

FOR TEACHERS ONLY

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

Le

LIVING ENVIRONMENT

Wednesday, January 30, 2003 — 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)	3	(25)	2
(2)	4	(14)	1	(26)	1
(3)	1	(15)	4	(27)	1
(4)	1	(16)	2	(28)	2
(5)	4	(17)	3	(29)	2
(6)	3	(18)	1	(30)	3
(7)	3	(19)	3	(31)	4
(8)	4	(20)	4	(32)	1
(9)	3	(21)	3	(33)	2
(10)	2	(22)	3	(34)	3
(11)	1	(23)	4	(35)	1
(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

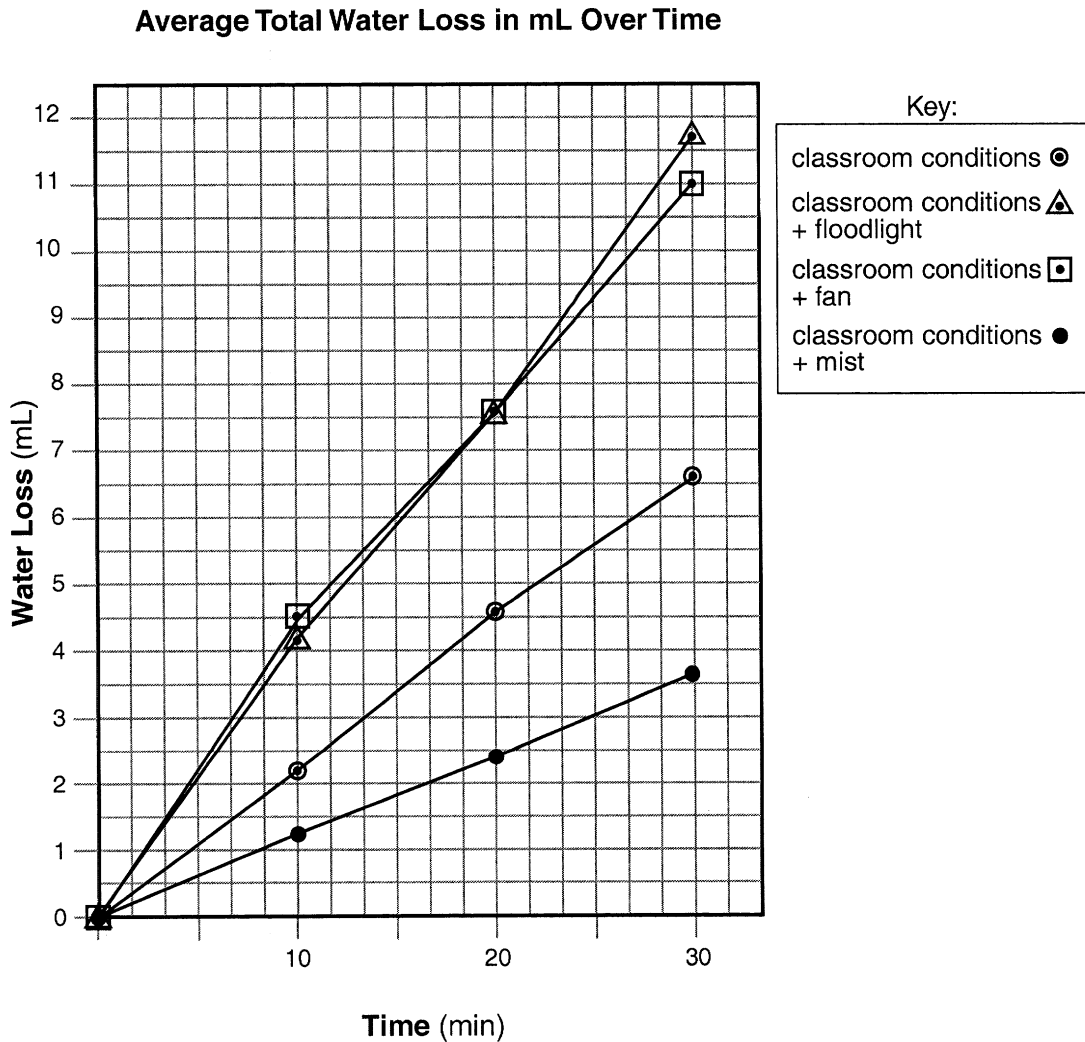
- (36) 2
- (37) 1
- (38) 3
- (39) 2
- (40) Allow 1 credit for indicating that both the river otter and the bald eagle appear to have been least affected by the oil spill.
- (41) 1
- (42) Allow 1 credit for citing information from the passage that indicates that the impact of the oil spill on the environment is still being experienced. Acceptable responses include, but are not limited to:
- A decade after the Exxon Valdez oil tanker spilled million of gallons of crude oil off Prince William Sound in Alaska, most of the fish and wildlife species that were injured have not fully recovered.
 - Eight species are considered to have made little or no progress toward recovery since the spill, including killer whales, harbor seals, and common loons.
 - Several other species, including sea otters and Pacific herring, have made significant progress toward recovery but are still not at levels seen before the accident.
- (43) Allow 1 credit for indicating that tidal plants (or other plants) were the autotrophic organisms negatively affected by the oil spill.
- (44) Allow 1 credit for indicating that exchanging genetic information provides genetic variations.
- (45) Allow a maximum of 2 credits, 1 for identifying a structure in a single-celled organism and 1 for stating how that structure is involved in the survival of the organism. Acceptable responses include, but are not limited to:
- mitochondrion: site of respiration or releases energy
 - cell membrane: regulates what enters (or leaves) the cell
- (46) Allow 1 credit for indicating that Process 2 restores the normal species number of chromosomes or that fertilization is necessary to produce offspring.

LIVING ENVIRONMENT – *continued*

- (47) Allow 1 credit for stating a difference between the cells produced by Process 1 and the cells produced by Process 3. Acceptable responses include, but are not limited to:
- Cells resulting from Process 1 have half the number of chromosomes as cells produced by Process 3.
 - Cells produced by Process 1 are sex cells and those produced by Process 3 are body cells.
- (48) Allow 1 credit for stating a change in the internal environment that might cause an increase in the cells labeled A. Acceptable responses include, but are not limited to:
- invasion of the body by any of the following:
 - bacteria, fungi, viruses, antigens, foreign proteins, allergens, foreign substances, disease-causing organisms
 - pregnancy
 - sickness
 - cancer
- (49) Allow 1 credit for describing one possible immune response, other than an increase in number, that one of the cells labeled A would carry out. Acceptable responses include, but are not limited to:
- attack or destroy a pathogen/antigen
 - produce antibodies
 - move to site of antigen
 - engulf invaders
- (50) 1
- (51) 3
- (52) 4
- (53) Allow 1 credit for indicating a predator-prey relationship found in the food web and indicating which organism is the predator and which is the prey. Acceptable responses include, but are not limited to:
- Predator/Prey
- lion/deer
 - lion/rabbit
 - hawk/mouse
 - mouse/cricket
 - frog/cricket
- (54) Allow 1 credit for marking an appropriate scale on the axis labeled “Time.”
- (55) Allow 1 credit for plotting the data for classroom conditions correctly, surrounding each point with a small circle, and connecting the points.

- (56) Allow 1 credit for plotting the data for classroom conditions + floodlight correctly, surrounding each point with a small triangle, and connecting the points.

Example of an Appropriate Graph



- (57) Allow 1 credit for indicating that classroom conditions + mist resulted in the lowest rate of transpiration.
- (58) Allow 1 credit for indicating that the group of plants in classroom conditions was the control.
- (59) Allow 1 credit for indicating that scientists formerly thought of repetitive DNA as “junk” because they did not understand its functions.
- (60) 2
- (61) Allow 1 credit for indicating that sentence 6 or 7 provides evidence that supports the hypothesis that increased amounts of repetitive DNA are responsible for increased size of organisms.

LIVING ENVIRONMENT – *continued*

(62) 2

(63) Allow 1 credit for indicating that global warming could decrease the ability of alligators to survive as a species.

(64) 4

Part C

- (65) Allow a maximum of 3 credits, 1 for each of the three components in the response.
- For significance of the difference in the results: [1]
Acceptable responses include, but are not limited to:
 - One centimeter is not a significant difference.
 - The difference could be the result of human error.
 - For significance of the number of plants used: [1]
Acceptable responses include, but are not limited to:
 - Growing one marigold in each location is not enough.
 - A larger sample size is needed to make valid conclusions.
 - For significance of the number of species of plants used: [1]
Acceptable responses include, but are not limited to:
 - The student cannot conclude that all plants grow more rapidly in sunlight when this observation was based on only one species.
 - The student would need to conduct the investigation with many different species in order to support a conclusion relating to all plants.
- (66) Allow a maximum of 3 credits, allocated as follows:
- Allow 1 credit for stating a malfunction associated with the selected system.
Acceptable responses include, but are not limited to:
 - digestive – ulcer
 - circulatory – heart attack
 - respiratory – emphysema
 - excretory – kidney stones
 - nervous – Parkinson’s disease
 - Allow 1 credit for stating a direct or indirect cause of the malfunction identified.
Acceptable responses include, but are not limited to:
 - ulcer – excess stomach acid
 - heart attack – high fat diet
 - emphysema – smoking
 - kidney stones – genetic cause
 - Parkinson’s disease–brain stops making a sufficient supply of a critical chemical (dopamine)

LIVING ENVIRONMENT – *continued*

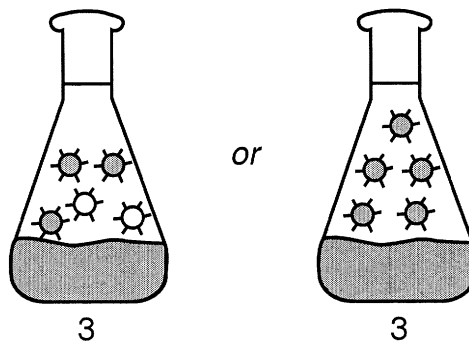
- Allow 1 credit for stating the effect the malfunction has on any other system. Acceptable responses include, but are not limited to:
 - ulcer – causes bleeding
 - heart attack – reduces oxygen to the brain
 - emphysema – reduces oxygen in the circulatory system
 - kidney stones – stimulates nervous system resulting in pain
 - Parkinson’s disease – involuntary muscular contractions

- (67) Allow a maximum of 3 credits, 1 each for the name of the genetic disorder, the technique used in diagnosis, and one characteristic of the disorder. Acceptable responses include, but are not limited to:
 - sickle cell anemia, microscopic examination of blood, low oxygen supply to the cells
 - Down syndrome, karyotype analysis, mental retardation
 - PKU, urine analysis, mental retardation

- (68) Allow a maximum of 2 credits, 1 for each appropriate safety procedure that should be followed when conducting an experiment that involves heating protein in a test tube containing water, an acid, and a digestive enzyme. Acceptable responses include, but are not limited to:
 - wear goggles
 - wear gloves
 - wear apron
 - handle chemicals properly
 - point test tube opening away from self and others
 - don’t stopper test tube

- (69) Allow 1 credit for a sketch that shows more than three “organisms,” with more than half (or possibly all) shaded.

Examples of Appropriate Sketches



LIVING ENVIRONMENT – *concluded*

- (70) Allow a maximum of 3 credits, 1 for each accurate explanation of three different components in the response. Acceptable responses include, but are not limited to:
- Not all of the animals were identical. They had *genetic variations*.
 - By *reproduction*, more organisms will be produced than can survive.
 - Only those organisms best adapted to their *environment* will survive. This is known as *survival of the fittest*.
 - Those animals that survive will *reproduce* and pass those favorable traits on to their offspring.
 - As the *environment* became more polluted, the pollution caused some animals to die. This is known as *selection*.

Note: No Lamarckian answers are acceptable. No credit should be allowed for responses that simply repeat the prompt and/or name the terms listed without an explanation.

- (71) Allow 1 credit for naming a process being controlled in the setup. Acceptable answers include, but are not limited to:
- photosynthesis
 - energy flow
 - carbon dioxide – oxygen cycle
- (72) Allow a maximum of 2 credits, 1 for each of two changes in chemical composition of the space station atmosphere as a result of the astronaut coming on board. Acceptable responses include, but are not limited to:
- an increase in the level of water vapor
 - an increase in the CO₂ level
 - a decrease in the O₂ level
- (73) Allow a maximum of 2 credits, 1 for each of two changes in the chemical composition of the space station atmosphere that would result from turning on more lights. Acceptable responses include, but are not limited to:
- increase in oxygen level
 - decrease in the CO₂ level

Regents Examination in Living Environment

January 2003

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

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 2003 Living Environment

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