Energy Transformations

Teach 1	Names of student(s) teaching:
Teach date: Teach time: Teach length: 45 minutes	Title of lesson: Energy Transformations Source (Kit, Lesson, Page #):

Concept statement/Main idea:
This lab is to expose students to the physical concept of energy transformations. Students will explore the different types of energy forms, how they are transferred in a system, and the basic principle of energy conservation.

Standards for the lesson:
Students are to have heard the law of conservation of energy.

Objectives	Evaluation
Write objectives in SWBAT form	Write at least one question to match the objective you listed or describe what you will look at to be sure that students can do this.
SWBAT **understand** that energy cannot be created or destroyed, but it can be transferred.	Scientists say that energy cannot be created or destroyed. Interpret this quote in your own words. When scientists state that energy cannot be created or destroyed, it means that energy can be transferred or transformed into another type of energy. This means if there is additional energy added to a system, it must have come from another source; it was not created.
SWBAT **analyze** how energy gets transferred and what it transforms to.	

Engagement

Estimated time: 10 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
Teacher will introduce an activity that allows students to investigate the flow of energy in the system. Teacher will go over the technical steps so the students will become familiar with the program. Teacher will also ask questions that allows them to grasp the students' prior knowledge.	Students will listen to the instructions. Students will also answer questions or ask questions regarding the curriculum.	How does the bulb from a flashlight get its light? What kinds of energy does the sun give? When driving a car, what happens when you step on the acceleration petal?

Resources needed:

Computer and powerpoint

Safety considerations:

Exploration

Estimated time: 25 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
The teacher explains what the students will do with the simulations.	Students will analyze how energy changes forms in a system.	What does temperature measure? Temperature measures the average kinetic energy of the particles in the object. The higher the temperature, the faster the

		molecules of the substance are moving. What happens when you heat the brick and place it into the container of water? The temperature of the water rises. What happens when you cool the brick and place it into the container of water? The temperature of the water decreases. What happens when the water is placed on top of the flame? The energy is "flowing" away from the water container, meaning it is transforming into heat. The water is evaporating.

Resources needed:
Computer

Safety considerations:

Explanation

Estimated time: 20 minutes
Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
Teacher instructs the students to make their own	Students will create their own system and explain what is happening.	What are the transformations of energy and where are they

system and describe what is happening in that system.		happening? Each of the students' will vary.

Resources needed:

Safety considerations:

Elaboration

Estimated time: 15 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses
Teacher will pass out a card sort that contains pictures of a system and the phases of the energy transformation.	The students will have to match the picture to the right energy transformation.	Where do the energy transformations happen? Can there be multiple energy transformations occurring at the same time? Where does the rest of the energy get converted to?

Resources needed:

Powerpoint

Card sort WS

Safety considerations:

Evaluation

Estimated time: 10 minutes

Description of activity:

What the teacher does	What the student does	Possible questions to ask students — think like a student and consider possible student responses

Teacher will pass out a formative assessment to measure what the students understood from the lesson.	Students will take the formative assessment.	

Resources needed:

Evaluation Quiz

Safety considerations:

A toaster	Electrical Energy→ Thermal Energy and Radiant Energy
Person running	Chemical Energy→ Mechanical Energy
Candle burning	Chemical Energy→ Thermal Energy and Radiant Energy
Play an instrument	Mechanical Energy→ Sound Energy
Turning on a flashlight	Chemical Energy→ Electrical Energy→ Radiant Energy
Windmill turning	Mechanical Energy→ Electrical Energy
Nuclear Power Plant	Nuclear Energy→ Electrical Energy
Tree Growing Fruit	Radiant Energy→ Chemical Energy
Ironing	Electrical Energy→ Thermal Energy
Digesting an Apple	Chemical Energy→ Mechanical Energy→ Thermal Energy
Solar Calculator	Radiant Energy→ Electrical Energy
Mechanical Energy→ Thermal Energy	Electrical Energy→ Mechanical Energy→ Radiant Energy

Name:

Date:

Energy Transformation Evaluation

1) What is an example of mechanical energy?
   a. Digesting food
   b. Riding a bike
   c. Plant creating food using sunlight
   d. Heating an iron block

2) What are the energy transformations involved in **turning on a flashlight?**

_____ → _____ → _____

3) Scientists say that "energy cannot be created or destroyed." What does this mean to you?

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