Kingdoms and Classification
Answer Key: Grades 7–8 Lesson Extensions

Notes:

- This answer key should be used as a guide for basic responses to the questions and instructions found in the grades 7–8 lesson extensions. The child should be encouraged to make his or her science journal tidy, beautiful, and exceptionally well done.
- Encourage the child to write his or her answers in his or her own words, with definitions being a possible exception.
- There is one type of answer provided in this answer key:

  Sample answers: Most questions are open-ended, so the child's answers will not match the provided text exactly or include everything provided in the sample answer. However, some answers should match more closely (for example, vocabulary word definitions, copied charts, etc.).

Lesson 1

2. With the help of DNA, scientists are better able to classify animals. Write two or three sentences explaining to someone who hasn't studied DNA and classification why it is important to distinguish differences between animals.

Sample answer:

It is important to use DNA sequencing to distinguish the differences between animals because it helps with the preservation of certain threatened species. There may be times when classifications of animals are so vastly different that they are unable to mate with one another.

Lesson 2

2. In your own words, list the two differences between a scanning electron microscope and a transmission electron microscope. Then write two sentences to explain one application of electron microscopes.

Sample answer:

A transmission electron microscope shoots beams through specimens, whereas a scanning electron microscope shoots beams onto the surface of the specimen. A transmission electron microscope is used to view the inside of a specimen, providing a black-and-white image, while a scanning electron microscope takes a detailed 3D color image.

These microscopes can be used to create synthetic materials such as Kevlar®.[1] They can also be used to see the surface or inside of bacteria and viruses to create medicines to prevent or treat disease.

Lesson 3

2. Imagine you are a taxonomist who studies amphibians. Create an hourly schedule for your day starting at 8:00 AM and ending at 5:00 PM.

Sample answer:

8:00 AM–9:00 AM Select amphibian from storage.

9:00 AM–10:00 AM Study the amphibian's external physical appearance and make notes.

10:00 AM–11:00 AM Study the internal anatomy.

11:00 AM–12:00 PM Draw samples for DNA analysis and microscope analysis. Run DNA sequencing to check later.

12:00 PM–1:00 PM Lunch break

1 DuPont™ and Kevlar® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company.

1:00 PM–2:00 PM Check sample on microscope and compare to existing species.

2:00 PM–3:00 PM Record all findings and review.

3:00 PM–4:00 PM If DNA results are back, review them and determine if the species is existing or discovered.

4:00 PM–5:00 PM Using all data collected, determine where the species is from.

Lesson 4

2. Imagine you are a scientist wanting to discover new tardigrade survival skills. Write a paragraph about what type of test you would complete and a paragraph about how the results might benefit humanity. For example, if tardigrades are fire-resistant, how could that potentially benefit firefighters?

Sample answer:

We would first need to study what is causing a tardigrade to be fire-resistant. If it is a protein, we could apply that protein to human cells and test whether humans have a higher tolerance to external heat. The simulation would reach the heat of a building that is burning down to determine how helpful the protein would be to firefighters.

Assuming the protein provides the necessary protection, humans would benefit greatly, as the firefighters would be better protected while doing their jobs. This added protection would allow them to enter a building with less or thinner gear, giving them more flexibility and stamina. This would allow them to be more effective and efficient in a live-fire situation, possibly leading to saving more lives.

Lesson 5

2. Scientists believe one reason algal blooms have increased is the runoff of agricultural fertilizers into oceans. Write a paragraph with 3–4 sentences about something you could do to prevent or correct this problem.

Sample answer:

Education and prevention can lead to reducing the fertilizer runoff into the oceans. Informing farmers that runoff is causing a problem in the oceans or lakes is a good step to help reduce the issue. Farmers can use technology to allow them to produce similar amounts of crops with less fertilizer.

Lesson 6

2. Describe each of the four steps in the antibiotic discovery process by writing one or two sentences about each step. In your own words, write a sentence about how antibiotics are used.

Sample answer:

Step 1: Discovery—Researchers study various compounds to test their reactions to harmful bacteria.

Step 2: Development—Once an antibiotic is found, it is made in large quantities.

Step 3: Treatment—People who are sick with harmful bacteria take the antibiotic in either pill or liquid form.

Step 4: Response—The antibiotics travel through the body and help the immune system fight off the bacteria.

Antibiotics are used to help our bodies fight off harmful bacteria that are inside our bodies.

Lesson 7

2. We learned that forest fires are beneficial to environments. With these reasons in mind, list three ways you think volcanic eruptions are beneficial to environments.

Sample answer:

Volcanic eruptions are beneficial to environments because they produce fertile soil. This is great for farming and crops. Volcanic eruptions create flourishing habitats for animals, plants, and insects.

Lesson 8

2. Think about a natural environment near your home, whether it is a pond, mountain, lake, ocean, or field. List three organisms living in that environment and one way that they are all connected. What keystone species could exist in this environment?

Sample answer:

At a nearby park, there are bees, flowers, and trees. The bees consume nectar from the flowers and build nests in the trees. Flowers are a keystone species in this environment because without them this ecosystem would not survive.

Lesson 9

2. Imagine you are a scientist studying bioluminescence. Write a paragraph about what you hope to achieve with bioluminescence and how it could benefit mankind. Include two sentences on how you will conduct your research—working in a lab, diving deep into the ocean, etc.

Sample answer:

Bioluminescence could be used in streetlights to help pedestrians, as well as drivers, see at night. The blue color would be most effective since blue light is the easiest to see at long distances. This would mean fewer streetlights would be needed. I would research and run tests on bioluminescence in my lab first. Then I would run tests with actual streetlights.

Lesson 10

2. Today you get to create the fastest animal in the world. Draw a picture of your animal and be sure to include the factors that make animals fast. Write a description of your animal in 1–2 sentences and include how fast you think your animal would go.

Sample answer:

Winged animals are typically fast because air offers less resistance and sometimes even an advantage in the form of wind currents. Body shape and strength are other factors that make animals fast. My animal has huge wings and a muscular body. I think my animal could travel at 200 miles per hour!