FOR TEACHERS ONLY

The University of the State of New York

Le

REGENTS HIGH SCHOOL EXAMINATION

LIVING ENVIRONMENT

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

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) 2

(37) 2

(38) 2

(39) 4

(40) 3

(41) 4

(42) Allow 1 credit for stating one valid inference regarding the relationship of bears to other animals in the canine family tree. Acceptable responses include, but are not limited to:

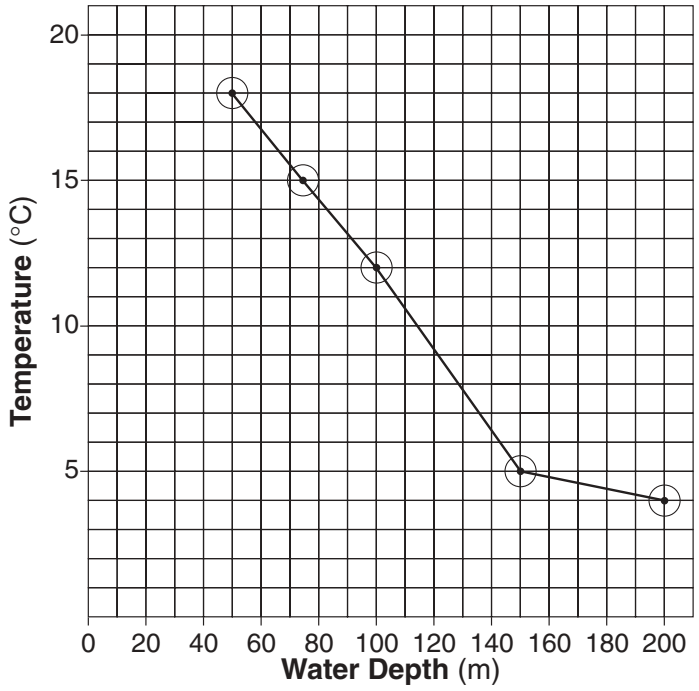
— *Miacis* is an ancestor of bears.
— Bears are more closely related to raccoons than to the domestic dog.
— Bears and canines share common ancestors.

(43) Allow 1 credit for indicating that the two animals adapted to different environments.

(44) Allow 1 credit for marking an appropriate scale on the axis labeled "Water Depth (m)."

(45) Allow 1 credit for plotting the data correctly, surrounding each point with a small circle, and connecting the points.

Example of an Appropriate Graph



(46) Allow 1 credit for indicating that as the water depth increases, the temperature decreases.

(47) 3

(48) Allow 1 credit for indicating that the percent maximum activity of trypsin is the dependent variable.

Note: Allow no credit for the response "trypsin" or "amount of trypsin."

(49) Allow 1 credit for stating a scientifically accurate reason that the offspring of organisms that reproduce sexually are *not* genetically identical to their parents. Acceptable responses include, but are not limited to:

— Sexual reproduction allows for the recombination of genes.
— Sexual reproduction allows for the exchange of genes/DNA during crossing-over in meiosis.
— Sexual reproduction involves the combination of genes from two parents.

(50) Allow 1 credit for a scientifically accurate explanation of how the introduction of a foreign species can lead to the extinction of species that are native to an area. Acceptable responses include, but are not limited to:

— Foreign species may be better adapted.
— competition
— no natural predators of the foreign species
— Foreign species may carry disease or parasites.

(51) 1

(52) 3

(53) 4

(54) Allow 1 credit for an accurate description of how the new discovery concerning stem cells might help to treat diseases such as Alzheimer's or Parkinson's disease. Acceptable responses include, but are not limited to:

— Existing stem cells could be made to produce functional nerve cells in damaged brain areas.
— Damaged neurons could be restored by the activity of stem cells.

(55) Allow 1 credit for stating how a steady decrease in arterial pressure will affect homeostasis in the human body. Acceptable responses include, but are not limited to:

— reduce the normal kidney function
— reduce the rate of filtration by the kidney
— disrupt homeostasis

(56) 1

(57) 3

(58) Allow 1 credit for stating one possible cause for the failure of muscle *E* to respond to a stimulus at *A*. Acceptable responses include, but are not limited to:

— a cut in any of the nerve cells
— failure of any neuron to release chemical transmitters
— failure of any neuron or muscle to receive (or respond to) a chemical transmitter
— inability of muscles to contract
— lack of food (or oxygen) in any cells
— very weak stimulus
— death of nerve cell

(59) 1

(60) 2

(61) 3

(62) Allow 1 credit for identifying one factor that could disrupt the final stage of the ecosystem. Acceptable responses include, but are not limited to:

— natural disasters (fire, flood, etc.)
— human activity
— disease
— introduction of a new species
— climatic change

(63) Allow 1 credit for naming one species shown in the food web and explaining how its removal could affect one of the other species in the food web. Acceptable responses include, but are not limited to:

— If the frogs were removed, the cricket population could increase.
— If the hawks were removed, the mouse population could increase.
— If the grass were removed, the cricket population could decrease.
— If the crickets were removed, the grass population could increase.

(64) Allow 1 credit for identifying one process a producer can accomplish that a carnivore can *not* accomplish. Acceptable responses include, but are not limited to:

— photosynthesis
— oxygen release
— food making

(65) Allow 1 credit for a scientifically accurate explanation of how guard cells of a leaf help to maintain homeostasis in a plant. Acceptable responses include, but are not limited to:

— Guard cells can regulate the amount of water loss through the leaf.
— Guard cells carry out photosynthesis.
— allow CO_2 to enter the leaf
— regulate gas exchange

Part C

(66) Allow a maximum of 5 credits for describing an experiment to test the hypothesis, allocated as follows:

- Allow 1 credit for indicating that the experimental group received vitamin C and the control group did not.
- Allow a maximum of 2 credits, 1 for each of two correctly identified conditions that should be kept constant. Acceptable responses include, but are not limited to:

  — age of people
  — type of wound
  — number in each group
  — dosage
  — food
  — water

  Note: Allow no credit for the response "environment."

- Allow 1 credit for identifying a measurable variable that could be used to collect data. Acceptable responses include, but are not limited to:

  — number of days to heal
  — rate of healing

- Allow 1 credit for indicating that the experimental results would support the hypothesis if the experimental group healed more quickly (spent less time in the hospital, got better faster) than the control group.

(67) Allow a maximum of 3 credits, 1 credit each for accurately stating:

- one human activity that may have caused the ecological problem selected from the list
- one way the problem may negatively affect humans
- one positive action that could be taken to reduce the problem

Note: No credit should be allowed for discussing an ecological problem not on the list.

Acceptable responses include, but are not limited to:

Ecological Problem	Cause	Negative Effect	Positive Action
Global warming	Air pollution Increased industry Burning rain forests Auto emissions	Changes in weather patterns Increase in temperature Increase in natural disasters (floods, storms) Loss of icecap	Alternative energy Carpooling Public transportation
Destruction of ozone shield	Use of chemicals that destroy ozone shield Use of CFCs in aerosols Air pollution	Increased exposure to UV rays	Reduce use of chemicals that destroy ozone shield Reduce use of CFCs in aerosols

Note: The response "air pollution" is acceptable for the ecological problem "destruction of ozone shield" because all halogens can cause destruction of ozone layer and many are produced by factories. "Pollution" or "pollution from cars" when standing alone is *not* acceptable.

Loss of biodiversity	Cutting down forests for farming Destruction of habitat	Loss of sources of medicine Loss of species	Set up protected areas Restrict logging Restore wetlands

(68) Allow 1 credit for identifying an alternative to be used *and* giving an ecologically sound reason for choosing that alternative. Acceptable responses include but are not limited to:

A Trunk banding does not damage the tree nor does it disrupt the environment.
B The chemical insecticide is effective and disappears rapidly.
C The liquid spray contains naturally occurring bacteria and will not disrupt the ecosystem.
D No action because this has the least human impact on the environment.

(69) Allow a maximum of 3 credits, 1 for each of the three components of the explanation. Acceptable responses include, but are not limited to:

Cartoon 1
— The concept is overproduction. [1]
— More organisms are produced than can survive. [1]
— The organisms that are best adapted will survive. [1]

Cartoon 2
— The concept is struggle for survival (or survival of the fittest.) [1]
— Those organisms best adapted will survive. [1]
— Those that survive will pass these traits on to their offspring. [1]

(70) Allow 1 credit for naming *or* describing the process by which plastic-producing plants were developed. Acceptable responses include, but are not limited to:

— genetic engineering
— recombinant DNA
— gene splicing
— gene manipulation
— biotechnology

(71) Allow a maximum of 2 credits, 1 for each of two reasons that plastic produced by these plants is better for the environment than plastic produced by human technology and why this plastic would be a benefit to future generations. Acceptable responses include, but are not limited to:

— Plant plastics will decrease the need for recycling.
— Plant plastics will reduce pollution and trash.
— Plastic produced by plants breaks down easily in the environment.
— Plastics produced by humans break down very slowly.
— Plant plastics will not deplete oil reserves.
— Plant plastics will reduce the size of landfills.
— Growing plastic-producing plants will give farmers a new source of income.
— Plant plastics will provide a supply of plastic for the future.

(72) *a* Allow a maximum of 2 credits, 1 each for stating the function of the two systems chosen in helping to maintain homeostasis in the body. Acceptable responses include, but are not limited to:

— circulatory: carries nutrients to cells
— digestive: breaks down substances *or* makes nutrients available
— respiratory: exchange of gases
— excretory: eliminates metabolic wastes

b • Allow 1 credit for correctly stating a malfunction of the system chosen. Acceptable responses include, but are not limited to:

— circulatory: heart attack, hardening of arteries, disruption of blood flow
— digestive: constipation, diarrhea
— respiratory: asthma, bronchitis, emphysema
— excretory: kidney disease, gout

• Allow 1 credit for explaining how the malfunction disrupts homeostasis. Acceptable responses include, but are not limited to:

— hardening of arteries: raises blood pressure
— diarrhea: results in dehydration
— emphysema: reduced oxygen supply to cells
— kidney disease: interferes with excretion of some wastes

• Allow 1 credit for describing one way the malfunction could be prevented or treated. Acceptable responses include, but are not limited to:

— hardening of arteries: exercise
— emphysema: do not smoke

Regents Examination in Living Environment

June 2002

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

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