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Earth Science Curriculum Map

The experiments fall under topics that relate to three aspects of earth and space science:

1. Conservation of Energy
2. Renewable and Non-Renewable Resources
3. Weather

The activities in this book have two intentions:

- to teach concepts related to earth and space science
- to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted.

Suggestions for differentiation are also included so that all students can be successful in the learning environment

Introduction:

- At a Glance
- Introduction
- Table of Contents
- Teacher Assessment Rubric
- Student Self-Assessment Rubric

Lesson Topics:

Lesson One: Forms of Energy

Lesson Two: Energy Transformation

Lesson Three: Invention Fair

Lesson Four: Energy Sources

Lesson Five: Energy Conservation

Lesson Six: Researching Resources

Lesson Seven: Weather Patterns

Lesson Eight: The Heat of the Sun

Lesson Nine: Precipitation

Lesson Ten: Cloud Formation

Lesson Eleven: Weather Instruments

Lesson Twelve: Extreme Weather

FORMS OF ENERGY

LEARNING INTENTION:

Students will learn that energy is present in different forms, and that it exists in two main states.

SUCCESS CRITERIA:

- identify and define different forms of energy
- recognize the everyday uses of different energy forms by recording some examples
- determine a state of energy as potential or kinetic
- depict examples of potential energy transforming to kinetic energy, and vice-versa

MATERIALS NEEDED:

- a copy of “A Grab Bag of Energy!” Worksheet 1 for each student
- a copy of “Forms of Energy” Worksheet 2 and 3 for each student
- a copy of “The Everyday Uses of Energy” Worksheet 4 for each student
- a copy of “States of Energy” Worksheet 5 and 6 for each student
- a grab bag filled with objects such as a small battery, a light bulb, a magnet, a whistle or other small noise maker, an orange or an apple, utensils such as an egg beater or can opener, or other objects that produce an energy form (a set for each group of students)
- pencils, pencil crayons, markers, chart paper

PROCEDURE:

***This lesson can be done as one long lesson, or be divided into three shorter lessons.**

1. Divide students into small groups. Give each group a grab bag filled with objects that produce an energy form. Using Worksheet 1, students will illustrate and record an object from the bag and explain its energy potential. After sharing with other group members,

students will look for an example of energy in the classroom and describe its purpose.

2. Give students Worksheets 2 and 3 to complete.
3. Divide students into pairs, and give them Worksheet 4. They will brainstorm and record how different energy forms are used in our daily lives. An option would be come back as a large group and share ideas. Record student responses on chart paper and post in the classroom for future use.

(some sample ideas are: heat energy to keep our homes warm, mechanical energy to make tires on a bicycle spin, kinetic energy used to pedal the bicycle forward, magnetic energy to keep our fridges closed properly, etc.)

4. Next, explain to students that energy exists in two main states, potential and kinetic. Give them Worksheets 5 and 6. Read through and discuss the definitions of each state to ensure their understanding. Students will determine the energy forms given as in a state of potential or in a kinetic state. Given a particular form of energy, students will depict what the other state of energy could look like.

DIFFERENTIATION:

Slower learners may benefit by working together in a small group with teacher support to complete Worksheets 2 and 3. This would allow the opportunity to assist with reading the information provided, and further explanation. An additional accommodation would be to have these learners provide an oral response to the question at the bottom of Worksheet 1.

For enrichment, faster learners could add more examples of potential states of energy and depict the kinetic state of each example, using the back of Worksheet 6.



A Grab Bag of Energy!

Many things in your house or school give energy. Some things even hold energy. Let's explore this idea. Using the grab bag that your teacher gave you, try this!!

What to do:

1. Pull an object from the grab bag.
2. Draw a picture of your object.
3. Guess the kind of energy that the object gives or holds. Record your answer below.
4. Share your findings and ideas with your group members.



What kind of energy does it give or have?

Look around your classroom. Do you see another example of an energy form? Tell what it is and describe the energy it has or gives.

Forms of Energy

Energy is what makes things go. Everything that changes or moves has some form of energy. We use energy all the time, all day long. Whether we are walking, talking, running, or even sleeping, we are using energy. Machines use energy. Actions in nature require energy. Energy comes in many forms and serves different purposes in our lives.

Solve the grid puzzle below by matching the words in the Word Box to the clues on Worksheet 3.

chemical	electrical	kinetic	heat	light
sound	magnetic	wind	mechanical	gravitational

1													
2													
3													
4													
5													
6													
7													
8													
9													
10													



Energy Form Clues:

3

This energy allows us to see things around us.

10

This energy is found in an object that is above the surface of the Earth.

7

This is the energy that is contained in a field between opposing poles.

8

This energy is used by our toasters, stoves, and coffee makers.

6

This energy is produced by a chemical reaction.

4

This energy is produced by a vibrating object.

5

An object has this energy due to its motion.

1

Hot objects have more of this energy than cold objects.

9

This energy is the motion that makes work happen.

2

This energy is found in moving air.

The Everyday Uses of Energy

Think **Pair** **Share**

With a partner do some thinking and sharing of ideas of how different energy forms are used in our daily lives. In the box below, record some examples.



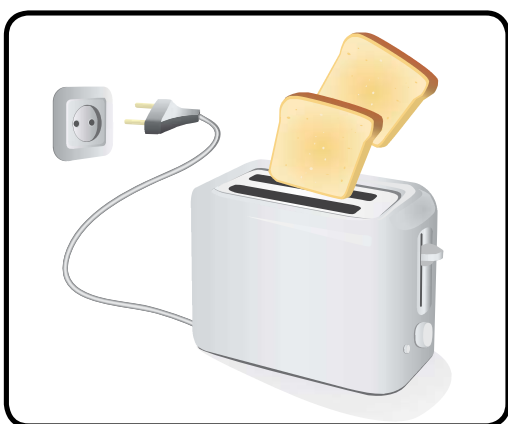
States of Energy

There are two main states of energy: potential energy and kinetic energy.

Potential energy is stored energy that an object has when it is not moving. It gives the object the ability to do work. Potential energy is hard to see, but it is there.

Kinetic energy is energy in action. We see it when an object is moving or doing work.

Look at each picture below. Decide on the state of energy, **potential** or **kinetic**. Write the answers below each picture.



Think about the forms of energy shown below. Then draw a picture to show what the other state of energy would look like.

POTENTIAL**KINETIC**