FOR TEACHERS ONLY

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

LIVING ENVIRONMENT

Tuesday, June 18, 2019 — 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: http://www.p12.nysed.gov/assessment/ 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.p12.nysed.gov/assessment/ on Tuesday, January 22, 2019. 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.

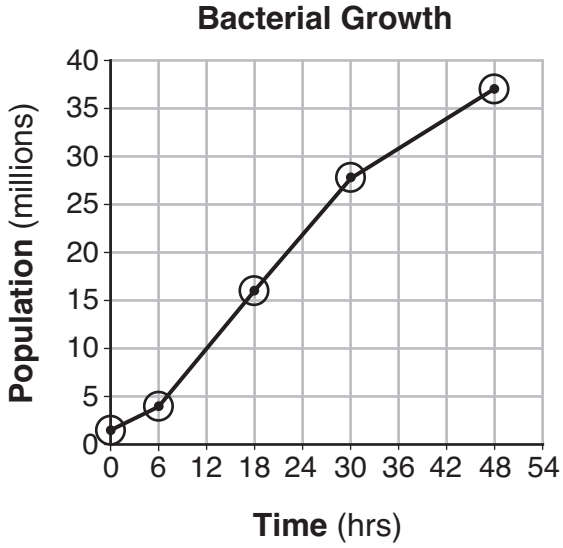
Part B–2

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 graph 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 stating that the data point at 60 hours would be either above 37 million or below 37 million and supporting the answer. Acceptable responses include, but are not limited to:

— Since there are no more nutrients being added to the culture, the bacterial population will begin to drop below 37 million.

— The bacteria will continue to increase as long as food is available.

— Without additional nutrients in the culture, the bacteria population will begin to drop.

— The population would decrease as wastes build up.

— Above 37 million, if the trend continues, because as time increased, the population increased.

47 MC on scoring key

48 [1] Allow 1 credit for identifying crocodilians and birds and for describing how they may have been able to survive to the present. Acceptable responses include, but are not limited to:

— The crocodilians/crocodiles and birds may have survived because they had certain adaptations that allowed them to be successful in their environment then and now.

— They had characteristics that allowed them to survive, reproduce, and pass their traits on to their offspring.

— They had adaptations to their environments that allowed them to fill available niches.

49 MC on scoring key

50 MC on scoring key

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

— production of egg cells

— production of gametes

— production of sex hormones

— production of the hormones estrogen and progesterone

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

— Embryos that grow inside the body of the female parent get greater protection from the environment than embryos that develop externally.

— The survival rate of offspring is higher for internal development than external.

— It is an efficient way to provide nutrients to the fetus.

53 [1] Allow 1 credit for ecological succession or succession and explaining why each stage is important to the stage that follows it. Acceptable responses include, but are not limited to:

— Each stage modifies the environment for the next stage.

— Each stage makes the environment more suitable for the replacement community.

54 [1] Allow 1 credit for identifying *two* abiotic factors. Acceptable responses include, but are not limited to:

— light intensity and temperature

— soil composition and pH

— water availability and light

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

— Biodiversity would decrease.

— Many trees and animals would no longer be present.

Part C

56 [1] Allow 1 credit for identifying the molecule as DNA and that it is found in the nucleus.

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

— The turtles produced proteins that strengthened skin, resulting in a tough shell for a defense mechanism.

— The mutation results in a shell with better protection.

— They produced skin proteins that protect against infection in humans.

— The turtles were protected from predators.

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

— It can catch these insects because it can fly.

— It uses echolocation and can hear the return echo to find prey.

— It has 38 teeth.

— It has large ears so that it can hear the insects.

— because it feeds at night

— It feeds near bodies of water where mosquitoes breed.

59 [1] Allow 1 credit for describing what will most likely happen to the frequency of the *original* trait in the population and supporting the answer. Acceptable responses include, but are not limited to:

— The frequency of the original trait will decrease because these bats will not be as successful at obtaining food. They will be less likely to produce offspring than the bats with the new mutation.

— Since they will not be able to compete successfully with the bats with the mutation, they will produce fewer offspring, and the trait will decrease.

— The trait would decrease in that population because those bats would be less successful.

— The original trait will decrease due to natural selection for the new trait, which is beneficial.

— There could be no change if there's plenty of food.

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

— After the bats evolved echolocation, some moths evolved a way to block it.

— Bats that had adapted to find and eat moths by using echolocation led to the evolution of moths that could block these signals.

— The bats evolved the ability to find food by echolocation. This made them better able to capture moths for food. Moths with the mutation to emit the sounds that blocked the echolocation of the bats were able to survive. The ability of the bats to use echolocation led to the ability of some moths to block it with a new adaptation of their own.

61 [1] Allow 1 credit for stating *one* likely effect of the whiteflies on the bean plants in the control group by the end of the study and supporting the answer. Acceptable responses include, but are not limited to:

— Since no pest-control method was used, they were probably eaten to a much greater extent.

— Without pesticide or kaolin, the whiteflies probably caused serious damage to the plants in the control group.

— With no protective spray/treatment added, these plants were probably eaten.

62 [1] Allow 1 credit for stating whether the kaolin treatments should be considered as an acceptable alternative control method for whiteflies and supporting the answer with data from the chart. Acceptable responses include, but are not limited to:

— The insecticide was about 90% effective, while both kaolin treatments were only about 80% effective. However 80% effectiveness is still quite effective, so it could be a good alternative.

— The kaolin was only 10% less effective, but it was found to have other positive effects in the plants that could make it more desirable to use.

— The kaolin treatments were only 80% effective, which is 10% less than the effectiveness of the insecticide, so it is not as good an alternative.

— Even though the pesticide was the most effective (90%), it could damage other organisms in the area, so it should be replaced.

— It should be considered as an acceptable method because it kills the majority of whiteflies.

63 [1] Allow 1 credit for identifying the kaolin treatment that would be best for bean plants grown in areas where low rainfall is a common occurrence and supporting the answer. Acceptable responses include, but are not limited to:

— Treat the plants with 5% kaolin spray, since the plants will survive better in drought conditions.

— Use the group 4 treatment, since the plants will function better in a drought and will grow better with more chlorophyll.

— 5% kaolin would give protection against insects and help the plants survive dry conditions too.

— The plants treated with 5% kaolin spray will lose 40% less water.

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

— because they are a significant pest of the region's bean crops

— The whitefly/insect is a major pest of bean plants in Andean regions.

— The whiteflies decrease crop yields.

— They cause damage to the plants/eat the crops.

— in order to grow more crops

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

— If the lungs do not function well, less oxygen is available to release energy in his cells.

— He wouldn't get as much oxygen/air into his blood.

— The damage to the man's lung resulted in a decrease in his ability to breathe.

— Less carbon dioxide would be released and would build up.

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

— White blood cells engulf and devour the pathogen.

— The body makes killer T cells that destroy the pathogens.

— The cells make antibodies to fight foreign antigens.

— Certain white blood cells would mark the pathogens for destruction.

— The cells release histamines.

67 [1] Allow 1 credit for writing *two* environmental factors. Acceptable responses include, but are not limited to:

— moisture/water and oxygen

— warm and moist

— water and air

— temperature and pH

68 [1] Allow 1 credit for no and supporting the answer. Acceptable responses include, but are not limited to:

— No, because the lungs have no source of light for photosynthesis.

— No, because after the plant used up the nutrients stored in the seed, it would die.

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

— Only molecules with a specific shape can fit into the receptor.

— If the molecule had a different shape, it would not fit into the receptor, and the response would not occur.

— If the molecule shape changes, it won't match the shape of the other molecule it reacts with.

— If the molecule's shape is different, it won't cause a reaction.

— The shape of the molecule allows it to bind to the correct receptor.

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

— The plant responds to a stimulus. When there is a drought, ABA is produced and the stomates are closed. When the drought is over, no ABA is produced and the stomates are opened.

— The plant maintains homeostasis by opening or closing leaf openings according to the amount of water available.

— The plant closes the stomates/slows growth when there is a drought or opens them/resumes growth when it rains.

— The stomates open or close in response to changes in available water.

— The guard cells close the stomates when there is less available water.

71 [1] Allow 1 credit for recording the concentration of CO_2 in 1958 and describing how it compares to the concentration in 2015. Acceptable responses include, but are not limited to:

— $315(\pm 3)$ppm

Description:

— In 2015, the concentration is approximately 400 ppm, while it was 315 ppm in 1958.

— The concentration in 2015 is much more than in 1958.

— The concentration was lower when the study began.

— It has increased by about 85 ppm.

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

— The concentration of CO_2 increased between 1958 and 2015 due to more CO_2 produced by burning fossil fuels.

— There was an increase in CO_2 due to more people driving more cars.

— There has been an increase in the use of fossil fuels.

— increased industrialization

— CO_2 in the atmosphere increased due to human activities.

— deforestation

Note: Do *not* accept global warming since this is a result rather than the reason for the change.

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 describing the test and the result. Acceptable responses include, but are not limited to:

— Add starch indicator to the samples. The one that turns black or blue-black would be the one with starch in it.

— Add iodine to each sample. If one of the samples turns blue-black, it is the one that contains starch.

— To test for starch, add Lugol's solution. If starch is present, it will turn blue-black.

— Add starch indicator, and if starch is present, it will change color.

78 [1] Allow 1 credit for stating that these organisms live in fresh water and supporting the answer. Acceptable responses include, but are not limited to:

— Fresh water—water would move in and they would need to remove or excrete it.

— Fresh water—in fresh water, the water would be diffusing into them all the time and would need to be pumped out in order to maintain homeostasis.

— Fresh water—if they are pumping out excess water, it is because water is diffusing into them from an area with a higher concentration of water. This means that the outside environment would be fresh water.

— Fresh water—if they were in salt water, they would be losing water all the time, and there would be no benefit in pumping out more.

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

— The sucrose molecule may be too large to diffuse through the membrane.

— Glucose is a smaller molecule.

— Glucose is less complex.

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

— The tortoises have beneficial structures that allow them to feed on specific food/vegetation located on certain islands.

— Tortoises have inherited adaptations favorable to their survival on certain islands.

— Different islands have different types of food that tortoises have to eat.

— They are adapted to the food, temperature, and climate on certain islands.

81 MC on scoring key

82 MC on scoring key

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

— Soaking fish briefly in salt water would reduce the water content in the cells, allowing space for the remaining water to expand when it freezes.

— The fish cells will lose water, so they won't burst.

84 [1] Allow 1 credit for identifying *one* finch population that would be negatively affected if the birth rate of small tree finches increased significantly. Acceptable responses include, but are not limited to:

— Large tree finch
They eat mostly animal food/have biting tips on their beaks/have grasping bills.
because it will have more competition for food

— Woodpecker finches
They eat mostly the same food/both have biting beak tips.

— Warbler finch
because the small tree finch eats the warbler finch's only food source

85 [1] Allow 1 credit for completing the chart with the number 17, as shown below.

Trial Number	Seeds Picked Up
1	11
2	11
3	**17**
Average	13

The *Chart for Determining the Final Examination Score for the June 2019 Regents Examination in Living Environment* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Tuesday, June 18, 2019. 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.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.
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 2019 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			49	
Key Idea 2				
Key Idea 3		32	44, 45, 46	62, 63, 71
Appendix A (Laboratory Checklist)		39		61, 64
Standard 4				
Key Idea 1	11, 12, 17, 19, 20, 22, 29	33, 36, 37, 41		
Key Idea 2	6, 18, 23, 27	31, 40	47	56
Key Idea 3	25, 26		48	57, 58, 59, 60
Key Idea 4	3, 4		50, 51, 52	
Key Idea 5	2, 5, 10, 30	35, 42, 43		65, 66, 68, 69, 70
Key Idea 6	1, 15, 21	34, 38	53, 54, 55	67
Key Idea 7	7, 8, 9, 13, 14, 16, 24, 28			72

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