

FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Wednesday, August 17, 2022 — 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: <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 Wednesday, August 17, 2022. 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.

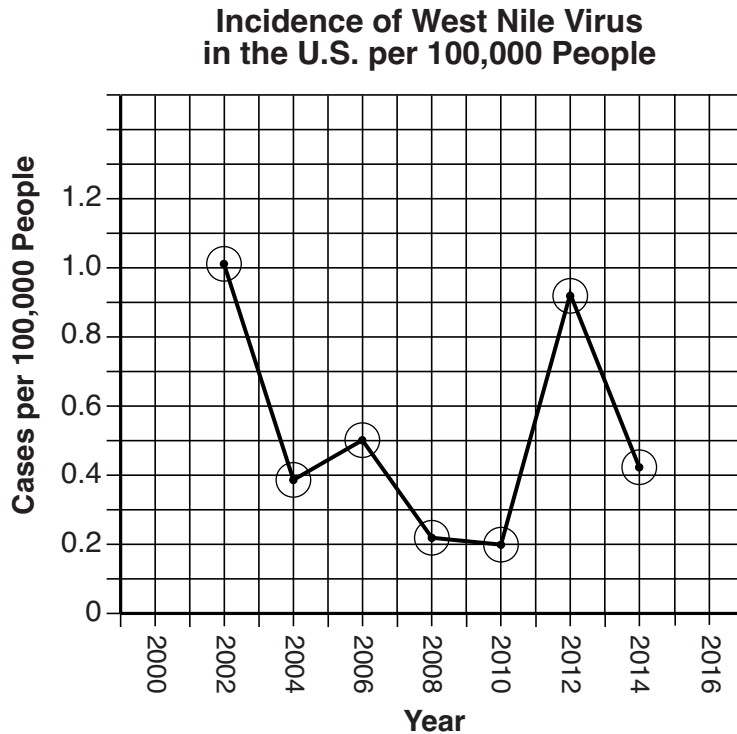
Part B-2

44 [1] Allow 1 credit for marking an appropriate scale, without any breaks in the data, on each labeled axis.

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

45 [1] Allow 1 credit for correctly plotting the data and connecting the points.

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 stating whether or not it is possible to predict what the number of cases per 100,000 people will be for the year 2020 and supporting the answer with information from the graph. Acceptable responses include, but are not limited to:
- It is not possible to make an accurate prediction. In 2002 more than 1 person per 100,000 are infected. In 2004 it is down to .39 people, and then back up in 2012 and down again in 2014.
 - The number of cases per 100,000 people varies widely from one year to the next. There is no consistent trend, making it impossible to predict the number of cases for 2020.
 - The number of cases will likely be less than 1.02 per 100,000. It has not been that high since 2002.
 - No, there is no trend/pattern.
 - The data vary too much to make a prediction.

47 MC on scoring key

- 48** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- They are suffering from a disease that affects their immune system.
 - Their immune system is not able to combat the virus.
 - They may be very young or old and not able to combat the virus.
 - They might have been bitten more times by infected mosquitoes.
 - They have a weaker immune system.
 - They live in a region where more birds carry the WNV.

49 MC on scoring key

50 MC on scoring key

- 51** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Fish can be predators of squid, and squid can be predators of fish.
 - Each species can be both predator and prey.
 - They can feed on each other.

- 52** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The higher the blood alcohol concentration, the lower the total brain weight in newborn rats.
 - A lower peak blood alcohol results in higher total brain weight.
 - As blood alcohol concentration increases, total brain weight decreases.
 - It is an indirect relationship.

53 [1] Allow 1 credit for stating whether or not the claim is correct and supporting the answer. Acceptable responses include, but are not limited to:

- Since there are a number of different species in this ecosystem, the system is probably stable.
- There are producers and consumers in this food web, and their interactions would keep this ecosystem stable.
- Yes, it supports the conclusion because the more diversity there is in an ecosystem, the more stable it is.
- There are no decomposers represented in the food web, so the ecosystem would not be stable.
- No, there is only one type of producer.

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

Two organisms: snakes and foxes

- They both have other sources of food so they are not totally dependent on the one organism.

Two organisms: rabbits and squirrels

- They obtain nutrients from different parts of plants.
- There is enough food for both populations.

Two organisms: hawks and foxes

- They eat at different times of the day.

55 [1] Allow 1 credit for:

Number of structure: 1

Name of structure: ribosome

Part C

Note: The student's response to the bulleted items in question 56–57 need not appear in the following order.

56 [1] Allow 1 credit for stating *one* specific reason why the gene on the mutated fragile X chromosome is unable to produce the FMR1 protein. Acceptable responses include, but are not limited to:

- A mutation could have deleted the gene that codes for the synthesis of the protein.
- The mutated DNA may have a changed sequence of bases.
- The gene may have been turned off as a result of the mutation.
- The abnormal gene cannot regulate the proteins involved in the production of nerve cells.

57 [1] Allow 1 credit for explaining why children with fragile X syndrome would often have learning disabilities, including speech and language problems and intellectual disabilities. Acceptable responses include, but are not limited to:

- FMR1 proteins are associated with nerve cell development. Speech is a function of the nervous system.
- Nerve cell development is associated with FMR1 protein, and the problems mentioned are nervous system problems.
- The normal FMR1 protein helps regulate the production of other proteins that play a role in the development of nerve cells.
- Nerve cell development is not regulated.
- The nerve cells/brain haven't developed normally.

58 [1] Allow 1 credit for explaining why species C might have a greater chance of avoiding extinction in the changed environment than species B and supporting the answer. Acceptable responses include, but are not limited to:

- Species C is more likely to have a greater amount of variation because it has a higher reproductive rate than species B. Some of these variations could be adaptations to the changed environment.
- Species C produces more offspring in a shorter time than species B. This could result in a greater amount of variation being present in the population, which could result in a greater chance of survival.
- Species C has more offspring, so there would be more variations.
- Some members of species C already pass on favorable adaptations. Because they have a higher reproductive rate, they would be more successful.

Note: Acceptable responses must include a reference to the species having favorable adaptations/variations to avoid extinction.

- 59** [1] Allow 1 credit for stating *one* possible reason why species *A* could be the most successful in surviving environmental change and supporting the answer. Acceptable responses include, but are not limited to:
- If species *A* is already adapted to the new environment, it would continue to be successful, since the offspring would be identical to the parent.
 - Its short reproductive time would be an advantage, since all the offspring would inherit any favorable traits they have.
 - If a favorable mutation were to occur, the new traits would be passed on to many offspring at a rapid rate.
- 60** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Plastic bags could kill some animals, decreasing biodiversity.
 - The overuse of plastic bags increases the use of fossil fuels to produce them.
 - Animals mistake it as food and choke or starve to death.
 - Plastic pollution could disrupt natural habitats.
 - The disposal of plastic bags can increase the size and number of landfills, resulting in the destruction of habitats.
- 61** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Enzymes are used to digest/hydrolyze substances.
 - One common use of enzymes is to break down substances.
 - It breaks the chemical bonds in polyethylene.
 - Enzymes catalyze/speed up chemical reactions.
- 62** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- It is not likely to be toxic/harmful to the environment.
 - Enzymes are proteins and will most likely degrade/break down in the environment.
 - Caterpillars don't have to be killed to produce the chemical.
 - It is a substance produced naturally by the caterpillar, as opposed to using a man-made chemical.
- 63** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Encourage the use of reusable, cloth bags.
 - Set up plastic bag recycling containers at various locations.
 - Write letters to local politicians suggesting a ban on the use of plastic bags.
 - Make customers pay for plastic bags. They will be less likely to use them.
 - Educate community members about the issue.
 - Ban the use of plastic bags.

- 64 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- We benefit by obtaining a valuable resource for our use, but contaminated soil can be harmful to people and other organisms.
 - Positive result: We obtain valuable metal ore to use in manufacturing.
Negative result: Soil contamination is bad for the environment.
 - The benefit is we get the ore; the risk is that we pollute the environment.
 - You could obtain valuable resources, but destroy animal/plant habitats.

- 65 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The grasses could become invasive in the new area.
 - The grasses could compete with native plants in the new area.
 - Animals in the new area could eat these grasses and get sick or die.
 - Toxic metals could enter the food chain.
 - These grasses could disrupt the stability of the ecosystem.
 - There would be a problem with where/how to dispose of the grasses with the toxic waste.

- 66 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Mitochondria are the site of cellular respiration, a process that releases energy in the cell.
 - With faulty-functioning mitochondria, less energy is released, and the patient is tired.
 - The patients would produce less ATP.

Note: Do *not* accept “it is the powerhouse” of the cell without an explanation referring to energy or ATP.

- 67 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- Researchers have estimated that for every seven days that snow covers the ground, the snowshoe hare populations are four times more likely to survive.
 - The more snow cover there is, the higher the population of the snowshoe hares will be because there is a better chance that the hares can escape/hide from their predators.
 - Without snow cover, the hares are more visible to their predators, and a smaller number will survive.

- 68 [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The environmental factor that stimulates the change of fur color in the snowshoe hare is the shortening length of daylight in the fall.
 - The decrease in daylight hours is the environmental factor that causes the change in the color of the snowshoe hare.
 - the decreasing length of daylight
 - length of day/hours of daylight

- 69** [1] Allow 1 credit for identifying a specific environmental issue that is most likely to affect snowshoe hare populations in northern ecosystems and supporting the answer. Acceptable responses include, but are not limited to:

Environmental issue: Global Warming/Climate Change

- Global warming is causing average temperatures to increase and this would cause snow to melt, resulting in a shorter snow-cover time, which can cause the hare to move further north.

Environmental issue: Increasing Average Temperatures

- Since the average temperatures are higher in these regions, the snow cover melts sooner and the snowshoe hare is not protected in its habitat.

Environmental issue: Air pollution/Acid Rain

- They can kill many trees/plants, negatively affecting the ecosystem the hares live in.

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

- The fur color of the hare might be darker for more of the year.
- Over several generations, their feet may eventually become smaller.
- Their molting time may change.

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

- The roundworm lives in the ants and gets nutrients from the host/ants, harming them in the process.
- The roundworm benefits by living in the ant, and the ant is harmed.
- As the roundworms develop, they take nutrients from the ant.
- It increases the likelihood that the ant will be eaten.

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

- The birds transport the roundworm eggs to new areas.
- Birds disperse the roundworms.
- After the birds eat the ants, they deposit the roundworm eggs in their feces in the soil.

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:

- These shrews are important to maintaining biodiversity in their environment.
- The destruction of the habitat could have unintended consequences that could disrupt the entire food web.
- The destruction of the habitat might cause the shrews to become extinct.

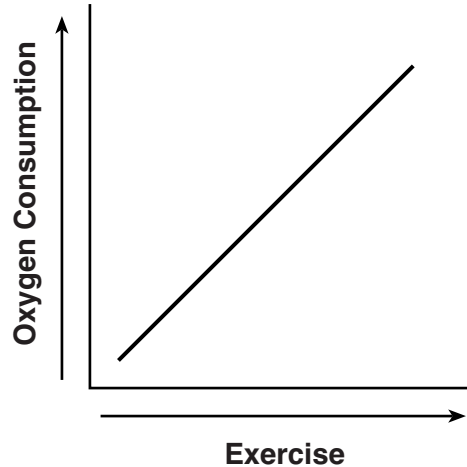
78 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- pulse rate
- beats/minute

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

- There is no control.
- The pulse rates were not measured at the start of the investigation.
- He couldn't tell if the pulse rate increased because he didn't know the pulse rate at the start.
- His sample size was too small.

- 80 [1] Allow 1 credit for drawing a line that shows a relationship between exercise and oxygen consumption and supporting the answer. Acceptable responses include, but are not limited to:



- As you exercise, you use more oxygen.
- Exercise causes you to use more oxygen.
- It is a direct relationship.
- During exercise more energy is required, so the body takes in more oxygen.

Note: Accept answers that show an increase in oxygen consumption as exercise continues.

81 MC on scoring key

82 MC on scoring key

- 83 [1] Allow 1 credit for gel electrophoresis/electrophoresis/DNA fingerprinting.

- 84 [1] Allow 1 credit for identifying Lane *B* as containing DNA from the suspect who committed the crime and supporting the answer. Acceptable responses include, but are not limited to:

- *B*, because it has the same bands as Lane *D*.
- It is most similar to Lane *D*.
- It is closest to the DNA found at the crime scene.

- 85 [1] Allow 1 credit for Lane *A* and supporting the answer. Acceptable responses include, but are not limited to:

- Lane *A*, because the shortest fragments move the farthest through the gel.
- Lane *A*, because it has one band that is farther down the gel than the others.
- Lane *A* has a band close to the bottom.

Regents Examination in Living Environment
August 2022
Chart for Converting Total Test Raw Scores to
Final Examination Scores (Scale Scores)

The Chart for Determining the Final Examination Score for the August 2022 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 Wednesday, August 17, 2022. 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

August 2022 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	
Key Idea 2				
Key Idea 3		34		57
Appendix A (Laboratory Checklist)		31, 32	44, 45, 46, 52	
Standard 4				
Key Idea 1	2, 4, 7, 10, 15, 17	40, 43	50, 55	66
Key Idea 2	3, 5, 9, 13, 28	37, 38		56
Key Idea 3	1, 11	33, 36		58, 59, 70, 72
Key Idea 4	8, 12, 18, 21, 27			
Key Idea 5	6, 24, 25, 26, 30	39, 41, 42	48	61, 68
Key Idea 6	14, 23, 29	35	49, 51, 53, 54	65, 71
Key Idea 7	16, 19, 20, 22			60, 62, 63, 64, 67, 69

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