

## Plant and Animal Structures Lesson 1: *The Solve* Educator's Resource Guide

### Objective

In *The Solve*, students will:

1. Solve a mystery that demonstrates structures and functions of both the Acacia tree and the giraffe and how these are used for survival.
2. Create a Mind Map to explore relationships among complex plant and animal structure vocabulary.
3. Communicate understanding that plants and animals have unique structures that help them in survival, growth, behavior, and reproduction.
4. Communicate understanding that animals and plants are interconnected and rely on one another for survival.

**Time Required:** 40-75 minutes

Materials Required	Safety Considerations	Science & Engineering Practices
<ul style="list-style-type: none"> <li>● Student Guide (<i>includes student agenda and vocabulary handout</i>)</li> <li>● Plant &amp; Animal Structures Comic</li> <li>● Scissors</li> <li>● Glue or tape</li> </ul>	None	<ul style="list-style-type: none"> <li>● Developing and using models</li> <li>● Constructing explanations or arguments from evidence</li> </ul>

### Episode Description

Giraffes are troubled in the African savanna. People want to remove giraffes from the savanna because they believe that the giraffes are killing the Acacia trees!

Mosa and her crew are called to the scene to help. Mosa studies the structures of both the giraffes and Acacia trees in order to understand how each species survives. Mosa soon discovers that the giraffes and Acacia trees have an important relationship: they both help one another survive! Giraffes use the Acacia tree for food, but the Acacia tree uses giraffes to help them spread their seeds and reproduce!



## **Inquiry Scale: Leveling Information**

*The Solve* can be completed in various settings, including presentation-style, small groups, or individually. In the case of a flipped or blended classroom, it can be completed entirely at home.

### **Level 1: Most teacher-driven** (*recommended for grades 4–5*)

View the animated mystery twice: once in full, and a second time along with the discussion questions, pausing the video as needed to answer the episode questions as a group. Project and complete the Mind Map as a class-wide activity. This can be done digitally or on paper. Have students informally quiz each other on the vocabulary until you feel they're familiar with the terms. Use the discussion questions at the bottom of the Mind Map to have a group discussion. Finally, have students complete the quiz digitally or on paper as an exit ticket.

### **Level 2** (*recommended for grades 5–6*)

View the animated mystery in full. Afterwards, have students work through the episode questions to the best of their ability in small groups. Play the mystery a second time, pausing the video to discuss each question. Direct students to complete the Mind Map in small groups, either digitally or on paper. Come back as a class to review correct answers, as needed. Have students informally quiz each other on the vocabulary until you feel they're familiar with the terms. Use the discussion questions at the bottom of the Mind Map to have a group discussion. Finally, have students complete the quiz digitally or on paper as an exit ticket.

### **Level 3** (*recommended for grades 6–7*)

Provide students with their student URL and have students view the animated mystery in small groups. Have students play the animated mystery once in full and then answer episode questions in their table groups to the best of their ability. Then, as a class, project the mystery, pausing, as needed, to discuss episode questions in a think-pair-share format. Have students complete the Mind Map in table groups, either digitally or on paper. Have students quiz each other on the vocabulary until you feel they're familiar with the terms. In table groups, have students go through the discussion questions on their own, and review answers as a class. Finally, have students complete the quiz digitally or on paper as an exit ticket.

### **Level 4** (*recommended for grades 7–8*)

Provide students with their student URL and have students view the animated mystery and complete episode questions in pairs. Have students review their answers with a neighboring table group. Have students complete the Mind Map in pairs, either digitally or on paper. Have students quiz each other on the vocabulary until they feel they're familiar with the terms. Have these same pairs go through the discussion questions. Finally, have students complete the quiz digitally or on paper as an exit ticket.

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## Agenda

### I. Solve the Plant & Animal Structures Mosa Mack Mystery (20 minutes)

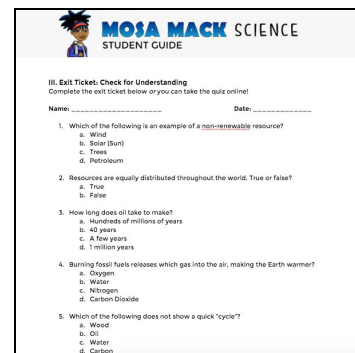
Differentiation Tip: The comic book and motion comic video can be read/watched as a class, in small groups, individually, or completed for homework. For additional support, students can read or watch the comic/episode twice: once before completing the questions, and once with teacher guidance, pausing to discuss each answer.



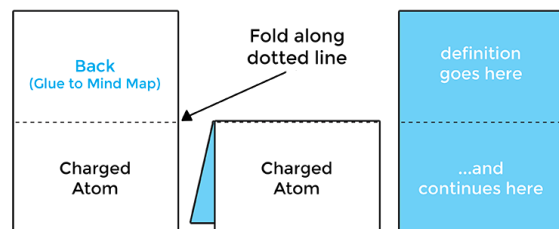
1. Read/watch the Mosa Mack Mystery on Plant & Animal Structures.
2. Students answer the questions in their Student Guide as they read/watch. Encourage students to cite the specific page numbers/time codes in the Comic Mystery to promote writing with supporting evidence. Answers can be found in the key below.

### II. Vocabulary Mind Map Activity (15–45 minutes)

Differentiation Tip: The Mind Map can be done as a class, in small groups, individually, or completed for homework.



1. Students may complete the Mind Map **digitally**. Follow directions below. (15 minutes)
  - a. Go to <https://mosamack.com/home/plant-animal-structure>
  - b. Select **Lesson 1: The Solve**.
  - c. Select **Vocabulary** and complete **Part 1**: matching terms with definitions.
  - d. Complete **Part 2**: matching terms and definitions with images on a diagram.
2. To complete the Mind Map **on paper**, follow the directions below (45 minutes).
  - a. Print and pass out the Student Guide: Plant & Animal Structures Lesson 1: *The Solve*.
  - b. Introduce the warm up task: students will be making a Mind Map of the vocabulary for this Plant & Animal Structures unit.
  - c. Model the directions carefully, emphasizing the following. Students should:
    - **cut** out the vocabulary cards on the solid lines only
    - **fold** the cards at the dotted lines
    - write the definition of the term on the inside of the card using definitions provided



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- d. Students use the clues from the Mind Map images, definitions, and terms to place the cards in the correct location in the Mind Map.
- e. Check that the students have matched their cards correctly before moving on.
- f. Students use glue or double-sided tape to connect the back of the vocabulary card to the correct place on the Mind Map.
- g. Students discuss the questions with their group or as a class when they have completed the Mind Map.

## Teacher Tips:

- Since this is the first time many of the students will have seen these vocabulary terms, have students work together to use the images, definitions, and collaborative thinking to figure out where the terms go.
- Check in on student groups through this process. When you see a student or group who has placed a card in the correct place, ask a facilitating question such as, “Why do you think that term goes there?” or “What evidence leads you to believe that term goes there?” When students explain their thinking, this is a great opportunity to provide positive reinforcement. Then, encourage students to share their reasoning to the class or to other groups who may have trouble identifying the location of that specific term.
- If you do not have access to a color printer, provide students with black and white copies and project the colored version of the Mind Map at the front of the room so that students can reference both images.

## III. Exit Ticket: Check for Understanding (10–15 minutes)

**Differentiation Tip:** This can be done in groups, pairs, individually, or more formally as a quiz online.

1. Students complete the exit ticket to check for understanding. This can be done online by selecting the **Quiz** button in Lesson 1 or on paper in the Student Guide. Answers are in the key below.

## Answer Key

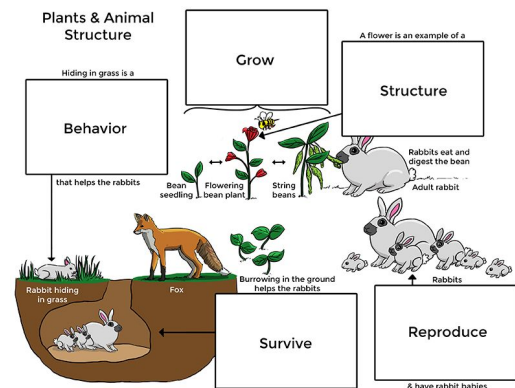
### Mind Map Discussion Questions

- a. Identify two plant structures that help a bean plant survive.

*Structures observed in this bean plant diagram that help the plant survive could include the stem to help support the plant, the leaves to capture sunlight for photosynthesis, the flower to attract insects for pollination, or the bean pods to attract animals in order to eat the “fruit” and help spread the bean seeds.*

- b. What are two behaviors that can help rabbits survive a fox attack?

*Rabbits can burrow underground in order to escape from a fox, or they can lie low and very still in the grass, thus blending in with the environment.*



### Episode Question

- Why is the council representative trying to move the giraffes? (page 1)  
*The council representative is trying to move the giraffes because she believes that the giraffes are killing the Acacia trees on the savanna.*
- Why does the council representative believe that the giraffes are killing the trees? (page 2) *The council representative believes that the giraffes are killing the Acacia trees by using their structures (long neck, long legs, muscular tongues) to devour the trees.*
- Which parts of its body does the giraffe use to eat the Acacia trees? (page 2)  
*The giraffe uses its long legs and neck to reach the leaves on the top of the Acacia trees, its bendy, muscular tongue to sneak around the tree thorns in order to reach the leaves of the Acacia tree, and its four-chambered stomach to contract and expand to digest the leaves.*
- How does the Acacia tree get water? (page 5)  
*Acacia trees have long roots that extend deep into the soil in search of water. The roots are covered with root hairs that absorb water and carry water up to the rest of the plant.*
- Explain how the leaves of the Acacia tree help the tree to survive. (page 6)  
*Leaves of the Acacia tree are flat so that sunlight can hit the surface of the leaf. The leaf absorbs sunlight in order for the plant to produce food.*
- What structures on the Acacia tree help protect it from other animals? (page 7)  
*Acacia trees use thorns for protection. The thorns are long, spiky, and sharp, which keeps predators from eating the Acacia.*
- Explain how a giraffe’s tongue helps it to successfully feed from the Acacia tree. (pages 2 and 9) *Giraffes have long, bendy muscular tongues that can reach around the thorns of the Acacia in order to reach the leaves.*
- Mosa and her crew observed black specks inside the giraffe’s stomach. What were these black specks? (page 10)  
*The black specks inside the giraffe’s stomach were Acacia seeds. When the giraffe eats the seed pod, the giraffe digests the pod, but not the seeds.*

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9. What did Mosa figure out? How do giraffes help the Acacia tree survive? (pages 10 and 11) *After studying the giraffe's digestive system, Mosa learned that the giraffes do not digest the seeds of the Acacia tree. Instead, the seeds move through the digestive tract and are released in the solid waste of the giraffe. Once released, the seeds can then grow into a new Acacia tree. Giraffes help the Acacia tree to reproduce and spread its seeds!*

## Quiz:

- All living things have structures that help them:
  - Reproduce
  - Grow
  - Survive
  - All of the above**
- Which characteristic helps the giraffe to blend in with its environment:
  - Four-chambered stomach
  - Long neck
  - Spots**
  - Muscular tongue
- Which of the following is true of Acacia tree roots?
  - Acacia tree roots grow deep into the soil to help absorb water for the tree and to help anchor the tree into the ground**
  - Acacia tree roots have root hairs that control the temperature of the plant
  - Acacia tree roots absorb sunlight for the plant to make food
  - Acacia tree roots help to protect and spread the seeds of the tree
- Which of the following elements is NOT essential for the Acacia tree to survive?
  - Sunlight
  - Wind**
  - Thorns
  - Water
- Giraffes can feed from the Acacia tree, which is covered in long, spiky thorns, due to what key structure?
  - Spotted fur
  - Long legs
  - Four-chambered stomach
  - Muscular, bendy tongue**
- True or false: plants and animals rely on each other for survival.
  - True**
  - False
- When a turtle is being attacked, it tucks its head, and limbs into its shell. This behavior is a form of \_\_\_\_\_ which helps the turtle \_\_\_\_\_.
  - Reproduction, communicate
  - Defense, survive**
  - Reproduction, grow
  - Fun, eat