

FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Friday, January 26, 2007 — 9:15 a.m. to 12:15 p.m., only

SCORING KEY AND RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 3 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 <http://www.emsc.nysed.gov/osa/> and select the link "Examination 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.

Part A and Part B-1

Allow 1 credit for each correct response.

Part A			Part B-1	
1 2	11 3	21 4	31 3	36 2
2 2	12 3	22 4	32 3	37 2
3 4	13 1	23 1	33 4	38 2
4 3	14 4	24 4	34 1	39 1
5 1	15 1	25 3	35 1	40 1
6 1	16 2	26 2		
7 3	17 4	27 4		
8 1	18 2	28 3		
9 2	19 1	29 1		
10 4	20 3	30 1		

LIVING ENVIRONMENT – *continued*

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*.

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the student's work by making insertions or changes of any kind.

Allow 1 credit for each correct response for multiple-choice questions.

On the detachable answer sheet for Part A and Part B–1, indicate by means of a checkmark each incorrect or omitted answer to multiple-choice questions. In the box provided in the upper right corner of the answer sheet, record the number of questions the student answered correctly for each of these parts.

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 all the open-ended questions on a student's answer paper.

Students' responses must be scored strictly according to the Scoring Key and 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. In the student's examination booklet, record the number of credits earned for each answer in the box printed to the right of the answer lines or spaces for that question.

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.

Raters should enter the scores earned for Part A, Part B–1, Part B–2, Part C, and Part D on the appropriate lines in the box printed on the answer sheet and should add these 5 scores and enter the total in the box labeled "Total Raw Score." Then the student's raw score should be converted to a scaled score by using the conversion chart that will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Friday, January 26, 2007. The student's scaled score should be entered in the box labeled "Final Score" on the student's answer sheet. The scaled score is the student's final examination score.

All student answer papers that receive a scaled score of 60 through 64 **must** be scored a second time. For the second scoring, a different committee of teachers may score the student's paper or the original committee may score the paper, except that no teacher may score the same open-ended questions that he/she scored in the first rating of the paper. The school principal is responsible for assuring that the student's final examination score is based on a fair, accurate, and reliable scoring of the student's answer paper.

Because scaled scores corresponding to raw scores in the conversion chart may change from one examination 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

41 Allow 1 credit for stating *one* way the euglena’s two methods of nutrition provide a survival advantage the other unicellular organisms do *not* have. Acceptable responses include, but are not limited to:

- If food is not available, the euglena can make its own food.

42 4

43 Allow 1 credit for identifying the process that releases the nutrients from the bodies of the dead salmon, making the nutrients available for other organisms in the ecosystem. Acceptable responses include, but are not limited to:

- decomposition
- decay
- recycling

44 Allow 1 credit for identifying *one* organism, other than the salmon, that would be present in or near the river that would most likely be part of a food web in the river ecosystem. Acceptable responses include, but are not limited to:

- decomposer/bacteria
- small fish
- seagulls
- green plant

45 Allow 1 credit for identifying *two* nutrients that are returned to the ecosystem when the salmon die. Acceptable responses include, but are not limited to:

- nitrogen compounds
- phosphorus compounds
- carbon compounds

46 Allow 1 credit for stating *one* impact, other than reducing the salmon population, that commercial ocean fishing has on the river ecosystem. Acceptable responses include, but are not limited to:

- Fishing deprives upstream ecosystems of nutrients.
- Consumers in the ecosystem would be deprived of food.
- Decomposer populations would decrease.
- disrupts food webs

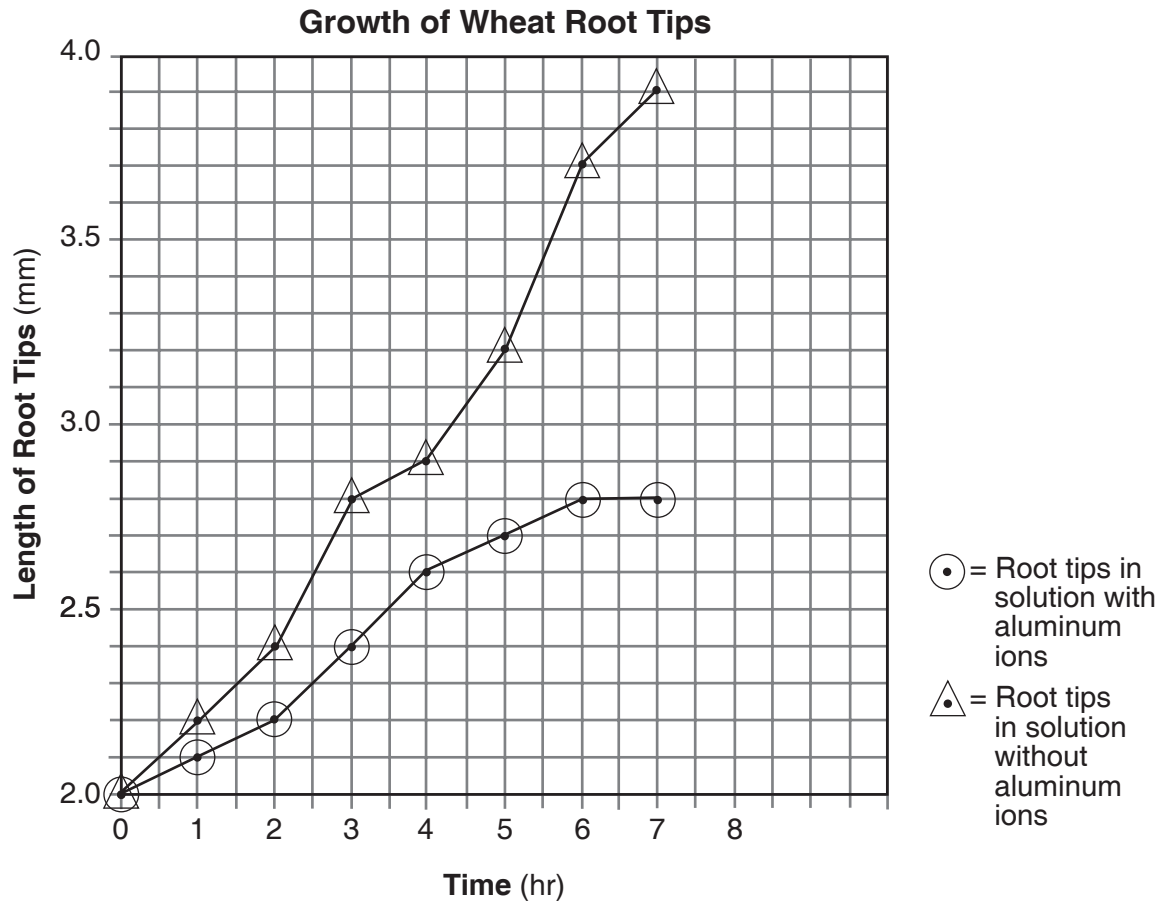
47 Allow 1 credit for marking an appropriate scale on each labeled axis.

Note: Make no assumptions about the origin unless it is labeled.

48 Allow 1 credit for plotting the data for root tips in the solution with aluminum ions, surrounding each point with a small circle, and connecting the points.

49 Allow 1 credit for plotting the data for root tips in the solution without aluminum ions, surrounding each point with a small triangle, and connecting the points.

Example of a 3-credit graph for questions 47 through 49:



50 3

51 Allow 1 credit for describing the effect of aluminum ions on the growth of the root tips of wheat. Acceptable responses include, but are not limited to:

- Root tips grow less when exposed to aluminum ions.
- The growth of the root tips was stunted.
- Without aluminum ions, the root tips grow more.

LIVING ENVIRONMENT – *continued*

- 52** Allow 1 credit for identifying the ecological process responsible for the changes to the pond as ecological succession or succession.
- 53** Allow 1 credit for predicting what will most likely happen to this pond area over the next hundred years if this process continues. Acceptable responses include, but are not limited to:
- The pond will probably be totally filled in.
 - It may become a swampy area.
 - It may become a forest.
- 54** Allow 1 credit for stating *one* positive effect on an ecosystem of using nuclear fuel to generate electricity. Acceptable responses include, but are not limited to:
- There is little air pollution from nuclear fuels.
 - It doesn't contribute to acid rain.
 - It doesn't use fossil fuels.
 - It doesn't contribute to global warming by releasing CO₂.
- 55** Allow 1 credit for stating *one negative* effect on an ecosystem of using nuclear fuel to generate electricity. Acceptable responses include, but are not limited to:
- results in nuclear waste
 - dangers from radiation
 - thermal pollution

Part C

- 56** Allow a maximum of 2 credits, 1 credit for defining selective breeding and 1 credit for stating how it would be used to improve the racing ability of horses.

Example of a 2-credit response:

Choose parents with the desired trait to breed. A fast male horse is bred to a fast female horse and the offspring may inherit the fast-running traits of both parents.

- 57** Allow 1 credit for stating *one disadvantage* of selective breeding. Acceptable responses include, but are not limited to:

- Undesirable traits of parents may be expressed in the offspring.
- unexpected combinations of genes
- unpredictable results
- decreased variation in race horses

- 58** Allow 1 credit for stating *one* specific way the removal of trees from an area has had a *negative* impact on the environment. Acceptable responses include, but are not limited to:

- Less oxygen is produced.
- Less carbon dioxide is removed from the atmosphere.
- Habitats are destroyed.
- Biodiversity is diminished.
- Plant species valued for medicines are lost.
- affects global temperatures
- increased erosion

LIVING ENVIRONMENT – *continued*

- 59** Allow 1 credit for identifying the specialized structures in the cell membrane that are involved in communication. Acceptable responses include, but are not limited to:
- receptors
 - receptor molecules
- 60** Allow 1 credit for explaining why chemicals released from one plant species may not cause a response in a different plant species. Acceptable responses include, but are not limited to:
- Receptors are specialized.
 - The chemicals released by one plant species may not be recognized by the receptors of another plant species.
 - Genetic differences between the two plant species may limit responses to specific chemicals.
- 61** Allow a maximum of 2 credits, 1 for each of *two* advantages of relying on chemicals released by plants rather than using man-made chemicals for insect control. Acceptable responses include, but are not limited to:
- less harmful to the environment
 - cheaper
 - do not cause pollution
- 62** Allow a maximum of 2 credits, 1 credit for each of *two* ways cells of the immune system fight disease. Acceptable responses include, but are not limited to:
- engulf foreign substances
 - produce antibodies
 - recognize pathogens/antigens
- 63** Allow 1 credit for identifying hormones as the substance produced by the cells of all the endocrine glands that helps maintain homeostasis.
- 64** Allow 1 credit for identifying *one* specific product of one of the endocrine glands and stating how it aids in the maintenance of homeostasis. Acceptable responses include, but are not limited to:
- Insulin regulates blood sugar levels.
 - Estrogen *or* testosterone regulates the reproductive system.

65 Allow a maximum of 5 credits for designing a controlled experiment to determine if soil pH affects petal color, allocated as follows:

- Allow 1 credit for stating the hypothesis to be tested. Acceptable responses include, but are not limited to:

- Soil pH affects flower (petal) color.

Note: Do *not* allow credit for a hypothesis in the form of a question.

- Allow 1 credit for stating *one* way the control group will be treated differently from the experimental group. Acceptable responses include, but are not limited to:

- The control group will be planted in soil that is slightly basic. The experimental groups will be planted in soil that has a pH that is not slightly basic.
- The experimental group will be grown in acidic soil. The control group will be grown in nonacidic soil.

- Allow 1 credit for identifying *two* factors that must be kept the same in both the control group and the experimental group. Acceptable responses include, but are not limited to:

- amount of soil
- amount of water
- amount of light
- temperature

- Allow 1 credit for identifying the dependent variable as petal color *or* flower color.

- Allow 1 credit for stating *one* result of the experiment that would support the hypothesis. Acceptable responses include, but are not limited to:

- Red flowers appear on the plants that grow in soil that is not slightly basic.
- Plants grown in acidic soil have red flowers.

Part D

- 66** Allow 1 credit for stating the relationship between activity and pulse rate. Acceptable responses include, but are not limited to:
- As activity increases, so does the pulse rate.
 - The pulse rate increases as the activity increases.
- 67** Allow 1 credit for stating *one* way that this investigation could be improved. Acceptable responses include, but are not limited to:
- larger sample size
 - repeat the investigation
- 68** Allow 1 credit for identifying the kind of molecules whose action was being demonstrated when the DNA samples were cut. Acceptable responses include, but are not limited to:
- enzymes
 - restriction enzymes
 - proteins
 - biological catalysts
- 69** Allow 1 credit for electrophoresis or gel electrophoresis.
- 70** 2
- 71** Allow 1 credit for stating *one* way that the arrangement of the two samples on the gel model would differ. Acceptable responses include, but are not limited to:
- The number of bands would differ.
 - The bands would be in different positions.
 - The banding patterns would be different.

72 Allow 1 credit for describing *one* change in beak characteristics that would most likely occur in the medium ground finch population after many generations when an environmental change results in a permanent shortage of small seeds. Acceptable responses include, but are not limited to:

- Beaks would be thicker.
- Birds with larger, thicker beaks would become more common in the population than those with the original beak characteristics.

73 Allow a maximum of 3 credits for explaining the long-term change in beak characteristics, allocated as follows:

- Allow 1 credit for including the concept of competition.
- Allow 1 credit for including the concept of survival of the fittest.
- Allow 1 credit for including the concept of inheritance.

Example of a 3-credit response:

Competition for food would increase as small seeds became scarce. Birds with larger, thicker beaks would have a better chance of surviving when the seeds were larger and tougher to crack. Birds with normal thickness beaks would be less likely to survive. Reproduction of the surviving birds, many with the larger, thicker beaks, would produce more offspring inheriting the better adapted beak type. Over time, this would lead to a large proportion of the population having the thicker beaks.

74 Allow 1 credit for identifying a substance that was most likely added to the slide to cause the change observed. Acceptable responses include, but are not limited to:

- salt solution
- salt water
- salt

75 Allow 1 credit for describing a procedure that could be used to add this substance to the cells on the slide without removing the coverslip. Acceptable responses include, but are not limited to:

- Put a piece of paper towel on one edge of the coverslip and add the substance to the opposite edge of the coverslip one drop at a time. Add more drops as the paper towel soaks up the liquid from under the slide.

76 1

The *Chart for Determining the Final Examination Score for the January 2007 Regents Examination in Living Environment* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa/> on Friday, January 26, 2007. 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.

Submitting 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 www.emsc.nysed.gov/osa/exameval/.
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

January 2007 Living Environment

Standards	Question Numbers			
	Part A 1–30	Part B–1 31–40	Part B–2 41–55	Part C 56–65
Standard 1 — Analysis, Inquiry and Design				
Key Idea 1		33		
Key Idea 2				65
Key Idea 3			47,48,49,50	
Appendix A (Laboratory Checklist)		31,35		
Standard 4				
Key Idea 1	2,3,4,5	32	43,44,46,51	59,60
Key Idea 2	6,7,9,10,24			56,57
Key Idea 3	8,11,12,14	40	41,42	
Key Idea 4	13,16,17,18,30			
Key Idea 5	15,19,20,21,29	38,39		62,63,64
Key Idea 6	1,22,23,25	34,36	45,52,53	
Key Idea 7	26,27,28	37	54,55	58,61

Part D 66–76	
Lab 1	68,69,70,71
Lab 2	66,67
Lab 3	72,73
Lab 5	74,75,76