Introducing the Types of Energy

By: Kimberly Miller

Focus on Inquiry

The students will investigate and model how the various forms of energy are transferred into other forms of energy.

Lesson Content Overview

The students will investigate how the various forms of energy are transferred into other forms of energy and will use graphic organizers and stations to describe how the energy is being transferred.

Duration	Setting	Grouping	PTI Inquiry Subskills
2-3 class periods	7th grade classroom	Group work	3.7,5.2, 5.5, 3.3, 6.1, 6.2 7.2, 7.3, 4.1

Lesson Components	Estimated Time	Inquiry Subskills Used	Technology Used	Level of Student Engagement	Brief Description
Engage	5-8 minutes	3.7 5.2	Computer (optional)	3	Students will use the website Answer Garden to construct a word web of what they already know about energy.
Explore	20-30 minutes	5.5, 3.3, 6.1	Computer (optional)	3	Students will use stations to investigate energy transformations.
Explain	10-15 minutes	7.2, 7.3, 4.1, 5.5	None	2	Using their graphic organizers students will explain how the energy was transferred.
Expand	20-30 minutes	6.2, 7.3, 7.2	None	3	Students will create collages that show more examples of the energy transfer they picked.
Evaluate	5 minutes	6.2, 7.3, 7.2	None	1	Can be the collage or the assessment at the end of the lesson.

Level of Student Engagement

1	Low	Listen to lecture, observe the teacher, individual reading, teacher demonstration, teacher-centered instruction
2	Moderate	Raise questions, lecture with discussion, record data, make predictions, technology interaction with assistance
3	High	Hands-on activity or inquiry; critique others, draw conclusions, make connections, problem-solve, student-centered

Next Generation Science Standards – Inquiry Practices

NGSSS Practice 2 Developing and using models
NGSSS Practice 6 Constructing explanations and designing solutions
NGSSS Practice 7 Engaging in Arguments from Evidence
NGSSS Practice 8 Obtaining, Evaluating, and Communicating Information

Next Generation Science Standards – Physical Science

MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes energy is transferred to or from the object.

Florida Science Standards – Nature of Science

SC.7.N.3.2 Explain the benefits and limitations of models.

Florida Science Standards - Physical Science

SC.7.P.11.2 Investigate and describe the transformation of energy from one form to another.

Materials and Advance Preparation

Materials List

Class Set

- 1 set of energy cards in envelopes per group, see **Blackline Master #1**
- 1 set of station tasks cards
- 1 set of Go Fish cards (optional), see **Blackline master #7**

Student Materials:

- 1 highlighter per student
- Dry erase boards & markers (1 per student)
- 1 **Blackline master #2** for each student
- 1 **Blackline master #4** for each student
- 1 **Blackline master #5** for each student *(construction paper, copy paper or lined paper could be used instead)*

Energy Station Materials

- Plant
- Table lamp

Blackline Masters

1. **Blackline Master #1:** Picture & Energy Type Sorting Cards
2. **Blackline Master #2:** Energy Types Graphic Organizer
3. **Blackline Master #3:** Station Tasks
4. **Blackline Master #4:** Station Sheet for Students
5. **Blackline Master #5:** Graphic Organizer of Examples
6. **Blackline Master #6:** Go Fish cards
7. **Blackline Master #7:** Check for Understanding – Energy Types
8. **Blackline Master #8:** Answer Keys

Advance Preparation

1. Print out & cut the sorting cards and stuff into envelopes **Blackline Master #1** (1 set per group).
2. Gather the station materials that you will need.
3. Arrange stations as instructed in the Explore section below and using **Blackline master #3**
4. Print enough copies of **Blackline Masters #2, #4, and #5** for each student.
5. On day 2, label the energy transfers at each station for students to compare their answers with. See Part 1 in the explain section below.
6. Make copies of **Blackline Master #7** for each student.
7. Make copies of the Go Fish cards and cut them up. See **Blackline Master #6.**

Lesson Information

Learning Objectives

1. Students will investigate and model the transformation of energy from one form to another.
2. Students will identify and explain situations where energy is transformed between one form of energy into another form of energy.
3. Students will identify the different types of energy.
4. Students will explain the benefits and limitations of the models at the stations.

Prior Knowledge Needed by the Students

- Students should have a basic understanding of potential and kinetic energy and the law of conservation of energy.

Background Information

Energy is neither created nor destroyed according to the Law of Conservation of Energy. This law is considered the first law of thermodynamics. An energy transformation is when one type of energy is

transformed into a different type of energy resulting in a loss of heat. Each type of energy is classified under one of the two main types of energy: kinetic energy and potential energy. Sound, thermal, electrical, electromagnetic and mechanical are all considered forms of kinetic energy (moving sound waves, moving molecules, moving electrons, moving waves, object moving). Nuclear, chemical, and mechanical are all considered forms of potential energy (energy stored in nucleus, energy stored in chemical bonds, potential energy is increased by changing something's position).

Lesson Procedure

Engage

1. Show students the following gif: http://gph.is/1WeDgYn
    a. *NOTE: Make sure to fast forward past the advertisements and display the video "whole screen" so that the web page advertisements located on the right-hand side and underneath the video will not be seen. In addition, please be on the lookout for "pop up" ads while the video is playing.*
2. Ask the class, "How does this video demonstrate "energy"? What do you remember about energy?" Possible student responses will vary due to their depth of knowledge.
3. Next, using the structure below have students work through their response.
    a. Students will be in groups with 1 piece of paper.
    b. Give students 1 minute after posing the above question to pass the paper around the table.
    c. Students take turns writing something they remember as the paper gets passed around the table. Each student writes 1 idea at a time.
    d. Students continue to pass around the paper until time is called.
    e. Tell the groups to nominate 1 person to be the speaker.
    f. Starting at the first table have the speaker say 1 idea of what they remember. If the other tables have that idea on their paper, they have to scratch it off.
    g. Each table takes their turn to say something about what they remember about energy. Teacher may elect to go around the room a few times to get a good understanding of their student's prior knowledge.
4. Teachers may want to incorporate technology into the lesson using the website, "Answer Garden" at https://answergarden.ch/.
    a. This program allows teachers to create a free account and will create a word map of the student's answers on the screen.
    b. Students would text in their "energy" answer responses to help create the word map.
    c. This is an example of a Word Garden: 

    d. The more a response is given, the larger it appears in the "garden."
    e. Students can watch the garden grow as they enter more responses.

Explore

Part 1

1. Each group of students will receive 1 envelope. Inside the envelope are the different types of energy and pictures that correspond to each energy type. *See sheet below for answers.*
2. Allow students to match the pictures to the definition of the type of energy they belong to (based on prior knowledge). Instruct students to keep the cards on their desk once they have them matched.
3. Once students have all pictures and energy types matched, have them raise their hands for you to come to check their work. Instruct students to keep the cards together once they have the order correct.

4. If there are wrong matches, silently un-match those words and have students correct them until all pairs are correctly matched.
5. Have students write a working definition and draw a picture(s) in the space provided on **Blackline Master #2.** *See sheet below for answers.*
6. Have students highlight words within the definition that help them remember what each type of energy is.

Part 2

1. Arrange the following stations (see **Blackline Master # 3** for station tasks):
    a. *Plant and lamp*
    b. *Car tracks*
    c. *Have a video clip of an athlete eating (make sure to have a computer or other electronic device to show the gif) Teachers may use a picture of an athlete/person eating instead.*
    d. *Hand warmer*
    e. *Picture of a bomb exploding*
    f. *Have a table set up for kids to knock and listen for sound.*
    g. *Flashlight*
    h. *Fan*
2. Have students fill out **Blackline Master #4,** columns 2 and 3 only, as they rotate through the stations. *Time at each station is at the teacher's discretion.*
3. After rotating once through the stations, have students sit down and compare the energies they have identified on their station sheet **(Blackline Master #4)** to their organizer **(Blackline Master #2)**

Explain

On the second day students will rotate 1 time through the stations in order to correct any answers that they got wrong (there may be time at the end of the 1st day to do this). *The teacher will label each energy transfer at the stations before students come in for class.*

Part 1

1. Have students take their **Blackline Master #4** around to each of the stations in order to check and correct their mistakes. Teacher monitors for any misconceptions.
2. Have students team up with other students at their table or around them to come up with an explanation for each station. Have them explain how the energy is being transferred in column 3 of their **Blackline Master #4**.

Part 2

1. Using a dry erase board have students group their energies under where they think they belong: potential or kinetic energy?
2. Have each student create their own lists and then have them share out at the table. Have students explain their reasoning for placing those energies under either potential or kinetic. Have the table come up with a group list.
3. Have students go back to their **Blackline master #4** to write a K or P next to each energy type.

Expand

1. Have students pick 1 form of energy from their **Blackline masters #2 or #4**.
2. Using **Blackline master #5** have students write their chosen energy form in the middle of the graphic organizer.
3. Students then will find 4 images that they draw, cut out of a magazine, or download and print to fill in the rest of the graphic organizer that show their form of energy being transformed into FOUR different other forms of energy *(for example, if I chose chemical energy for the middle, I would show 4 different types of energy that chemical energy transforms into using pictures and then explanations/descriptions).*
4. Students will also explain the energy transformations that are taking place in the pictures that they chose.
5. Lastly, students will identify and explain the limitations and benefits of modeling energy transformations.

6. Teacher can elect to have students present their collages.

Evaluate

INFORMAL or OPTIONAL EVALUTIONS: Collages the students made in the expand section above.
FORMAL EVALUATIONS: Check for Understanding – Energy Types (**Blackline Master #7)**

WRAP UP.

1. *Have one set of Go Fish cards for each group or pair of students that have all pictures of energy types on them (**Blackline Master #6**).*
2. *Students will play the game Go Fish.*
    a. *2 or 3 cards are dealt to each person.*
    b. *Students are trying to match energy types by asking each other if they have the energy types in their hand and drawing from the pile if the answer is, "Go Fish."*
    c. *When students make a match, the will lay down their pair of cards and explain the energy type and why the two cards are a match.*
    d. *After a set time the student who has the most pairs laid down wins the game.*

Supplementary Resources

Teachers & Students

Answer Garden. http://www.answergarden.ch/ - An online resource to get feedback from students.

Build-it-Solar. (2008). Renewable Energy and Conservation Projects You Can Build. Retrieved from http://www.builditsolar.com/Projects/Educational/educational.htm.

California Energy Commission. (2016). Energy Quest: Interactive Exploration of Energy. Retrieved from: http://www.energyquest.ca.gov/index.html.

eSchooltoday. (2016). Kinds of Energy. Retrieved from http://www.eschooltoday.com/energy/kinds-of-energy/what-is-kinetic-energy.html

FCPS Science. (2006). Energy Transformation Practice. Retrieved from http://www.wsanford.com/~wsanford/gr8ps/VA-SOLs/FCPS-SOL-Review-Booklet/pp117-130_SOL-Review_Student_FINAL_1.18.06.pdf

Glencoe. (n.d.) Interactive Energy Transformation Practice. Retrieved from http://www.glencoe.com/sites/common_assets/science/virtual_labs/E04/E04.html

St. Louis Public Schools. (2016). Energy Transformations Practice Activity. Retrieved from http://www.slps.org/cms/lib03/MO01001157/Centricity/Domain/5976/Energy%20Transformation%20Practice%202.pdf

US Energy Information Administration. (2016). Energy Kids. Available from: http://tonto.eia.doe.gov/kids/energy.cfm?page=Plans.

WGBH Educational Foundation. (2007). Rollercoaster simulation. Retrieved from http://www.pbslearningmedia.org/asset/mck05_int_rollercoaster/

CITATION OF SOURCES.

algotruneman. (2013). Cloud sound 3 picture. Retrieved from https://openclipart.org/detail/178826/cloud-sound-3

At09kg. (2011). Photosynthesis picture. Retrieved from https://commons.wikimedia.org/wiki/File:Photosynthesis.gif

Clip Art Panda. (2014). Flashlight picture. Retrieved from http://www.clipartpanda.com/clipart_images/has-a-flashlight-that-they-19447730

dear_theophilus. (2013). Listening picture. Retrieved from https://openclipart.org/detail/196387/listening

emilie.rollandin. (2011). Solar Cell Picture. Retrieved from https://openclipart.org/detail/165452/pannello-fotovoltaico

gnokii. (2011). Fast Food Picture. Retrieved from

https://openclipart.org/detail/150523/fast-food-menu

j4p4n. (2014). Sun picture. Retrieved from https://openclipart.org/detail/194877/cartoon-sun

johnny_automatic. (2006). Girl playing soccer picture. Retrieved from https://openclipart.org/detail/723/girl-playing-soccer

johnny_automatic. (2007). Rolling down hill picture. Retrieved from https://openclipart.org/detail/6659/rolling-down-hill

johnny_automatic. (2009). Gears picture. Retrieved from https://openclipart.org/detail/21153/skew-gear

kg. (2012). Nuclear explosion picture. Retrieved from https://openclipart.org/detail/168613/nuclear-explosion

liftarn. (2006). Electrical outlet and plug picture. Retrieved from https://openclipart.org/detail/2646/electrical-outlet-and-plug

liftarn. (2013). Power lines picture. Retrieved from https://openclipart.org/detail/181459/power-pole-with-power-lines

Makovka. (2006). Runner picture. Retrieved from https://openclipart.org/detail/2256/run

matheod. (2013). Atom picture. Retrieved from https://openclipart.org/detail/185844/energy

netalloy. (2010). Fire picture. Retrieved from https://openclipart.org/detail/88963/fire

nicubunu. (2009). Battery picture. Retrieved from https://openclipart.org/detail/22040/battery

online-sciences.com. (2016). Energy Transformations Picture. Permission by Creative Commons Attribute 4.0. Retrieved from http://www.online-sciences.com/the-energy/the-forms-of-the-energy-and-their-changes/attachment/energy-transformation/

Phoenix Film & Video. (2012). Potential energy picture. Retrieved from http://www.musicamoviles.com/ASZv3tIK56k/kinetic-and-potential-energy-clip/

rejon, (2010). Lightbulb picture. Retrieved from https://openclipart.org/detail/35935/lightbulb-01

Sick Science. (2013). Popsicle Stick Chain Reaction. Retrieved from https://youtu.be/r7j7l39ZAsU

Steve Spangler GIF - Find & Share on GIPHY. (n.d.). Retrieved March 01, 2016, from http://gph.is/1WeDgYn

timtjtim. (2015). Fan picture. Retrieved from https://openclipart.org/detail/217053/desk-fan-speed-designed.

tzunghaor. (2011). Nuclear explosion picture. Retrieved from https://openclipart.org/detail/166696/nuclear-explosion.

tzunghaor. (2012). Archer picture. Retrieved from https://openclipart.org/detail/170892/archer

__✓__ Yes, I cited all materials and resources used in this lesson.

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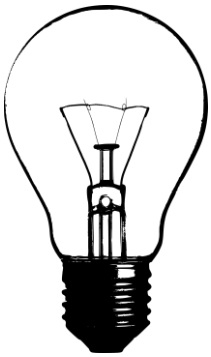
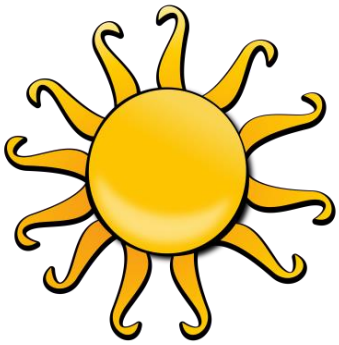
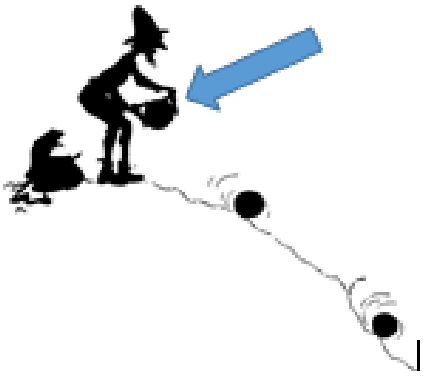
Lesson author signature

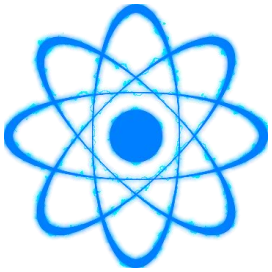
Blackline Master #1

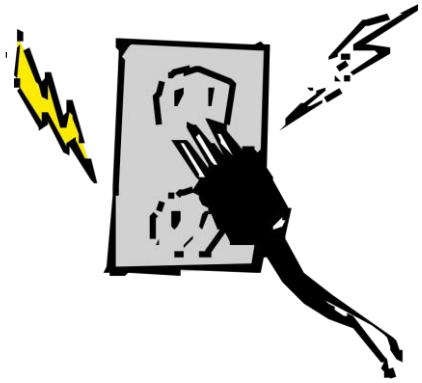
Picture & Energy Type Word Sort Cards

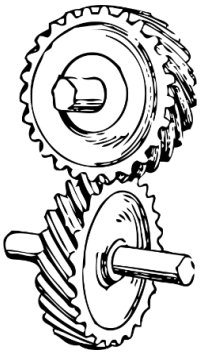












The energy that an object has due to its position or due to the configuration of its parts; for example if a rubber band is stretched or relaxed. One way to calculate this type of energy by multiplying its mass, the pull of gravity, and the object's height above the ground.

E = m • g • h

The stored energy in the bonds between the atoms in compounds. This stored energy is transformed when bonds are broken or formed through *chemical reactions.*

The stored energy of the nucleus of an atom. This energy can be released through the fusing together of two atoms (fusion) or the splitting apart of an atom (fission).

Energy that results from the vibration of the atoms and molecules that make up an object. We feel the vibration of these atoms and molecules as different temperatures.	Energy that results from the vibration of objects and air molecules. These vibrations must travel through some type of matter and we receive them with our ears. Sometimes, you can FEEL these waves!
Energy that comes in many different forms, primarily from the Sun. Wave types include radio waves, microwaves, infrared waves, visible light, ultraviolet waves, X-Rays, and gamma rays.	Energy that is a result of moving electrons through some sort of conductive material; for example metal wire.
The sum of potential energy and kinetic energy. This type of energy is associated with the motion and position of an object.	The energy that an object possesses due to its motion. We calculate this type of energy by multiplying an object's mass and the square of its velocity. **$E = \frac{1}{2} \bullet m \bullet v^2$**

Blackline Master #2

Energy Types Graphic Organizer

Electromagnetic	**Chemical**
Nuclear	**Sound**
Thermal	**Electrical**
Kinetic	**Potential**
Mechanical	

Blackline Master #3

Station #1

Using the plant and the lamp, draw and label the type of energy(s) shown at this station.

Station #2

Using the car and ramp, draw and label the types of energy(s) available shown at this station.

Station #3

Observe the athlete eating. Draw and label the type of energy(s) shown at this station.

Station #4

Hold the hand warmer in your hand. Draw and label the type(s) of energy shown at this station.

Station #5

Observe the picture of a bomb exploding.

Photo Credit: https://openclipart.org/detail/166696/nuclear-explosion

Draw and label the energy(s) shown at this station.

Station #6

Have student A place their ear on the table. Have student B knock on the other side of the table. Student A must count how many ‘knocks’ they hear. Switch roles and repeat. Draw and label the energy(s) shown at this station.

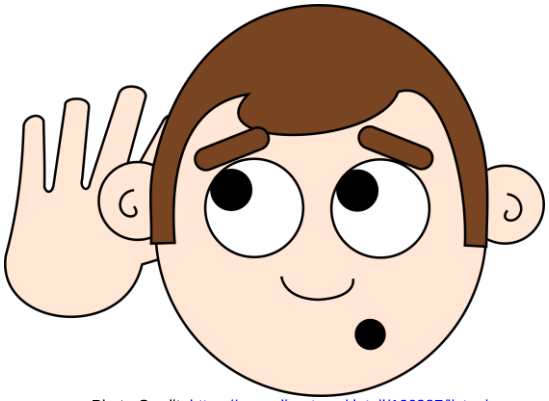


Photo Credit: https://openclipart.org/detail/196387/listening

Station #7

Using the flashlight; turn it off and on. Draw and label the type of energy(s) that are observed at this station.

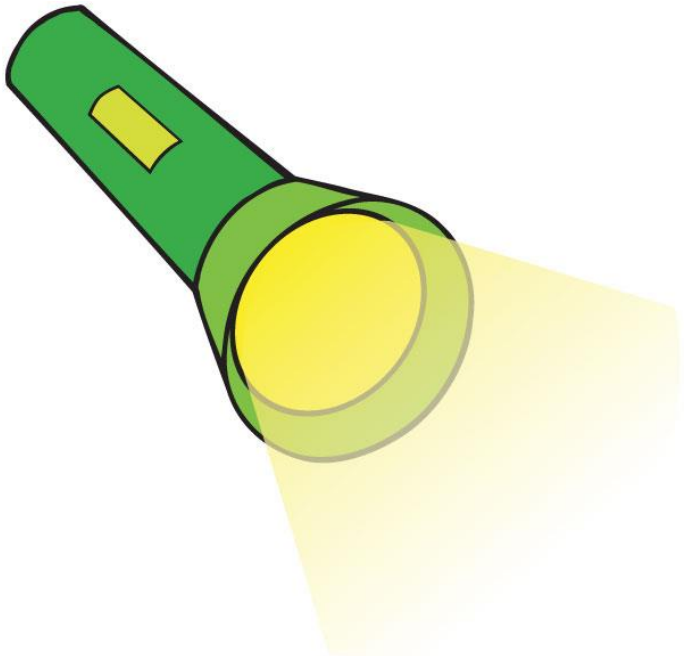


Photo Credit: http://www.clipartpanda.com/clipart_images/has-a-flashlight-that-they-19447730

Station #8

Turning the fan on. What type of energy(s) do you observe? Draw and label the types of energy(s) you observed at this station.

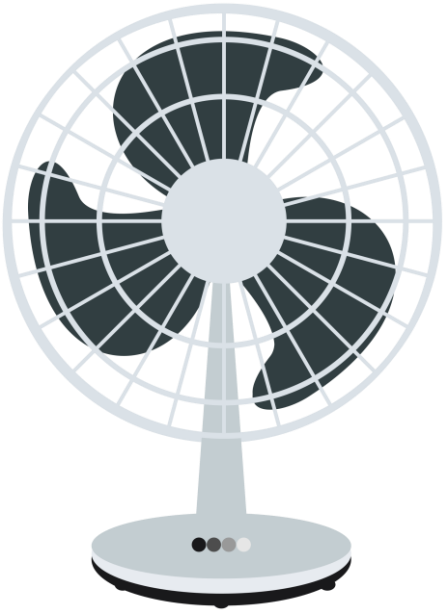
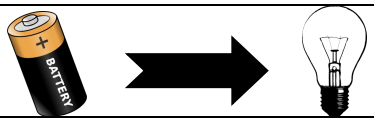


Photo Credit: https://openclipart.org/detail/217053/desk-fan-speed-designed

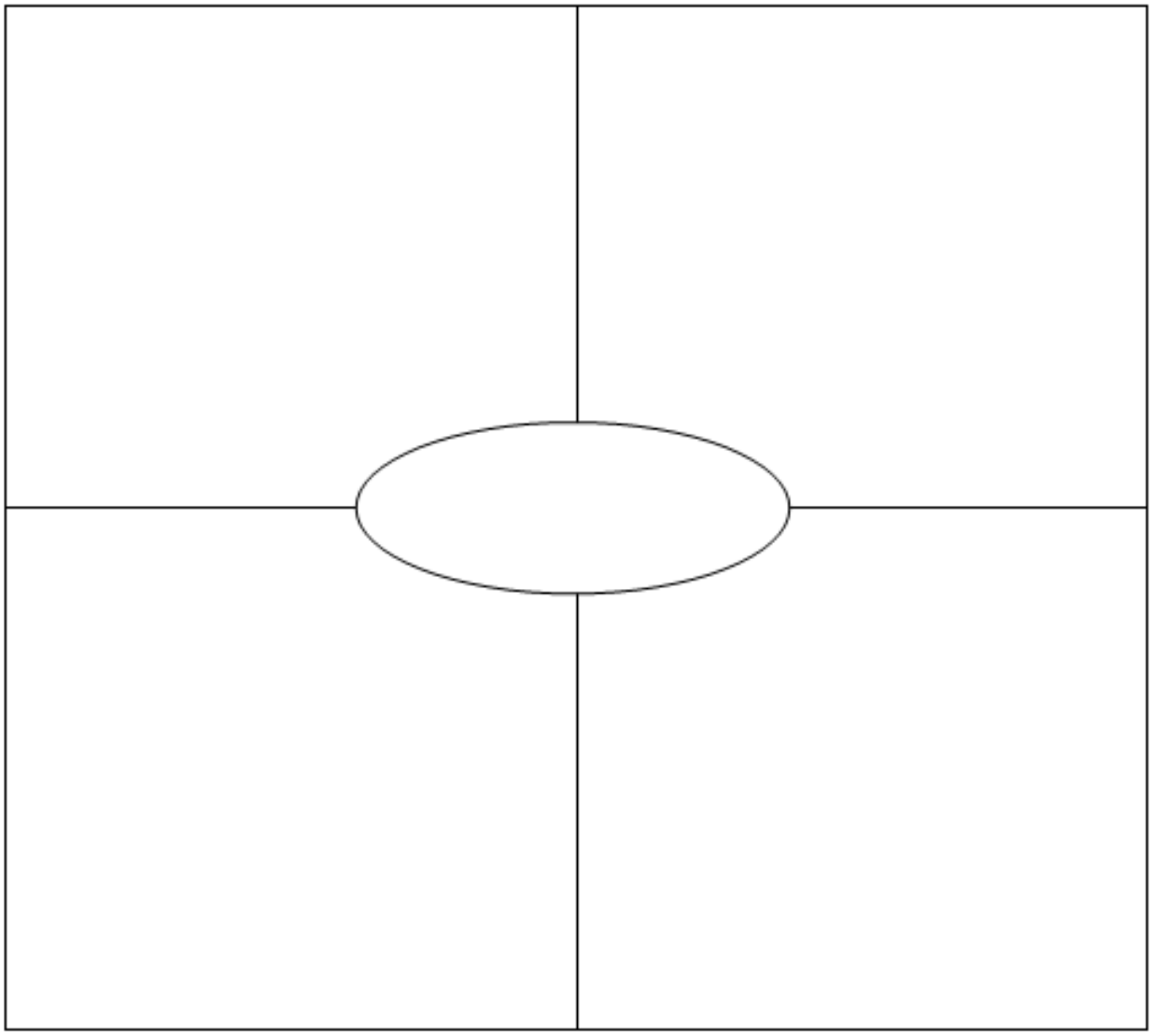
Blackline Master #4

Student Station Sheet

Station number:	The types of energy(s) identified at each station:	Draw a model of the energy transformation at this station:	Explain how energy is transferred at this station:
EXAMPLE	*Chemical, Light*		*The chemical energy in the battery is transformed into light in the light bulb.*
1			
2			
3			
4			
5			
6			
7			
8			

Blackline Master #5

Energy Examples Graphic Organizer



Explain your energy transformations.

1. _____
2. _____
3. _____
4. _____

Explain how/why modeling energy transformations might be helpful _____

_____

_____

Explain how/why modeling energy transformations might NOT be helpful. _____

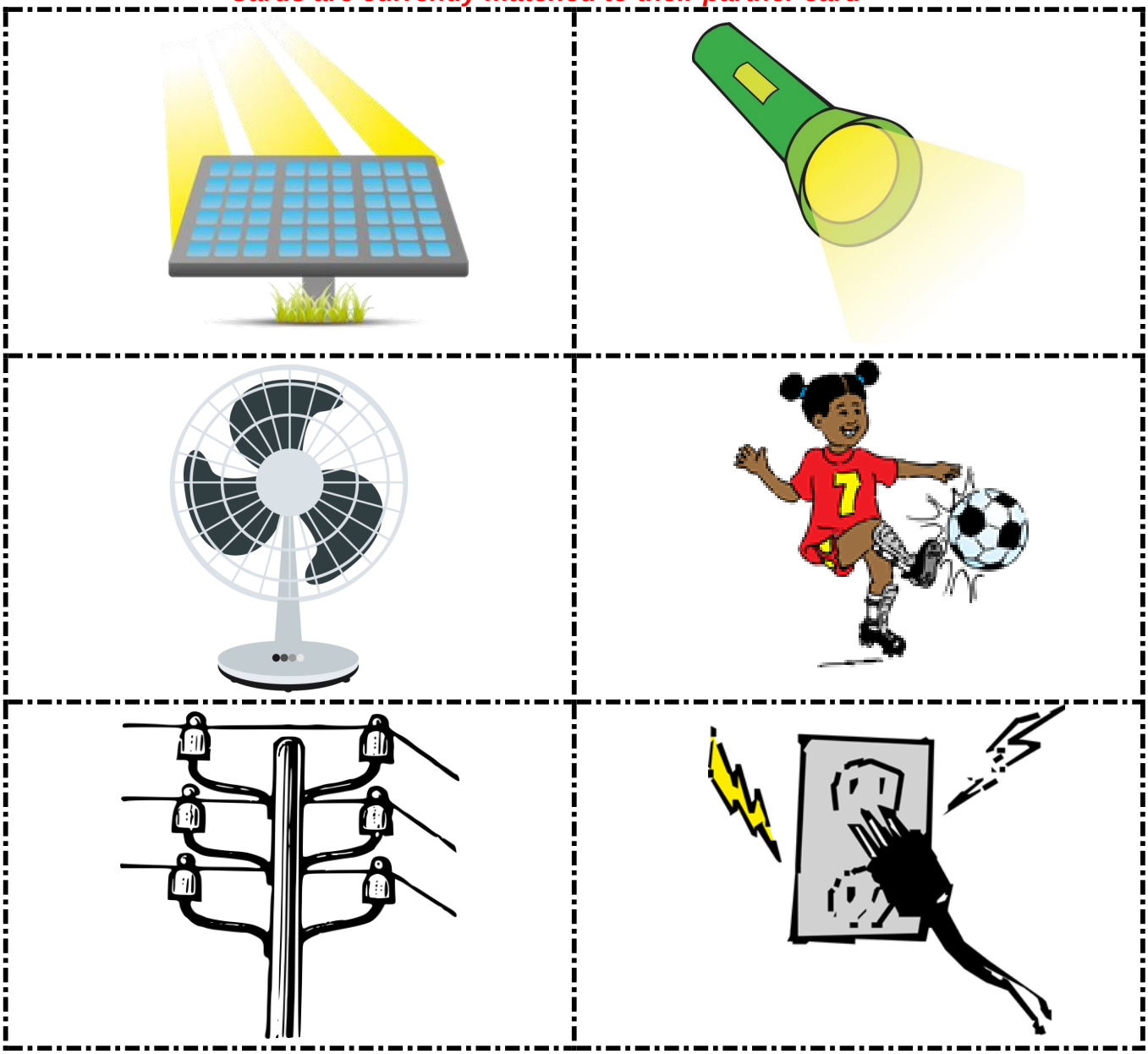
_____

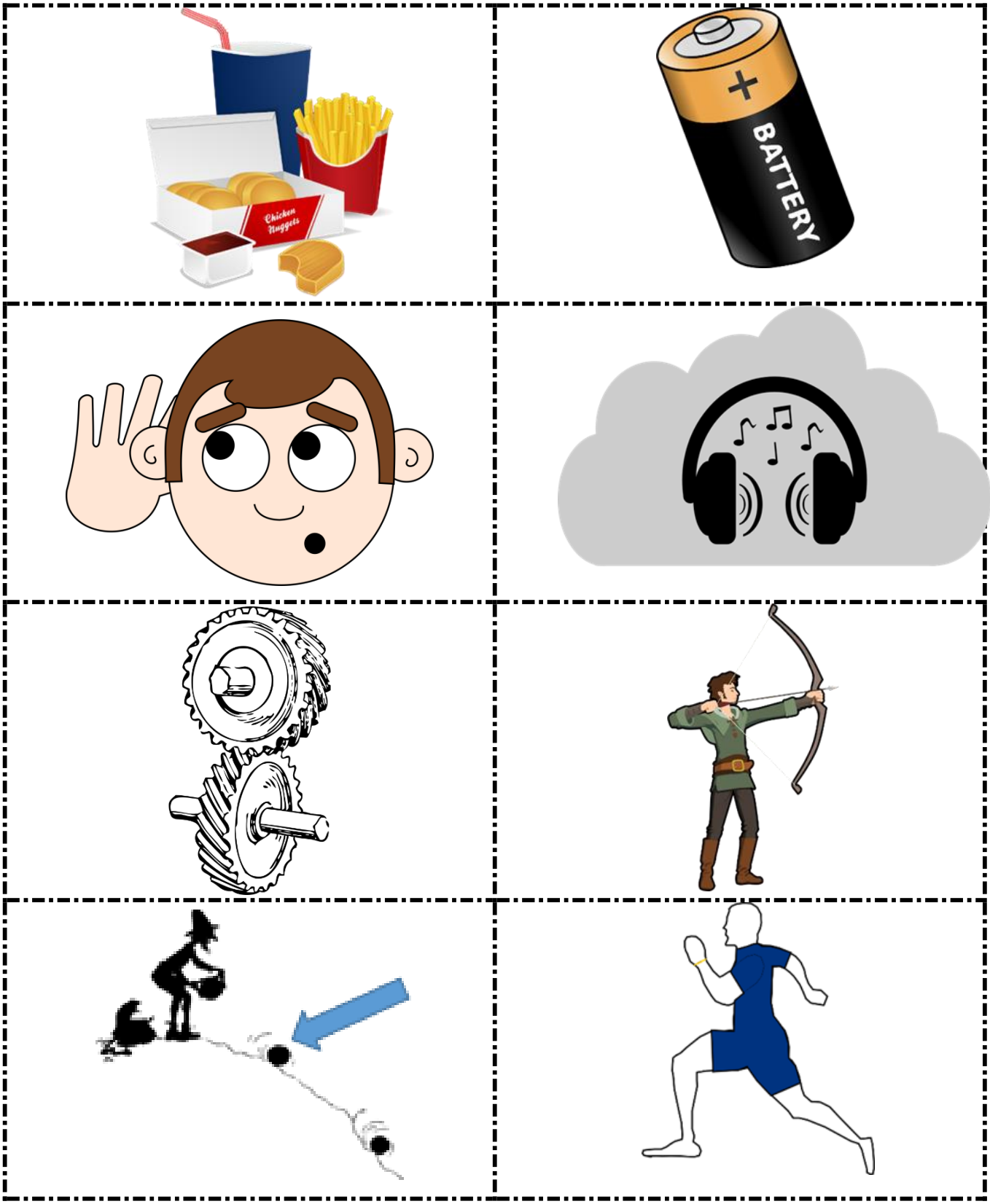
_____

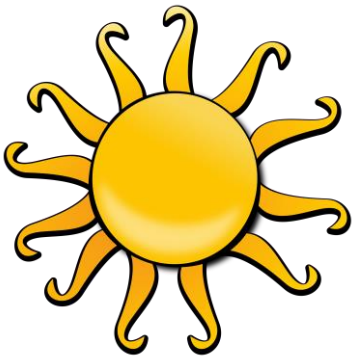
Blackline Master #6

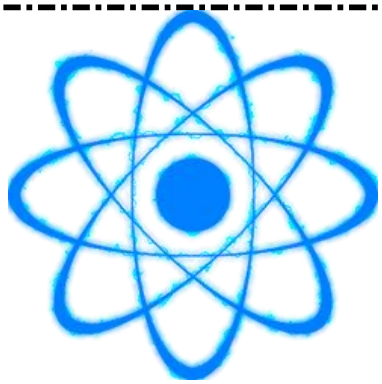
Go Fish Game Cards

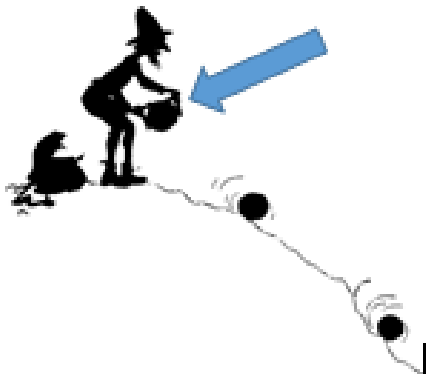
Cards are currently matched to their partner card

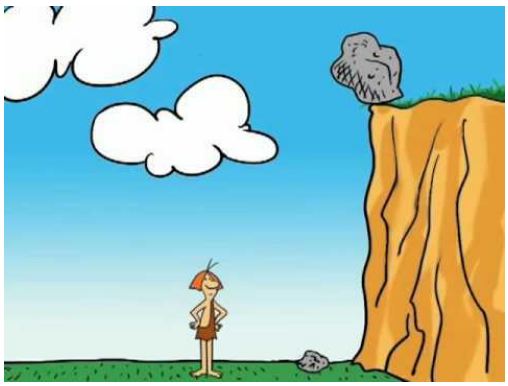



Chicken Nuggets
BATTERY









Blackline Master #7

Check for Understanding – Energy Types

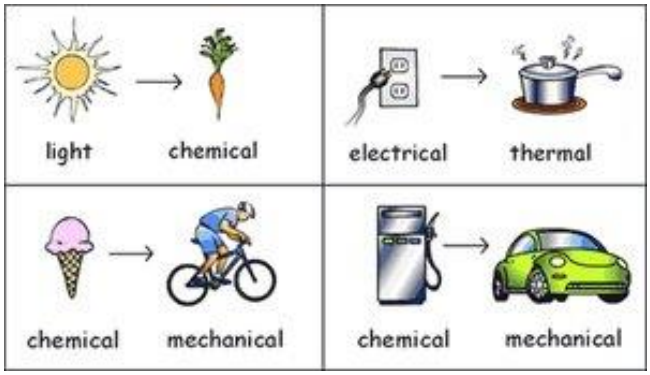
1. Your family is driving to New York for spring break. As you're moving, the car burns gasoline in the engine. The engine is doing which type of energy transfer? (SC.7.P.11.2)
   a. Electrical energy into thermal energy
   b. Mechanical energy into kinetic energy
   c. Chemical energy into mechanical energy
   d. Kinetic energy into potential energy

2. Before Timothy's soccer game he ate a big lunch. Which of the following energy transformations occur as he played his soccer game? (SC.7.P.11.2)
   a. Sound energy into kinetic energy
   b. Chemical energy into kinetic energy
   c. Kinetic energy into nuclear energy
   d. Kinetic energy into nuclear energy

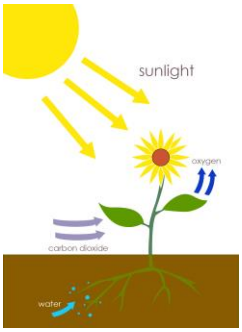
3. The picture below shows a girl kicking a soccer ball. Pick the answer that **BEST** shows the path that energy is being transferred. (SC.7.P.11.2)

   a. Nuclear energy to chemical energy to kinetic energy
   b. Mechanical energy to kinetic energy to potential energy
   c. Potential energy to chemical energy to kinetic energy
   d. Kinetic energy to mechanical energy to chemical energy

4. Using the diagram below, pick one of the energy transfers and explain how the energy is being transferred. Use the space below to write your answer. (SC.7.P.11.2)

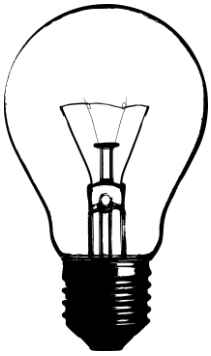


5. What are the benefits and limitations of using this picture to model an energy transformation? (SC.7.N.3.2)



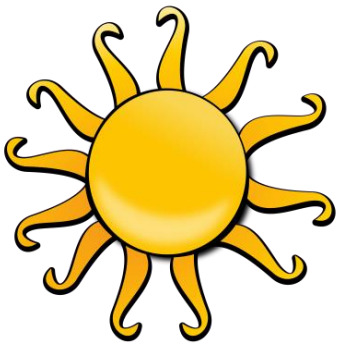
Blackline Master #8 – ANSWER KEYS

Energy Types Card Sort Answer Key



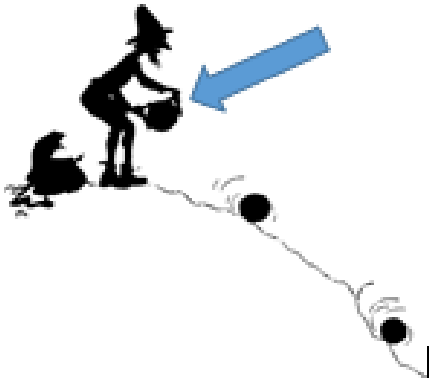
Electromagnetic Energy

Energy that comes in many different forms, primarily from the Sun. Wave types include radio waves, microwaves, infrared waves, visible light, ultraviolet waves, X-Rays, and gamma rays.



Heat Energy

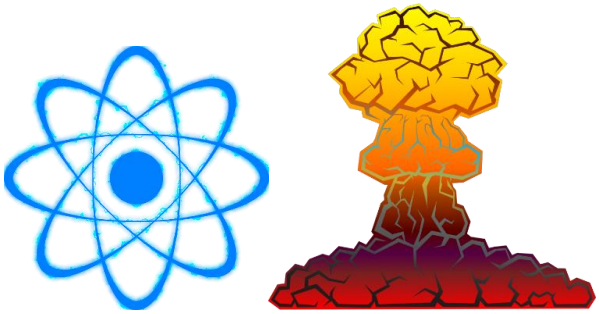
Energy that results from the vibration of the atoms and molecules that make up an object. We feel the vibration of these atoms and molecules as different temperatures.



Potential Energy

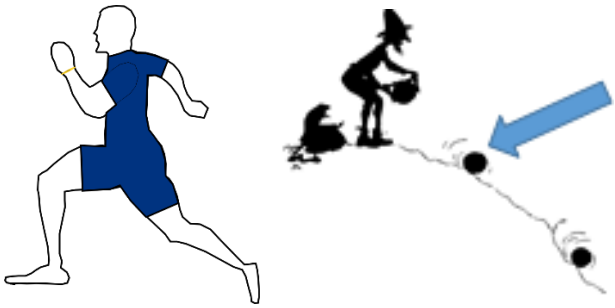
The energy that an object has due to its position or due to the configuration of its parts; for example if a rubber band is stretched or relaxed. One way to calculate this type of energy by multiplying its mass, the pull of gravity, and the object's height above the ground.

E = m • g • h



Nuclear Energy

The stored energy of the nucleus of an atom. This energy can be released through the fusing together of two atoms (fusion) or the splitting apart of an atom (fission).



Kinetic Energy

The energy that an object possesses due to its motion. We calculate this type of energy by multiplying an object's mass and the square of its velocity.

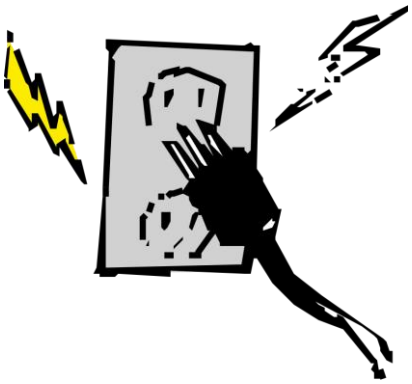
$$E = \frac{1}{2} \bullet m \bullet v^2$$

Chemical Energy

The stored energy in the bonds between the atoms in compounds. This stored energy is transformed when bonds are broken or formed through *chemical reactions.*

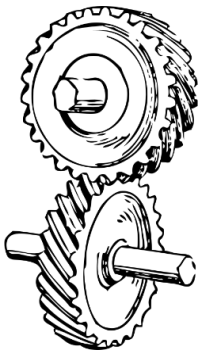
Sound Energy

Energy that results from the vibration of objects and air molecules. These vibrations must travel through some type of matter and we receive them with our ears. Sometimes, you can FEEL these waves!



Electrical Energy

Energy that is a result of moving electrons through some sort of conductive material; for example metal wire.



Mechanical Energy

The sum of potential energy and kinetic energy. This type of energy is associated with the motion and position of an object.

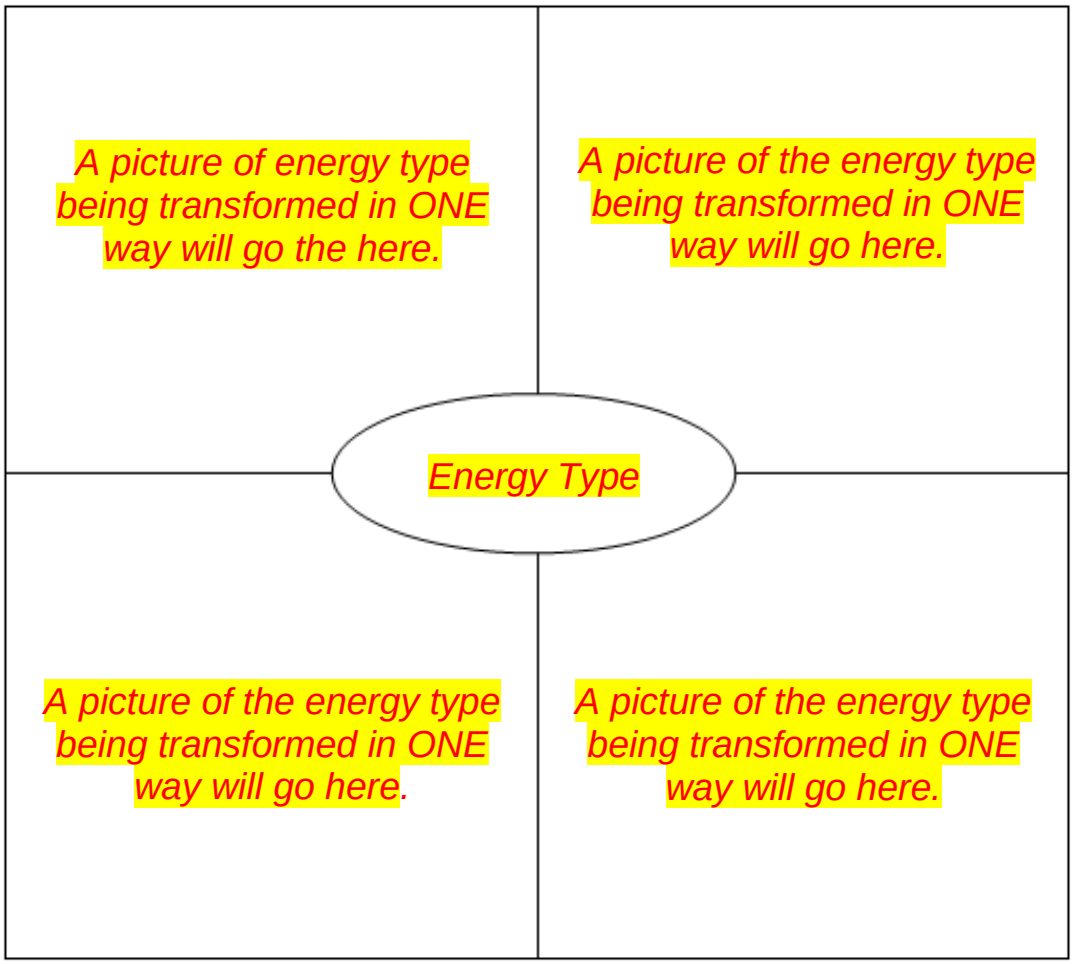
Student Station Sheet – Answer Key

Station number:	The types of energy(s) identified at each station:	Draw a model of the energy transformation at this station:	Explain how energy is transferred at this station:
1	*electrical energy* *electromagnetic energy* *chemical energy*	*student drawings and labels will vary*	*electromagnetic energy is transferred to the plant and is converted to chemical energy in the plant through photosynthesis*
2	*potential energy* *kinetic energy*	*student drawings and labels will vary*	*car at top of ramp has potential energy. when released, the potential energy converts to kinetic energy*
3	*chemical energy* *potential energy*	*student drawings and labels will vary*	*the chemical energy in the food is converted to potential energy that is stored in the fat and muscles of the athlete which can later be used for mechanical energy, heat energy, or sound energy.*
4	*chemical energy* *thermal energy*	*student drawings and labels will vary*	*the chemical reaction of the compounds in the hand warmer release heat as part of the reaction*
5	*nuclear energy, sound energy, heat energy, electromagnetic energy*	*student drawings and labels will vary*	*the release of energy from the nucleus of the atom converts to heat energy, electromagnetic energy, and sound energy*
6	*mechanical energy* *sound energy*	*student drawings and labels will vary*	*mechanical energy of knocking is converted to sound energy*
7	*chemical energy, electrical energy, electromagnetic energy*	*student drawings and labels will vary*	*the chemical energy in the batteries are converted to electrical energy which is converted to electromagnetic energy*
8	*electrical energy, mechanical energy, sound energy*	*student drawings and labels will vary*	*electricity powers the fan and is converted into mechanical energy of the turning fan blade. This may also result in sound energy*

Energy Examples Graphic Organizer - Answer Key

This is just an example of ONE possible graphic organizer

[Grab your reader's attention with a great quote from the document or use this space to emphasize a key point. To place this text box anywhere on the page, just drag it.]



Explain your energy transformations.

1. Answers here will vary depending on the students' energy type and the chosen forms of energy transformations, but students should be able to explain all four of their energy transformations.
2. _____
3. _____
4. _____

Explain how/why modeling energy transformations might be helpful *Answers here may vary, but should explain that modeling energy transformation is helpful because you can not visibly see the energy changing forms and people might think that it's "magic" or that the energy just "disappeared." It takes an abstract concept and makes it more concrete.*

Explain how/why modeling energy transformations might NOT be helpful. *The energy transformation diagrams don't show you the full extent of how the energy is transferred, how much is "lost" to heat or sound in each transformation, and does not give you real experience with those devices.*

Check for Understanding –Energy Types Answer Key

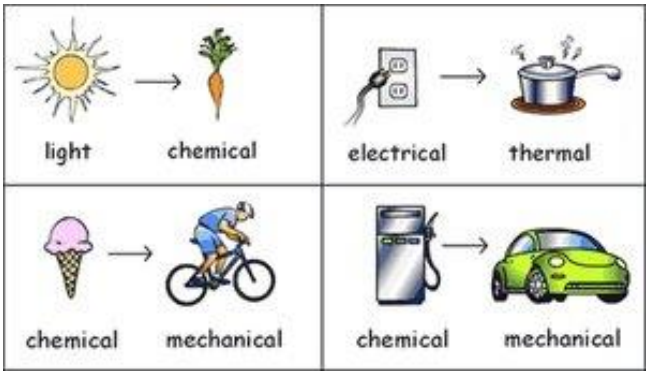
1. Your family is driving to New York for spring break. As you're moving, the car burns gasoline in the engine. The engine is doing which type of energy transfer? (SC.7.P.11.2)
   a. Electrical energy into thermal energy
   b. Mechanical energy into kinetic energy
   c. Chemical energy into mechanical energy
   d. Kinetic energy into potential energy

2. Before Timothy's soccer game he ate a big lunch. Which of the following energy transformations occur as he played his soccer game? (SC.7.P.11.2)
   a. Sound energy into kinetic energy
   b. Chemical energy into kinetic energy
   c. Kinetic energy into nuclear energy
   d. Kinetic energy into nuclear energy

3. The picture below shows a girl kicking a soccer ball. Pick the answer that **BEST** shows the path that energy is being transferred. (SC.7.P.11.2)

   a. Nuclear energy to chemical energy to kinetic energy
   b. Mechanical energy to kinetic energy to potential energy
   c. Potential energy to chemical energy to kinetic energy
   d. Kinetic energy to mechanical energy to chemical energy

4. Using the diagram below, pick one of the energy transfers and explain how the energy is being transferred. Use the space below to write your answer. (SC.7.P.11.2)



The light from the sun strikes the plant making the plant grow food.	The stove is plugged into the wall. When the stove is on the energy is transferred into the pot causing the water to boil.
Food provides energy for people which will allow them to move.	The chemical energy from the gas pump is put into the car allowing the car to move.

5. What are the benefits and limitations of using this picture to model an energy transformation? (SC.7.N.3.2) The benefit of using this picture to model photosynthesis is that it shows you all of the processes that take place that you can't normally see. A limitation is that you can't understand the complex chemical processes that are taking place in this process, and you can't tell how long the process takes or how much of the products or reactants are needed to undergo the reaction ***(this is a possible response, not necessarily the ONLY correct response).***