MOSA MACK SCIENCE

# Interaction of Body Systems Lesson 1: *The Solve*
# Educator's Resource Guide

**Objective**
In *The Solve*, students will:

1. Solve a mystery that demonstrates how a problem with one body system can affect the functioning of other body systems.
2. Create a Mind Map to explore relationships among complex Interaction of Body Systems vocabulary.
3. Communicate understanding of the functions of each of the following body systems: circulatory system, respiratory system, digestive system, muscular system, and nervous system.
4. Communicate understanding that all body systems are connected and work together to allow the body to function as a whole.

**Time Required:** 40-75 minutes

| Materials Required | Safety Considerations | Science & Engineering Practices |
|---|---|---|
| • Student Guide (*includes student agenda and Mind Map)*<br>• Interaction of Body Systems Comic/Motion Comic<br>• Scissors<br>• Glue or tape | None | • Developing and using models<br>• Constructing explanations or arguments from evidence |

**Mosa Mack Comic Mystery Episode Description**
Aaliyah, the trapeze artist in a famous circus, has a major issue… she is about to go on stage and she can't feel her leg!
Luckily, Mosa and the Gang are in the stands, so they come right down to try and figure out what is going on. Billy and Mosa decide to shrink down to the microscopic level, so they can get into the body and investigate. They soon find out that a problem with the leg might not be so simple. Since the body is a collection of systems that all work together, they will have to explore them all to see what is wrong with Aaliyah's leg.

**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.

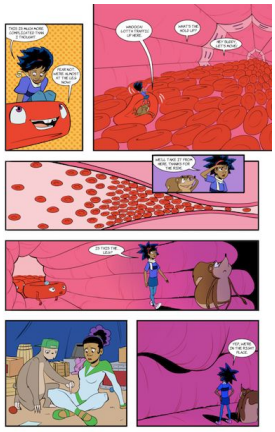
**Level 4** *(recommended for grades 7–8)*

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.

## Agenda

I. Solve the Interaction of Body Systems 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.

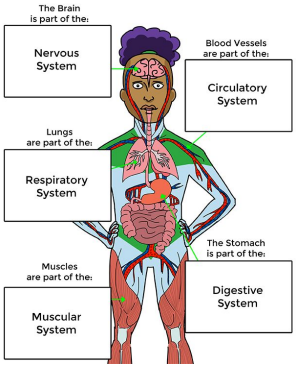


1. Read/watch the Mosa Mack Mystery on Interaction of Body Systems.
2. Students answer the questions in their Student Guide as they read/watch. Encourage students to cite the specific page numbers/time codes in the Comic Mystery to promote writing with supporting evidence. Answers can be found in the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

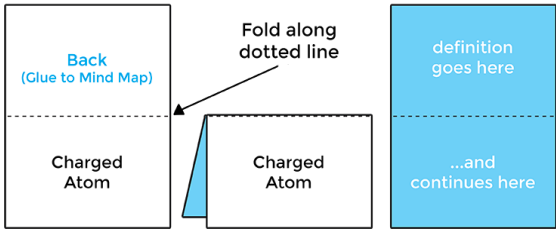
II. Vocabulary Mind Map Activity (15–45 minutes)

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/interactions-of-body-systems
    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: Interaction of Body Systems Lesson 1: *The Solve*.
    b. Introduce the warm up task: students will be making a Mind Map of the vocabulary for this Interaction of Body Systems 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



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.

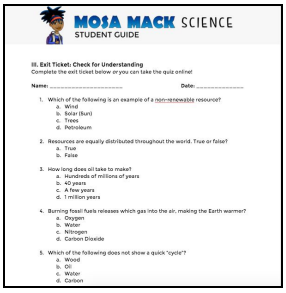
Teacher Tips:

- 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.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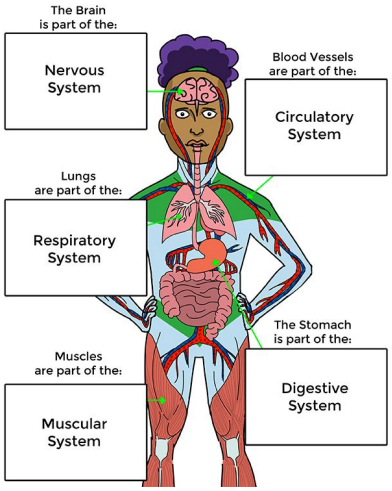
III. Exit Ticket: Check for Understanding
Complete the exit ticket below or you can take the quiz online!

Name: _____ Date: _____

1. Which of the following is an example of a non-renewable resource?
   a. Wind
   b. Solar (Sun)
   c. Trees
   d. Petroleum
2. Resources are equally distributed throughout the world. True or false?
   a. True
   b. False
3. How long does oil take to make?
   a. Hundreds of millions of years
   b. 40 years
   c. A few years
   d. 1 million years
4. Burning fossil fuels releases which gas into the air, making the Earth warmer?
   a. Oxygen
   b. Water
   c. Nitrogen
   d. Carbon Dioxide
5. Which of the following does not show a quick "cycle"?
   a. Wood
   b. Oil
   c. Water
   d. Carbon

**Answer Key**

Mind Map




Episode Questions Answers

1. What is the job of the muscular system? (Page 3) (1:15-1:25)
*It allows the body to physically move.*

2. Mosa and Billy are picked up by a red blood cell, who takes them on their journey. What is the job of the red blood cell? What system is it a part of? (Pages 4 and 9) (1:45-2:20 and
*Its job is to deliver fresh oxygen to cells and carry away the carbon dioxide waste, which will be gotten rid of. A red blood cell is part of the circulatory system.*

3. Where do the red blood cells pick up oxygen and drop off carbon dioxide? What system is this part of? (Page 5) (2:10-2:25)
*The lungs, which are part of the respiratory system.*

4. What else do Billy and Mosa see in the blood? What does it do and where does it come from? (Pages 6-7) (2:40-3:15)
*Mosa and Billy see glucose in the blood. Glucose provides energy to cells and comes from the digestive system. Food moves through the stomach and small intestine, where it is converted into a form of energy that the body can easily use.*

5. What is the job of the nervous system? (Page 8) (3:20-3:45)
*It sends messages through the body through electrical signals. The brain tells each system what to do.*

6. When Mosa and Billy continue their journey through the leg, why do they think they might be in the wrong place? (Pages 10-11) (4:25-4:40)
*The muscles look darker and purple and the nerve cell is dropping, only giving off eerie sparks of light.*

7. Why is the red blood cell with carbon dioxide panicking? (Page 13) (6:05-6:15)
*He is trapped and cannot get out of the blood cell and back to the lungs to get more oxygen.*

8. What did Mosa figure out? Which system was responsible for the tingling in Aaliyah's leg? (Answer Comic)
*Mosa figured out that it wasn't just one body system at fault – it was the interaction of all of Aaliyah's body systems. The circulatory system provides oxygen (from the respiratory system) and glucose (from the digestive system) to cells throughout the body, including nerve and muscle cells! When cells do not have glucose and oxygen, they can't function properly. When Aaliyah crossed her legs, she cut off circulation to her leg, so no oxygen and glucose were able to get to those nerve and muscle cells. This caused the tingling!*

**Quiz:**

1. Which body part is part of the circulatory system and responsible for pumping blood throughout the body?
    a. Leg
    b. Brain
    c. Stomach
    **d. Heart**
2. Which body part is considered the command center that controls everything in the body?
    a. Heart
    **b. Brain**
    c. Stomach
    d. Muscle cells
3. When we breathe in, oxygen goes into our lungs. The lungs are part of the:
    a. Muscular System
    **b. Respiratory System**
    c. Circulatory System
    d. Digestive System
4. When you walk, muscles in your legs contract and relax. This is a great example of the _____ system in action!
    **a. Muscular System**
    b. Circulatory System
    c. Endocrine System
    d. Nervous System
5. Which of the following is carried by a red blood cell throughout the body?
    a. Glucose
    b. Oxygen
    c. Carbon dioxide
    **d. Both b. and c.**
6. Where in the body is oxygen picked up and carbon dioxide dropped off?
    a. The tongue (located in the mouth)
    **b. The lungs (located in the chest)**
    c. The small intestine (located in the abdomen)
    d. A muscle (located in the leg)
7. Which of the following substances does a muscle cell need in order to function?
    a. Glucose
    b. Oxygen
    c. Carbon dioxide
    **d. Both a. and b.**
8. Which of the following statements are true about our body's systems? (Select all that apply.)
    **a. The nervous system sends messages to the body.**
    b. The digestive system helps carbon dioxide leave the body through the lungs.
    **c. Blood cells are part of the circulatory system.**
    **d. The digestive system helps break down food into energy.**