FOR TEACHERS ONLY

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

LIFE SCIENCE: BIOLOGY

Tuesday, June 10, 2025 — 9:15 a.m. to 12:15 p.m., only

RATING GUIDE

Directions to the Teacher:

Refer to the directions on page 2 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. Check this web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Directions to the Teacher

Follow the procedures below for scoring student answer papers for the Regents Examination in Life Science: Biology. Additional information about scoring is provided in the publication *Information Booklet for Scoring Regents Examinations in the Sciences*.

Allow 1 credit for each correct response.

At least two science teachers must participate in the scoring of the 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 more than approximately one-half of the open-ended questions on a student's answer paper. Teachers may not score their own students' answer papers.

Students' responses must be scored strictly according to the 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. Do not attempt to correct the student's work by making insertions or changes of any kind. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

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.

For hand scoring, raters should enter the scores earned in the appropriate boxes printed on the separate answer sheet. Next, the rater should add these scores and enter the total in the space provided. The student's score for the Life Science: Biology test should be recorded in the space provided. Then the student's raw score on the test should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations no later than June 26, 2025. The student's scale score should be entered in the box labeled "Scale Score" on the student's answer sheet. The scale score is the student's final examination score.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart may change from one administration 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.

1 [1] Allow 1 credit for 1.

2 [1] Allow 1 credit for 2.

3 [1] Allow 1 credit for 3.

4 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— As CO_2 increases, pH decreases. Less than 7.8 would prevent sea urchins from making skeletons, causing their population to decrease.

— The graph projects that shortly after 2100 ocean pH may be under 7.8, the level at which organisms like sea urchins can't build shells/skeletons.

5 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— As atmospheric CO_2 increases, the carbonate ions in the hydrosphere are used up and the urchins will not have the resources needed to make their shells, reducing the number of urchins in the biosphere.

— As carbonate ions are used to form bicarbonate in the hydrosphere, they are no longer available for sea urchin skeletons in the biosphere.

— Increased CO_2 in the atmosphere causes the oceans in the hydrosphere to be more acidic from carbonic acid. The decrease in pH affects the organisms in the biosphere that need a certain pH range to survive.

6 [1] Allow 1 credit for 4.

7 [1] Allow 1 credit for 2.

8 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— When participants were exposed to 120 minutes of low oxygen, their EPO levels increased from about 11 m/u/ml to 19 m/u/ml over 4.5 hours. More red blood cells make it possible to transport more oxygen until the appropriate blood oxygen level (set point) is reached.

— When there is a decrease in the amount of oxygen the blood is carrying to the kidney, the cells of the kidney release the EPO protein, which causes an increase in red blood cell production. This causes oxygen levels to increase back to normal.

— The graph shows that the longer a person is exposed to low oxygen levels, the more EPO is released. More red blood cells are produced to carry more oxygen until the normal oxygen level is reached.

9 [1] Allow 1 credit for 1.

10 [1] Allow 1 credit for 2.

11 [1] Allow 1 credit for 3.

12 [1] Allow 1 credit for 1.

13 [1] Allow 1 credit for 2.

14 [1] Allow 1 credit for 1.

15 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— They came from a similar ancestry because they all have similar Hox genes resulting in similar segmentation.

— The head (or thorax, or abdomen) in all organisms is coded for by the same Hox gene.

— The Hox gene makes the body plan follow the head, thorax, abdomen pattern.

16 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The Hox genes are the same and are interchangeable because their DNA is the same, producing the right proteins to turn on the correct genes in the given animal.

— The Hox genes are so similar that they will switch on the correct genes for producing eyes in either animal.

17 [1] Allow 1 credit. Acceptable answers include, but are not limited to:

— Yaks with large hearts that pump more oxygenated blood to the cells were better able to survive and reproduce in high altitudes.

— Yaks that have small lungs and are less able to take in oxygen are more likely to die and less likely to pass on their traits.

— Yaks with specialized hemoglobin that can extract more oxygen from the air can survive in high-altitude environments. Since the altitude between 3000 and 5000m above sea level has only 52% to 66% of the normal amount of oxygen, they are better adapted to this environment. They will pass on this trait to offspring.

18 [1] Allow 1 credit for 3.

19 [1] Allow 1 credit for 2.

20 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— At altitudes of 3500 m and above, where the pika lives, temperatures are less than 6°C, so living underground would help them survive.

— They live in tunnels/burrows that protect them from the extreme cold of the Tibetan Plateau.

— The faster-moving pikas can quickly escape predators by running into tunnels.

21 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— There is a 800-900 g/m^2 (90%) reduction in biomass between the level that the pika and yak are at and the level of what they eat. This shows that the energy is lost as it flows up the trophic levels.

— Carnivores at the top level of the pyramid have less biomass than the herbivores that they prey on because energy is lost to heat as you move up trophic levels.

22 [1] Allow 1 credit for 4.

23 [1] Allow 1 credit for 3.

24 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The claim is valid. As sea levels continue to rise, crabs and mussels will move into the low marsh area, which will provide more food for herons and egrets, so their population will increase.

— Rising sea levels may cause the mudflat to move into the low marsh, which could decrease the habitat availability for minnows and silversides. This could decrease populations of heron and egret because of food shortage. This supports the claim that organisms will be impacted.

25 [1] Allow 1 credit for 3.

26 [1] Allow 1 credit for 2.

27 [1] Allow 1 credit. Answers must include:

- The name of a solution from the chart.
- A discussion of cost, reliability, and aesthetics.
- A discussion of social and environmental impacts.

Acceptable responses include, but are not limited to:

— Bulkheads have a higher initial price but lower maintenance costs and are a permanent and reliable solution to environmental concerns of shoreline loss. They are set back from the water, so social and recreational activities could continue without the aesthetics being affected.

— Because the community is focused on the social and recreational value of the shoreline, the revetment would be the best aesthetic option to restore the shoreline because it looks natural. The revetment also is the most reliable option and is cheaper to maintain. However, it does not protect against floods and has the highest cost.

— The best solution for Oswego is to install sills because they are not too expensive to construct, have low maintenance, and look more natural than some other options. Sills do not prevent the flooding of businesses but they do slow down water rise while providing habitat for organisms and protecting wetlands.

28 [1] Allow 1 credit for 2.

29 [1] Allow 1 credit for 4.

30 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Random changes in the genes for limb development provided variation for the process of natural selection to act on. Different limb variations will be selected for or against based on the habitat the organism lives in. The mole and the porpoise have similar bone structures, but are both well adapted to their environment. Organisms with beneficial variations will pass them on.

— When the environment changes, those organisms that are better able to survive will reproduce and pass on their genes to the next generation. Over time this would lead to limb development in the population that is well suited to the new environment.

31 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The fins of *Tiktaalik* have both thin bones, like ray-finned fish, and thick bones, like *Acanthostega*.

— *Tiktaalik* has thick bones close to its body with thin bones toward the tips of the pectoral fins.

— Some bone structures of *Tiktaalik* are similar to both the zebrafish and *Acanthostega*.

32 [1] Allow 1 credit for 4.

33 [1] Allow 1 credit for 1.

34 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— According to the model, matter from living organisms is returned to the soil, where it can be used by plants through the process of decomposition.

— Process *C* makes nutrients available to plants when organisms die/eliminate waste.

— When organisms die, bacteria use the matter to carry out their life processes.

— Process *C* releases carbon dioxide into the atmosphere as dead organisms and fertilizer products are broken down.

35 [1] Allow 1 credit for 3.

36 [1] Allow 1 credit for 2.

37 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Since plants absorb 123×10^{15} grams of matter but only emit 60×10^{15} grams of matter overall, they move matter from the atmosphere to the biosphere.

— Plants absorb 60×10^{15} more grams of matter into the biosphere than they release into the atmosphere.

38 [1] Allow 1 credit for 3.

39 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— The claim is valid because the prairie dogs interact with many other species. If the prairie dog population decreased, there would be less food available for black footed ferrets. As the ferrets are already endangered, this could mean the loss of this species and a direct decrease in biodiversity.

— Prairie dog burrows are used by owls/rattlesnakes/insects, so a decrease in prairie dog population would cause a decrease in the number of burrows available. This claim is valid because there would be fewer burrows/homes for many other organisms.

— This claim is supported because without prairie dogs dropping clippings, the soil would be lower in nutrients, which would dramatically alter the ecosystem.

40 [1] Allow 1 credit for 2.

41 [1] Allow 1 credit for 3.

42 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Because burrow dusting is effective at reducing fleas for up to two years, the prairie dogs will be protected from the plague at a lower cost than the vaccine, which fights infection for only nine months.

— Burrow dusting would be the safest method because the insecticide powder is applied to underground burrows, where it should not affect the cattle living on the range.

— Vaccination will be the most reliable method because prairie dogs will seek out the good-tasting tablets. Burrow dusting would be less reliable because workers might miss some burrows.

43 [1] Allow 1 credit for 1.

44 [1] Allow 1 credit for 1.

45 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Unmethylated DNA results in increased transcription of the IGF2 gene. This promotes the production of the growth hormone and increases fetal birth weight.

— More IDF2 is transcribed when DNA is unmethylated, so more growth hormone is made.

46 [1] Allow 1 credit for 2.

47 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

— Smoking can lead to demethylation, which increases cell division and may form tumors.

— Smoking can increase the risk of cancer by demethylating the DNA, causing cells to divide abnormally.

48 [1] Allow 1 credit for 3.

The *Chart for Determining the Final Examination Score for the June 2025 Regents Examination in Life Science: Biology* will be posted on the Department's web site at: https://www.nysed.gov/state-assessment/high-school-regents-examinations no later than June 26, 2025.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to https://www.nysed.gov/state-assessment/teacher-feedback-state-assessments.
2. Click Regents Examinations.
3. Complete the required demographic fields.
4. Select the test title from the Regents Examination dropdown list.
5. Complete each evaluation question and provide comments in the space provided.
6. Click the SUBMIT button at the bottom of the page to submit the completed form.

THE STATE EDUCATION DEPARTMENT

THE UNIVERSITY OF THE STATE OF NEW YORK / ALBANY, NY 12234

June 2025 Life Science: Biology Test Map to the Standards

Question	Type	Points	Performance Expectation
1	Multiple Choice	1	HS-LS2-4
2	Multiple Choice	1	HS-LS2-5
3	Multiple Choice	1	HS-LS1-5
4	Constructed Response	1	HS-LS2-2
5	Constructed Response	1	HS-ESS 2-6
6	Multiple Choice	1	HS-LS1-2
7	Multiple Choice	1	HS-LS4-2
8	Constructed Response	1	HS-LS1-3
9	Multiple Choice	1	HS-LS1-3
10	Multiple Choice	1	HS-LS1-3
11	Multiple Choice	1	HS-LS3-1
12	Multiple Choice	1	HS-LS4-2
13	Multiple Choice	1	HS-LS1-1
14	Multiple Choice	1	HS-LS3-1
15	Constructed Response	1	HS-LS4-1
16	Constructed Response	1	HS-LS1-1
17	Constructed Response	1	HS-LS4-4
18	Multiple Choice	1	HS-LS3-2
19	Multiple Choice	1	HS-LS2-1
20	Constructed Response	1	HS-LS4-4
21	Constructed Response	1	HS-LS2-4
22	Multiple Choice	1	HS-LS2-6
23	Multiple Choice	1	HS-LS2-1
24	Constructed Response	1	HS-LS2-6
25	Multiple Choice	1	HS-ETS1-3
26	Multiple Choice	1	HS-LS2-6
27	Constructed Response	1	HS-ETS1-3
28	Multiple Choice	1	HS-LS4-1
29	Multiple Choice	1	HS-LS4-1
30	Constructed Response	1	HS-LS4-2
31	Constructed Response	1	HS-LS4-1
32	Multiple Choice	1	HS-LS4-2
33	Multiple Choice	1	HS-LS1-7
34	Constructed Response	1	HS-LS2-3
35	Multiple Choice	1	HS-LS1-6
36	Multiple Choice	1	HS-LS1-6
37	Constructed Response	1	HS-ESS2-6
38	Multiple Choice	1	HS-LS2-1
39	Constructed Response	1	HS-LS2-6
40	Multiple Choice	1	HS-LS4-3
41	Multiple Choice	1	HS-LS2-1
42	Constructed Response	1	HS-ETS1-3
43	Multiple Choice	1	HS-LS3-1
44	Multiple Choice	1	HS-LS1-1
45	Constructed Response	1	HS-LS1-1
46	Multiple Choice	1	HS-LS3-2
47	Constructed Response	1	HS-LS1-4
48	Multiple Choice	1	HS-ETS1-2

* This item map identifies the Performance Expectation with which each test question is aligned. All NYSP-12SLS Performance Expectations are three-dimensional (https://www.nysed.gov/sites/default/files/programs/standards-instruction/p-12-science-learning-standards.pdf). The integration of these three dimensions provides students with a context for the content of science (DCI), the methods by which science knowledge is acquired and understood (SEP), and the ways in which the sciences are connected through concepts that have universal meaning across the disciplines (CCC).