

Say It Out Loud: The Solar Power Process

Grade Level:	Time Frame:
3rd Grade 4th Grade 5th Grade	50 Minutes
Standards (ALCOS Language Arts):	
<p>Oral Language 2. Present information orally using complex sentence structures, appropriate volume, and clear pronunciation.</p> <p>a. Use oral language for different purposes: to inform, to entertain, to persuade, to clarify, and to respond.</p> <p>Reading 23. Identify and use text features in informational passages to locate information. Examples: headings, photographs, illustrations, labels, charts, graphs, legends</p> <p>b. Explain how illustrations contribute to meaning in a story.</p> <p>Reading 2. Determine and use the correct syllable type(s) to decode unfamiliar multisyllabic words, including open, closed, vowel-consonant-e, r-controlled, vowel team (including diphthongs), consonant-le, and "leftovers" including odd and schwa syllables. Examples: dam-age, ac-tive, na-tion</p> <p>Speaking 42. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes, and speaking clearly with adequate volume, appropriate pacing, and clear pronunciation.</p> <p>a. Articulate ideas, claims, and perspectives in a logical sequence, presenting information, findings, and credible evidence from multiple sources and modalities to enhance listeners' understanding.</p>	

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Reading 3. Determine or clarify the meaning of unknown and multiple-meaning words and phrases, choosing flexibly from a range of strategies.

Speaking 9. Express ideas clearly and effectively to diverse partners or groups.

- a. Pose and respond to explicit questions in ways that contribute to the discussion and elaborate on the remarks of others.
- b. Verbally summarize information read aloud or presented in diverse media and formats.
- c. Report orally on a topic or text, sequencing ideas logically and supporting main ideas with appropriate facts and relevant details.
- d. Speak clearly at an understandable rate.

Objectives:

Students will integrate the use of unknown vocabulary terms into informative text to be presented and contributed to discussion within a small group setting.

Students will apply the use of diagrams to support information and explain steps of a scientific process.

Background Information:

After the initial installation fees, solar power is virtually free and 100% renewable!

Survey results show that Alabamians want freedom to choose where their energy comes from – and the right to produce their own electricity if they want. That means more energy providers and more renewable energy sources – which is exactly what Alabamians are asking for!

Most solar technologies convert sunlight into electrical energy using photovoltaic (PV) panels which can be used to generate electricity. How exactly does photovoltaic (PV) technology work?

The energy from sunlight creates charges from electrons that cause electricity to flow. An individual PV cell is small and made of different semiconductor materials that can control and manage this flow of electricity. Many of the PV cells put together make up a solar panel which can be connected to the electrical grid, or utility grid, as part of a complete PV system.

Learn more about the solar power process in this activity!

Materials:

- FOR EACH PAIR OF STUDENTS:
 - One set of “Key Terms Practice Cards”
 - “The Solar Power Process Graphic Organizer” handout (page 1-2)
 - Students could use a larger poster instead of page 2
 - One set of Key Terms cut-outs (page 3, each pair needs ½ page)
 - The printed diagrams and definitions are un-matched
 - Scissors
 - Glue
 - Colored pencils

Engage (10 minutes):

1. **Say it out loud!** Students will practice pronouncing 5 scientific key terms they may not have heard before.
 - a. Working in pairs, each student will use the set of “Key Terms Practice Cards” to pronounce each of the 5 words 5 times.

Explore (35 minutes):

1. **Organize it!** Students will use the “The Solar Power Process Graphic Organizer” to learn the steps of the solar power process.
 - a. Teacher should read each step out loud and have students choose which diagram and which key term definition fits best with each step.
 - i. Depending on grade level, students may be able to complete without teacher guidance.
 - b. Students will glue the correct diagram and definition square by the matching step of the solar power process.
2. After learning each of the 5 described steps, students will work in pairs to “write it in their own words.”
 - a. Students can use page 2 of the handout OR use a poster.
 - b. Students should draw a picture for each of the 5 steps of the solar power process and write one sentence or more “in their own words” to describe each step. They should use the learned key terms correctly in each step.

Evaluate (5 minutes):

1. **Share it!** Each pair of students will share their work with another pair of students in the classroom.
 - a. Students should read the steps of the solar power process out loud and use the diagrams to inform the other students and display their knowledge.

References:

<https://www.energy.gov/eere/solar/how-does-solar-work>

<https://solect.com/the-science-of-solar-how-solar-panels-work/>

<https://solarpower.guide/solar-energy-insights/how-do-solar-panels-work>

Name: _____ Date: _____

THE SOLAR POWER PROCESS

Instructions: Find the correct diagram and key term that pairs with each step of the solar power process.

Diagram

Key Term

Step 1

Sunlight hits the photovoltaic cells of solar panels and generates a DC (direct current) electrical field.

Step 2

The electricity generated by movement of electrons flows to the edge of the panel, and into a conductive wire.

Step 3

The conductive wire brings the electricity to the inverter, where it is transformed from DC electricity to AC electricity, which is used to power buildings.

Step 4

Another wire transports the AC electricity from the inverter to the electric panel on the property (also called a breaker box), which distributes the electricity throughout the building as needed.

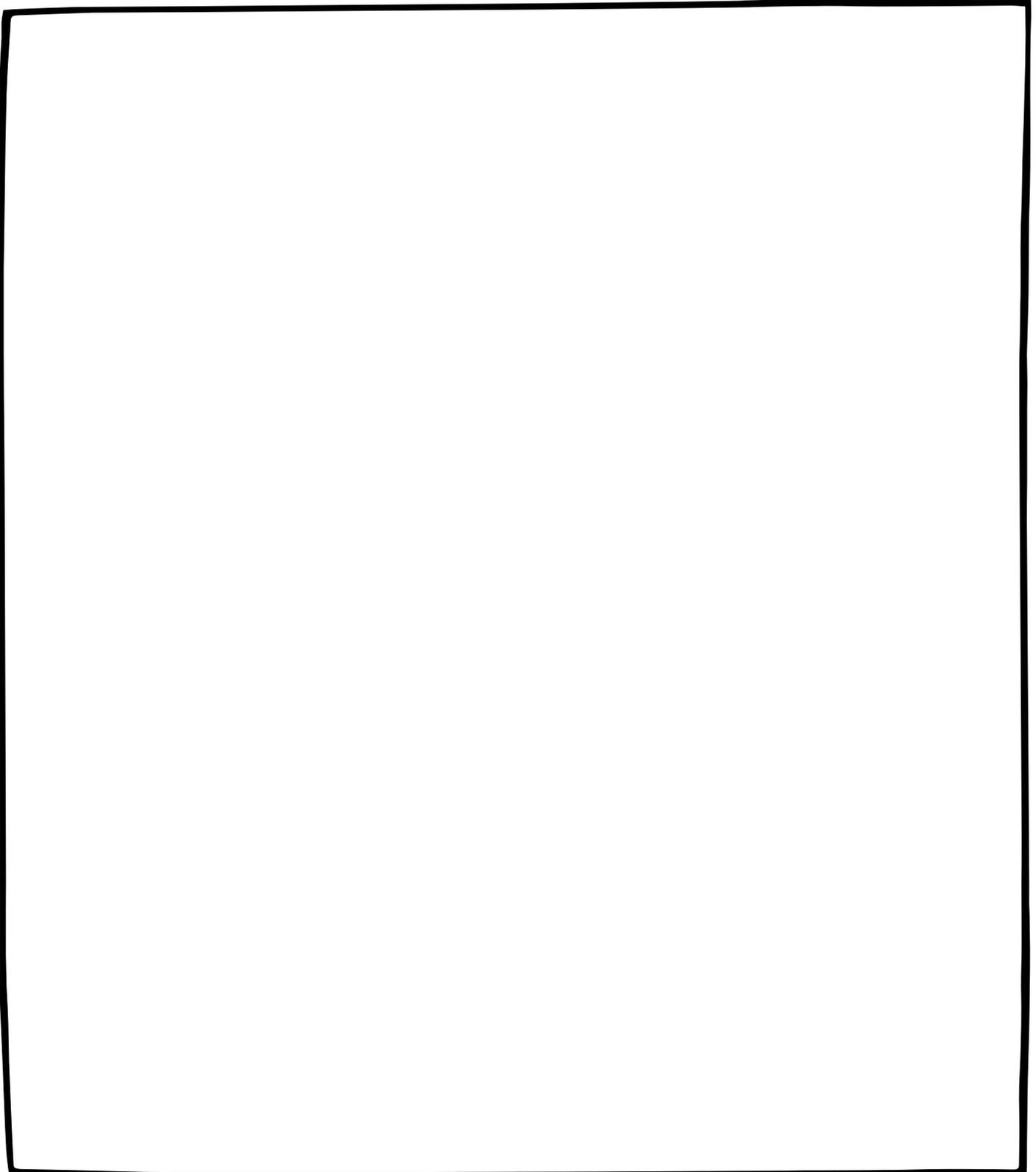
Step 5

Any electricity not needed at the building flows through the utility meter and into the utility electrical grid. If there is extra electricity generated, the building will get extra credits on its power bill.

Name:----- Date:-----

THE SOLAR POWER PROCESS: SAY IT OUT LOUD

Instructions: Using your assigned step (#1-5) of the solar power process, re-write the description in your own words and draw your own diagram to better explain the step. Remember to use the key terms. You will read this description aloud and show the picture to your group.



Instructions:

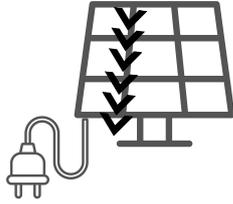
Cut out the key terms and diagrams below and match with the correct step of the solar power process. Glue in the space provided on your graphic organizer.

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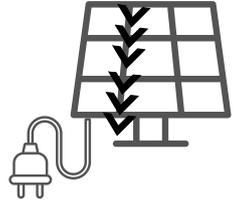
conductive wire:
(con-duc-tive)

a wire made up of metal that can easily transport an electric current



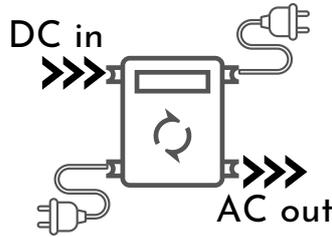
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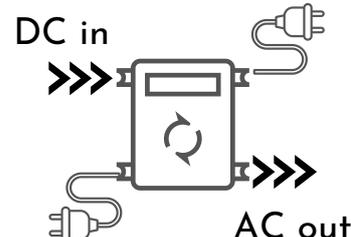
utility grid:
(u-til-i-ty)

a place where all electrical power lines in a community connect and power can be distributed to many buildings and homes



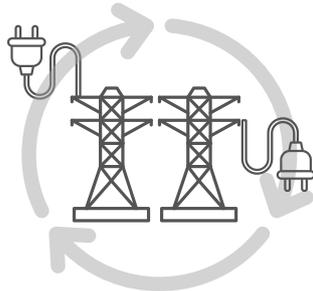
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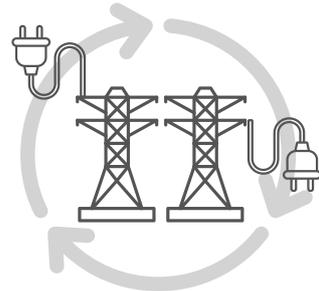
photovoltaic cells:
(pho-to-vol-ta-ic)

many small cells that can collect sunlight energy and convert into electricity



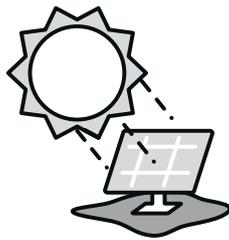
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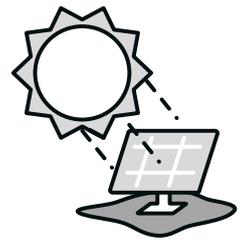
electrons:
(e-lec-tron)

loose particles of atoms that move in one direction to produce an electrical current



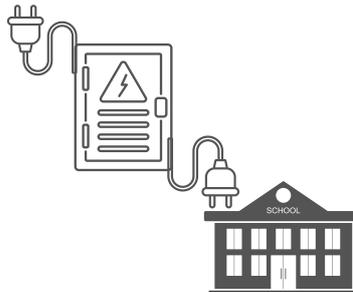
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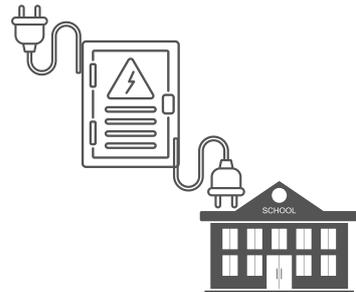
inverter:
(in-vert-er)

a machine that converts DC electricity (from sunlight) into AC electricity (that buildings can use for power)



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con-duc-tive	con-duc-tive
conductive	conductive
u-til-i-ty	u-til-i-ty
utility	utility
pho-to-vol-ta-ic	pho-to-vol-ta-ic
photovoltaic	photovoltaic
e-lec-tron	e-lec-tron
electron	electron
in-ver-ter	in-ver-ter
inverter	inverter