

FOR TEACHERS ONLY

The University of the State of New York

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REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

Tuesday, August 13, 2002 — 12:30 to 3:30 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) 2	(13) 1	(25) 4
(2) 1	(14) 2	(26) 4
(3) 3	(15) 1	(27) 2
(4) 1	(16) 4	(28) 4
(5) 4	(17) 1	(29) 1
(6) 2	(18) 3	(30) 3
(7) 3	(19) 2	(31) 2
(8) 4	(20) 3	(32) 1
(9) 3	(21) 3	(33) 3
(10) 4	(22) 1	(34) 2
(11) 1	(23) 3	(35) 3
(12) 2	(24) 2	

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.

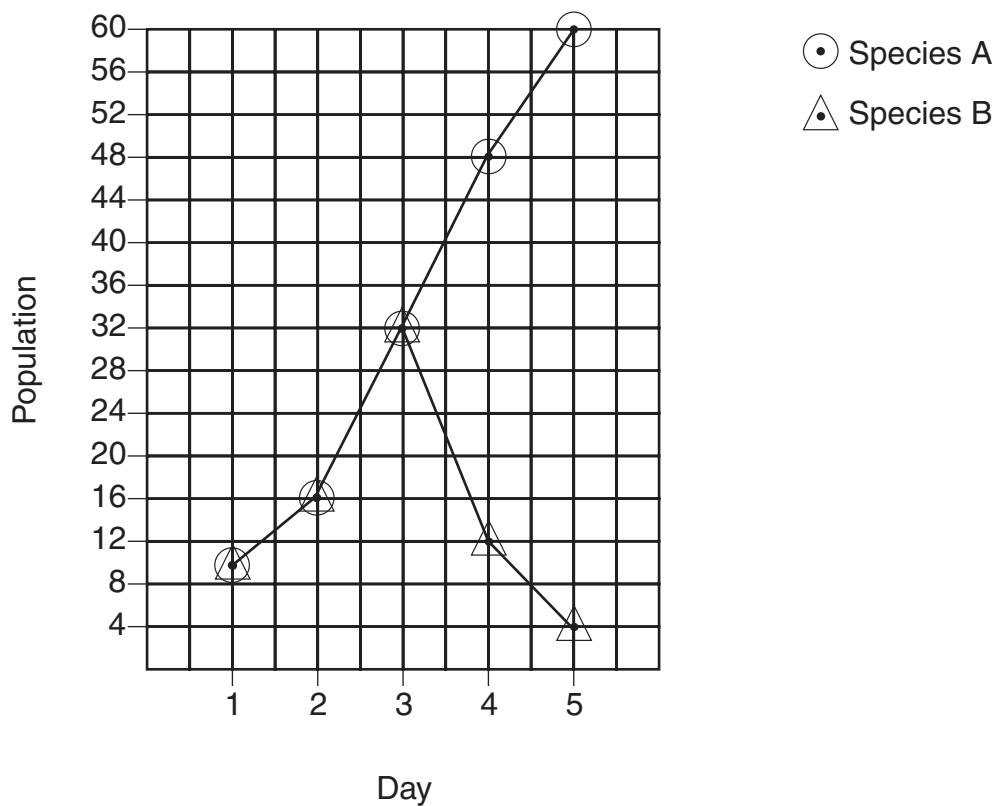
Fractional credit is *not* allowed. Only whole-number credit may be given to a response. If the student gives more than one answer to a question, only the first answer should be rated. Units need not be given when the wording of the questions allows such omissions.

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) 3
- (37) 1
- (38) 2
- (39) 1
- (40) 3
- (41) 3
- (42) Allow 1 credit for marking an appropriate scale on each axis.
- (43) Allow 1 credit for plotting the data for species A correctly, surrounding each point with a small circle, and connecting the points.
- (44) Allow 1 credit for plotting the data for species B correctly, surrounding each point with a small triangle, and connecting the points.

(42–44) Example of an Appropriate Graph



LIVING ENVIRONMENT – *continued*

- (45) Allow 1 credit for indicating that Day 4 is the day when it first becomes evident that one species was better adapted.
- (46) 3
- (47) 3
- (48) Allow 1 credit for describing one way the student could make the experiment more valid. Acceptable responses include, but are not limited to:
- use more plants of each type
 - use more types of plants
 - extend the length of the experiment
 - repeat the experiment
- (49) Allow 1 credit for indicating that the untreated cuttings serve as a control. Acceptable responses include, but are not limited to:
- control
 - something to compare the experimental results to
- (50) Allow 1 credit for **diffusion** *or* **passive transport** *or* **dissolving**.
- (51) Allow 1 credit for indicating that any membrane within a cell serves the same purpose as structure Z. Acceptable responses include, but are not limited to:
- cell membrane
 - nuclear envelope
 - nuclear membrane
 - plasma membrane
- (52) Allow 1 credit for **Ca⁺⁺** *or* **Ca⁺²** *or* **Ca ions**.
- Note:** Ca is *not* acceptable.
- (53) Allow 1 credit for naming the correct process. Acceptable responses include, but are not limited to:
- active transport
 - sodium/potassium pump
- (54) Allow 1 credit for indicating that cells have specific receptors. Acceptable responses include, but are not limited to:
- Target cells have receptors that are specific for that hormone.
 - Nontarget cells lack receptors for the hormone.

LIVING ENVIRONMENT – *continued*

- (55) Allow a maximum of 2 credits, 1 for naming a specific substance produced and 1 for stating how humans have benefited from the production of this substance. Acceptable responses include, but are not limited to:
- This technique is used to produce insulin, which is used in the treatment of diabetes.
 - human growth hormone that can increase bone density in the elderly
 - hormones that may reduce the cost and side effects of replacing missing body chemicals
- (56) Allow 1 credit for using a specific example that explains why the human genome project is considered important. Acceptable responses include, but are not limited to:
- Scientists hope to cure (diagnose) diseases.
 - Scientists can replace defective genes with normal ones (gene therapy).
 - should eventually improve the health of humans
- (57) Allow 1 credit for indicating that scientists must use only certain enzymes because enzymes have specific functions. Acceptable responses include, but are not limited to:
- must use only certain enzymes since different enzymes will cut DNA at different locations
 - must be careful to use the enzyme that will splice out only the target gene
 - The wrong enzyme may cut out a normal gene.
- (58) Allow 1 credit for a scientifically accurate answer explaining why, in a mammal, a mutation in a gamete may contribute to evolution while a mutation in a body cell will not. Acceptable responses include, but are not limited to:
- Mutations in a gamete may lead to variation in a population.
 - Mutations occurring in body cells are not passed on to offspring.
 - Mutations in gametes may be passed on to offspring.
- (59) Allow 1 credit for describing how the introduction of a chemical into a culture of bacteria could be used to illustrate natural selection. Acceptable responses include, but are not limited to:
- Through survival of the fittest, only the thick-walled bacteria would survive.
 - When the chemical is introduced, only the bacteria with thick cell walls survive.
 - The introduction of the chemical causes an environmental change that selectively allows only the thick-walled bacteria to survive.
- (60) Allow 1 credit for a scientifically accurate reason that woolly mammoths died out. Acceptable responses include, but are not limited to:
- The environment changed and the woolly mammoth could no longer adapt.
 - The number of herbivores increased 10,000 years ago and there was more competition for food.
 - increase in predators
 - overhunting by humans

- (61) Allow 1 credit for correctly drawing the three chromosomes.

Example of an Acceptable Drawing



- (62) Allow 1 credit for an accurate explanation of how increased ultraviolet light reaching Earth may be harmful. Acceptable responses include, but are not limited to:
- UV light can be a mutagen or a carcinogen.
 - cause harmful mutations in plants and animals
 - cause cancers
- (63) Allow a maximum of 2 credits, 1 for correctly identifying a renewable resource, and 1 for correctly describing how to restore that resource. Acceptable responses include, but are not limited to:
- Trees are a renewable resource. They can be replanted if they are being depleted.
 - Gasohol can be made from corn. When the source is depleted you can grow more corn.

Part C

- (64) Allow 1 credit for stating a valid reason that placing the sheep on the endangered species list might lead to the shooting of mountain lions. Acceptable responses include, but are not limited to:
- To increase the sheep population, the population of its predator, the mountain lion, would need to be reduced.
 - In order to protect the endangered sheep, any mountain lion found to be attacking sheep may be shot.
 - Increasing the sheep population would lead to more mountain lions, leading people to shoot the mountain lions.
- (65) Allow a maximum of 2 credits, 1 for each of two reasons that some people would oppose the shooting of the mountain lions. Acceptable responses include, but are not limited to:
- Mountain lions may become extinct.
 - There would be an increase in the populations of other prey of the lions.
 - There would be an increase in competition between sheep and other herbivores.
 - ethics, it's not right to kill one animal to benefit another
 - It may disrupt the food chain.
 - Mountain lions are beautiful.
- (66) Allow 1 credit for indicating that Molecule *D* will most likely react with the enzyme.
- (67) Allow 1 credit for indicating that Molecule *D* is the only one that fits the shape of the enzyme.
- (68) Allow 1 credit for indicating that the rate would increase.
- (69) Allow a maximum of 2 credits, 1 for identifying structure *X* as the uterus and 1 for explaining how structure *X* helps provide nutrition for a developing fetus. Acceptable responses include, but are not limited to:
- Blood vessels in the uterus provide nutrients for the developing embryo/fetus.
- Note:** Allow 1 credit if the student incorrectly identifies structure *X* but gives a scientifically accurate description of how the identified structure helps to provide nutrition.
- (70) Allow 1 credit for accurately describing one effect on the food web of spraying the pesticide. Acceptable responses include, but are not limited to:
- If the crickets are killed, the food supply of frogs will be reduced.
 - The mouse population might increase due to lack of competition with the crickets.
- (71) Allow 1 credit for indicating that the arrow shows the direction of energy flow. Acceptable responses include, but are not limited to:
- The arrow shows the direction of energy flow.
 - The arrow shows that energy moves from the tree to the deer.
 - The arrow shows that the deer eats trees.

LIVING ENVIRONMENT – *continued*

- (72) Allow 1 credit for indicating that decomposers recycle materials. Acceptable responses include, but are not limited to:
- Decomposers break down dead organic matter.
 - Decomposers return nutrients to the soil.
 - Decomposers recycle materials in the environment.
 - Decomposers return materials to the environment.
- (73) Allow 1 credit for a correct hypothesis. Acceptable responses include, but are not limited to:
- As the pH decreases, the bean plants will grow faster.
 - Bean plants will grow faster in normal rain than in acid rain.
- (74) Allow 1 credit for identifying pH as the independent variable.
- (75) Allow a maximum of 2 credits, 1 for each of two factors that should be kept constant. Acceptable responses include, but are not limited to
- type of soil
 - growing conditions
 - amount of liquid
 - type of bean plant
 - temperature
- (76) Allow 1 credit for properly setting up a data table to organize results. The data table must include separate labeled columns for the independent and dependent variables.

- (77) Allow a maximum of 2 credits, 1 for identifying the energy source in the process chosen and 1 for identifying where the energy ends up at the completion of the process chosen. Acceptable responses include, but are not limited to:

a Photosynthesis

b Energy source:

— sunlight

c Where energy ends up:

— glucose (carbohydrate or monosaccharide)

— sugar

— chemical bonds

— $C_6H_{12}O_6$

a Respiration

b Energy source:

— glucose (carbohydrate or monosaccharide)

— sugar

— chemical bonds

— $C_6H_{12}O_6$

c Where energy ends up:

— ATP

— high-energy bonds

— heat

- (78) Allow a maximum of 2 credits, 1 for an accurate reason photosynthesis is important for living things and 1 for an accurate reason respiration is important for living things. Acceptable responses include, but are not limited to:

Photosynthesis:

— glucose produced is basis of all food chains

— O_2 released is needed by aerobic organisms

— changes light energy to chemical energy

Respiration:

— supplies energy for metabolism

— supplies CO_2 for photosynthesis

Regents Examination in Living Environment

August 2002

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

Raw Score	NYSED Scaled	Raw Score	NYSED Scaled	Raw Score	NYSED Scaled
85	100	56	78	27	51
84	99	55	78	26	50
83	98	54	77	25	49
82	97	53	76	24	47
81	96	52	75	23	46
80	96	51	75	22	44
79	95	50	74	21	43
78	94	49	73	20	41
77	93	48	72	19	40
76	92	47	72	18	38
75	92	46	71	17	36
74	91	45	70	16	35
73	90	44	69	15	33
72	89	43	68	14	31
71	89	42	67	13	29
70	88	41	67	12	27
69	87	40	66	11	25
68	86	39	65	10	23
67	86	38	64	9	21
66	85	37	63	8	19
65	84	36	62	7	17
64	84	35	61	6	15
63	83	34	60	5	12
62	82	33	59	4	10
61	82	32	57	3	8
60	81	31	56	2	5
59	80	30	55	1	3
58	80	29	54	0	0
57	79	28	53		

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

Standards	Question Numbers		
	Part A 1–35	Part B 36–63	Part C 64–78
Standard 1—Analysis, Inquiry, and Design			
Key Idea 1			
Key Idea 2	1, 2	36, 48, 49	73
Key Idea 3		42, 43, 44, 45	
Appendix A (Laboratory Checklist)			74, 75, 76
Standard 4			
Key Idea 1	4, 7, 8, 24	40, 50, 51, 52, 53, 54	71, 72
Key Idea 2	5, 10, 11, 12, 13	55, 56, 57	
Key Idea 3	9, 14, 15, 18	46, 58, 59, 60	
Key Idea 4	16, 17, 19, 20	47, 61	69
Key Idea 5	6, 21, 22, 23, 25, 26	37, 38, 39,	66, 67, 68
Key Idea 6	3, 27, 28, 29, 30, 33	41	77, 78
Key Idea 7	31, 32, 34, 35	62, 63	64, 65, 70