

# FOR TEACHERS ONLY

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

# LE

## LIVING ENVIRONMENT

Friday, January 28, 2005 — 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. Visit the site <http://www.emsc.nysed.gov/osa/> and select the link "Latest Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and at least one more time before the final scores for the examination are recorded

**Part A and Part B-1**

**Allow one credit for each correct answer.**

Part A			Part B-1	
(1) <b>1</b>	(11) <b>3</b>	(21) <b>2</b>	(31) <b>1</b>	(34) <b>2</b>
(2) <b>1</b>	(12) <b>3</b>	(22) <b>3</b>	(32) <b>2</b>	(35) <b>3</b>
(3) <b>3</b>	(13) <b>4</b>	(23) <b>4</b>	(33) <b>3</b>	
(4) <b>3</b>	(14) <b>4</b>	(24) <b>3</b>		
(5) <b>4</b>	(15) <b>1</b>	(25) <b>2</b>		
(6) <b>2</b>	(16) <b>2</b>	(26) <b>2</b>		
(7) <b>1</b>	(17) <b>3</b>	(27) <b>1</b>		
(8) <b>3</b>	(18) <b>1</b>	(28) <b>2</b>		
(9) <b>3</b>	(19) <b>1</b>	(29) <b>4</b>		
(10) <b>4</b>	(20) <b>4</b>	(30) <b>4</b>		



## 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 Administering and 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 28, 2005. The student's scaled score should be entered in the box labeled "Final Score" on the student's answer booklet. 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**

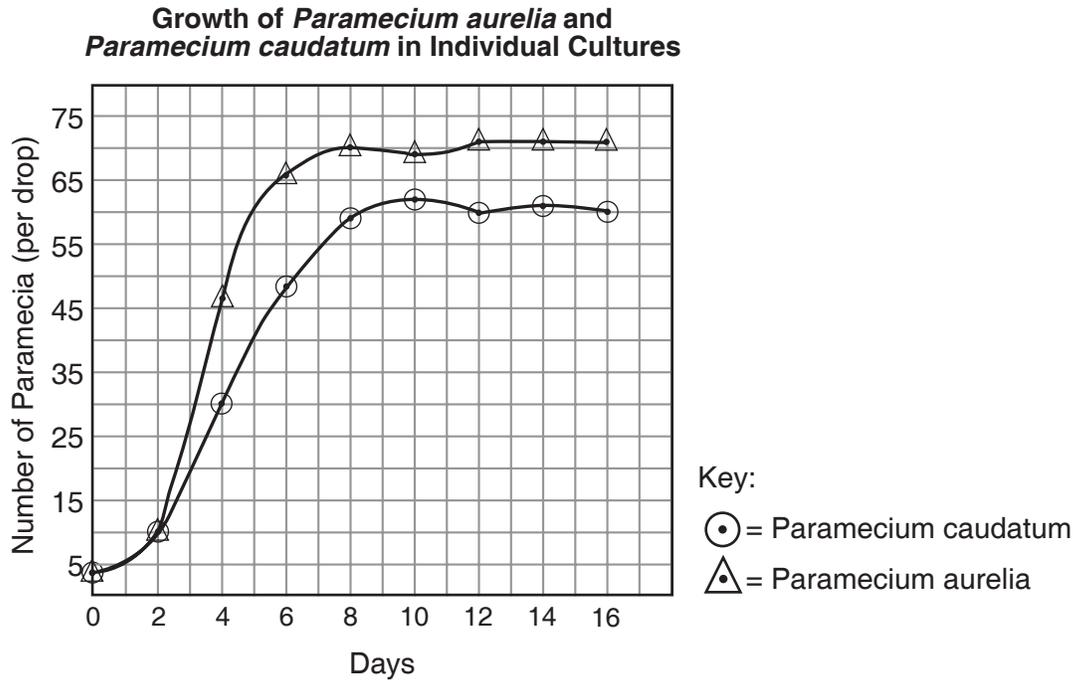
- 36** Allow 1 credit for explaining why the student can *not* draw a valid conclusion. Acceptable responses include, but are not limited to:
- There is no control group.
  - There is no basis for comparison.
  - There is no data on “normal” growth.
- 37** Allow 1 credit for stating one biological reason that the arrows only point away from “Grasses, shrubs” and not toward them. Acceptable responses include, but are not limited to:
- The grasses and shrubs produce the food which is then transferred to other members of the food web.
  - Grasses and shrubs are not consumers.
  - They don’t eat other members of the food web.
  - Arrows show the direction of energy flow.
  - Arrows point to organisms that eat them.
- 38** Allow a maximum of 2 credits, 1 credit for identifying the two organisms that would be expected to have the most similar genetic material and 1 credit for using information from the chart to support the answer.

**Example of a 2-Credit Response**

A and C would probably have the most similar genetic material. A and C have more of the given characteristics in common than any other pair.

- 39 Allow 1 credit for marking a scale on each labeled axis appropriate for the data for *Paramecium caudatum* that has already been plotted.
- 40 Allow 1 credit for plotting the data for *Paramecium aurelia* correctly (based on the student’s axes), surrounding each point with a triangle, and connecting the points.

**Example of a 2-Credit Graph**



- 41 Allow 1 credit for describing the change in the two populations between days 0 and 8. Acceptable responses include, but are not limited to:
- Both populations increased in number.
  - The population of *Paramecium aurelia* increased at a slightly greater rate than *Paramecium caudatum*.
- 42 Allow 1 credit for indicating that *Paramecium aurelia* grows (reproduces) faster than *Paramecium caudatum* or that *Paramecium aurelia* is better adapted to the environment than *Paramecium caudatum*.

LIVING ENVIRONMENT – *continued*

- 43 Allow 1 credit for *A* — cell/plasma membrane *or B* — nucleus *or C* — mitochondrion.
- 44 Allow 1 credit for stating one function of the organelle selected. Acceptable responses include, but are not limited to:
- *A* (cell membrane) regulates what enters and leaves the cell.
  - *B* (nucleus) controls cell activities or contains the genetic codes. (Do not accept “brain” or “control center” without further explanation.)
  - *C* (mitochondrion) respiration or energy release or production of ATP (Do not accept “power house” without further explanation.)
- Note:** If the response specifies the letter or organelle name, the function must match it. If only a function is given, and if the response to question 43 is incorrect, allow credit for this question if the response correctly matches a function with either the letter or organelle identified in the response for question 43.
- 45 Allow 1 credit for identifying one process carried out in cell *Y* that is not carried out in cell *X*. Acceptable responses include, but are not limited to:
- photosynthesis
  - production of cellulose
  - produces chlorophyll
  - producing its own food
- 46 Allow 1 credit for identifying the life process responsible for the change in tube *A*. Acceptable responses include, but are not limited to:
- cellular respiration
  - respiration
- 47 Allow 1 credit for explaining how the temperature difference could lead to the different results in tubes *A* and *B* after six days. Acceptable responses include, but are not limited to:
- The shape of enzymes changes at high temperatures.
  - The rate at which the enzymes work is affected by the temperature.
  - Tube *B* is too hot.
  - The beans will not grow at 60° so they will not respire and will not produce CO<sub>2</sub>.

LIVING ENVIRONMENT – *continued*

- 48** Allow 1 credit for explaining how the habitat of Kirtland’s Warbler may be changed as a result of global warming. Acceptable responses include, but are not limited to:
- Global warming may result in the dying out of the young jack pines where the Kirtland’s Warbler lives.
  - Temperature increases could reduce the population of jack pine.
- 49** Allow 1 credit for identifying one producer found in the water of Lake Ontario. Acceptable responses include, but are not limited to:
- algae
  - plants

**50** 4

LIVING ENVIRONMENT – *continued*

**51** Allow 1 credit for identifying one organism represented in the diagram that provides the vital link for the transfer of energy from the Sun to the other organisms in the ecosystem. Acceptable responses include, but are not limited to:

- plant
- cattail
- pond lily
- producers
- autotrophs

**52** Allow 1 credit for identifying one predator/prey relationship that may occur in this ecosystem. Acceptable responses include, but are not limited to:

- frog/insect
- big fish/little fish
- fish/crayfish
- duck or goose/frog
- duck or goose /insect

**53** Allow 1 credit for stating one piece of evidence from the diagram that indicates that light penetrates to the bottom of the lake. Acceptable responses include, but are not limited to:

- There are plants growing on the lake bottom.
- Plants are living in the deepest part of the lake.

**54** Allow 1 credit for identifying the type of organism that is not visible in the diagram but must be present in this ecosystem to recycle the remains of dead organisms. Acceptable responses include, but are not limited to:

- decomposers
- bacteria
- fungi

**Part C**

**55** Allow 1 credit for stating one change in the composition of the blood as it flows through the digestive system. Acceptable responses include, but are not limited to:

- The blood absorbs nutrients.
- Food is added to the blood as it flows through the digestive system.
- Sugar is added.
- Amino acids are added.
- decrease in oxygen

**56** Allow 1 credit for stating one reason that mutations are often referred to as the “raw materials” of evolution. Acceptable responses include, but are not limited to:

- Mutations may result in variations that may promote survival.
- A mutation can result in the production of a new variation that could be passed on to offspring.
- Mutations cause variations.

**57** Allow 1 credit for using appropriate letters to write a 9-base DNA sequence that could represent a portion of a gene. Acceptable responses include, but are not limited to:

- AACCTGCTC
- CCTACGGCA

**58** Allow 1 credit for showing one example of what could happen to the 9-base DNA sequence if a mutation occurred in that gene. At least one change to the student’s answer to question 57 must be indicated.

**59** Allow a maximum of 4 credits for a definition of the process of fertilization and a description of the resulting development of a human embryo. The answer must include:

- a definition of fertilization [1]
- the function of the following structures
  - ovary [1]
  - uterus [1]
  - placenta [1]

**Example of a 4-Credit Response**

Eggs are produced in the ovaries. Fertilization occurs when a sperm unites with an egg. An embryo forms and is implanted into the uterus. A placenta develops and helps provide nutrients for the embryo. (The placenta also provides oxygen for the embryo and it helps to remove wastes from the embryo.)

**Note:** Do *not* deduct credit if the student does not circle the terms.

LIVING ENVIRONMENT – *continued*

**60** Allow 1 credit for identifying one hormone directly involved in the human female reproductive system that could cause this problem. Acceptable responses include, but are not limited to:

- estrogen
- progesterone
- FSH
- LH

**61** Allow 1 credit for explaining why some cells in a female’s body respond to reproductive hormones while other cells do not. Acceptable responses include, but are not limited to:

- The cells that respond have appropriate receptors.
- Cells that don’t respond do not have appropriate receptors.
- The shape of the hormone molecule is recognized by cells in the reproductive system.
- Some cells recognize the reproductive hormones and respond to them. (The student must indicate recognition.)
- Specific reproductive hormones target specific cells.

**Note:** Do *not* allow credit for stating that only cells in the reproductive system will respond without explaining why they respond.

**62** Allow a maximum of 4 credits for identifying two life functions involved in meeting the energy demands of a cell or organism and explaining how they interact to make energy available, allocated as follows:

- Allow a maximum of 2 credits, 1 for each of two life functions involved in meeting energy demands of a cell or organism. Acceptable responses include, but are not limited to:

- digestion
- transport
- respiration
- photosynthesis

- Allow a maximum of 2 credits, 1 for explaining how each life function identified interacts with the other to make energy available. Acceptable responses include, but are not limited to:

- Digestion breaks food down into smaller molecules which can pass across the lining of the intestine and enter the blood and be transported to cells for energy release.
- Photosynthesis produces food that is broken down by respiration to make energy available.

LIVING ENVIRONMENT – *continued*

- 63** Allow 1 credit for describing how gaurs produced through normal means are different from gaurs produced by cloning. Acceptable responses include, but are not limited to:
- Gaurs produced by normal means have more variations than gaurs produced by cloning.
  - Gaurs produced by normal means have genetic material from both parents.
  - Gaurs produced by cloning are genetically identical.
- 64** Allow 1 credit for stating one biological benefit of preserving endangered species. Acceptable responses include, but are not limited to:
- helps preserve biodiversity
  - ensures availability of a variety of genetic material
- 65** Allow 1 credit for stating one way, other than cloning, that gaurs might be saved from extinction. Acceptable responses include, but are not limited to:
- preserving the habitats in which they live
  - restricting hunting of gaurs

**Part D**

**66** 2

**67** Allow 1 credit for stating that the diagram does not support the older system of classification and providing an explanation. Acceptable responses include, but are not limited to:

- Snakes are in their own group, rather than grouped with turtles.
- Turtles are on the same branch as the birds.
- Snakes have one kind of protein that is very different from that found in turtles and birds.

**68** Allow 1 credit for stating that the pig is more closely related to the dog than it is to the kangaroo, and justifying that answer. Acceptable responses include, but are not limited to:

- separated more recently
- closer together on the tree
- have a more recent common ancestor
- The protein in the pig is more similar to that in the dog.

**69** 2

**70** Allow 1 credit for stating a hypothesis relating the number of trials and number of squeezes in 30 seconds that is supported by the data. Acceptable responses include, but are not limited to:

- The number of squeezes in 30 seconds will decrease with each consecutive trial.
- As the number of trials increases, the number of squeezes decreases.

**71** 1

**72** Allow a maximum of 4 credits for explaining how a genetic trait that gives a hawk better eyesight than other hawks of the same species in the same area could lead to evolutionary change within this species of hawk over a long period of time. The answer must include an explanation of:

- competition within the hawk population [1]  
Acceptable responses include, but are not limited to:
  - The hawk with the better eyesight would compete more successfully.
  - The hawks with the better eyesight would have a better chance of obtaining food.
- survival of various individuals in the population [1]  
Acceptable responses include, but are not limited to:
  - Individuals with the better-eyesight trait would have a better chance to survive.
- how the frequency of the better-eyesight trait would be expected to change over time within the population [1]  
Acceptable responses include, but are not limited to:
  - The frequency of the better-eyesight trait would increase.
- what would most likely happen to the hawks having the better-eyesight trait if they also had unusually weak wing muscles [1]  
Acceptable responses include, but are not limited to:
  - If the hawks have better eyesight and weak wings, they will not have the same advantage as those with better eyesight and normal wings.

**73** Allow a maximum of 3 credits for describing the steps that could be used to make cell *A* resemble cell *B* using a piece of paper towel and an eye-dropper or a pipette without removing the coverslip, allocated as follows:

- Allow 1 credit for stating that the paper towel should be placed along one edge of the coverslip.
- Allow 1 credit for stating that water is needed.
- Allow 1 credit for stating that the water (liquid) should be placed along the edge of the coverslip opposite the paper towel.

**The *Chart for Determining the Final Examination Score for the January 2005 Regents Examination in Living Environment* will be posted on the Department's web site <http://www.emsc.nysed.gov/osa> on Friday, January 28, 2005. 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.**

# Map to Core Curriculum

## January 2005 Living Environment

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

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