

Resources Lesson 1: *The Solve* Educator's Resource Guide

Objective

In *The Solve*, students will:

1. Solve a mystery that demonstrates the differences between a renewable and nonrenewable resource.
2. Create a Mind Map to explore relationships among complex Renewable Resources vocabulary.
3. Communicate understanding that environmental resources cycle at different rates. Those that cycle quickly are called renewable resources. Those that cycle slowly are called nonrenewable resources.
4. Communicate understanding that human removal of these resources has a drastic effect on the environment.

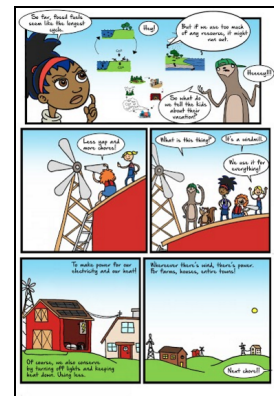
Time Required: 40-75 minutes

Materials Required	Safety Considerations	Science & Engineering Practices
<ul style="list-style-type: none"> • Student Guide (<i>includes Student Agenda and Mind Map</i>) • Renewable Resource Episode • Computer with speakers • Scissors • Glue or tape 	None	<ul style="list-style-type: none"> • Developing and using models • Constructing explanations or arguments from evidence

Episode Description

Jody and his classmates arrive home on the last day of school to some terrible news: their summer vacations have been canceled. Gas prices have skyrocketed and no one can afford to go anywhere fun!

They call Mosa Mack to help them figure out why gas is so expensive and how to get their summer vacations back. Mosa travels around the world to explore the cause of the price increases and discovers that human use is the root cause. Luckily, Mosa thinks she has found another way to get their vacation plans soaring again.



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 Renewable Resources 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 Renewable Resources.
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.

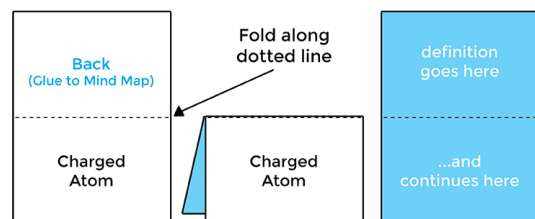
1. Students may complete the Mind Map **digitally**. Follow directions below. (15 minutes)
 - a. Go to <https://mosamack.com/home/renewable-resources>
 - b. Select **Lesson 1: The Solve**.
 - c. Select **Vocabulary** and complete **Part 1**: matching terms with definitions.
 - d. Complete **Part 2**: 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: Renewable Resources Lesson 1: *The Solve*.
 - b. Introduce the warm up task: students will be making a Mind Map of the vocabulary for this Renewable Resources 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.

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STUDENT GUIDE

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 it 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



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- 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:

- 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

Episode Questions

1. Why is travelling to vacation destinations so expensive?

(Page 3-4)

Travelling uses fuels, like oil and gas, which are very expensive because it is hard to get fossil fuels and demand is very high.

2. Is oil available everywhere? Give an example. (Page 4)

Oil is much more available in some places, like the Middle East, but not in Japan.

3. Where does oil come from? How long does it take to make?

(Page 5-7)

It comes from deep underground and is drawn up by drilling. It takes 400 million years to make! The oil is made from the carbon of dead creatures and plants.

4. How does burning fossils contribute to climate change? (Page 8)

It releases carbon back into the atmosphere and CO₂ traps heat from the sun, making Earth warmer and warmer.

5. Why did the towns in Virginia and Russia “die”? (Page 9-10)

They were prosperous because of their resources and when the resources run out, jobs are lost, and people must leave.

6. Why are fossil fuels out of the question? (Page 10)

They take too long to make!

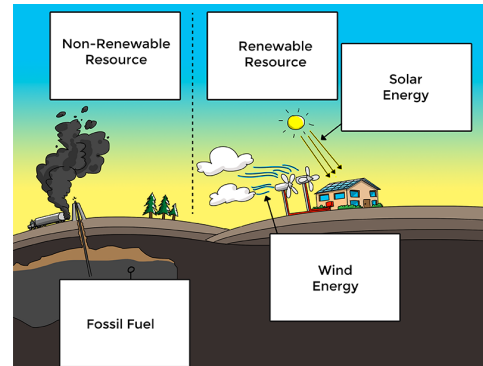
7. Why are wood and water semi-renewable resources? (Page 11-13)

They don't take as long to make as fossil fuels, but we must leave some wood and water in order to continue replenishing the resource!

8. What did Mosa figure out? How can the kids' vacations be saved? (Answer Video)

Wind energy and sun energy provide renewable sources of energy! This energy can be captured by windmills and solar energy and used to power homes, allowing parents to save money they can use on travel.

Mind Map



Quiz:

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
6. Which of the following is the most renewable source of energy?
 - a. Oil
 - b. Petroleum
 - c. Solar (Sun)**
 - d. Trees