment again but placed the test tubes in a hot water bath kept at 65°C for 15 minutes and supporting the answer. Acceptable responses include, but are not limited to:

— All of the results would be negative. The increased temperature would most likely destroy/denature the enzymes.

— There would be no positive results. Since the enzymes worked at human body temperature, 65°C would most likely change the shape of the enzymes so that they would not break down the proteins in the meat or the starch in the bread.

55 [1] Allow 1 credit for control/comparison and supporting the answer. Acceptable responses include, but are not limited to:

— Test Tubes 3 and 4 are controls. There were no enzymes in these two test tubes.

— Test Tubes 3 and 4 were used as a comparison. They were used to prove that enzymes were needed to digest the food.

— Test Tubes 3 and 4 would show that enzymes were necessary to break down the proteins in the meat and the starch in the bread.

Part C

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

— The Sun provides energy for producers to carry out photosynthesis to make sugar. When organisms are eaten, some of the chemical energy in the sugar molecules is transferred to the next level.

— The Sun's energy is converted into chemical energy by photosynthesis. When consumers eat other organisms, the energy is transferred through the food web.

— The Sun provides the energy, and some of it is passed from organism to organism as they feed on each other.

57 [1] Allow 1 credit for claiming that there is no gain or loss of matter during photosynthesis and providing evidence from the data to support the claim. Acceptable responses include, but are not limited to:

— According to the chart, the number of atoms in the molecules used during photosynthesis is the same as the number of atoms in the molecules produced by the process.

— The amount of carbon, hydrogen, and oxygen is the same going into the reaction and coming out of the reaction.

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

— There were no predators to keep the zebra mussels in check.

— The mussels could outcompete the native mussels.

— They reproduce quickly and drift to other waterways.

— The Great Lakes connect to other waterways.

— They were well adapted to live in the waterways.

— Boats can easily carry and transport the eggs and larvae.

— The mussels produce a million eggs per year.

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

— After 1992, the zebra mussels had consumed most of the phytoplankton, so there was little for the other consumers to eat.

— Between 1988 and 2009, the amount of phytoplankton chlorophyll decreased from about 30 µg/liter to 6 µg/liter.

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

— The zebra mussels spread and clogged water pipes and damaged boats, docks, buoys, and other structures.

— The damage that they caused costs money to repair.

— Zebra mussels reduced biodiversity.

— They reduce dissolved oxygen in the water.

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

— The zebra mussels outcompeted the native mussels, so there were more zebra mussels.

— Once the zebra mussels were established in the river, they outcompeted the native mussels, and then the native mussels didn't have enough food and declined.

— The native and zebra mussels competed for the same food, so when the zebra mussels increased, the native mussels decreased.

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

— Mimicry is advantageous because the king snake looks like a venomous coral snake. Predators will see the king snake and avoid it.

— The mimicry reduces the chance that the king snake will be eaten, so it can live longer and reproduce.

63 [1] Allow 1 credit for predicting how the population size of king snakes might change over time *without* coral snakes in the area where they live and justifiying your answers. Acceptable responses include, but are not limited to:

— The population of king snakes would decrease. The mimicry would not be an advantage, and they might be attacked more by predators.

— The population of king snakes might increase, as they would not compete with the coral snakes for some food.

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

— The deer population could decline/be better controlled.

— They would compete with the coyotes, and the coyote population would decrease or leave the area.

— There might not be enough food to support two predators, and each population would decrease.

— The mountain lions might move into populated areas and pose a threat to people and pets.

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

— Building projects take up space and reduce the resources available to the deer, so the number of deer would go down.

— Since there will be less land for food, the deer population will decrease through competition.

— The development projects remove plants and trees, resulting in less food for the deer.

66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— If antibodies recognize the drug protein, the drug protein is marked for destruction.

— White blood cells/dendritic cells may engulf and destroy the drug particles.

— The immune system destroys the drug particles before they can work.

— Activated T cells produce antibodies that mark the drug for destruction.

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

— AIDS patients have weakened immune systems; therefore, they would be less likely to attack the biologic drug particles, making the drugs more effective.

— AIDS patients have weaker immune systems and may not attack the drug particles.

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

— People will still have immunity to other pathogens because antibodies are specific to the pathogen. The SVPs block only the antibodies to this drug.

— Antibodies are specific; the SVPs block the production only of antibodies that match the drug.

— Antibodies are specific.

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

— The algae growth blocked light, which the plants needed for photosynthesis.

— The plants did not get enough light to carry out photosynthesis.

— The plants died out because they didn't have light for the process of photosynthesis.

— Algae may have used nutrients also needed by the complex plants.

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

— The organisms that were eating the complex plants would either die out or move away from the region due to a lack of food.

— The food webs would become unstable, since the organisms supported by the complex plants would lose their source of energy.

— New food webs would develop in the area. These webs would depend on algae as their source of energy.

— Shelter for young fish will decline.

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

— If the analysis of the data showed that algae growth increased more rapidly when more nitrogen compounds were in the Bay, this would support the conclusion.

— One piece of evidence would be if the data show that, as nitrogen compounds increased or decreased in the Bay, the growth rate of the algae did the same.

— If the research data show that, of all the nutrients, nitrogen had the greatest effect on algae growth, then nitrogen would be the main cause of the algae growth.

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

— Eggs need to be fertilized by functional sperm in order for offspring to be produced.

— If males cannot produce functional sperm, eggs will not be fertilized and there will be no offspring.

— If the mosquitoes can't produce sperm, they cannot reproduce/produce offspring.

Part D

73 2

74 4

75 2

76 4

77 [1] Allow 1 credit for enzyme, restriction enzyme, or biological catalyst.

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

— Their muscle cells got tired because waste products were building up in them from the activity.

— Muscle fatigue caused them to slow down/become weaker.

— They might not be getting enough oxygen/nutrients.

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

— Resting pulse rates for different people can differ depending on their size, weight, degree of physical fitness, or genetic makeup.

— They may have been doing different things before the resting pulse rate was taken.

— naturally occuring variation between individuals

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

— The increased heart rate helps the cells get rid of the extra wastes produced from the activity.

— The pulse rate increase helps get oxygen to/take carbon dioxide away from the muscle cells that were involved in the exercise activity, causing the level of these gases to quickly return to normal.

81 4

82 4

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

— The proteins are too large to diffuse through the artificial cell membrane.

— The artificial cell membrane is not permeable to the proteins.

84 [1] Allow 1 credit for identifying *one* characteristic and explaining specifically why that characteristic would make them successful. Acceptable responses include, but are not limited to:

— Better eyesight would help them find smaller seeds more easily than other finches.

— Better eyesight/hearing would help them detect predators in their environment, giving them a better chance to get away from them.

— Being stronger or more aggressive could help them be more successful at obtaining food.

— Flying faster or being able to fly farther may help them escape predators or get to other food sources that other finches cannot.

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

— The new lizards might outcompete the lizards already there and drive them to extinction.

— They could eat some of the species of plants or animals that the original lizards eat, which would disrupt the food webs/diversity.

— They might fill an ecological niche on the new island that was not already filled and survive with no negative effects on the native species.

Regents Examination in Living Environment

June 2024

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

The *Chart for Determining the Final Examination Score for the June 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 Friday, June 14, 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.

Map to Core Curriculum

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

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