

# FOR TEACHERS ONLY

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

## LIFE SCIENCE: BIOLOGY

Thursday, June 18, 2026 — 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 website during the rating period. Check this website 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 *Directions for Scoring Regents Examinations*.

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 website at: <https://www.nysed.gov/state-assessment/high-school-regents-examinations> on the day of the examination. 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.

The test item map on page 11 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).

1 [1] Allow 1 credit for 3.

2 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- As environmental temperature decreases, the body temperature of hibernating animals decreases. This results in a slowdown of metabolic activity such as heart rate. For example, in squirrels the heart rate decreases from 250 bpm to 5 bpm. The heart rate would return back to normal in the spring.
- In bears, the breathing rate drops from eight breaths per minute to less than one breath per minute as the environmental temperature decreases. It would return back to normal as the temperature increases.
- Metabolic activities, such as breathing and heart rate, decrease in squirrels and bears as their body temperature decreases during winter.

3 [1] Allow 1 credit for 3.

4 [1] Allow 1 credit for 2.

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

- Bats have a 45% reduction in white blood cells when hibernating. But when they wake up periodically, the white blood cell count increases; this will protect them from infection. Therefore, they are more likely to survive and reproduce.
- Bats that awaken are better able to fight off the fungus because their white blood cell count increases, making them more likely to survive and reproduce.

6 [1] Allow 1 credit for 3.

7 [1] Allow 1 credit for 1.

8 [1] Allow 1 credit for selecting *Valid* and including evidence as support. Acceptable responses include, but are not limited to:

- As the density of algae increases beyond  $12\text{--}13 \text{ cells/mL} \times 10^6$  due to agricultural runoff, the dissolved oxygen levels decrease. This will decrease the number of consumers that can be supported in the freshwater food web.
- An increase in nitrogen above 144 mg/L would cause a harmful algae bloom, resulting in lower oxygen levels. This could cause a decrease in the number of animals.
- Agricultural runoff results in algae blooms, decreasing dissolved oxygen. This would result in a decrease in large fish that require large amounts of oxygen for survival.

**Note:** Allow credit if a symbol other than a check mark is used.

9 [1] Allow 1 credit for 1.

**10** [1] Allow 1 credit for 3.

**11** [1] Allow 1 credit for 3.

**12** [1] Allow 1 credit for 2.

**13** [1] Allow 1 credit for 4.

**14** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Some roe deer that were less affected by the radiation survived and reproduced, passing on their traits to their offspring. The population was able to increase in number due to their increased survival. Over time, a greater number of deer will display the traits that helped them survive.
- Some roe deer may have had traits that made them better suited to surviving radiation exposure. They reproduced and passed the beneficial traits on to offspring, causing the population to recover. By 1996, more of the roe deer population should carry the alleles for this trait.
- The radiation may have caused a mutation that was beneficial to the roe deer and increased their probability of survival. These deer were then able to reproduce and pass this trait to their offspring. This trait would then become more prevalent in the population in the years following the appearance of the trait.

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

- When the level of progesterone increases, the uterine lining begins to get thicker.
- When the LH/FSH level in the blood peaks, ovulation occurs, releasing an egg from the ovary that can be fertilized.

**16** [1] Allow 1 credit for 2.

**17** [1] Allow 1 credit for 3.

18 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

| Constraint  | Trade-off | Reason Why Plan 1 Medication                                              | Reason Why Plan 2 Lifestyle                                                                                       |
|-------------|-----------|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Cost        | Pro       | — May be covered by insurance, so it is not expensive                     | — Individual can decide how much to spend on food/gym<br>— Walking is free                                        |
| Cost        | Con       | — Some medications may not be covered by insurance, so they are expensive | — Gym membership is expensive<br>— A healthy diet can increase grocery cost<br>— Seeing a dietician can be costly |
| Safety      | Pro       | — Medications have been tested for safety                                 | — Individual can manage intensity of exercise/diet                                                                |
| Safety      | Con       | — Medications may have side effects or cause allergic reaction            | — Possibility of injury                                                                                           |
| Reliability | Pro       | — Medications have been tested to ensure that they work as expected       | — Individual has full ownership of their actions<br>— Does not rely on outside organizations                      |
| Reliability | Con       | — Individuals might miss a dose of medication                             | — Individual must be consistent for changes to be effective                                                       |

**Note:** Students can use the same constraint for both a pro and a con.

19 [1] Allow 1 credit for 2.

20 [1] Allow 1 credit for 3.

21 [1] Allow 1 credit for 3.

22 [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Offspring produced by crossing the  $TBXT^{-6}/TBXT^{+}$  mice inherited the no-tail/short-tail trait.
- Sixty-three of the 98 mice born inherited a copy of the genetically engineered  $TBXT^{-6}$  gene from the parental generation.
- No  $TBXT^{-6}/TBXT^{-6}$  offspring survived when the hybrid mice were crossed.

23 [1] Allow 1 credit for 2.

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

- Carbon dioxide levels were much higher in the Carboniferous Period, making the carrying capacity greater than today. The relative CO<sub>2</sub> amount is 3 in the Carboniferous Period and nearly 1 today.
- During the Carboniferous Period, the increased levels of CO<sub>2</sub> increased the carrying capacity by allowing more plants to photosynthesize and produce more biomass.
- The carrying capacity for plants was higher because there was more CO<sub>2</sub> available to the plants for photosynthesis at that time than there is today.

**25** [1] Allow 1 credit for 4.

**26** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The carbon cycle would remain relatively stable without human actions. Combustion adds an extra 6.3 billion tons of carbon per year to the atmosphere that is not absorbed into the other spheres, including the hydrosphere.
- With humans adding 1.6 billion tons of carbon to the atmosphere from land use per year and combusting 6.3 billion tons per year, the amount of carbon being released from human actions and added to the atmosphere is much greater than can be absorbed by the other processes and the hydrosphere.
- As human activity releases more carbon into the atmosphere, the ocean may absorb even more carbon than it is releasing.

**27** [1] Allow 1 credit for 1.

**28** [1] Allow 1 credit for 2.

**29** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- The queen can mate with many different drones, which increases the number of possible combinations of genetic material in the offspring. Those offspring with advantageous gene combinations will better survive and reproduce, resulting in the evolution of the bees.
- The queen is important because she lays plenty of eggs, fertilized with genetic material from different drones, which increases genetic variation in the offspring. These different offspring may be able to better compete for limited resources in their environment.
- Since honeybees reproduce sexually, genetic variation is increased. This can provide traits that allow the bees to survive at a greater rate.

**30** [1] Allow 1 credit for 1.

31 [1] Allow 1 credit for 4.

32 [1] Allow 1 credit for identifying either Effective or Not Effective and an acceptable supporting explanation. Acceptable responses include, but are not limited to:

**Effective:**

- It is an effective solution because bees can be safely transported at a reasonable cost with minimal impact to the environment of the crops. These crops are needed for humans, so transporting bees to increase pollination is definitely worth the benefits to make the food available.
- There are trade-offs to be considered. While there may be many bees that die, and it may cost a great deal for the bees to be transported great distances, this process can be done safely. This process could be considered effective because it can produce a great deal of food, benefiting the environment and humanity.

**Not Effective:**

- The solution of transporting bees is not very effective because it can be very costly to move all of the bees, many of the bees die, and the environment can be disrupted by too many bees being released at once. Although bees can be transported safely, and they are reliable for pollinating the crops, the costs outweigh the benefits for this process.

**Note:** Allow credit if a symbol other than a check mark is used.

33 [1] Allow 1 credit for an acceptable evidence. Acceptable responses include, but are not limited to:

- As the tapir population decreases, it does not spread the seeds of the plants it eats, decreasing the number of plants. This decreases the amount of photosynthesis that could occur, increasing the amount of CO<sub>2</sub> in the ecosystem/atmosphere.
- The tapir population correlates to the tree population. As the tapir population decreases, the tree population would also decrease. Less photosynthesis occurs, which would increase the amount of CO<sub>2</sub> in the atmosphere.
- The tapir disperses 9822 seeds per hectare in degraded areas, and that is more than in undisturbed areas, so their decline would greatly reduce tree regeneration and increase CO<sub>2</sub> levels.

34 [1] Allow 1 credit for 3.

35 [1] Allow 1 credit for 4.

- 36** [1] Allow 1 credit for an acceptable evidence. Acceptable responses include, but are not limited to:
- The claim is valid. Based on the graph, the tapir population is declining. Jaguars would eat more caiman, cacomistle, and howler monkeys, so their numbers would decline.
  - I agree with this claim because the tapir population has decreased, causing a disruption in ecosystem stability. The number of caiman living in the rainforest would decrease because less food (tapirs) would be available to them, causing ecosystem instability.
- 37** [1] Allow 1 credit for 2.
- 38** [1] Allow 1 credit for 2.
- 39** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The order of DNA bases determines the shape of the receptor protein. The receptor protein shape is specific to adenosine, so when adenosine attaches, the neuron responds with an effect/sleepiness.
  - The order of bases in the *ADORA2A* gene determines the shape of the protein receptor, allowing adenosine to bind there. Caffeine can also attach to the receptor because it is shaped like adenosine. This blocks adenosine from affecting the neuron, preventing the person from becoming sleepy.
  - The DNA sequence is transcribed into an mRNA molecule that is translated into a sequence of amino acids in a specific order. The resulting receptor protein will have a shape specific to adenosine, allowing adenosine/caffeine to bind.
- 40** [1] Allow 1 credit for 3.
- 41** [1] Allow 1 credit for 2.
- 42** [1] Allow 1 credit for 1.
- 43** [1] Allow 1 credit for 4.
- 44** [1] Allow 1 credit. Acceptable responses include, but are not limited to:
- The modern-day koala has a more abundant supply of eucalyptus leaves than the giant koala had available in their different environments. Since the giant koalas had less food available, they were not able to survive.
  - The giant koala had a larger body size than the modern-day koala and needed more food to survive and reproduce, which was limited when the climate became more dry.



**45** [1] Allow 1 credit for 3.

**46** [1] Allow 1 credit for 2.

**47** [1] Allow 1 credit for 1.

**48** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Remediation of the lake reduced the mercury levels below .3 ppm in prey species such as the pumpkinseed. This provides more food for predators such as smallmouth, increasing their population.
- As the mercury levels in the banded killifish decrease as a result of the remediation, their population would likely increase. This could lead to an increase in the walleye population, as they are predators of the banded killifish.

**49** [1] Allow 1 credit. Acceptable responses include, but are not limited to:

- Solution 1 – Although distributing flyers may not reach all fishermen, it would reach some and they might be warned to stop eating the fish. There would need to be staff to pass out the flyers, so this would not be the least expensive alternative.
- Solution 2 – This would require the least staff, and the signs would last for a good period of time without maintenance. This alternative may not reach as many people. However, anyone launching a boat could read it.
- Solution 3 – This would be the most effective as the law enforcement official would actually be talking to the fishermen and providing information. This could cost much more as there would need to be staff/law enforcement on duty for long periods of time.

**The *Chart for Determining the Final Examination Score for the June 2026 Regents Examination in Life Science: Biology* will be posted on the Department's website at: <https://www.nysed.gov/state-assessment/high-school-regents-examinations> no later than on the day of the examination. Conversion charts provided for previous administrations of the Regents Examination in Life Science: Biology must NOT be used to determine students' final scores for this administration.**

### **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 2026 Life Science: Biology Test Item Map to the Standards

| Question | Type                 | Points | Performance Expectation |
|----------|----------------------|--------|-------------------------|
| 1        | Multiple Choice      | 1      | HS-LS1-2                |
| 2        | Constructed Response | 1      | HS-LS1-3                |
| 3        | Multiple Choice      | 1      | HS-LS1-7                |
| 4        | Multiple Choice      | 1      | HS-LS1-3                |
| 5        | Constructed Response | 1      | HS-LS4-2                |
| 6        | Multiple Choice      | 1      | HS-LS2-2                |
| 7        | Multiple Choice      | 1      | HS-LS2-1                |
| 8        | Constructed Response | 1      | HS-LS2-6                |
| 9        | Multiple Choice      | 1      | HS-ETS1-3               |
| 10       | Multiple Choice      | 1      | HS-LS3-1                |
| 11       | Multiple Choice      | 1      | HS-LS4-2                |
| 12       | Multiple Choice      | 1      | HS-LS4-4                |
| 13       | Multiple Choice      | 1      | HS-LS2-6                |
| 14       | Constructed Response | 1      | HS-LS4-4                |
| 15       | Constructed Response | 1      | HS-LS1-8                |
| 16       | Multiple Choice      | 1      | HS-LS1-3                |
| 17       | Multiple Choice      | 1      | HS-LS1-8                |
| 18       | Constructed Response | 1      | HS-ETS1-3               |
| 19       | Multiple Choice      | 1      | HS-LS4-1                |
| 20       | Multiple Choice      | 1      | HS-LS1-1                |
| 21       | Multiple Choice      | 1      | HS-LS3-1                |
| 22       | Constructed Response | 1      | HS-LS3-2                |
| 23       | Multiple Choice      | 1      | HS-LS2-5                |
| 24       | Constructed Response | 1      | HS-LS2-1                |
| 25       | Multiple Choice      | 1      | HS-ESS2-7               |
| 26       | Constructed Response | 1      | HS-ESS2-6               |
| 27       | Multiple Choice      | 1      | HS-ETS1-1               |
| 28       | Multiple Choice      | 1      | HS-LS2-3                |
| 29       | Constructed Response | 1      | HS-LS4-2                |
| 30       | Multiple Choice      | 1      | HS-LS2-8                |
| 31       | Multiple Choice      | 1      | HS-LS4-5                |
| 32       | Constructed Response | 1      | HS-ETS1-3               |
| 33       | Constructed Response | 1      | HS-LS2-3                |
| 34       | Multiple Choice      | 1      | HS-LS2-7                |
| 35       | Multiple Choice      | 1      | HS-LS2-4                |
| 36       | Constructed Response | 1      | HS-LS2-6                |
| 37       | Multiple Choice      | 1      | HS-LS2-3                |
| 38       | Multiple Choice      | 1      | HS-LS1-2                |
| 39       | Constructed Response | 1      | HS-LS1-1                |
| 40       | Multiple Choice      | 1      | HS-LS3-2                |
| 41       | Multiple Choice      | 1      | HS-LS3-1                |
| 42       | Multiple Choice      | 1      | HS-LS4-1                |
| 43       | Multiple Choice      | 1      | HS-LS4-5                |
| 44       | Constructed Response | 1      | HS-LS4-2                |
| 45       | Multiple Choice      | 1      | HS-LS4-4                |
| 46       | Multiple Choice      | 1      | HS-LS2-7                |
| 47       | Multiple Choice      | 1      | HS-LS2-2                |
| 48       | Constructed Response | 1      | HS-LS2-1                |
| 49       | Constructed Response | 1      | HS-LS2-7                |