FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Wednesday, June 14, 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: 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 Wednesday, June 14, 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 identifying when during Earth's history autotrophs first appeared and supporting the answer. Acceptable responses include, but are not limited to:

— Autotrophs first appeared 2500 mya (± 100 mya). That is when oxygen started to accumulate in the atmosphere.

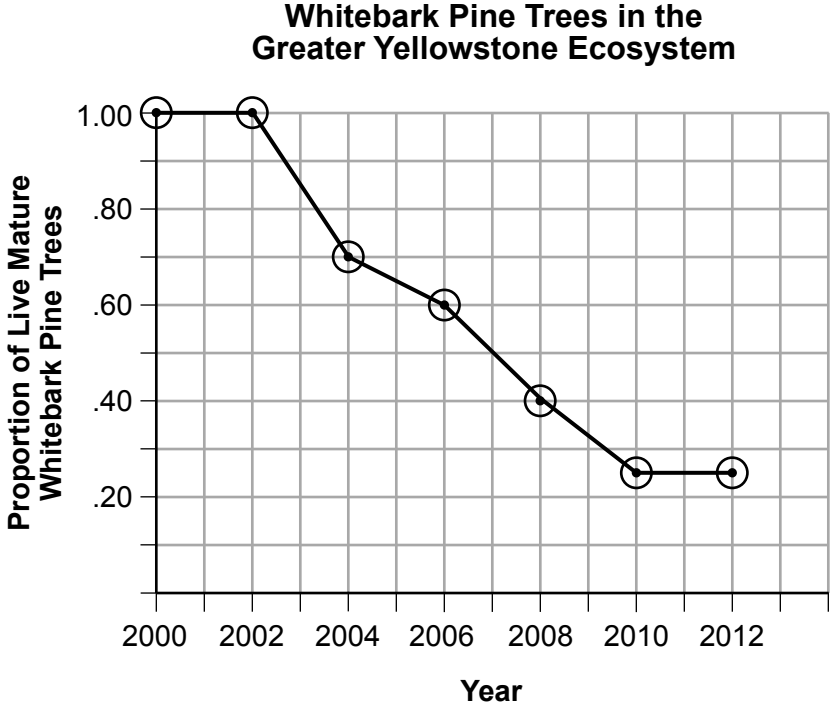
— 2500 mya, because autotrophs produce oxygen as a result of photosynthesis. The level of oxygen in the atmosphere before that was almost nonexistent.

45 [1] Allow 1 credit for marking an appropriate scale, without any breaks in the data, on each labeled axis.

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

46 [1] Allow 1 credit for correctly plotting the data and connecting the points.

Example of a 2-credit graph for questions 45-46:



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.

47 MC on scoring key

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

— Reduce the use of fossil fuels/use alternative energy sources.

— Decrease greenhouse gas (carbon dioxide) emissions.

— Decrease the amount of deforestation/industrialization.

— More people could use alternative (more efficient/less polluting) modes of transportation.

49 MC on scoring key

50 MC on scoring key

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

— The enzyme has the wrong shape.

— The extra segment blocks the active site of the pepsin.

— The segment prevents the pepsin from attaching to another molecule/substrate.

— keeps it from interacting with the proteins it would normally digest

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

— Each of the body cells of the dog has the same genetic information.

— One cell type is enough, since all the body cells in a dog have the same DNA.

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

— Recombination of existing genes could produce a new trait that her ancestors did not show.

— Conditions in Trixie's environment were different from those of her ancestors, which could affect gene expression.

— A mutation could have occurred.

— It could have been a recessive trait.

54 [1] Allow 1 credit for identifying the structure in the reproductive system and the function of that part. Acceptable responses include, but are not limited to:

Plastic bag:

— This represents the uterus, and the fetus develops here.

— This is the amniotic sac, which contains the fluid that protects/surrounds the fetus.

External oxygenator:

— This represents the placenta, where oxygen and CO_2 gases are exchanged.

— The placenta is represented by this, and it is where gases and nutrients are exchanged.

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

— The organs and systems of sheep are similar to humans.

— Testing in animals is easier to get approval for than testing in humans.

— There would be fewer ethical concerns.

— It will help determine if the procedure is safe for humans.

Part C

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

— In any ecosystem, the survival of organisms depends on physical factors such as pH. If the pH is altered, many organisms will not survive.

— The enzymes in organisms work best within a specific pH range, so if enzymes don't work, organisms may die.

— A change in pH could result in the death of many organisms, disrupting food webs.

— If the organisms weren't adapted to the pH changes, they could die.

57 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Use public transportation/carpool/walk/ride a bicycle.

— Use alternative energy sources such as wind and solar instead of fossil fuels.

— Don't burn fuels high in sulfur or nitrogen content.

— Reduce the burning of fossil fuels.

— Lobby the federal government to regulate SO_2 and NO_x emissions from power plants.

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

— Using public transportation (carpooling, walking, riding a bicycle) will result in less fossil fuel being burned and less acid rain being formed in the atmosphere.

— Alternative energy sources such as wind and solar do not add pollutants to the air.

— Some fuels have a lower sulfur content than others. By using them, less SO_2 will be put into the air.

— With less burning of fossil fuels, less CO_2/SO_2/NO_x will be put into the air.

— By advocating for stricter regulations, the government may limit SO_2 and NO_x emissions.

Note: Only allow credit for an answer consistent with the student's response to question 57.

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

— There are no natural predators in these regions.

— The lionfish can outcompete the native species for food.

— They can eat a large variety of food that is found in the area.

— They were adapted to a variety of environments.

— Lionfish may have reproductive rates that are greater than other fish.

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

— The original population was small/12 fish, so the amount of variation would be low.

— Only a dozen or so released lionfish started the whole population. They probably did not have much variation in their genes.

61 [1] Allow 1 credit for stating *two* ways invasive species can disrupt ecosystems. Acceptable responses include, but are not limited to:

— They could cause extinctions of native plants and animals.

— They reduce biodiversity/stability in an ecosystem.

— They compete with native organisms for limited resources.

— They alter habitats.

— They disrupt food webs.

Note: A correct response must include *two* ways invasive species can disrupt ecosystems.

62 [1] Allow 1 credit for stating *no* and supporting the answer. Acceptable responses include, but are not limited to:

— No, the chemotherapy drug is necessary to make holes in the protective shield so that white blood cells can reach the cancer cells.

— No, the new drug only strengthens the immune system; the chemotherapy drug allows white blood cells to reach tumor cells.

— No, both drugs must be used for white blood cells to attack these tumor cells.

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

— White blood cells mark cancer cells for destruction using antibodies.

— White blood cells attack/fight and engulf cancer cells.

— The cells normally recognize and target tumor cells for destruction.

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

— This treatment would be less effective if the person has AIDS because AIDS weakens the immune system, and there might not be enough white blood cells to attack the tumor.

— This treatment would be less effective because AIDS weakens the immune system.

65 [1] Allow 1 credit for *A* and explaining why model *A* is correct.

— Cottonwoods, which are producers, are eaten by the deer, which are eaten by the cougars.

— Food chains go from producers to herbivores to predators.

— Energy and materials flow from producers to primary to secondary consumers.

— Food chains start with a producer/autotroph.

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

— Without cougars, the deer increased and consumed the cottonwoods.

— Cougars previously kept the deer in check, so fewer cottonwoods were eaten.

— There were more deer eating the cottonwood trees.

— Destabilization caused by the loss of cougars will result in an increase of deer, which results in a decrease in the cottonwoods.

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

— In areas with fewer visitors, the cougars are thriving.

— North Creek has few visitors, and cougars are more common.

— As the number of visitors increased, the number of cougars decreased.

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

— The DDT built up in the bald eagles, and their deaths signaled to humans that something was dangerous in the environment.

— The decline of the bald eagle served as an indicator of a potential danger to human health and the environment.

— The bald eagles were reacting to harmful substances that could eventually harm humans.

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

— It may be expensive to find a safe alternative chemical that works as well.

— Insects that cause diseases in humans might increase in number.

— There would be damage to crops.

— The pest population would increase.

— Insects compete with humans' food/resources.

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

— Companies could have secure storage of the chemical in their factory.

— Stop using the toxic chemical and replace it with a non-toxic alternative.

— Treat the chemicals to make them safe before they are released into the environment.

— Fine companies that release these chemicals so they won't do it again.

— Use less of the toxic chemical.

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

— Less sunlight would reduce plant growth, so the dinosaurs would have less food.

— It was colder, so the plants the dinosaurs ate died.

— Dinosaurs were not adapted to the changed environment, so they did not survive.

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

— The bird species that existed must have had adaptations that enabled them to survive the conditions after the asteroid impact.

— Birds had the ability to fly greater distances to find food and other resources they needed to survive.

— They were able to find enough food.

— They were smaller and required less food.

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 13.

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

— There would be more oxygen available.

— CO_2 would be removed more rapidly.

— It would allow for the production of more ATP in muscle cells.

— It helps maintain homeostasis.

79 [1] Allow 1 credit for diffusion/osmosis/passive transport.

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

— Water moved into the potato cells because there was a higher concentration outside than inside the slice. The concentration of water outside the other slices was lower, so water moved out of them and they lost mass.

— The potato slice increased in water content. This made it gain mass. The other slices lost water content.

— Solution 1 is the only one with the water concentration higher outside than inside the potato cells, so water moved in.

— More water moved into that potato slice.

81 MC on scoring key

82 MC on scoring key

83 [1] Allow 1 credit for species 1.

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

— The 60-year-old person had a rate lower than many of the others.

— The 8-year-old had a higher pulse rate than the 60-year-old.

— There weren't enough people tested to draw a valid conclusion.

— Only ten people were tested.

— The pulse rate did not increase each time the age increased.

85 [1] Allow 1 credit for identifying an organ of the human body where diffusion occurs and identifying *one* specific molecule that diffuses between that organ and the blood. Acceptable responses include, but are not limited to:

— lungs – oxygen/CO_2

— small intestine – simple sugars/amino acids/nutrients

— intestine – glucose

— large intestine – water

— liver – oxygen/glucose

Regents Examination in Living Environment

June 2023

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

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

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

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