

FOR TEACHERS ONLY

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

LE

LIVING ENVIRONMENT

Thursday, January 29, 2004 — 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.

Part A (35 credits)

Allow a total of 35 credits for Part A, one credit for each correct answer.

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

Note: The **June 2004** Living Environment Regents Examination will include a Part D, which will assess content and skills contained in required laboratory activities 1, 2, 3, and 5. The number of credits on the examination will remain at 85.

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 in Part A and Part B.

On the detachable answer sheet for Part A, 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 that part.

At least two science teachers must participate in the scoring of the Part B and Part C 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 to 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, and Part C on the appropriate lines in the box printed on the answer sheet and should add these 3 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 printed at the end of this Scoring Key and Rating Guide. The student's scaled score should be entered in the labeled box on the student's answer booklet. The scaled score is the student's final examination score.

Part B

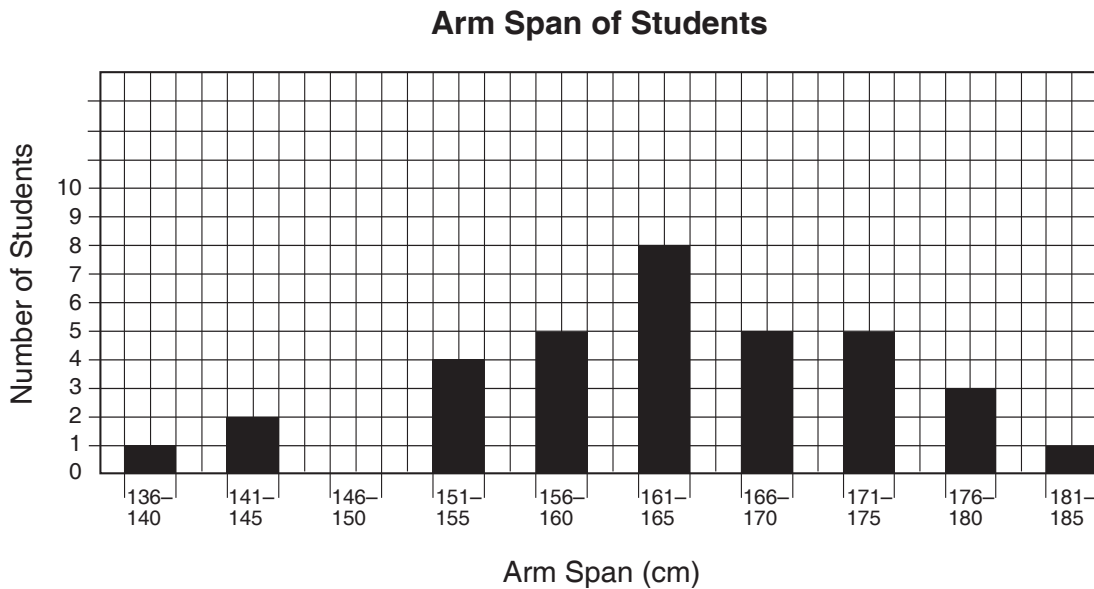
- (36) 1
- (37) 2
- (38) 1
- (39) 2
- (40) 1
- (41) 4

- (42) Allow 1 credit for marking an appropriate scale on the axis labeled “Number of Students.”

- (43) Allow 1 credit for constructing vertical bars to represent the data.

Note: Do not deduct credit if the bars are not shaded.

Example of a 2-Credit Graph



- (44) Allow 1 credit for stating what should be done to provide additional support. Acceptable responses include, but are not limited to:
- The investigation should be repeated a number of times.
 - The investigation should be repeated using larger numbers of students.
 - Repeat the investigation using people from different age groups.
- (45) Allow 1 credit for stating one major error made in the investigation. Acceptable responses include, but are not limited to:
- used two variables
 - changed the living space and food
 - should have only changed the amount of living space or food
 - There is no control.
- (46) Allow 1 credit for stating one possible reason that a larger number of the dark-colored variety were present in the polluted environment. Acceptable responses include, but are not limited to:
- Dark-colored moths were better camouflaged from predators in the polluted environment.
 - Dark-colored moths were better adapted for survival on the darker tree bark.
- (47) Allow 1 credit for stating one possible reason that the light-colored variety was not completely eliminated from the polluted environment. Acceptable responses include, but are not limited to:
- Dark-colored moths may be carriers of a gene for light color.
 - Some light-colored moths may have migrated in from other areas.
 - Some light-colored moths may have other adaptations that are more important than color for survival.
 - Some light-colored moths may have rested in areas other than the bark.
- (48) Allow 1 credit for stating one way the decrease in soot and other air pollutants will most likely influence the survival of the light-colored variety of peppered moth. Acceptable responses include, but are not limited to:
- The lichens may return so more light-colored moths will be camouflaged and survive.
 - More light-colored moths would survive.
- (49) 2

(50) 4

- (51) Allow a maximum of 2 credits, 1 credit each for identifying an appropriate structure and its function within either the circulatory *or* the respiratory system. Acceptable responses include, but are not limited to:

System: Circulatory	
Structure	Function
heart	pumps blood
artery	carries blood

System: Respiratory	
Structure	Function
trachea	transports oxygen
alveolus	exchanges gases

- (52) Allow 1 credit for indicating that the role of bacteria and fungi in an ecosystem is to recycle materials *or* that they are decomposers.

- (53) Allow 1 credit for indicating that the correct order is:

Largest	nucleus
↓	chromosome
Smallest	gene

- (54) Allow 1 credit for identifying one abiotic factor that would directly affect the survival of organism A. Acceptable responses include, but are not limited to:

- oxygen
- water temperature

- (55) Allow 1 credit for explaining why most ecologists would agree with the statement. Acceptable responses include, but are not limited to:

- A forest ecosystem has greater biodiversity. This leads to a more stable ecosystem since more interrelationships and interdependencies among the organisms exist in a forest than in a cornfield.
- A forest has much greater plant biodiversity than a cornfield that is dominated by a single plant species.
- A forest has more species involved with the cycling of matter and flow of energy.
- A forest ecosystem has greater biodiversity.

LIVING ENVIRONMENT – *continued*

- (56) Allow 1 credit for describing how structures 1 and 2 interact in the process of protein synthesis. An acceptable response includes, but is not limited to:
- Structure 2 provides the code for assembling a protein at structure 1.
- (57) Allow 1 credit for describing how either structure 3 or structure 4 aids the process of protein synthesis. Acceptable responses include, but are not limited to:
- Structure 3 provides the energy needed for protein synthesis.
 - Structure 4 allows the movement of substances into the cell for the process of protein synthesis.
- (58) 2
- (59) Allow 1 credit for indicating that the receptor molecules on Cell A are not the correct shape to combine with the hormone or are not the correct receptors for the hormone.
- (60) 1
- (61) Allow a maximum of 2 credits, 1 credit for describing the action represented by arrow X and 1 credit for stating one reason that this action is important. Acceptable responses include, but are not limited to:
- Action: high level of thyroxin causes the pituitary to produce less TSH
Importance: — to slow down metabolism
 — to regulate metabolism
 or
Action: shows control of the anterior pituitary
Importance: the pituitary controls the thyroid
- (62) Allow a maximum of 2 credits, 1 credit for identifying the hormone involved and 1 credit for identifying an organ directly affected by that hormone. Acceptable responses include, but are not limited to:
- Insulin—pancreas or *any* organ requiring glucose
 - Glucagon—liver
 - Estrogen—uterus

Part C

(63) Allow a maximum of 6 credits for designing an experiment to test the effect of one environmental factor on some aspect of plant growth, allocated as follows:

- Allow 1 credit for stating a hypothesis, e.g., presence of light affects the height of plants. [1]
- Allow 2 credits for providing enough information so that the experiment could be carried out, i.e., criteria for selection of uniform subjects, treatment of control and experimental groups leading to a comparison of observations and collection of data.

Allow only 1 credit for providing limited information, but not enough to actually carry out the experiment.

Example of a 2-Credit Response

- 1 Obtain plants of the same species and height.
 - 2 Place equal numbers of plants in light and in the dark. Maintain all other growing conditions, i.e., water, temperature, soil, pot size, the same.
 - 3 Collect growth data by measuring the height of each plant in each group (light and dark) immediately before and after a period of two weeks. Determine average plant height for each group immediately before and after the two week period and record the data in a table.
- Allow 1 credit for identifying the control setup, e.g., the control setup is the group of plants grown in the dark. The control setup should be some standard that the experiment can be compared to.
 - Allow 1 credit for an appropriate data table with column headings.

Example of an Appropriate Data Table

Growth Condition	Average Height of Plants	
	Initial	Final
Light		
Dark		

- Allow 1 credit for identifying the independent variable.

Note: The response should be evaluated as a whole. Portions of the response do not need to be addressed in order, e.g., measurement of growth in height may be found in the data table and not necessarily in the procedural steps.

- (64) Allow a maximum of 3 credits for a comparison of asexual and sexual reproduction, allocated as follows:
- Allow 1 credit for indicating that asexual reproduction results in offspring that are usually genetically identical to the previous generation and 1 credit for indicating that this is because offspring receive all their genetic information from one parent.
 - Allow 1 credit for indicating that sexual reproduction involves meiosis and asexual reproduction does not.
- (65) Allow a maximum of 6 credits for describing some long-term changes in the Hudson River ecosystem that could be caused by zebra mussels, allocated as follows:
- Allow a maximum of 2 credits, 1 credit for stating one likely change in the population of each of two species in the Hudson. Acceptable responses include, but are not limited to:
 - phytoplankton population will likely decrease
 - freshwater clam population will likely decrease
 - Any organism that eats the phytoplankton population or clam population will likely decrease.
 - Allow 1 credit for identifying one gas in the ecosystem and stating how a change in its concentration due to the zebra mussels would affect other organisms. Acceptable responses include, but are not limited to:
 - The oxygen concentration will likely decrease, resulting in a decrease in fish or clam populations.
 - Allow 2 credits, 1 credit for stating how the death of many native organisms could affect the rate of decay and 1 credit for stating how this would affect the amount of material being recycled. Acceptable responses include, but are not limited to:
 - The rate of decay would increase. [1]
 - The amount of material being recycled would increase. [1]
 - Allow 1 credit for explaining why the size of the zebra mussel population would decrease after an initial increase. Acceptable responses include, but are not limited to:
 - The zebra mussel population would increase for a time then decrease because of the lack of food (or the lack of oxygen).
 - limiting factors

LIVING ENVIRONMENT – *concluded*

(66) Allow a maximum of 5 credits for discussing different aspects of building paved highways in the rain forest, allocated as follows:

- Allow a maximum of 2 credits, 1 credit for stating one possible impact on biodiversity and 1 credit for providing one reason for this impact. Acceptable responses include, but are not limited to:
 - Biodiversity would decrease when plants are removed and habitats destroyed.
 - Biodiversity would increase when trees are removed and more light becomes available.
- Allow 1 credit for indicating that some producers could increase in number because more light becomes available along the side of the road.
- Allow 1 credit for indicating that herbivores would increase in number as a direct result of an increase in a producer population.
- Allow 1 credit for stating one possible action the road builders could take to minimize human impact on the ecology of this region. Acceptable responses include, but are not limited to:
 - provide pathways for animals to cross the road
 - take steps to reduce erosion
 - limit the size of the road

Regents Examination in Living Environment

January 2004

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

Raw Score	Scaled Score	Raw Score	Scaled Score	Raw Score	Scaled Score
85	100	56	75	27	50
84	99	55	74	26	49
83	98	54	74	25	47
82	97	53	73	24	46
81	95	52	72	23	45
80	94	51	71	22	43
79	93	50	71	21	42
78	92	49	70	20	40
77	91	48	69	19	39
76	90	47	69	18	37
75	89	46	68	17	36
74	89	45	67	16	34
73	88	44	66	15	32
72	87	43	65	14	31
71	86	42	65	13	29
70	85	41	64	12	27
69	84	40	63	11	25
68	84	39	62	10	23
67	83	38	61	9	21
66	82	37	60	8	19
65	81	36	59	7	17
64	81	35	59	6	15
63	80	34	58	5	12
62	79	33	57	4	10
61	78	32	56	3	8
60	78	31	54	2	5
59	77	30	53	1	3
58	76	29	52	0	0
57	76	28	51		

To determine the student's final examination score, find the student's total test raw score in the column labeled "Raw Score" and then locate the scaled score that corresponds to that raw score. The scaled score is the student's final examination score. Enter this score in the space labeled "Final Score" on the student's answer sheet.

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 in the scoring key for the administration be used to determine the student's final score. The chart above is usable only for this administration of the living environment examination.

Map to Core Curriculum

January 2004 Living Environment

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