Cross-Curricular Activities Connected to Life Science, Grade 4

The following activities from ***Plant and Animal Structures,*** integrate math, social studies, English Language Arts (ELA), art, and more into life science topics. These cross-curricular connections help students see how science is related to their lives, and the world they live in. These activities reinforce and extend ideas about internal and external structures of organisms and the conditions in which they function effectively and are perfect for learning-from-home lesson plans. Permission is granted to incorporate these activities into teacher and parent lesson plans.

Adaptation Math (Math)

Challenge students to create an equation for each of the word problems below, using a symbol for the unknown number. Have students solve one another's equations.

1. A cactus has spines to protect it from being eaten by desert animals, but the spines also allow the cactus to retain water in an environment with very little rainfall. If there are 32 cacti in a desert with 198 spines each, how many spines are there in all?

2. Migration is a behavior in which animals move from one environment to another during seasonal changes. Hummingbirds migrate south every year over a four-week period. If hummingbirds travel 32 kilometers per day, how many kilometers do they travel in total to get to their destination?

Adaptations Myths (Literacy)

Read one of the following fictional explanations for naturally occurring structures or behaviors. Have students determine an adaptive reason for the body structure or behavior addressed in the fable. (All stories can be found online.)

- "Why Raven's Beak Is Curved": This Native American story explains one version of how the raven's beak became curved.
- "Why the Possum's Tail Is Bare": This Native American story explains one version of why the opossum does not have a furry tail.
- "Narcissus": This Greek myth explain why the narcissus flower grows near water.

Animals by Design (Art and ELA)

Ask students to design an animal with special adaptations to help it survive. They should draw their imaginary animal and label at least two adaptations that help the animal survive in its environment. They should then draw and label a map of where the animal is from. Finally, students should name the animal and write a fable about it.

Animal Discovery (ELA)

Have students research a squid or an animal of their choosing using online resources and write a brief report of their findings. Some topics to have students consider during their research include:

- The group the animal belongs to
- The types of food it eats and whether this makes it an herbivore, omnivore, or carnivore
- The habitat and location(s) throughout the world in which it can be found
- The external structures it has to help it survive in the wild
- The internal structures it has to help it survive in the wild
- Its potential predators

Virtual Frog Dissection (Science)

To strengthen understanding of both external and internal adaptations, search for a website that demonstrates a frog dissection. The website should allow students to virtually explore the external structures and eight organ systems inside the frog. Have students make notes in their science notebooks during their exploration, and then discuss their findings as a class. Ask students to explain what would happen if any of the frog's organ systems suddenly stopped working.

Creature Features (ELA)

As a class, read Creature Features by Steve Jenkins and Robin Page. Each page includes a statement about an external structure of a unique animal. Read the statement aloud and challenge students to predict what they think the animal uses that particular structure for. Then read the rest of the information on the page and allow students to see if their predictions were correct. Afterward, allow time for students to research other unique external structures that members of the animal kingdom have and to present their findings to the class.

Giving Back with Organ Donation (Social Studies)

Explain to students that some illnesses and disease require a person to receive an organ transplant. Organ donation is an important treatment option that saves thousands of lives every year. The most common transplantations include the kidneys, heart, liver, pancreas, intestines, lungs, bones, bone marrow, skin, and corneas. Typically, a persons' organs are donated upon their death, but living donors can provide transplantable organs, too. Discuss organ donation, and help students make connections to the importance of being healthy. Challenge them to think about how injuries, poor diet, and illness can affect their organs and what they can do to improve their internal and external body systems. Share videos or local news stories to support your discussion. You might assign a Science in the News Article (see Appendix B) to prompt your discussion.

From Root to Tip (Math)

Ask students to measure the height of the radish plant they have been growing. Collect height data from the entire class and have students use it to create a line plot. Challenge students to use the line plot to answer the following questions:

- What is the difference in height between the tallest plant and the shortest plant in the classroom?
- Which height is the most common?
- What is the difference in height between your plant and the plant of the person sitting next to you?

The Giving Tree (Literacy and Science)

Read *The Giving Tree* by Shel Silverstein. Compare the parts of a tree with the parts of a flower. Are these parts considered internal or external structures?

Seeds Galore (Math)

Challenge students to solve the following word problem: One sunflower plant can produce thousands of seeds. A farmer has a row of 56 sunflower heads. About how many seeds can his garden produce if each sunflower head can produce more than 1,056 seeds? (More than 59,000 seeds)

Nature Walk (Movement Education and Science)

Take students outside to engage their senses. Lead them on a sensory walk around the school or sit on the grass and have them describe what they see, smell, hear, and feel. Have them record their observations in their science notebooks, and then invite them to share those observations when they return to the classroom.

Reading the Senses (ELA)

To dive further into the five senses and how the human body responds, read Time for Kids: The Five Senses by Jennifer Prior. The book covers the five senses and many of the internal and external structures involved with processing the world around us. After reading, have students create skits and act out how information from our senses is sent to our brains for processing and how we are able to respond.

Musical Math (Math and Music)

Play some instrumental music for the class. Consider classical music, scores from movie soundtracks, and orchestra music. Have students close their eyes as you play a song for them. Have them record all the instruments they think they can hear during the song. Discuss their ideas as a class. Tally the number of students who thought they heard each different instrument. Make a chart of this data on the board. Challenge students to express the data using fractions. For example, students could create a fraction that represents how many students heard a violin during the song. After making a few fractions, challenge students to add or subtract the fractions. For example:

- 16/24 students thought a violin was played
- 8/24 students thought a flute was being played
- (16/24 – 8/24 = 8/24), which can be reduced to 1/3 of the class thought they heard a violin.

Allow time for students to create and solve their own fraction problems using the class data.

Lenses Magnify (Science)

Pass around the dried lens from a dissected cow eye. Have students place the lens over printed text and look through it. (The lens magnifies the letters, making them appear larger.) Explain that the lens in an animal's eye is a convex lens. This means the lens bubbles out in the middle, and when light shines through it, all the rays bend inward and focus in on a single point. Explain that when a convex lens is by itself, it has the ability to magnify objects. Hand lenses, magnifying glasses, microscopes, and telescopes are all made with convex lenses. Because the convex lens in our eye is so far away from the retina, the image isn't magnified. Rather, the light becomes focused on the back of the eye, allowing us to see the world around us.

Animal Eyes (Literacy)

As a class, read Eye to Eye: How Animals See the World by Steve Jenkins to explore the diversity of eyes in the animal kingdom. Have students look at the differences in pupil shape, size, and placement within the eye, and discuss why they may be designed that way.

Eye Researched This! (ELA)

Have students research eyes of the animal kingdom. Examples of research topics include the difference between diurnal and nocturnal eyes, compound and simple eyes, and any other interesting eye adaptations. Some animals to focus on include cats, owls, cuttlefish, mantis shrimp, bees, butterflies, chameleons, and jumping spiders. Students should write a summary of their findings and include an illustration of the eye(s) they researched. Have students present their findings to the class.

Eye Measurements (Math)

Provide students with the average circumference of the animal eyes listed in bold below. Direct students to make a table in their science notebooks like the one below, and enter the information provided. Challenge them to convert each measurement into the other metric forms in the chart. Choose a couple of measurements from the table, and have students write an expression to show whether those measurements are greater than, less than, or equal to each other.

Eye	mm	cm	km
Human	24	2.4	0.000024
Coyote	14	1.4	0.000014
Ostrich	50	5	0.00005
Colossal Squid	270	27	0.00027
Rattlesnake	8	0.8	0.000008
Moose	40	4	0.0004

Sample Expressions:

24 mm < 4 cm

0.00027 km > 24 mm

Lenses and Eyesight (ELA)

Have all students in the class research nearsightedness and farsightedness. How do artificial lenses from glasses work with the natural lenses in our eyes to correct imperfect vision? How do contact lenses work? Students should record their findings in their science notebooks. Discuss students' findings as a class.

Eye Disorder vs. Eye Disease (ELA)

Have students research eye disorders or diseases common to humans. Topics to research include color blindness, astigmatism, conjunctivitis (pink eye), allergic conjunctivitis, cataract, and dry eyes. Have students record their findings in their science notebooks and write a one-page report on their findings. Students should present their findings about the disorder or disease they researched to the class.

In Your Line of Sight (Math)

Enlarge Figure 5.1 and make a copy of this enlargement for each student. Challenge students to identify any parallel lines, perpendicular lines, line segments, rays, and types of angles (obtuse, right, and acute) in the diagram. Direct them to record on the diagram what geometric properties are being expressed by the light as it passes from an object into our eyes.