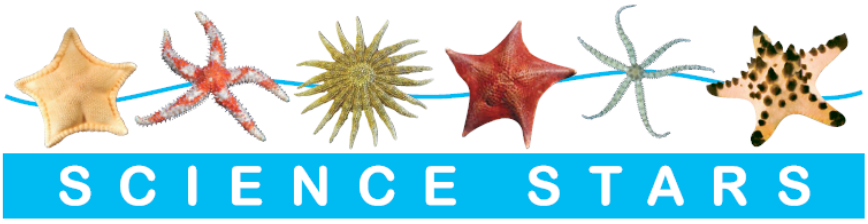
AQUARIUM OF THE PACIFIC®



Science Stars: 3rd Grade Lesson Plan

Renewable and Nonrenewable Energy

Standards:

1.b Students know sources of stored energy take many forms, such as food, fuel, and batteries.

c. *Students know* machines and living things convert stored energy to motion and heat.

Suggested Time allotment: 50 minutes

Pressed for time: 30 minutes

Introduce renewable and nonrenewable energy sources
Hide fewer chips in the classroom
Give each team only two search attempts

Anticipatory set (engage): What is energy? What are some forms of energy we see around the room? Where do we get energy play? What about cars, TV's, and flashlights? Are there types of energy sources that could run out?

Objective: Students will compare the availability of renewable and nonrenewable energy sources, while illustrating the dilemma of searching for nonrenewable energy sources. Introduce the concept of energy conservation at homes and in the community.

Background:

Fossil fuels are hydrocarbons, primarily coal and petroleum (fuel oil or natural gas), formed from the fossilized remains of dead plants and animals by exposure to heat and pressure in the Earth's crust over hundreds of millions of years. Fossil fuels are therefore in limited supply, yet make up a large portion of the energy source we rely on for gasoline, coal, and oil. In order to counter the diminished supply of fossil fuels, renewable energy sources, such a wind, solar, nuclear, and hydrothermal sources of energy are being developed as more economically viable options. Burning fossil fuels is the largest source of carbon dioxide emissions. Carbon dioxide is one greenhouse gases that reduces the amount of radiant heat lost through the atmosphere and contributes to global warming. The atmospheric concentration of CO_2, a greenhouse gas, is increasing, raising concerns that solar heat will be trapped and the average surface temperature of the Earth will rise in response.

Materials:

100 Poker chips
4 Containers per team labeled 1st, 2nd, 3rd, and 4th to be used for each search attempt
Pinwheels (optional)
Energy Sources Worksheet

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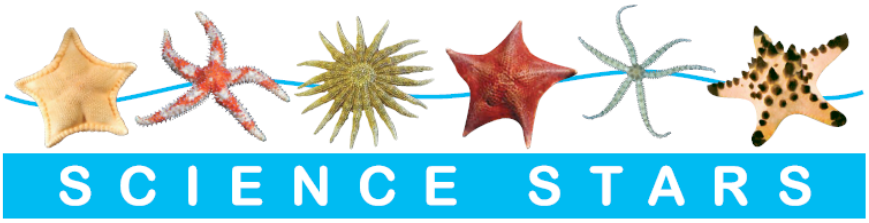

Vocabulary:

- Energy
- Fossil Fuel
- Renewable resource
- Nonrenewable resource

Prep:
Hide chips around the room prior to the lesson. Some should be easily seen, while others can be more challenging to find. Be sure students do not touch the chips as they enter the room.

Modeling 1:

1. Explain that students will be working in teams to search the room for "energy sources" in the form of poker chips.
2. Students will work in teams of 4 to find as many chips as they can in 30 seconds. There will be 4 search attempts.
3. Model how to safely move around the room and gather chips in the appropriate container.
4. Model how to record the data from each round of hunting on the *Energy Sources* worksheet.
5. Ask student if they anticipate finding more chips in the 1st attempt or last attempt. Why?

Guided Practice 1:

1. Provide 4 four rounds of 30 seconds for hunting.
2. Students record data on the *Energy Sources* Worksheet after each round.
3. Graph the results. What did they find?

Modeling 2:

1. Introduce the term nonrenewable resource. Discuss fossil fuels and gasoline as examples of energy sources that exist in limited quantity.
2. Hold up a pinwheel. Invite the students to determine what energy source is needed to make a pinwheel move. Introduce the term renewable resource.
3. Brainstorm other sources of energy that can not be used up (solar, wind, wave, etc.)

Guided Practice 2 (optional):

1. Allow students access to pinwheels as a way to experiment with wind energy.
2. Have students brainstorm ways to conserve energy in their homes.

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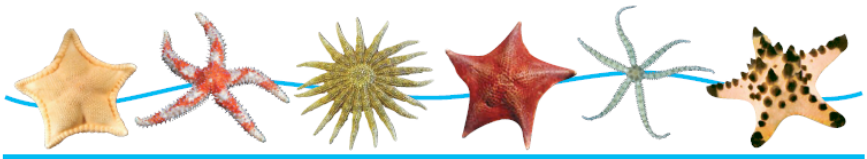


SCIENCE STARS

Check for understanding: When did you find the most chips? Did the number of available chips increase or decrease? What type of energy decreases overtime? What type of energy is constantly available? What things can we do to make nonrenewable energy last longer?

Independent Practice (*Learning extension):*
Build solar ovens to reinforce the concept of renewable energy. What type of energy does your oven use to heat up? Is this nonrenewable or renewable energy? What kind of energy do you think powers your oven at home? Do you think that it is renewable energy?

Complete Energy Sources crossword puzzle.

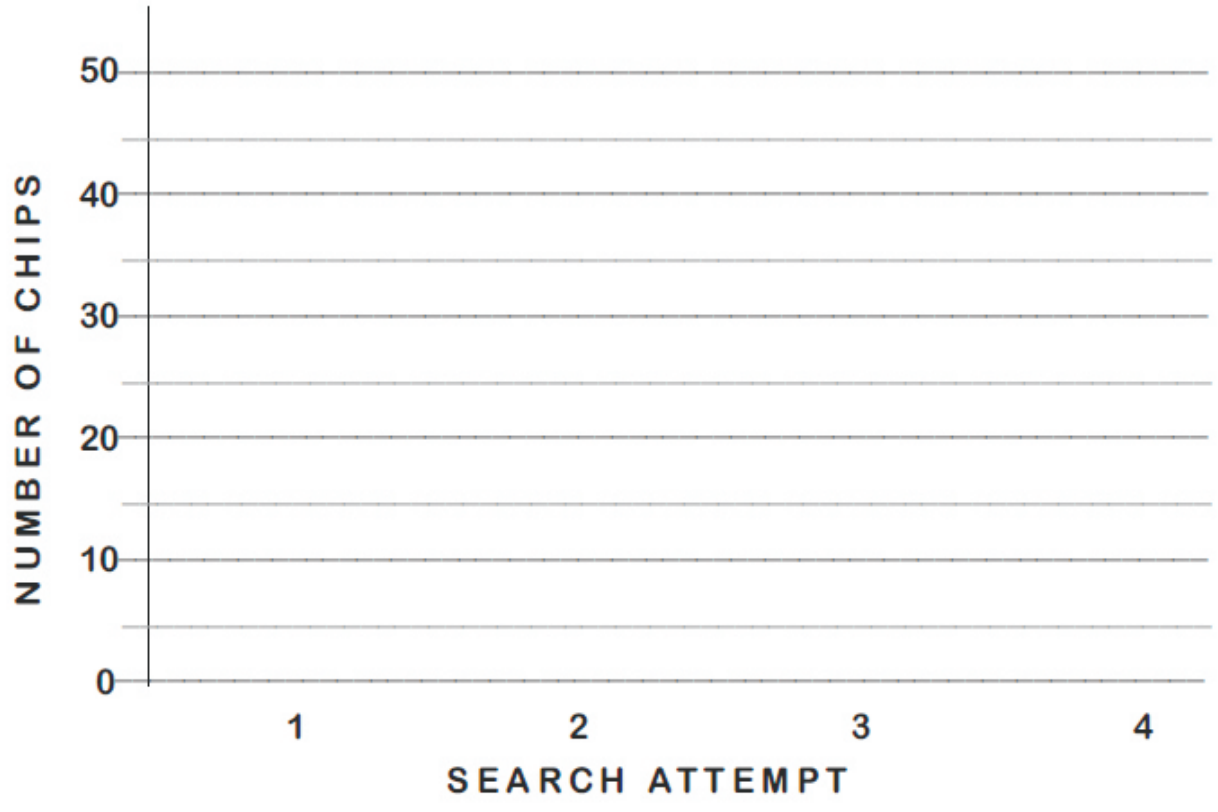
SCIENCE STARS
GRADE 3

Energy Sources

Search for Energy Sources

	Number of chips found	
	MY TABLE	MY CLASS
FIRST SEARCH		
SECOND SEARCH		
THIRD SEARCH		
FOURTH SEARCH		

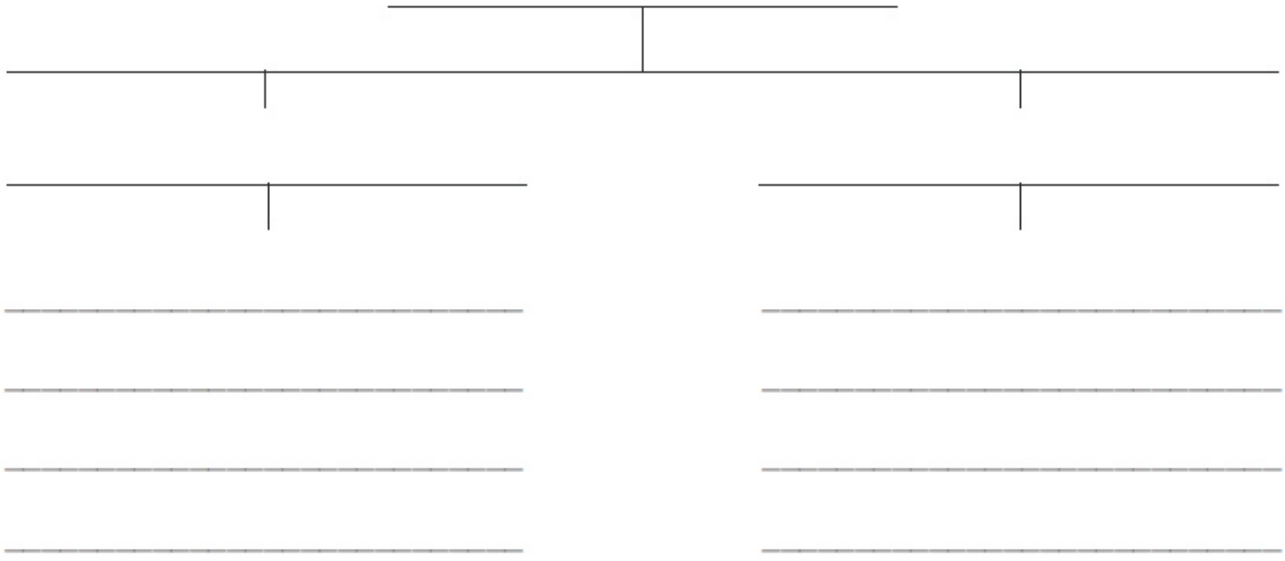
Graph of Your Results Below



Energy Sources Worksheet

Directions: Use the following words to complete the tree map about energy.

Energy	Renewable	Nonrenewable	Solar Energy	Battery
Gasoline	Fossil Fuels	Wind Energy	Energy from Waves	



Directions: Answer the questions below. Use 4 of the words from the word bank.

Energy	Renewable	Nonrenewable	Conserve	Fossil Fuel

1. What are some things that waste energy? _____

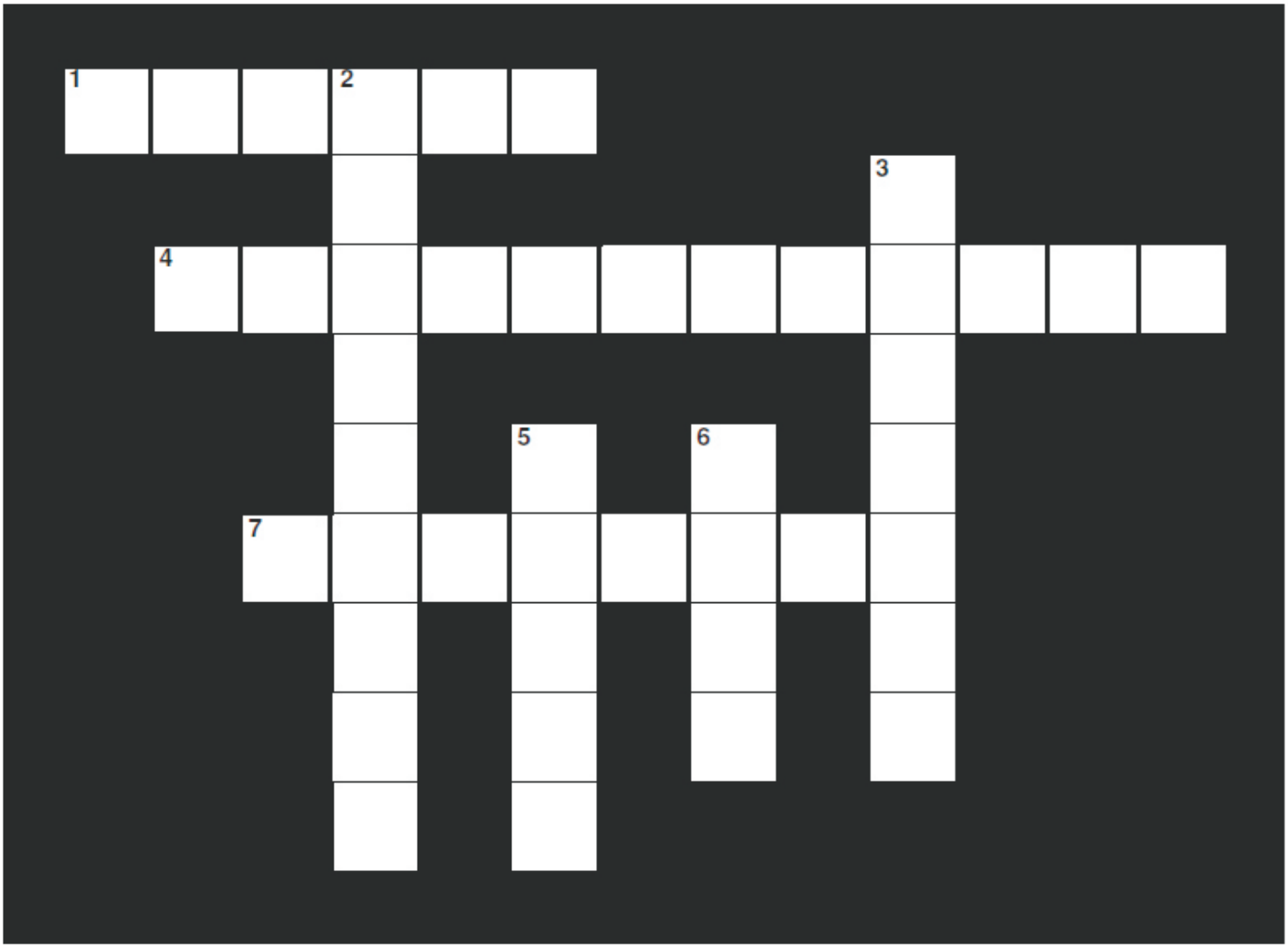
2. What can you do to conserve energy? _____

3. Why is it important to conserve energy? _____

Energy Sources Worksheet Crossword Puzzle

Directions: Use the words below to answer the questions and fill in the crossword puzzle.

BATTERY
ENERGY
GASOLINE
NONRENEWABLE
RENEWABLE
SOLAR
WIND



ACROSS:

1. What we need to work and play
4. An energy source that can run out
7. The energy source we use in a car

DOWN:

2. An energy source that will never run out
3. An energy source used in flashlights and cell phones
5. Energy that comes from the sun
6. Energy source that uses windmills

SCIENCE STARS
GRADE 3

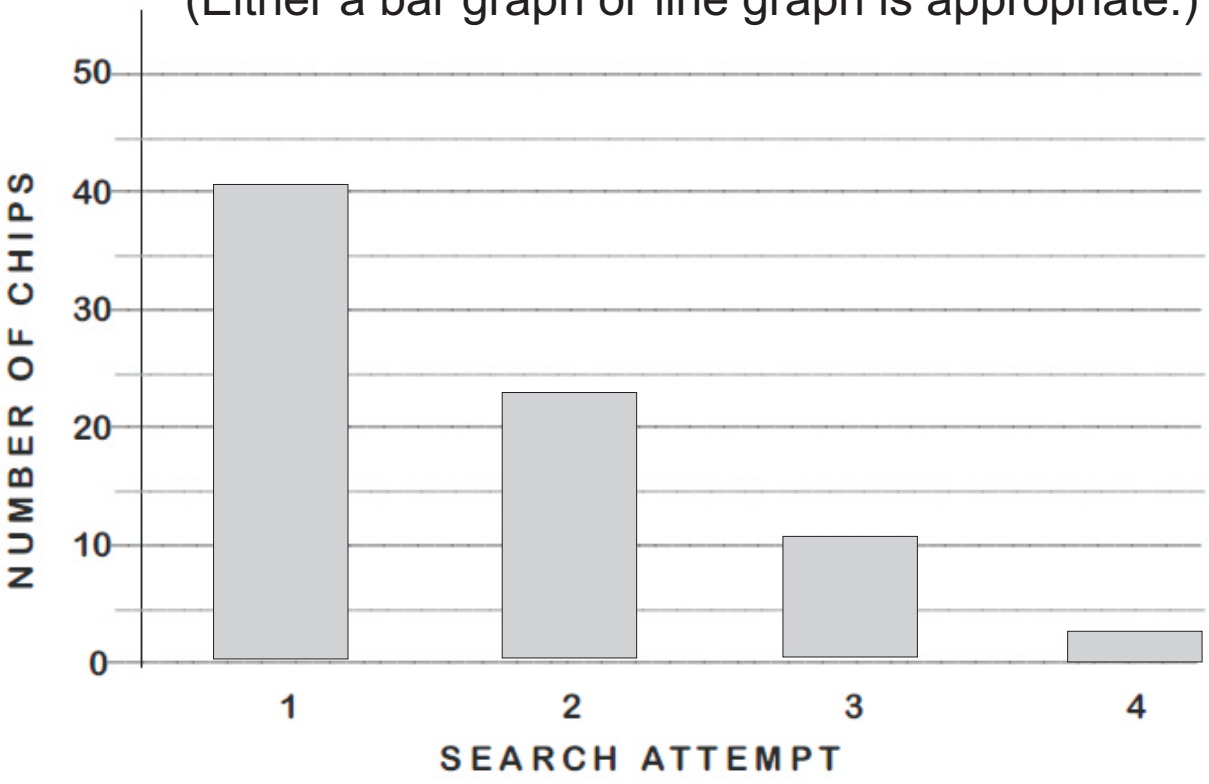
ENERGY SOURCES

SEARCH FOR ENERGY SOURCES

	Number of chips found	
	MY TABLE	MY CLASS
FIRST SEARCH	(answers will vary	
SECOND SEARCH	but students will see	
THIRD SEARCH	a decrease in supply	
FOURTH SEARCH	as the game continues)	

GRAPH OF YOUR RESULTS BELOW

(Either a bar graph or line graph is appropriate.)



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- Energy
  - Renewable
    - Energy from Waves
    - Wind Energy
    - Solar Energy
  - Nonrenewable
    - Gasoline
    - Fossil Fuels
    - Battery

Directions: Answer the questions below. Use 4 of the words from the word bank.

Energy	Renewable	Nonrenewable	Conserve	Fossil Fuel

1. What are some things that waste energy? (answers vary but may include household items that run on fossil fuels.)

2. What can you do to conserve energy? (answers vary but may include ride a bike, turn off electronics, use wind or solar)

3. Why is it important to conserve energy? (students may refer to nonrenewable energy sources and the need for conserving energy around the house)

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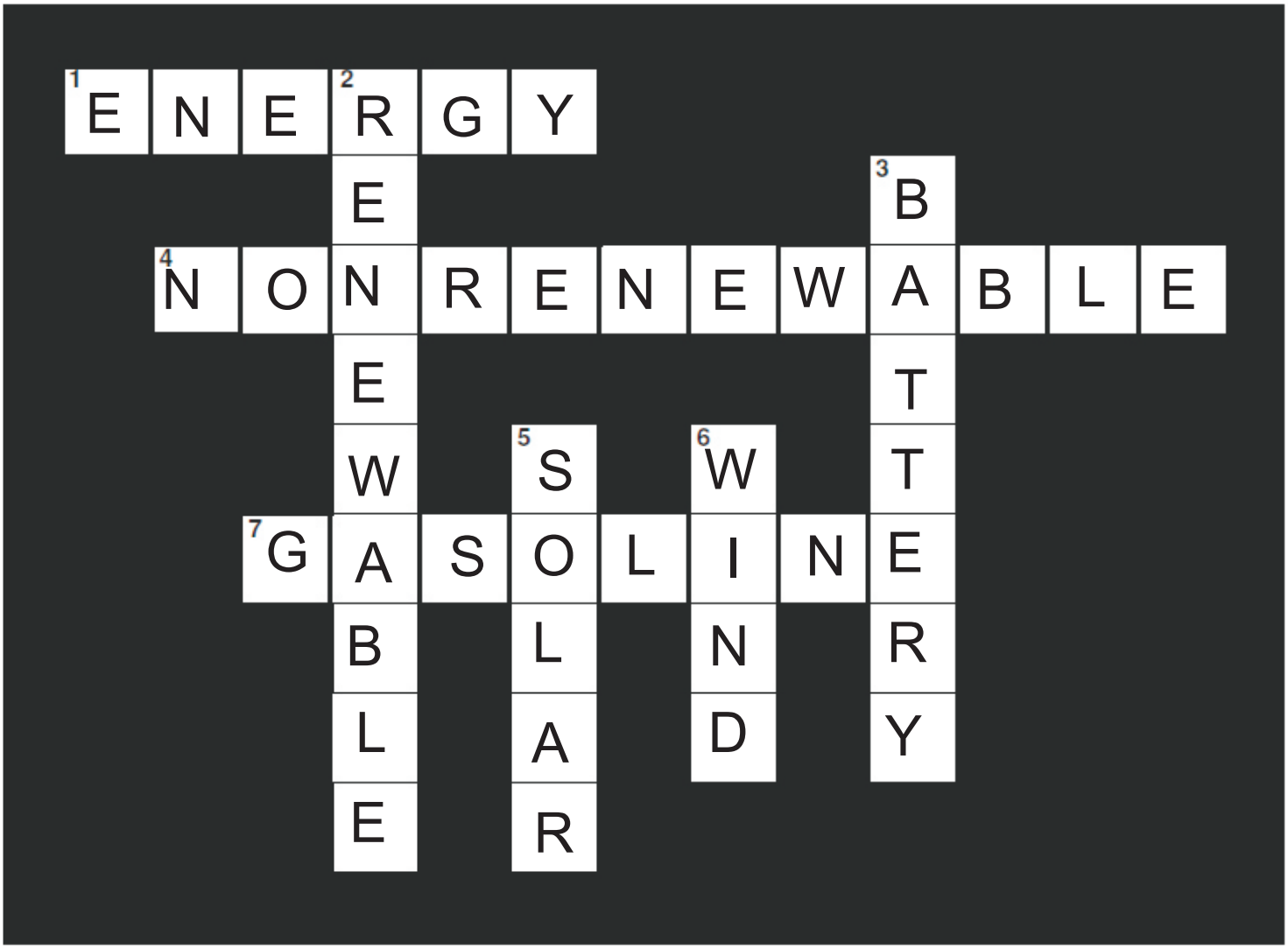

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