SCIENCE

Conservation of Energy

Madly LEARNING

Junior 3-5

Inquiry Based Unit

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Conservation of Energy

Information about these Lessons

This is a unit that is designed to teach students about energy and energy conservation which has lessons and activities that meet the following learning goals.

- What is energy?
- How is energy transformed and stored?
- Can energy be created, destroyed or lost?
- Renewable and non renewable energy sources.
- Sources of energy: How do we generate electricity?
- Identifies the impact that some sources of energy have on the environment.
- How do people use energy?
- Why should we conserve energy?

Lessons include shared/independent reading, student task cards, discussions, video links, demonstrations and experiments, online links for additional/ complementary lessons, and student reflections.

Each of the standard lessons include an interactive notebook activity/ foldable/flip book.

Materials:

- To discover energy it is often easiest if students learn through experimentation or demonstration. Especially considering that these concepts are quite complex, learning through simple experiments is a concrete way to cover this topic. Many of the materials needed for these experiments are easily found in the classroom or school environment or can be obtained at a local dollar store or grocery store for minimal funds.
    - Batteries
    - Balloons
    - Food Colouring
    - Flashlights

All the links contained in this resource can be found here:
http://www.livebinders.com/play/play?id=2070684

If you find any dead links in the live binder, please email at info@MadlyLearning.com so they can immediately updated.

Conservation of Energy

Information about these Lessons

Learning Goals:
Ensure that students are told what the learning goal is for each lesson. Post these learning goals on an anchor chart for students to reference. At any point in your lesson your students should be able to tell a stranger who walks in the room what they are doing and why they are doing it.

Teacher Directed Lessons:
This unit is balanced between direct instruction and inquiry learning. Using a variety of lesson formats, teaching styles, and student activities the direct instruction component of this unit will help to give students the basis for understanding the complexities of their inquiry project. This unit is not a replacement for good teaching but will give you the tools and ideas to creatively meet your curriculum needs.

Interactive Notebook:
Each of the lessons involve an interactive notebook reflection activity. This component of the Unit will allow students to reflect and consolidate their learning from the lesson.

Inquiry Project:
Students are more engaged in learning if they buy into what they are learning about. Students should use an inquiry booklet that has components geared specifically for this unit but can also be used for other inquiry studies. Students begin to explore Energy and Energy Conservation in the world around them. Students are guided to discover a topic of interest through a variety of online activities . With the other corresponding pages the inquiry process is scaffolded to help you guide students through their inquiry journey.

If you aren't yet familiar with the inquiry method of teaching, please watch my video series at bit.ly/ML-inquiry

NOTE: Canadian Spelling and Units of Measurements are used.

Interactive Notebooks

More Information

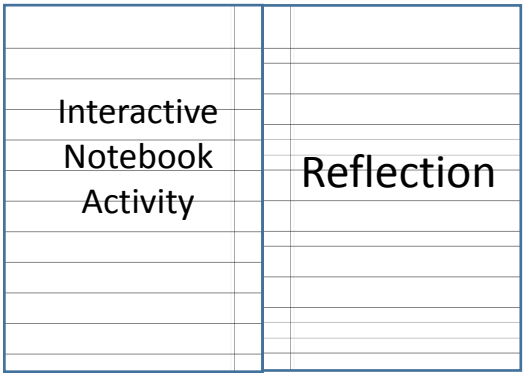
The purpose of this interactive notebook is to allow students to reflect and consolidate their learning.

It is important to have students participate in a lesson and get the gist of the lesson instead of an insignificant factoid being their take away. To ensure that students learn what you intend to teach them it is important to give them a learning goal to work towards, activities in which to learn this, then to have them reflect on what they have learned or summarize their learning. I see the interactive notebook as an important part to this type of learning.

Using the foldable activities in this notebook will give students an interesting activity to use and reflect on. With the teacher's guidance students will learn what they are supposed to learn.

Student reflection can be used on blank pages in the student notebook on the pages or using either of the sample pages in the next two pages.

These pages can serve as the basis for both formative and summative assessment.



Unit Plan Overview

Learning Goal

We are learning to understand what energy is, where it comes from and why it is important to conserve energy in our daily lives.

Essential questions - What will foster inquiry?	Knowledge - Students will know:	Skills - Students will be able to:
• What is Energy? • Where does energy come from? • What can we do to conserve energy?	• What is energy? • Energy cannot be created or destroyed but only transformed.	• Identify sources of energy. • Understand and demonstrate how energy is transformed. • Make a plan to conserve energy.

Culminating Activity

Overview of Task

Students will design a game board that will teach other students about energy and energy conservation.

Success Criteria

- The game board will teach people about the following information:
  - What is energy?
  - How is energy transferred and stored?
  - Can energy be created, destroyed or lost?
  - Renewable and non renewable energy sources.
  - Sources of energy: How do we generate electricity?
  - Identifies the impact that some sources of energy has on the environment.
  - How do people use energy?
  - Why should we conserve energy?
- Presentation
  - Decorate it
  - Make it colourful and appealing
  - Make it simple: Ensure your instructions are easy to follow and play.

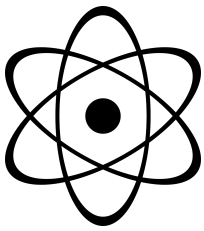
G – Goal What should students accomplish by completing this task?	Students should consolidate their learning about energy and apply it to instructing other about what they have learned throughout the unit.
R – Role What role (perspective) will your students be taking?	Students will be taking the role of game developer or designer.
A – Audience Who is the relevant audience?	Students will design the game for their peers to play.
S – Situation The context or challenge provided to the student.	Games are often a great way to teach others about different topics.
P – Presentation What product/ performance will the student create?	Students will create a game board that is designed based on this energy unit. Students will then play each other's games and evaluate them.

Materials:

- Interactive notebook reflections and information from the unit.
- Inquiry research
- Art supplies

Final assessment:

Students will be assessed using the rubric included at the end of this unit.



Provocation

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 1

	First Half	Second Half
Prep	Photocopy STW chart for each student Print provocation cards in colour for students to use training knowledge building circle	
Grade 5	***Provocation*** In small groups have students look at the pictures and word cards in a gallery walk format have them complete a STW chart	Students will me a knowledge building circle with the teacher to discuss the cards and what they wrote other STW chart.

Wonder Wall

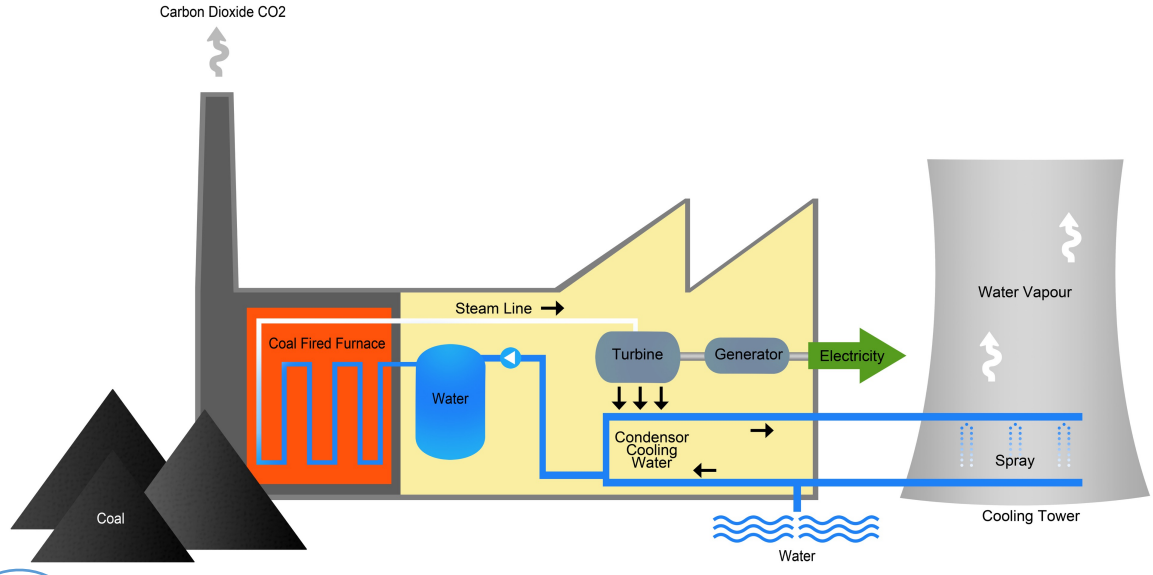
Use the following pictures to build your inquiry board.

Show students the pictures of provided and ask them to identify what they think the unit is about and what types of things they know about the pictures and what they have to do with energy.

This is a great way to see what students already know about energy before beginning the unit. Also helps to gauge interest in certain areas.

Picture #	Description
House	This is a thermal image of a house it indicates where the house might be losing heat. Red means that there is heat and blue means cool. In your house you do not want to see red because that means that you are losing heat energy.
Coal Plant	This is a diagram that shows how a coal plant turns coal into energy.
Light Bulbs	This diagram demonstrates the energy savings that can be made when you switch your light bulbs to more energy efficient bulbs.
Niagara Falls	This in an example of how we can produce energy and electricity from falling water. One of the largest examples of hydro-electric power.
Explosion (in color)	This is a photo of the Fukushima nuclear power plant explosion in Japan.
Explosion and devastation	This is a photo of the Chernobyl nuclear power plant and the devastation that it created when it exploded. Nuclear power is a great source and runs clean. However if there are problems it can devastate a community.
Toilet Diagram	This diagram shows where the water in your house goes and how it is used.
Map of Southern Ontario	This map shows the locations of wind farms around Ontario. The use of wind farms in Ontario is controversial and many are in rural communities not in large cities.
Basketball	This diagram shows the different between kinetic and potential energy.
Solar Panels	These are renewable energy sources that are clean to operate but expensive to install.
Electricity Towers	These are most commonly used to transport electricity from power plants to our homes. These towers keep the power running high above the ground. Some people think these are an eyesore and don't want to live near them.

A



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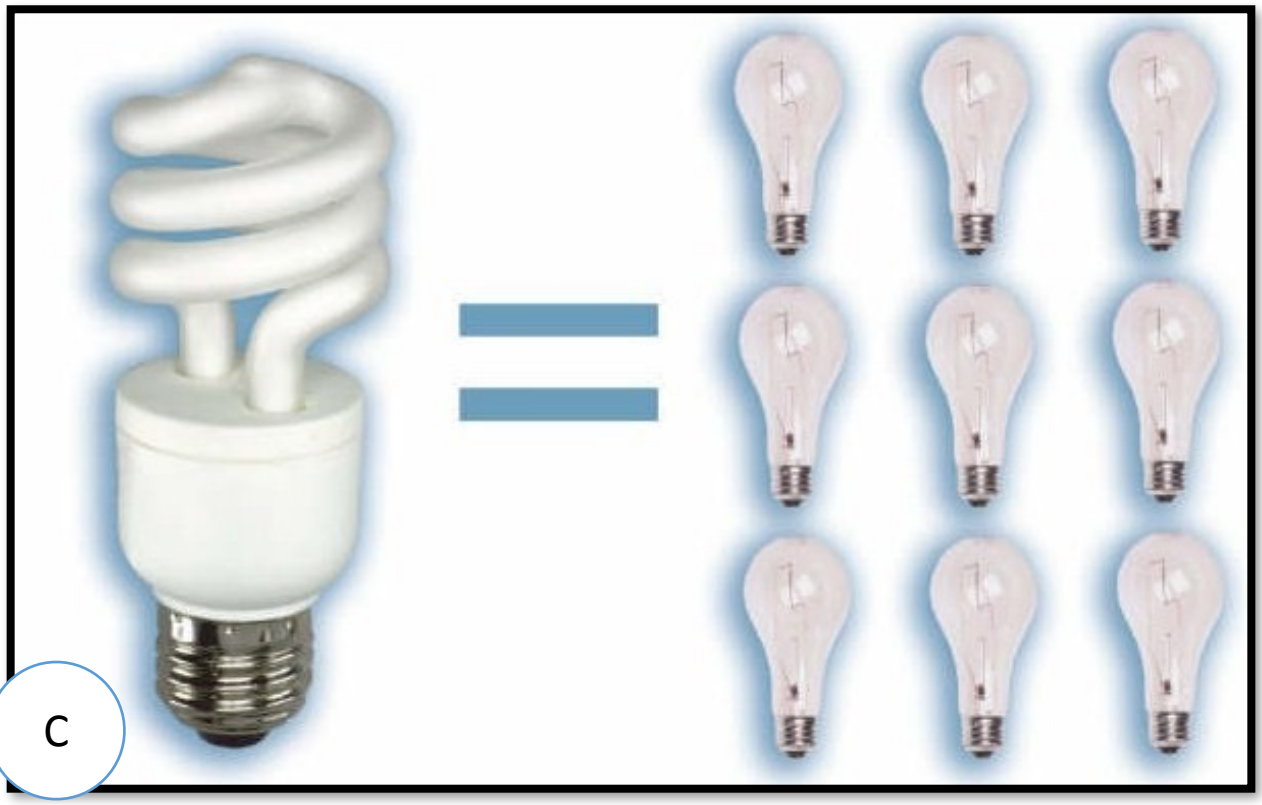
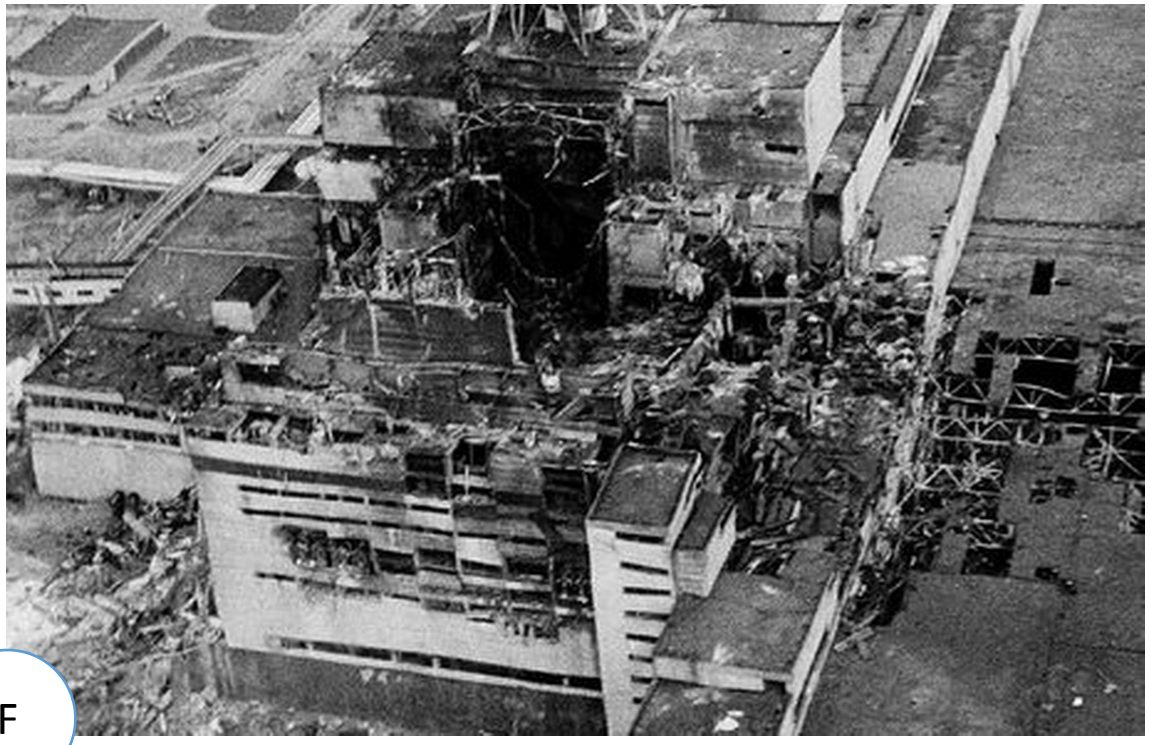


C

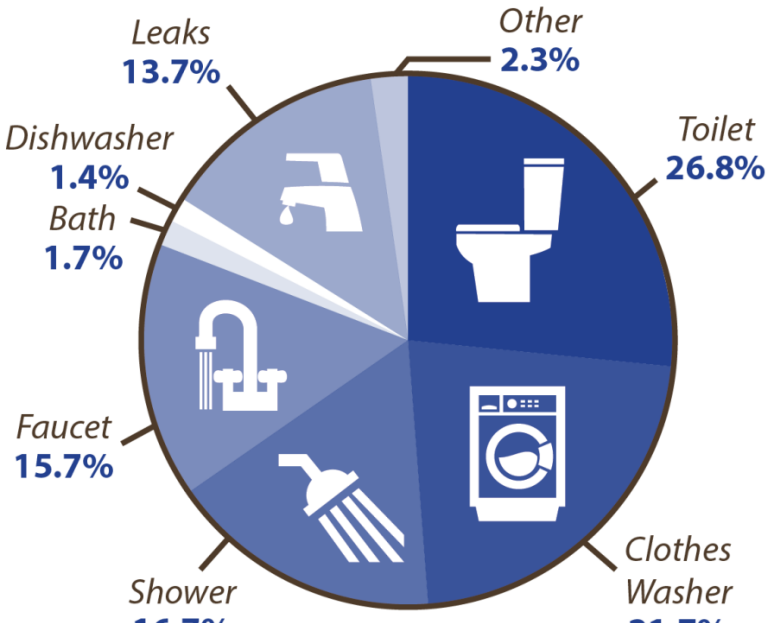
D

E



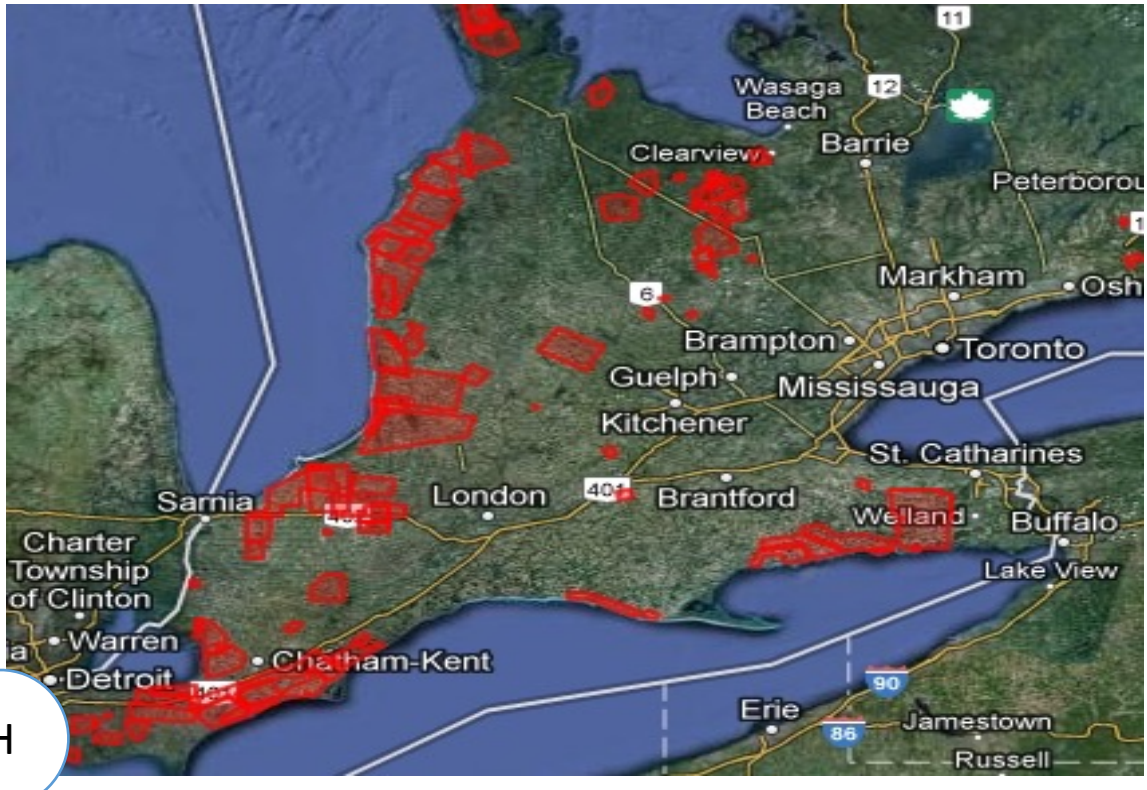
F

Average Indoor Household Water Use



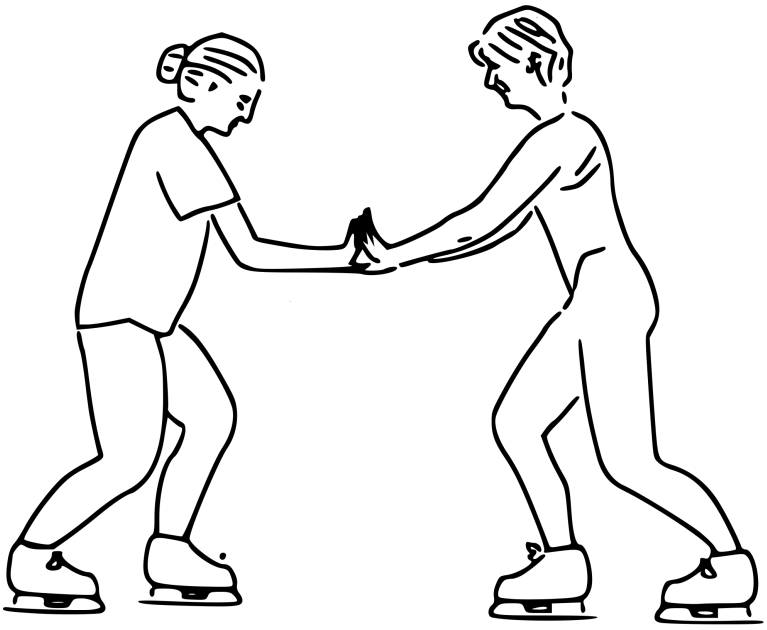
Source: AWWA Research Foundation, 1999

G



H

I



For every action there is an equal and opposite reaction

J

Kinetic

Stored

Potential

K

L

Energy

M

Conservation

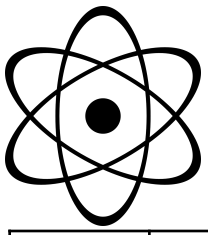
N

Renewable Energy

O

Non-Renewable Energy

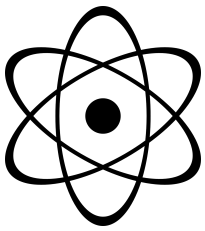
P



Wonder Card Recording Page

Look at the wonder cards. Complete this page sharing what you see, think about and wonder.

CARD	I SEE Label what you see in the picture	I THINK What do you think this is? Add your guesses and hypothesis.	I WONDER What questions do you have about this card?



Lesson #2

Identifying Energy

Grade 5 Lesson

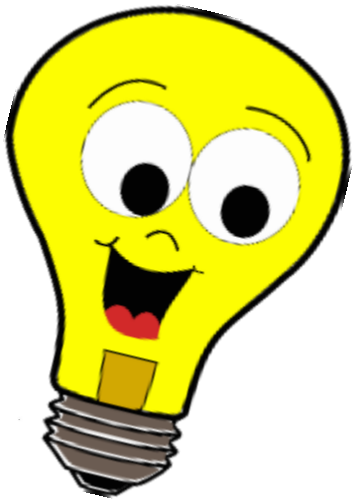
ENERGY CONSERVATION

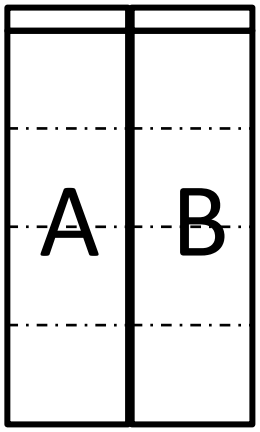
Lesson 2

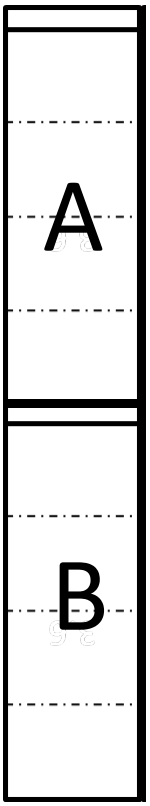
	First Half	Second Half
Prep	5-From this Unit • What is energy: Instructions. • What is energy: true and false. • What is energy: corrected anchor chart. • What is Energy: Foldable. Classroom Resources • Online audio/video equipment • Chart paper and markers • Scissors, glue.	
Grade 5	WHAT IS ENERGY: 1. Watch three videos from the unit live binder. (22 minute video, but the first ten minutes are the most appropriate for this lessons topic; however the whole video is informative as an introduction). 2. Watch video and students fill out true or false statements.	Teacher Directed 1. Discuss answers with a partner. 2. Create your notebook foldable. (see "What is energy" guide for Instructions).
	For a digital copy of the energy quiz follow this link https://docs.google.com/forms/d/1SsxQZkoW5l710QyNF9o5Cmz6c8q6R1N1J82yUFxMNjk/edit	

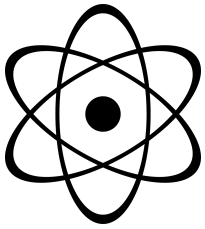
What is Energy?

1. Using the live binder web resource Watch the videos from the "What is Energy" tab.
2. While Watching these videos fill out the true or false video guide. (individual or whole group)
3. Participate in a group discussion comparing your answers with others.
4. Create your notebook foldable. You have six boxes. Use the statements from the true or false video guide. Write the true statements and correct the false statements to make them true.
5. Cut out the foldable activity.
    1. First cut out shape "A"
    2. Then cut out shape "B"
    3. Glue the top tab on Shape "B" to the Bottom of Shape "A"
    4. Glue the tab and first box of Shape "A" in your notebook.
    5. Fold the up the boxes like an accordion on the dotted lines.





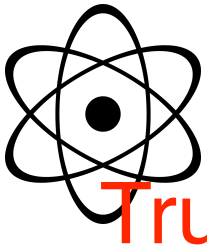




What is Energy?

True or False Video Guide

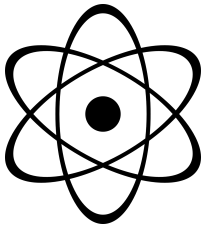
Check off the correct answer	Watch the energy videos. Identify which statements are true and which statements are false
❑ True ❑ False	Energy makes things happen, it makes things go and makes things move.
❑ True ❑ False	POTENTIAL ENERGY is when something is moving and KINETIC ENERGY is when energy is stored.
❑ True ❑ False	Energy is created when you move things and it is destroyed when the thing you move stops.
❑ True ❑ False	We get electrical energy from falling water, burning coal, nuclear fission, wind turbines, solar panels.
❑ True ❑ False	When energy is converted some energy is always lost.
❑ True ❑ False	Energy can be transformed and converted. Electrical energy can be turned into light energy, heat energy or back into kinetic energy.



What is Energy?

True or False Answer Sheet

Check off the correct answer	Watch the energy videos. Identify which statements are true and which statements are false
☑ True ❑ False	Energy makes things happen, it makes things go and makes things move.
❑ True ☑ False	POTENTIAL ENERGY is when something is moving and KINETIC ENERGY is when energy is stored.
❑ True ☑ False	Energy is created when you move things and it is destroyed when the thing you move stops.
☑ True ❑ False	We get electrical energy from falling water, burning coal, nuclear fission, wind turbines, solar panels.
❑ True ☑ False	When energy is converted some energy is always lost.
☑ True ❑ False	Energy can be transformed and converted. Electrical energy can be turned into light energy, heat energy or back into kinetic energy.



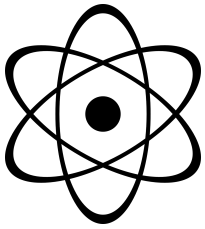
What is Energy?

True or False Video Guide

Energy makes things happen, it makes things go and makes things move.

POTENTIAL ENERGY is stored energy and
KINETIC ENERGY is energy in motion.

Energy can NOT be created, destroyed or lost. Energy can only be transformed from one kind of energy to another.



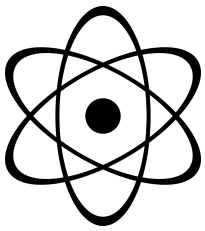
What is Energy?

True or False Video Guide

We get electrical energy from falling water, burning coal, nuclear fission, wind turbines, solar panels and burning natural gas.

When energy is transformed it is never really lost. It has been transformed to heat.

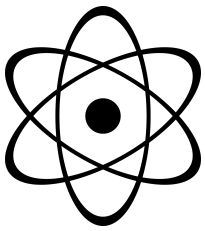
Energy can be transformed and converted. Electrical Energy can be turned into light energy, heat energy or back into kinetic energy.



What is Energy?

Cut out the boxes from the two pages. Sort the boxes into two groups: one true and one false. Check your answers with a partner. Once you are sure your answers are correct, glue the correct answers on the foldable activity page.

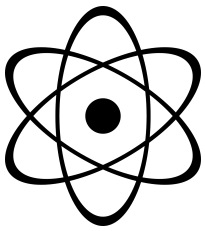
What is Energy?	By: _____
Energy makes things happen, it makes things go and makes things move.	Energy can be made from many different sources. Energy is created easily.
POTENTIAL ENERGY is when something is moving and KINETIC ENERGY means energy that is stored.	POTENTIAL ENERGY is stored energy KINETIC ENERGY is energy in motion.



What is Energy?

Energy can NOT be created, destroyed or lost. Energy can only be transformed from one kind of energy to another.	Energy is created when you move things and it is destroyed when the thing you move stops.
We get electrical energy from falling water, burning coal, nuclear fission, wind turbines, solar panels and burning natural gas.	Solar panels and wind turbines do not create electricity. Only power plants make electricity.
When energy is transformed it is never really lost. It has been transformed to heat.	When energy is converted some energy is always lost.
Energy can be transformed and converted. Electrical Energy can be turned into light energy, heat energy or back into kinetic energy.	There are many different types of electricity. Once it is used up it disappears.

What Is Energy: Foldable



Lesson #3

Describing Energy

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 3

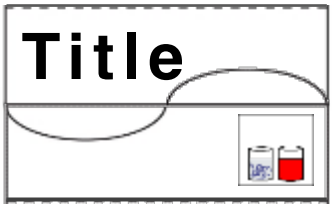
Learning Goal:	I can describe the properties that are used to identify minerals (colour, lustre, streak, transparency, hardness)	
	First Half	**Second Half**
Prep	5 - Readings: Forms of Energy (A,B,C), Experiment Cards (A,B,C), Think About It / Answer Cards (A,B,C) Scissors and glue, Experiment materials. Gather Materials for Experiments. Set up buckets for these experiments beforehand with all of the supplies. Place the answer and reflection sheet in an envelope	
Grade 5	TEACHER DIRECTED 1. First read the text reading FORMS OF ENERGY. A 2. Outline the expectations for the experiments.	*Then students follow instructions to conduct the experiment. Students will complete the observation section of their foldable.* *When the experiment is over students will open the answer page and write their answers to the "THINK ABOUT IT" questions and then read the explanation of the experiment.* *Students complete the reflection questions about what they learned.*
	Provided are two different options for student reflection pages choose the page that works best for your students.	

Forms of Energy

Conducting an Experiment

Getting Started:

- ❑ First read the text called **FORMS OF ENERGY.**
- ❑ Next read the experiment Instructions Card.
- ❑ Check to make sure that you have all of your materials.
- ❑ Cut out your foldable, and fold it together on the dotted lines to close it.
- ❑ Put your title on the top tab.



Get Working:

- ❑ Follow the instructions to complete each experiment.
- ❑ Draw a picture of your experiment on the outside bottom flap.
- ❑ Open up your foldable and write what you observed happening during your experiment.

Think about it:

- ❑ Open the answer page and read the **THINK ABOUT IT** questions.
- ❑ Answer your questions in the **THINK ABOUT IT** section on your foldable.
- ❑ Read the explanation of the experiment.
- ❑ Finally complete the reflection questions about what you have learned.

Science Experiments

Observations:_____

_____

_____

_____

_____

THINK ABOUT IT: _____

_____

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Reflection _____

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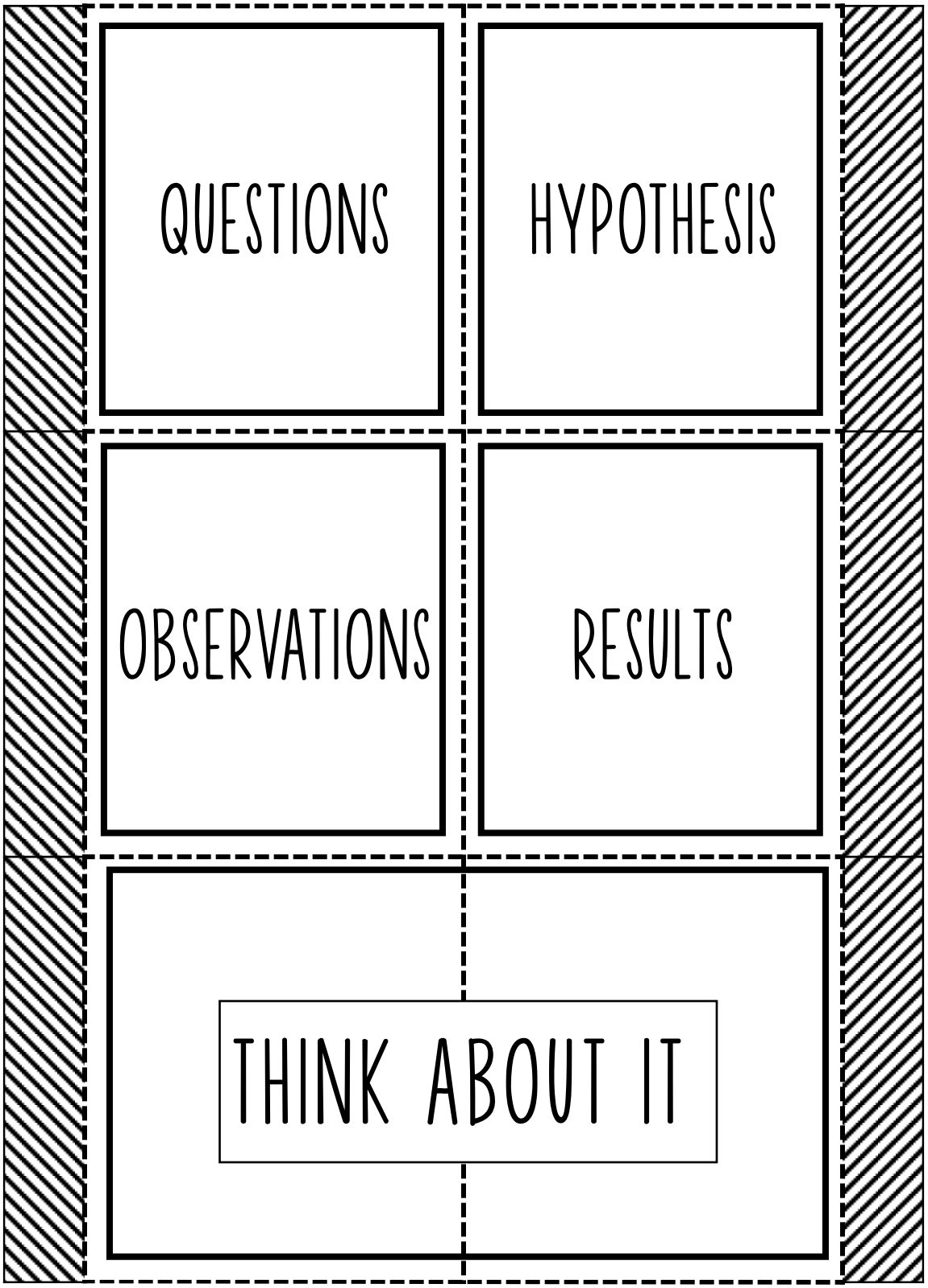


Science experiment reflection

My experiment: _____

Think about it:

Forms of Energy

A

Energy is everywhere. Energy makes things go, it makes things move. But where is it? Where can we find the energy to help us in our daily lives?

Potential energy:

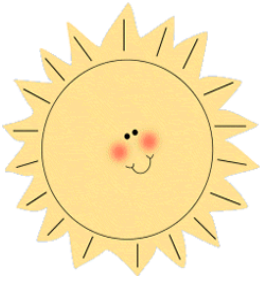
This is the energy stored in an object. The object has the potential for energy. For example, if you are holding a basketball in your hands, then the basketball is full of potential energy.

Kinetic energy:

Kinetic energy is moving energy. If you take the basketball in your hand and begin to bounce it then you have just transferred kinetic energy from your muscles to the basketball. Now it is moving.

Mechanical energy:

Mechanical Energy is the sum of KINETIC ENERGY and POTENTIAL ENERGY Mechanical Energy refers to the force of moving something. With the basketball you use the potential energy in your muscles to move your arm which pushes the ball down to the floor. This is mechanical energy.



Light energy:

Our biggest source of light energy is the sun. The energy from the sun is transferred to plants in a process called photosynthesis. Light energy is also important for us to be able to see.

AI) Forms of Energy

A Basketball Experiment

Read the information page before you begin your experiment

Materials

1. A basketball
2. A variety of hard and soft floor surfaces (carpet, tile, cork, blanket, pillow , etc.)
3. Metre stick.

Test #1

1. Hold your hands out at shoulder height with the basketball in your hands.
2. Have a partner hold the metre stick to measure the balls bounce.
3. Drop the basketball on the flooring surfaces.
4. Use a third partner to Measure how high it bounces back up.
5. Record what happens
6. Repeat the test on different flooring surfaces.

AI) Forms of Energy

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Read the information page before you begin your experiment

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6. Repeat the test on different flooring surfaces.

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AI) Forms of Energy

A Basketball Experiment

THINK ABOUT IT

- What differences did you notice between the height of the bounce on hard surfaces vs soft surfaces?
- Why do you think it bounced differently on different surfaces? Use your knowledge of energy to explain.
- Can you think of other surfaces that would create the best bounce or the worst bounce?

Explanation

A1: During this test students dropping the basketball should notice that dropping it on harder surfaces yields a higher bounce back. The harder the floor surface the less energy that is absorbed into the floor and more energy is put back into the ball to bounce it back up.

AI) Forms of Energy

A Basketball Experiment

THINK ABOUT IT

- What differences did you notice between the height of the bounce on hard surfaces vs soft surfaces?
- Why do you think it bounced differently on different surfaces? Use your knowledge of energy to explain.
- Can you think of other surfaces that would create the best bounce or the worst bounce?

Explanation

A1: During this test students dropping the basketball should notice that dropping it on harder surfaces yields a higher bounce back. The harder the floor surface the less energy that is absorbed into the floor and more energy is put back into the ball to bounce it back up.

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A2) Forms of Energy

A Ping Pong Ball Shooter

Read the information page before you begin your experiment

Materials
1. Cup
2. Ping - pong ball
3. Balloon

Test #2

1. Using two disposable plastic cups cut off the bottom of both cups. (adult assistance is recommended).
2. Tie the bottom of the balloon. Then cut the top off of a balloon off.
3. Stretch the balloon over the lip of the cup (the part you drink out of).
4. Place the ping pong ball inside the cup
5. Pull back lightly on the balloon knot then let go.
6. Record your observations.

BE SAFE

PLEASE SHOOT AT THE IDENTIFIED TARGET ONLY

A2) Forms of Energy

A Ping Pong Ball Shooter

Read the information page before you begin your experiment

Materials
1. Cup
2. Ping - pong ball
3. Balloon

Test #2

1. Using two disposable plastic cups cut off the bottom of both cups. (adult assistance is recommended).
2. Tie the bottom of the balloon. Then cut the top off of a balloon off.
3. Stretch the balloon over the lip of the cup (the part you drink out of).
4. Place the ping pong ball inside the cup
5. Pull back lightly on the balloon knot then let go.
6. Record your observations.

BE SAFE

PLEASE SHOOT AT THE IDENTIFIED TARGET ONLY

A2) Forms of Energy

A Ping Pong Ball Shooter

THINK ABOUT IT

- What kinds of energy are use in this experiment? Explain.
- How is energy transferred in this experiment?
- How might you change the construction of this shooter to increase or decrease the distance the ping pong ball travels?

Explanation

A2: The ping pong ball and the balloon both have potential energy. When the balloon is pulled you have transferred the Kinetic energy from your muscles into the balloon. The balloon now has more potential energy. When you let go of the balloon the energy from the balloon is transferred through to the ping pong ball forcing it to shoot out of the cup at your target.

A2) Forms of Energy

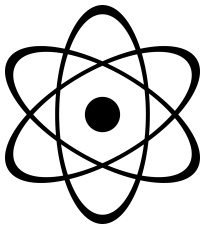
A Ping Pong Ball Shooter

THINK ABOUT IT

- What kinds of energy is use in this experiment? Explain.
- How is energy transferred in this experiment?
- How might you change the construction of this shooter to increase or decrease the distance the ping pong ball travels?

Explanation

A2: The ping pong ball and the balloon both have potential energy. When the balloon is pulled you have transferred the Kinetic energy from your muscles into the balloon. The balloon now has more potential energy. When you let go of the balloon the energy from the balloon is transferred through to the ping pong ball forcing it to shoot out of the cup at your target.



Lesson #4

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 4

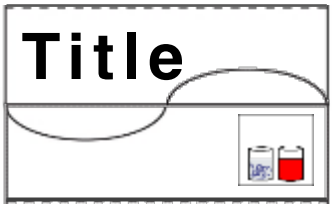
	First Half	Second Half
Prep	5 - Readings: Forms of Energy (A,B,C), Experiment Cards (A,B,C), Think About It / Answer Cards (A,B,C) Scissors and glue, Experiment materials. Gather Materials for Experiments. Set up buckets for these experiments beforehand with all of the supplies. Place the answer and reflection sheet in an envelope	
Grade 5	**Continue to B experiments** TEACHER DIRECTED 1. First read the text reading FORMS OF ENERGY. B 2. Outline the expectations for the experiments.	Then students follow instructions to conduct the experiment. Students will complete the observation section of their foldable. When the experiment is over students will open the answer page and write their answers to the "THINK ABOUT IT" questions and then read the explanation of the experiment. Students complete the reflection questions about what they learned.
	Provided are two different options for student reflection pages choose the page that works best for your students.	

Forms of Energy

Conducting an Experiment

Getting Started:

- ❑ First read the text called **FORMS OF ENERGY.**
- ❑ Next read the experiment Instructions Card.
- ❑ Check to make sure that you have all of your materials.
- ❑ Cut out your foldable, and fold it together on the dotted lines to close it.
- ❑ Put your title on the top tab.



Get Working:

- ❑ Follow the instructions to complete each experiment.
- ❑ Draw a picture of your experiment on the outside bottom flap.
- ❑ Open up your foldable and write what you observed happening during your experiment.

Think about it:

- ❑ Open the answer page and read the **THINK ABOUT IT** questions.
- ❑ Answer your questions in the **THINK ABOUT IT** section on your foldable.
- ❑ Read the explanation of the experiment.
- ❑ Finally complete the reflection questions about what you have learned.

Science Experiments

Observations:_____

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THINK ABOUT IT: _____

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Reflection _____

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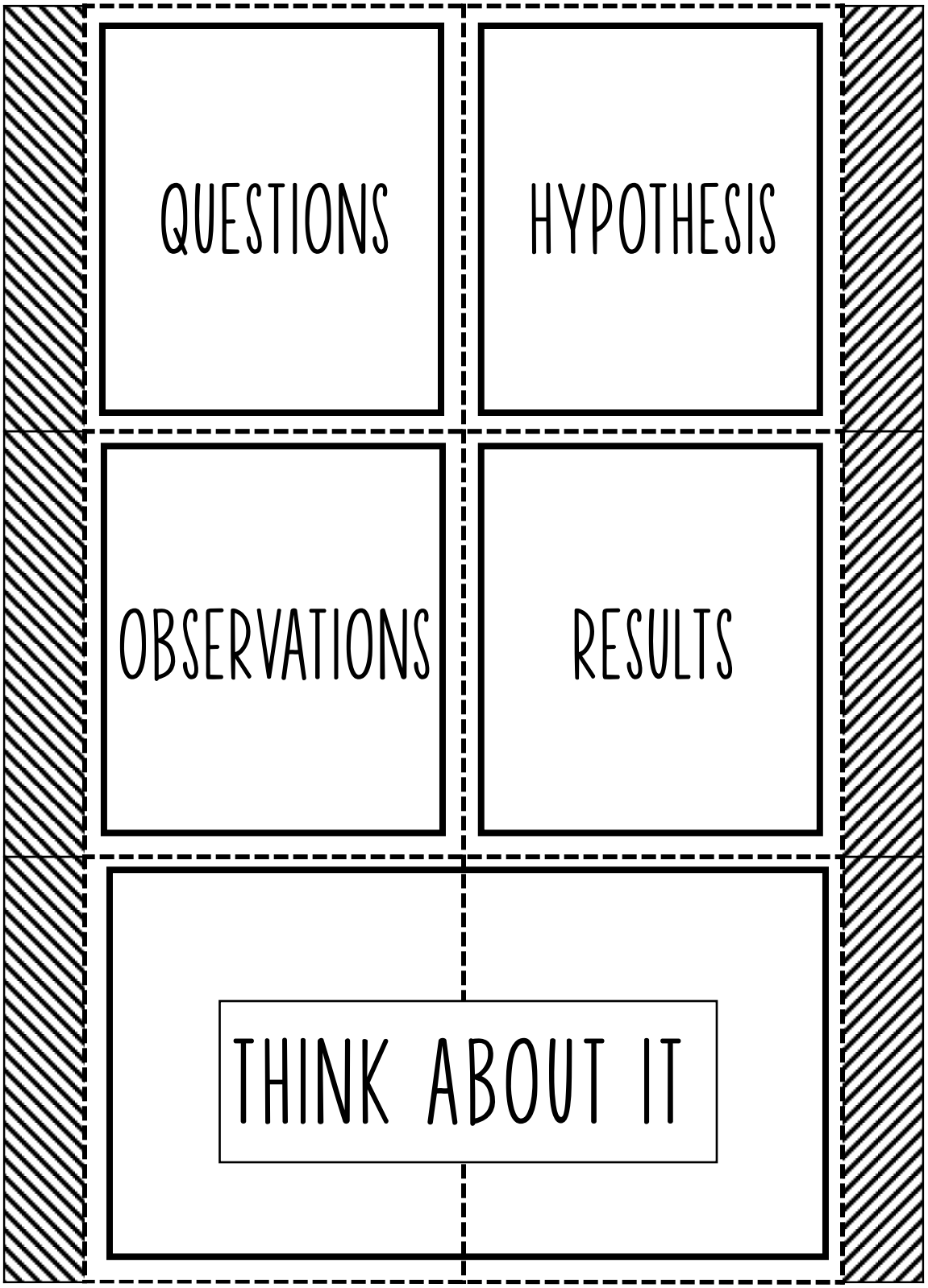
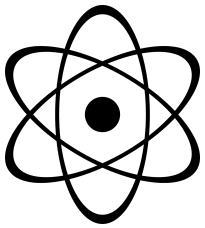


Science experiment reflection

My experiment: _____

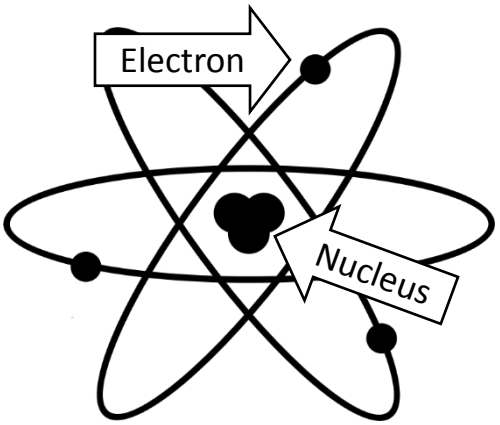


Think about it:

Forms of Energy

B

Everything in the world is composed of Atoms. Tiny little building blocks of everything on Earth. Many parts of understanding energy happens at a microscopic level with atoms.



Electrical Energy:

This is the most common form of energy. Electricity happens in the atom. At the centre of the **ATOM** is the nucleus. Spinning around the nucleus are positive and negative electrons. Electricity happens when an electron spins away from its original atom and joins a new atom. With the help of strong magnets pulling on the electrons, electricity flows like a game of hot potato. As an electron enters a new atom an old electron is pushed out to the next atom down a wire that is usually copper.

Nuclear Energy:

At the centre of an atom you will find a nucleus. The energy of an atom is found in the Nucleus. One way to get energy from an atom, is to split atoms into two smaller parts. When this happens heat is released. This heat is then transferred to create electricity.

BI) Forms of Energy

Salt and Pepper

Read the information page before you begin your experiment

Materials

1. **Balloon**
2. **Salt**
3. **Pepper**

Test #1

1. Pour some salt and pepper on a plate and mix them together well
2. Blow up a balloon
3. Rub the balloon on your hair (or someone else who has longer hair).
4. Hold the balloon over the salt and pepper mix.
5. Record your results.

BI) Forms of Energy

Salt and Pepper

Read the information page before you begin your experiment

Materials

1. **Balloon**
2. **Salt**
3. **Pepper**

Test #1

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1. Rub the balloon on your hair (or someone else who has longer hair).
2. Hold the balloon over the salt and pepper mix.
3. Record your results

BI) Forms of Energy

Salt and Pepper

Read the information page before you begin your experiment

THINK ABOUT IT

- What happened to the balloon when you rubbed it on hair?
- How might you explain this using your knowledge of electricity and electrons?
- Why do you think the pepper was picked up instead of the salt?

Explanation

B1: Rubbing the balloon on your hair creates static electricity. Extra electrons are transferred from your hair to the balloon. Because this makes your hair negatively charged it attracts the pepper because pepper is neutral.

BI) Forms of Energy

Salt and Pepper

Read the information page before you begin your experiment

THINK ABOUT IT

- What happened to the balloon when you rubbed it on hair?
- How might you explain this using your knowledge of electricity and electrons?
- Why do you think the pepper was picked up instead of the salt?

Explanation

B1: Rubbing the balloon on your hair creates static electricity. Extra electrons are transferred from your hair to the balloon. Because this makes your hair negatively charged it attracts the pepper because pepper is neutral.

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B2) Forms of Energy

Mystery Flashlight

Read the information page before you begin your experiment

Materials

1. **2 - "D" sized batteries.**
2. **Aluminium foil.**
3. **One incandescent flashlight bulb.**
4. **Tape**

Test #2

1. Take one or two strips of aluminium foil and fold it length wise over and over again to make a small thin strip.
2. Connect the batteries, light bulb, and foil.
3. Try to figure out how to connect them to so that the light bulb lights up.
4. Record your results.

B2) Forms of Energy

Mystery Flashlight

Read the information page before you begin your experiment

Materials

1. **2 - "D" sized batteries.**
2. **Aluminium foil.**
3. **One incandescent flashlight bulb.**
4. **Tape**

Test #2

1. Take one or two strips of aluminium foil and fold it length wise over and over again to make a small thin strip.
2. Connect the batteries, light bulb, and foil.
3. Try to figure out how to connect them to so that the light bulb lights up.
4. Record your results.

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B2) Forms of Energy

Mystery Flashlight

THINK ABOUT IT

- Explain how you figured out how to make the light bulb light up?
- Draw a diagram of the successful design.
- How was the energy that was stored in the battery transferred to the light bulb?
- How does this experiment help you understand how a flashlight (or other lights) work?

Explanation

B2 First you connect one end of the foil to the negative side of the battery. Then you connect the other end of the foil to the light bulb. When the light bulb touches the top of the positive side of the battery the bulb lights up because the circuit is completed.

B2) Forms of Energy

Mystery Flashlight

THINK ABOUT IT

- Explain how you figured out how to make the light bulb light up?
- Draw a diagram of the successful design.
- How was the energy that was stored in the battery transferred to the light bulb?
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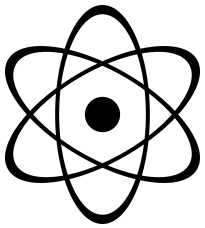

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 5

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 5

	First Half	Second Half
Prep	5 - Readings: Forms of Energy (A,B,C), Experiment Cards (A,B,C), Think About It / Answer Cards (A,B,C) Scissors and glue, Experiment materials. Gather Materials for Experiments. Set up buckets for these experiments beforehand with all of the supplies. Place the answer and reflection sheet in an envelope	
Grade 5	Continue to **C** experiments TEACHER DIRECTED quickly review the outline for the experments **Independent Activity** 1. First read the text reading FORMS OF ENERGY. C	Then students follow instructions to conduct the experiment. Students will complete the observation section of their foldable. When the experiment is over students will open the answer page and write their answers to the "THINK ABOUT IT" questions and then read the explanation of the experiment. Students complete the reflection questions about what they learned.
	Provided are two different options for student reflection pages choose the page that works best for your students. **You may want to invite a volunteer in to help you with this lesson.**	

Forms of Energy

Conducting an Experiment

Getting Started:

- ❑ First read the text called **FORMS OF ENERGY.**
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- ❑ Check to make sure that you have all of your materials.
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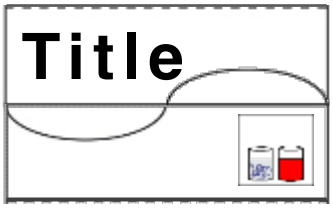

Get Working:

- ❑ Follow the instructions to complete each experiment.
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Think about it:

- ❑ Open the answer page and read the **THINK ABOUT IT** questions.
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- ❑ Read the explanation of the experiment.
- ❑ Finally complete the reflection questions about what you have learned.

Science Experiments

Observations:_____

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THINK ABOUT IT: _____

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Reflection _____

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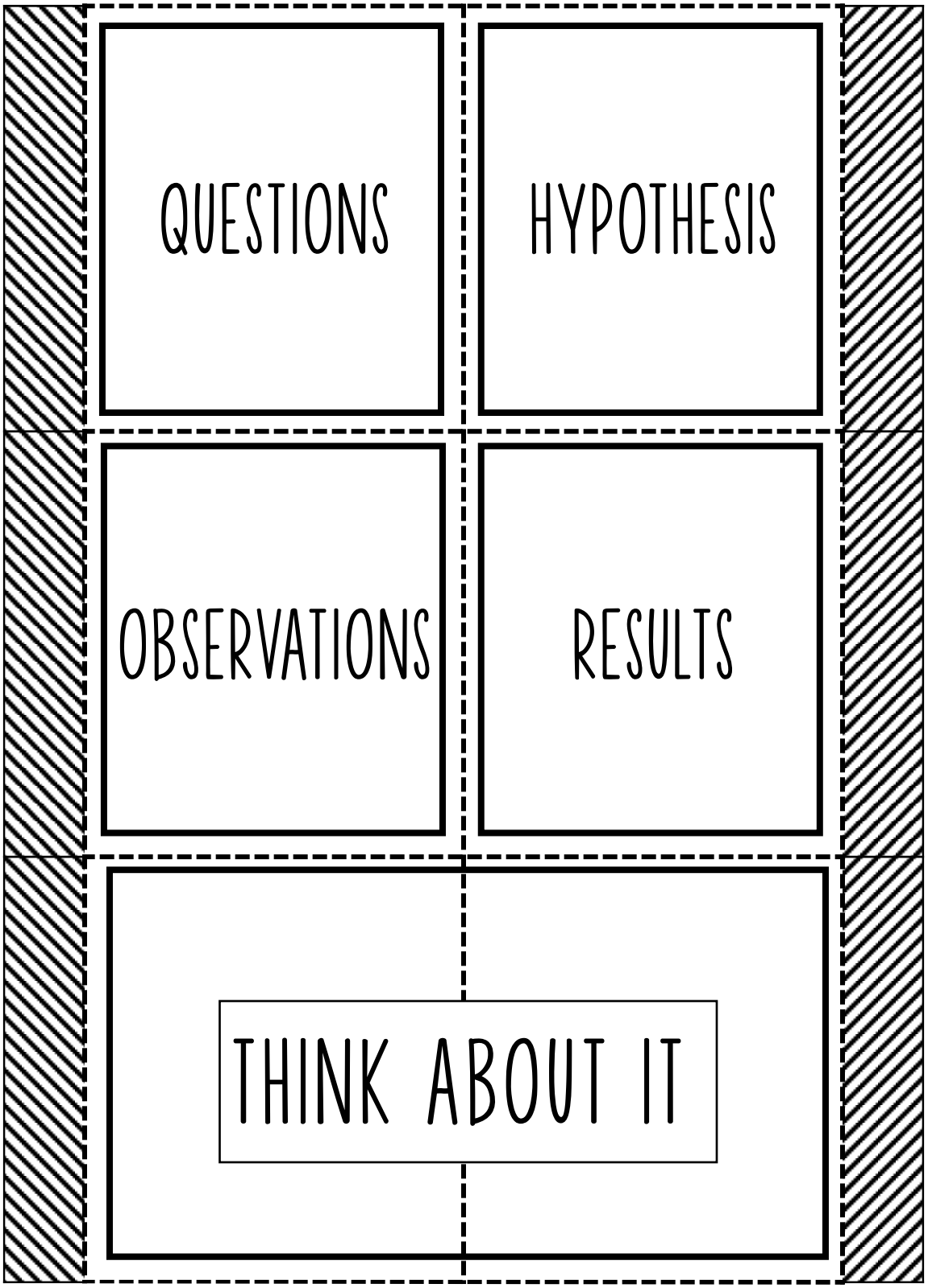

Science experiment reflection

My experiment: _____

Think about it:

Heat Energy

EXPERIMENT

Question:
How is energy transferred?

What is your hypothesis?

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HYPOTHESIS

Draw and label what you saw during your experiment.

OBSERVATIONS

Describe what happened during your experiment.

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RESULTS

Read and answer the think about it questions to share your conclusions.

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THINK ABOUT IT

Electric Energy

EXPERIMENT

Question:
How is energy transferred?

What is your hypothesis?

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HYPOTHESIS

Draw and label what you saw during your experiment.

OBSERVATIONS

Describe what happened during your experiment.

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RESULTS

Read and answer the think about it questions to share your conclusions.

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THINK ABOUT IT

Chemical Energy

EXPERIMENT

Question:
How is energy transferred?

What is your hypothesis?

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HYPOTHESIS

Draw and label what you saw during your experiment.

OBSERVATIONS

Describe what happened during your experiment.

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RESULTS

Read and answer the think about it questions to share your conclusions.

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THINK ABOUT IT

Forms of Energy

C

Chemical Energy:

This type of energy is stored potential energy. To release this potential energy we can mix chemicals together to get a reaction. We can also burn things that were once living like wood or coal. These living things store the energy that they got from the sun. They release this energy when they are set on fire and their energy is converted into light and heat energy.

Heat Energy:

Atoms and Molecules (groups of atoms combined together) are always moving or vibrating. When things are heated they begin to vibrate more quickly causing heat.

Sound Energy:

We hear sound energy all around us. Sound energy is energy that passes through things in waves. When you speak the energy in your vocal cords vibrate. This energy flows through the air to someone else's ears

Think of a tea kettle. When you put water in a kettle and heat it up, eventually the water gets hotter and begins to boil. As the steam fills the kettle it tries to escape and is squeezed out of a tiny opening in the spout. The energy of the steam escaping is transformed into sound energy causing it to whistle

CI) Forms of Energy

A Chemical Balloon

Read the information page before you begin your experiment

Materials:

1. A balloon
2. Funnel
3. Baking soda
4. Elastic band
5. Vinegar
6. Measuring cup
7. Marker
8. Water bottle

Test #1

1. Measure 250 ml or 1 cup of vinegar and using the funnel pour it into the water bottle.
2. Put 15 ml or 1Tbsp of baking soda into a balloon. You could use a second funnel or make one with paper.
3. Twist the balloon with a twist tie to keep the baking soda in the balloon.
4. Carefully put the end of the balloon on the top of the neck of the water bottle. Make sure the baking soda does not mix with the vinegar yet.
5. Secure the balloon on the neck of the bottle with the rubber band.
6. When ready, remove the twist tie from the balloon and dump the baking soda in the balloon into the water bottle
7. Record your results.

CI) Forms of Energy

A Chemical Balloon

Read the information page before you begin your experiment

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5. Secure the balloon on the neck of the bottle with the rubber band.
6. When ready, remove the twist tie from the balloon and dump the baking soda in the balloon into the water bottle
7. Record your results.

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C1) Forms of Energy

A Chemical Balloon

THINK ABOUT IT

- What happened when the baking soda mixed with the vinegar? Describe the changes you observed.
- How was energy transferred in this experiment?
- What do you think would happen if you changed the amounts of vinegar and baking soda?

Explanation

C1: Baking soda and vinegar when mixed together create a chemical reaction and Carbon dioxide is created. This reaction produces a lot of energy and the carbon dioxide gas expands rapidly filling the balloon with the gas.

C1) Forms of Energy

A Chemical Balloon

THINK ABOUT IT

- What happened when the baking soda mixed with the vinegar? Describe the changes you observed.
- How was energy transferred in this experiment?
- What do you think would happen if you changed the amounts of vinegar and baking soda?

Explanation

C1: Baking soda and vinegar when mixed together create a chemical reaction and Carbon dioxide is created. This reaction produces a lot of energy and the carbon dioxide gas expands rapidly filling the balloon with the gas.

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C2) Forms of Energy

Mixing with Heat Energy

Read the information page before you begin your experiment

Materials

1. Kettle (adult assistance)
2. Pitcher of Ice water
3. Two clear glass containers
4. Food dye

Test #2

1. Have an adult boil water in a kettle.
2. Fill two glasses one with HOT water and one with COLD water.
3. Let the cups sit for one minute.
4. Drop one drop of food colouring in each glass. Do not touch the glasses.
5. Observe what happens.
6. Draw a picture of what it looks like after 1 min, and 3 min.
7. Record your results.

C2) Forms of Energy

Mixing with Heat Energy

Read the information page before you begin your experiment

Materials

1. Kettle (adult assistance)
2. Pitcher of ice water
3. Two clear glass containers
4. Food dye

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5. Observe what happens.
6. Draw a picture of what it looks like after 1 min, and 3 min.
7. Record your results.

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C2) Forms of Energy

Mixing with Heat Energy

THINK ABOUT IT

- Which cup mixed with the colour faster?
- How might you explain this with your understanding of heat energy and atoms?
- How does this experiment apply to cooking? For example Look at the instructions for Jell-O on the right?

Explanation

C2: Hotter objects have particles that move and vibrate faster than cold objects. In this experiment the particles in the hotter water allow the dye to mix much quicker. In the cold water the dye mixes much slower as the particles in the water are not vibrating as quickly.

C2) Forms of Energy

Mixing with Heat Energy

THINK ABOUT IT

- Which cup mixed with the colour faster?
- How might you explain this with your understanding of heat energy and atoms?
- How does this experiment apply to cooking? For example Look at the instructions for Jell-O on the right?

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Forms of Energy

Answers and Reflections

A1: During this test students dropping the basketball should notice that dropping it on harder surfaces yields a higher bounce back. The harder the floor surface the less energy that is absorbed into the floor and more energy is put back into the ball to bounce it back up.

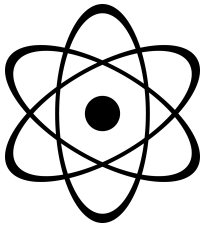
A2: The ping pong ball and the balloon both have potential energy. When the balloon is pulled you have transferred the Kinetic energy from your muscles into the balloon. The balloon now has more potential energy. When you let go of the balloon the energy from the balloon is transferred through to the ping pong ball forcing it to shoot out of the cup at your target.

B1: Rubbing the balloon on your hair creates static electricity. Extra electrons are transferred from your hair to the balloon. Because this makes your hair negatively charged it attracts the pepper because pepper is neutral.

B2: First you connect one end of the foil to the negative side of the battery. Then the other end of the foil to the light bulb. When the light bulb touches the top of the positive side of the battery the bulb lights up because the circuit is completed.

C1: Baking soda and vinegar when mixed together create a chemical reaction. Carbon Dioxide is created. This reaction produces a lot of energy and the carbon dioxide gas expands rapidly filling the balloon with the gas.

C2: Hotter objects have particles that move and vibrate faster than cold objects. In this experiment the particles in the hotter water allow the dye to mix much quicker. In the cold water the dye mixes much slower as the particles in the water are not vibrating as quickly.



Forms of Energy

Lesson #6

Renewable and Non-Renewable Energy

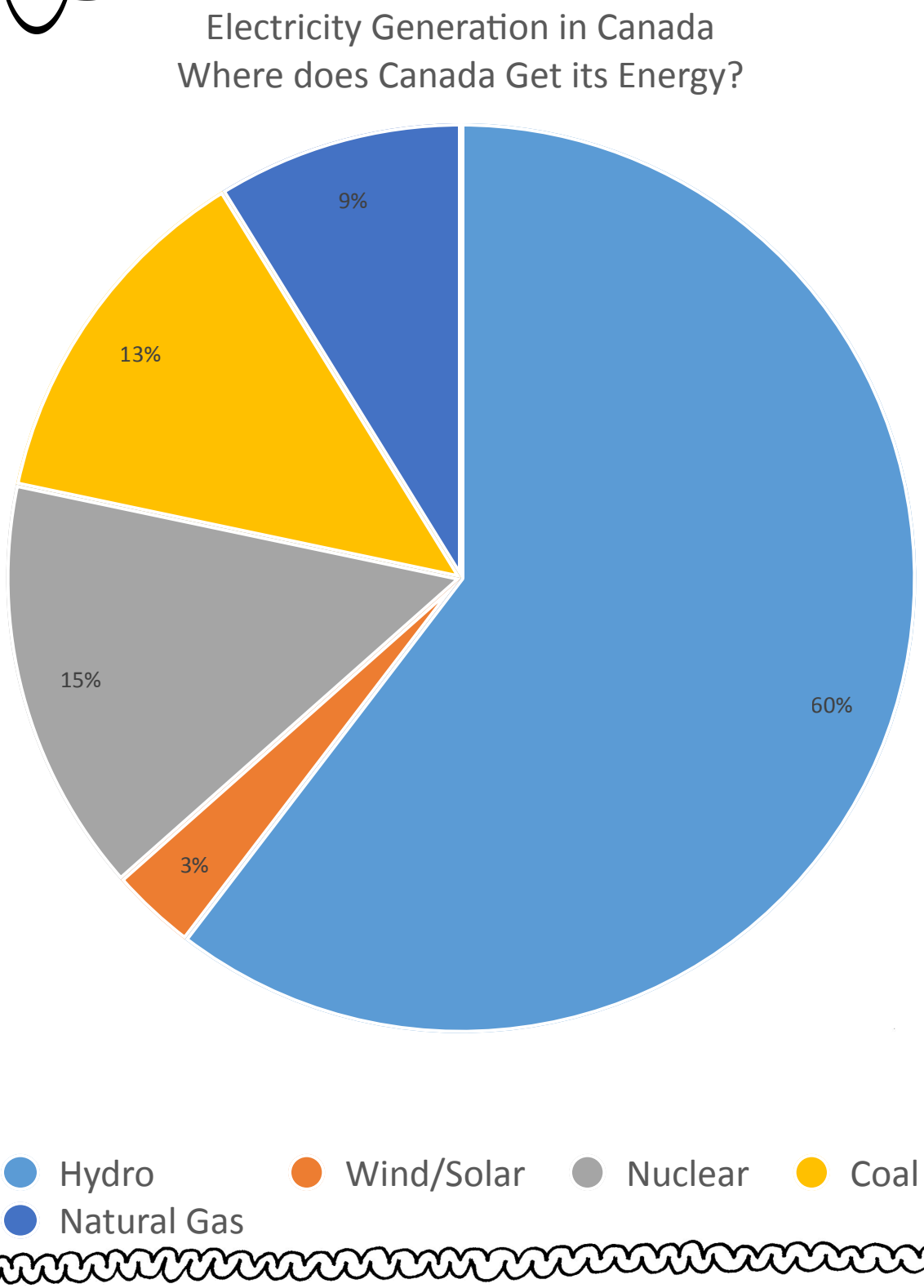
Grade 5 Lesson

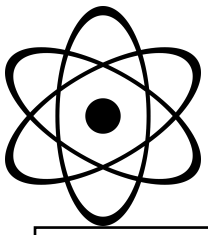
ENERGY CONSERVATION

Lesson 6

	First Half	Second Half
Prep		
Grade 5	Introduction discussion topic: People today rely on energy to live. Because energy cannot be created or destroyed the energy we use must come from somewhere. Create a T-Chart (Sources of energy/what I know about it) Energy section — students come up with ideas about where we get energy. What I know section — on sticky notes have them tell details about each of the energy sources. Introduce the jigsaw activity. See the Jigsaw guide to see how to do this. Divide students into six groups. (use the group tickets) Hydro, Wind, Solar, Nuclear, Goal, & Natural Gas	Provide each group with materials to research about one of the six types of power. Have students answer the questions on the organizer. Have students come back together and present their findings on the energy sources. Sort energy sources into renewable and non-renewable resources. Students then complete a flip book with a picture of the energy source, a summary of the energy source, and a reflection "Is this a good source of energy" Consider impacts on the environment and society.

Where does Energy Come From?

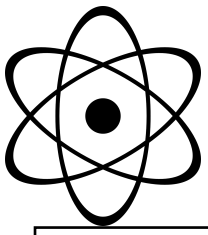




Sources of Energy:

Organize your Research

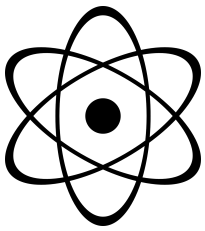
Where does it come from?	Definition
	How does it Work
Renewable or Non Renewable? Explain	
Positives	Negatives



Sources of Energy:

Organize your Research

Where does it come from?	Definition
	How does it Work
Renewable or Non Renewable? Explain	
Positives	Negatives



Sources of Energy

Jig Saw Organizer

Two types of groups are created in a jigsaw activity. The first group is the home group. This is the group that they start with and finish with.

- Each "Home group" should have 6 members; one for each source of energy. This activity doesn't need 6 "Home groups".
- At the beginning students meet and discuss the t-chart that was created as a class.
- Each group member will then be given an expert topic.
- They will then go to their expert groups. In their expert groups students will conduct the research for their topic. Students will complete an organizer as a group using the template provided. (teacher will photocopy the organizer so that students each have a copy to return to their home groups)
- Finally they will return to their home group and teach their home group about their expert topic.
- Use the Jigsaw cards to help you sort students into groups Cut them out on the dotted lines and distribute to students.

Special Education Notes:

- It is recommended that students with special education needs form an expert group that are led by teacher in a guided reading session.

Home Groups 1 2 3 4 5 6
Expert Groups A) Hydro B) Wind C) Solar D) Nuclear E) Coal F) Natural Gas

JIGSAW Student Cards

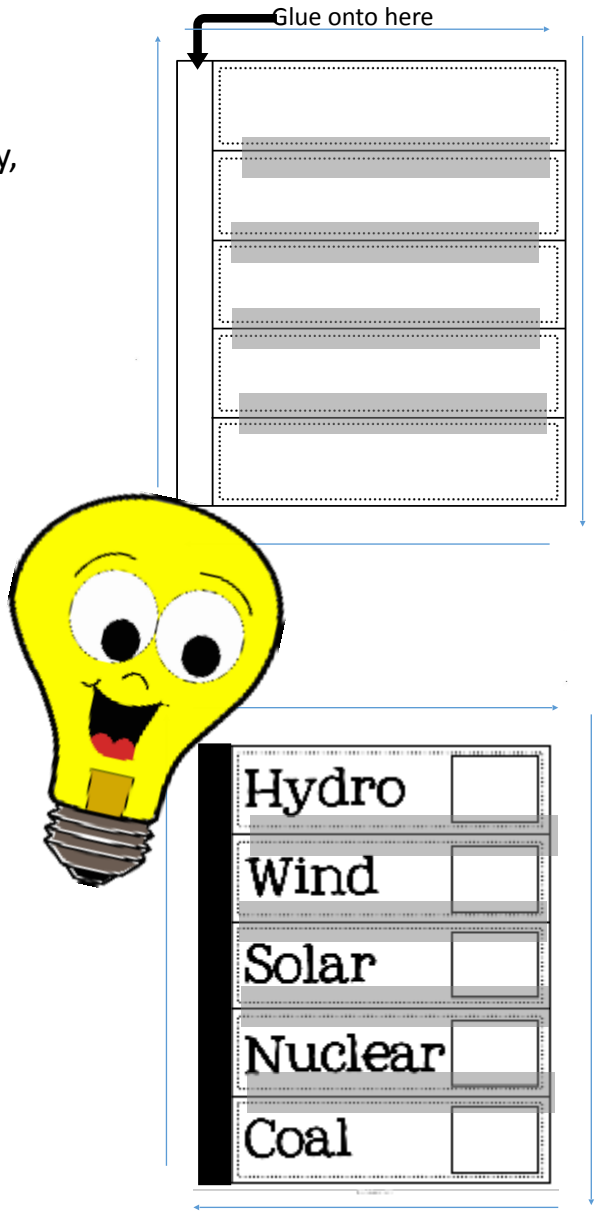
Home Group #1 Expert Group A - Hydro	Home Group #1 Expert Group B- Wind	Home Group #1 Expert Group C - Solar	Home Group #1 Expert Group D - Nuclear	Home Group #1 Expert Group E – Coal	Home Group #1 Expert Group F – Natural Gas
Home Group #2 Expert Group A - Hydro	Home Group #2 Expert Group B- Wind	Home Group #2 Expert Group C - Solar	Home Group #2 Expert Group D - Nuclear	Home Group #2 Expert Group E – Coal	Home Group #2 Expert Group F – Natural Gas
Home Group #3 Expert Group A - Hydro	Home Group #3 Expert Group B- Wind	Home Group #3 Expert Group C - Solar	Home Group #3 Expert Group D - Nuclear	Home Group #3 Expert Group E – Coal	Home Group #3 Expert Group F – Natural Gas
Home Group #4 Expert Group A - Hydro	Home Group #4 Expert Group B- Wind	Home Group #4 Expert Group C - Solar	Home Group #4 Expert Group D - Nuclear	Home Group #4 Expert Group E – Coal	Home Group #4 Expert Group F – Natural Gas
Home Group #5 Expert Group A - Hydro	Home Group #5 Expert Group B- Wind	Home Group #5 Expert Group C - Solar	Home Group #5 Expert Group D - Nuclear	Home Group #5 Expert Group E – Coal	Home Group #5 Expert Group F – Natural Gas
Home Group #6 Expert Group A - Hydro	Home Group #6 Expert Group B- Wind	Home Group #6 Expert Group C - Solar	Home Group #6 Expert Group D - Nuclear	Home Group #6 Expert Group E – Coal	Home Group #6 Expert Group F – Natural Gas

Sources of Energy

Interactive Notebook Reflection

Instructions

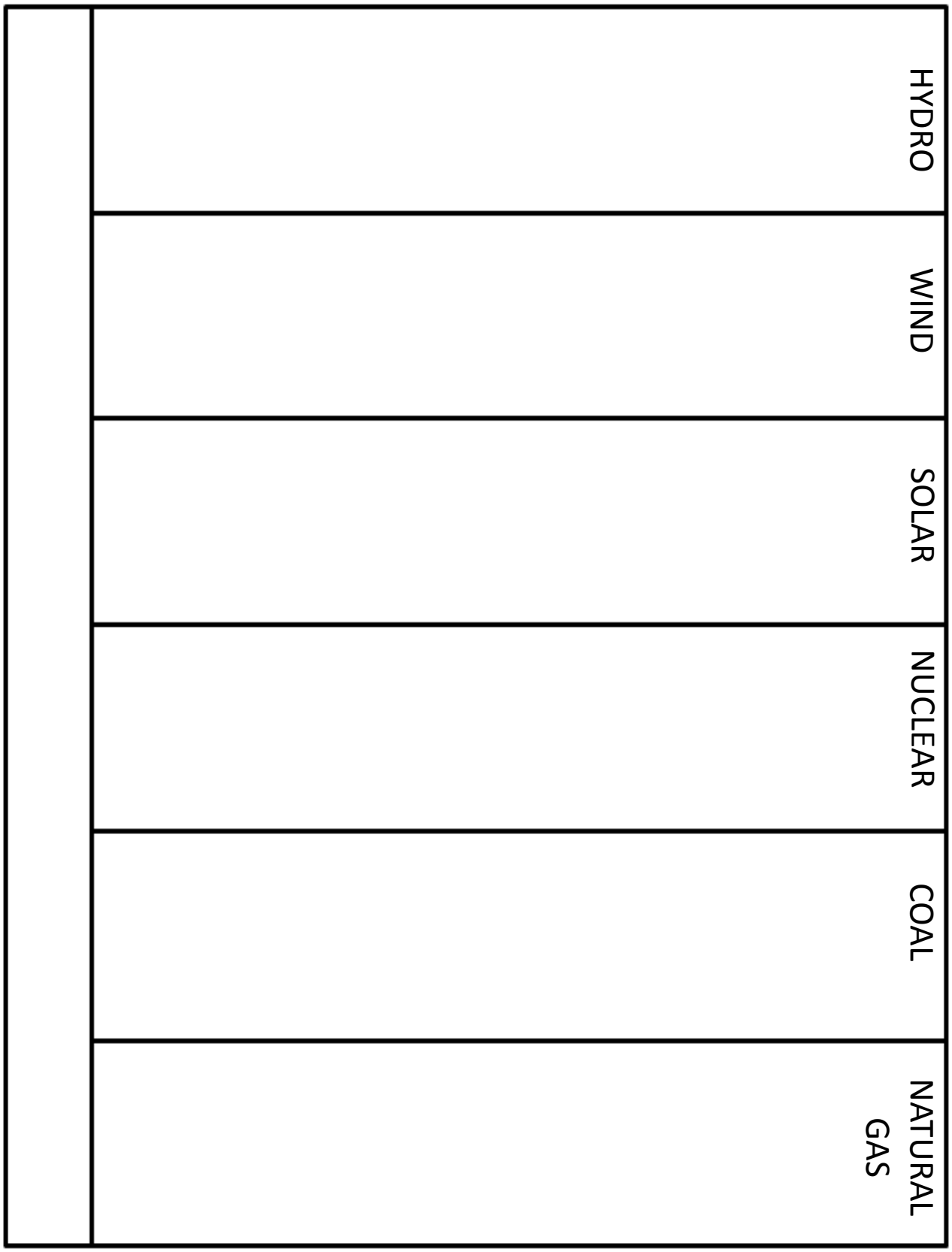
1. Make sure you have the three templates found on the following pages. Template 1 for your summary, template 2 for your reflection and template 3 with the titles.
2. Complete your Templates
   - Draw a picture of the energy source in the box on the titles template.
   - Write your summary of each energy source on the First blank template.
   - Write your reflection on the last blank template.
3. Cut around the outside of all three templates. (follow the arrows)
4. Cut the shaded lines between the boxes Do not cut into the black Rectangle.
5. Glue or staple templates together. The back side of the black rectangle to the white rectangle on the blank templates.



Summarize Each Energy Source #1

HYDRO	WIND	SOLAR	NUCLEAR	COAL	NATURAL GAS

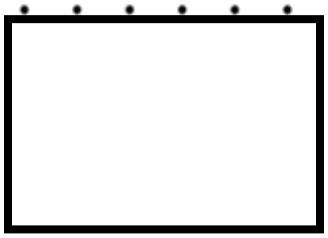
Reflection on Each Energy Source #2



Titles #3

Hydro

Wind

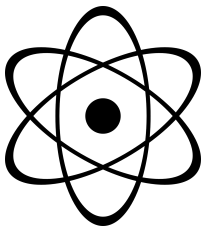


Solar

Nuclear

Coal

Natural Gas



Lesson #7

How we use Energy

Grade 5 Lesson

ENERGY CONSERVATION

Lesson 7

	First Half	Second Half
Prep	5 - Students will require access to research materials	
	Independently students will use the light bulb research activity to discover more about electrical energy. Only the first 5 pages.	In a knowledge building circle ask students to consider the following question. Students will write an open response answer paragraph to this question on thelast page of the lightbulb. . "Many things in our lives rely on electrical energy to work. Considering that many energy sources negatively impact society and/or the environment. Should people be concerned about their amount of energy usage? Please explain your opinion supported by evidence."

How we use Energy

Interactive Notebook Reflection

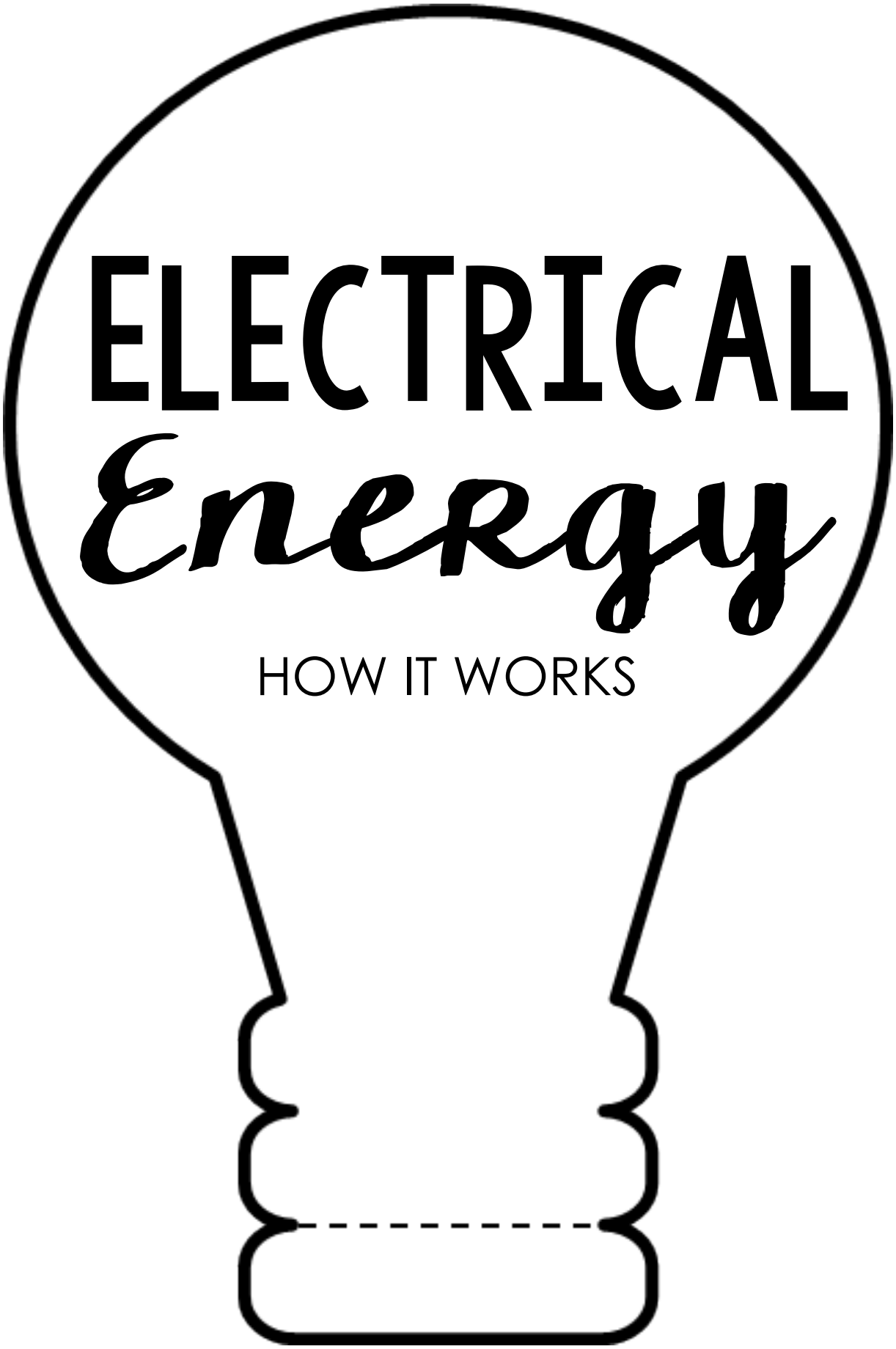
Assembly Instructions:

1. Cut out the light bulbs from the pages.
2. Set the title light bulb aside and line up the other papers.
3. place the title page on top of the other pages matching the bulbs of each page together.
4. fold the title page on the dotted line on the bottom back over the other pages and staple.

Activity Instructions:

- Read the paragraph on electrical energy
- follow the QR or website codes for research(links also contained in the live binder)
- complete the activity pages

"Many things in our lives rely on electrical energy to work. Considering that many energy sources negatively impact society and/or the environment. Should people be concerned about their amount of energy usage? Please explain your opinion supported by evidence."

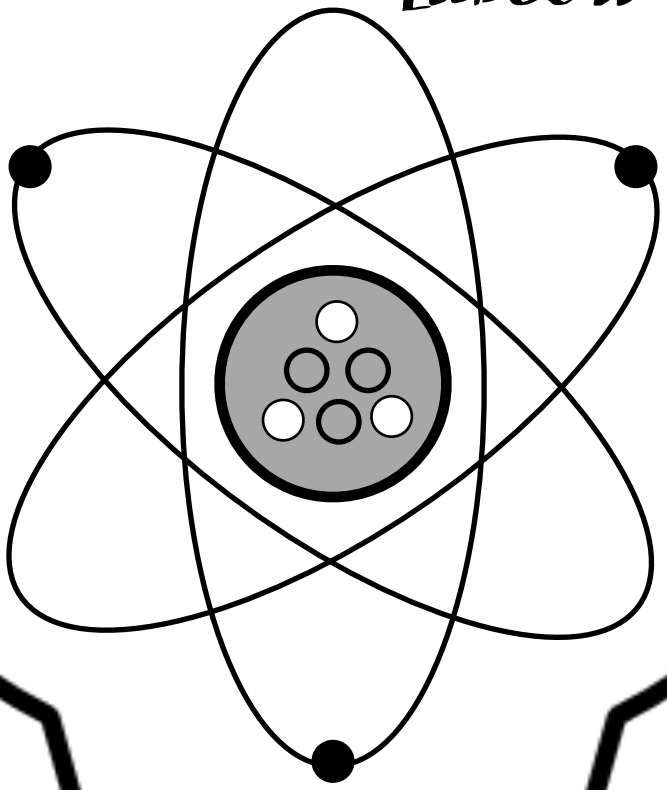

ELECTRICAL
Energy
HOW IT WORKS

Electrical Energy

This is the most common form of energy. Electricity happens in the atom. At the center of the Atom is the nucleus which contains neutral neutrons and positively charged protons. Spinning around the nucleus are negatively charged electrons. The protons and electrons work together like a magnet. Electricity happens when an electron is pulled or spins away from its original atom and joins a new atom. Electricity flows like a game of hot potato. As an electron enters a new atom an old electron is pushed out to the next atom down a wire that is good at conducting energy like copper or aluminium. .

What is ELECTRICITY

Label it



NEUTRON

ELECTRON

PROTON

How is ELECTRICITY Made

Describe how electricity is generated

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Watch this Video

http://bit.ly/MLelectricity2

How does ELECTRICITY Move

Draw a diagram of how electricity moves down a wire, or how it lights a bulb.

Watch this Video

http://bit.ly/MLelectricity3

Reflect on ELECTRICAL energy

"Many things in our lives rely on electrical energy to work. Considering that many energy sources negatively impact society and/or the environment. Should people be concerned about their amount of energy usage? Please explain your opinion supported by evidence."

_____

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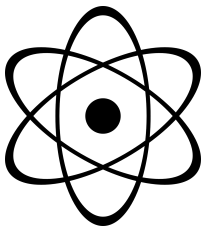


Lesson #8

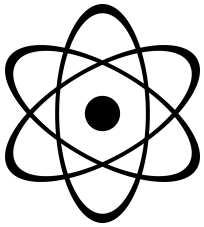
Humans Impact on the Environment

4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 8

	First Half	Second Half
Prep	Students will require access to research materials	
Grade 5	Watch the video. While watching have students record any new ideas about how to conserve energy. https://www.youtube.com/watch?v=1-g73ty9v04&index=2&list=PL366E88A22FD077A2 Have students place these on the chart. These will be discussed during the second part of the lesson	In a knowledge building circle pose these questions: Why is it important to conserve energy in our daily lives? What are some of the things that you can do to conserve energy?
	5- Here is a great resource to have students conduct an energy audit on their homes, or at school. Also included in this resource are fantastic mini lessons that coordinate with this learning goal: http://www.greenschools.net/article.php-id=99.html	

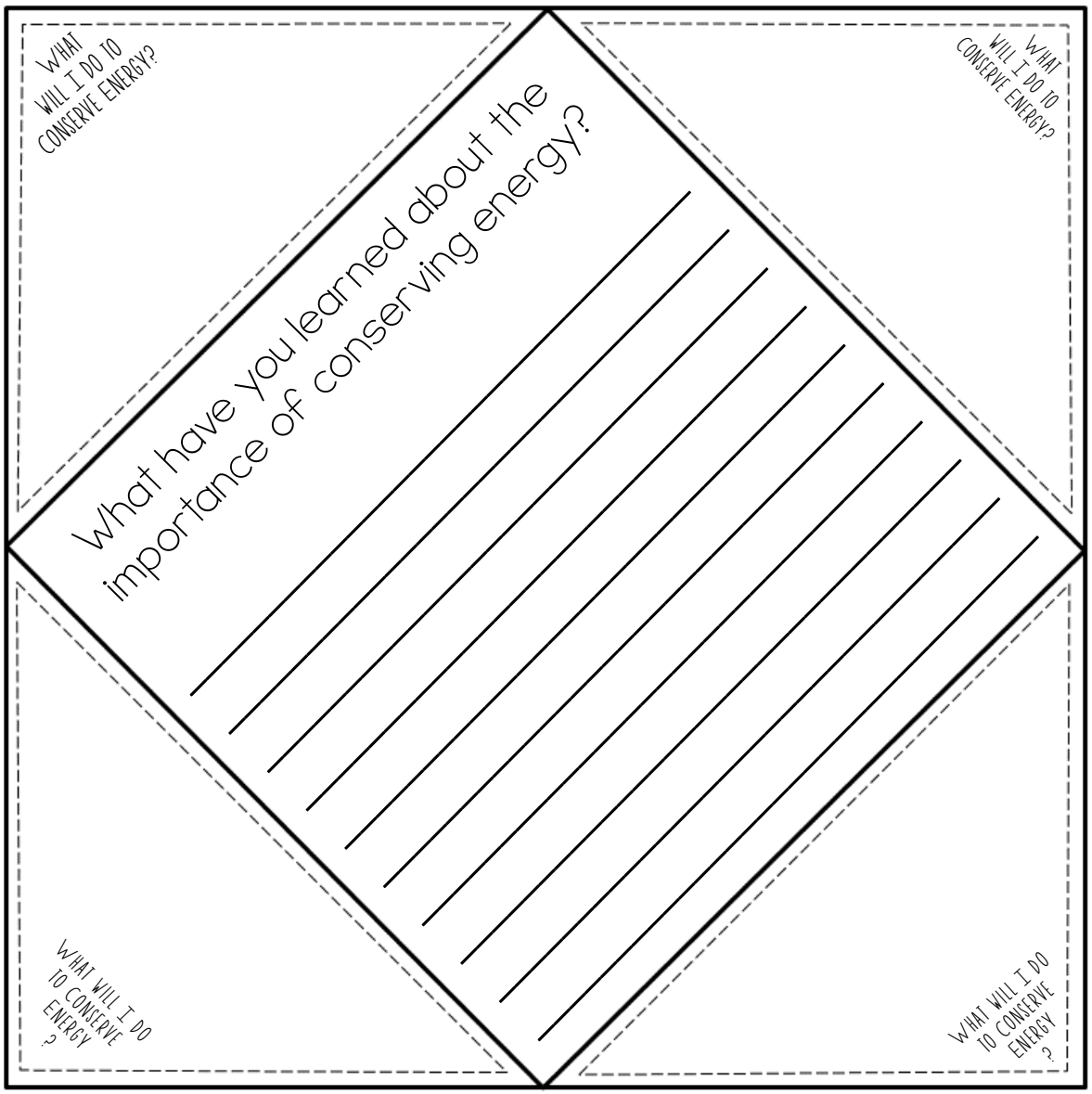


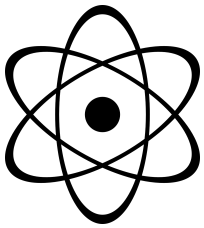
Conserving Energy

WHAT CAN WE DO

Conserving Energy

My Plan to Save Energy





Lesson 9

Review: Board Game

4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 9

	First Half	Second Half
Prep	Students will require access to research materials	
Grade 5	Students will be preparing a game board as a review activity to assess their overall knowledge and understanding of the ideas and concepts learned so far in each unit. Introduce the activity Co-create with students a list of key ideas from each unit that should be focused on. Sample criteria and instructions are provided following this lesson. Review different types of games. You may give students a blank paper to design their games or use the templates provided.	• Students will divide into groups. • Each group member is responsible for creating one question and answer that shows their understanding of key ideas in the unit. These question cards will be combined to create the game. Students can use the question card template to create their questions. These question cards will act as an assessment of student learning and knowledge. As a further extension use these questions, one for each student in a game of Scoot. Template is provided. Allow students time to play the game with friends.
Unit Review	Scoot: choose twenty review questions generated by students. Write them as true or false statements, short answer, or multiple choice on the blank cards provided. Create an answer master using the scoot answer page. Spread the cards around the room and give each student scoot answer page. Have them start at a card in the room. When you say SCOOT students move to a card. If there is not a free card students go to a central location in the room called Katchup. Every 30sec-1min you will say SCOOT, then students will move to a different card or the katchup space. Students must do this activity in silence.	

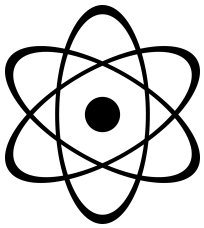
Culminating Task

Game Board Information Page
Make an Energy Board Game

1. Choose a type of board game to model your game after (suggestions below include):
   - Snakes and Ladders (path/story to Follow).
   - Trivial Pursuit (earn tokens per category).
   - Who Wants to be a Millionaire (question pyramid).
   - Jeopardy (categories with multiple questions).

2. Include information in your game board about what you have learned about CONSERVING ENERGY. This board game should teach people about conserving energy it should include questions and examples of the following topics.
   - What is energy?
   - How is energy transferred and stored?
   - Can energy be created, destroyed or lost?
   - Renewable and non renewable energy sources
   - Sources of energy: How do we generate electricity
   - Identifies the impact that some sources of energy has on the environment.
   - How do people use energy?
   - Why should we conserve energy?

3. Make your game board presentable.
   - Make sure it teaches people about energy
   - Decorate it.
   - Make it colourful and appealing.
   - Make it Simple: Ensure your instructions are easy to follow and play.

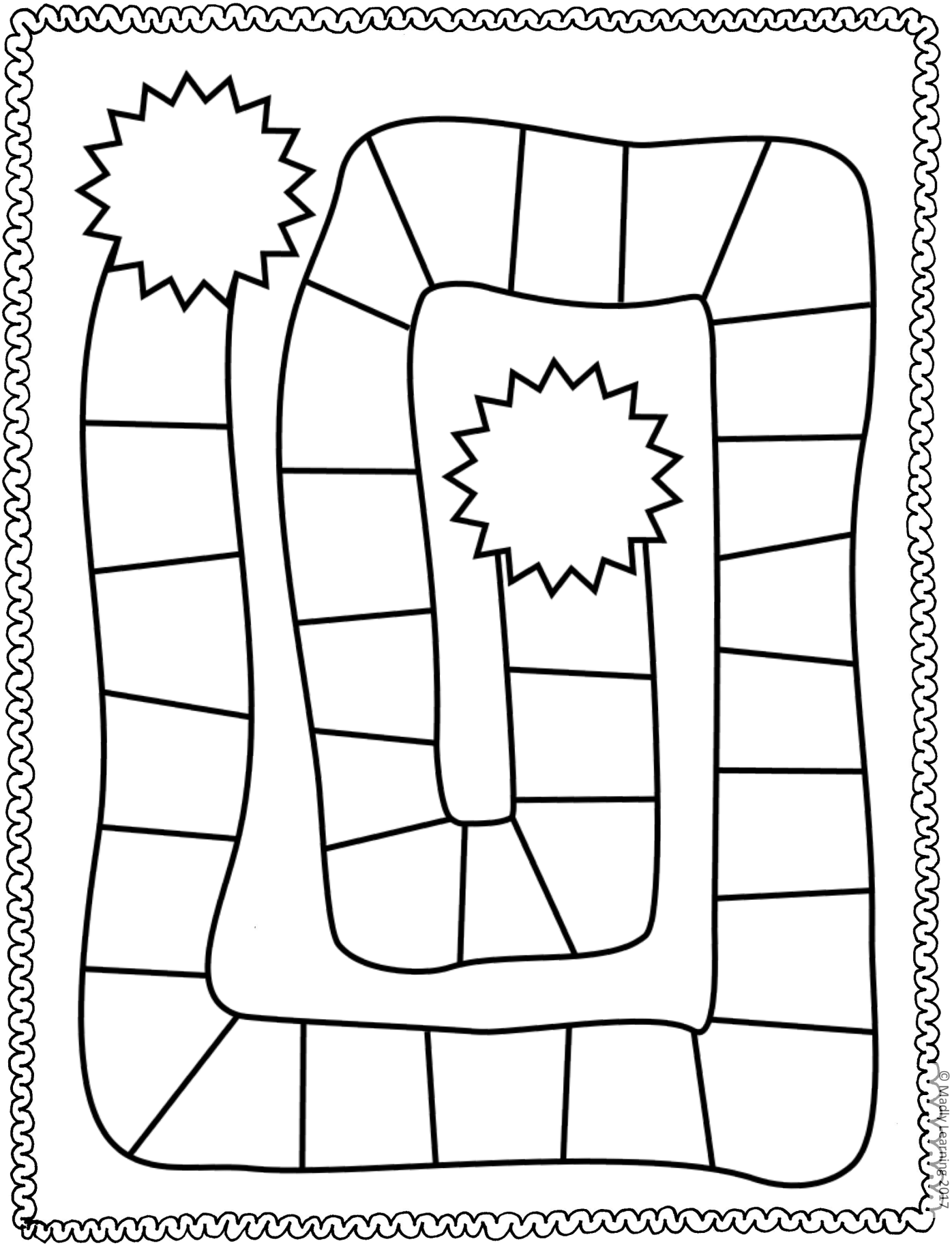


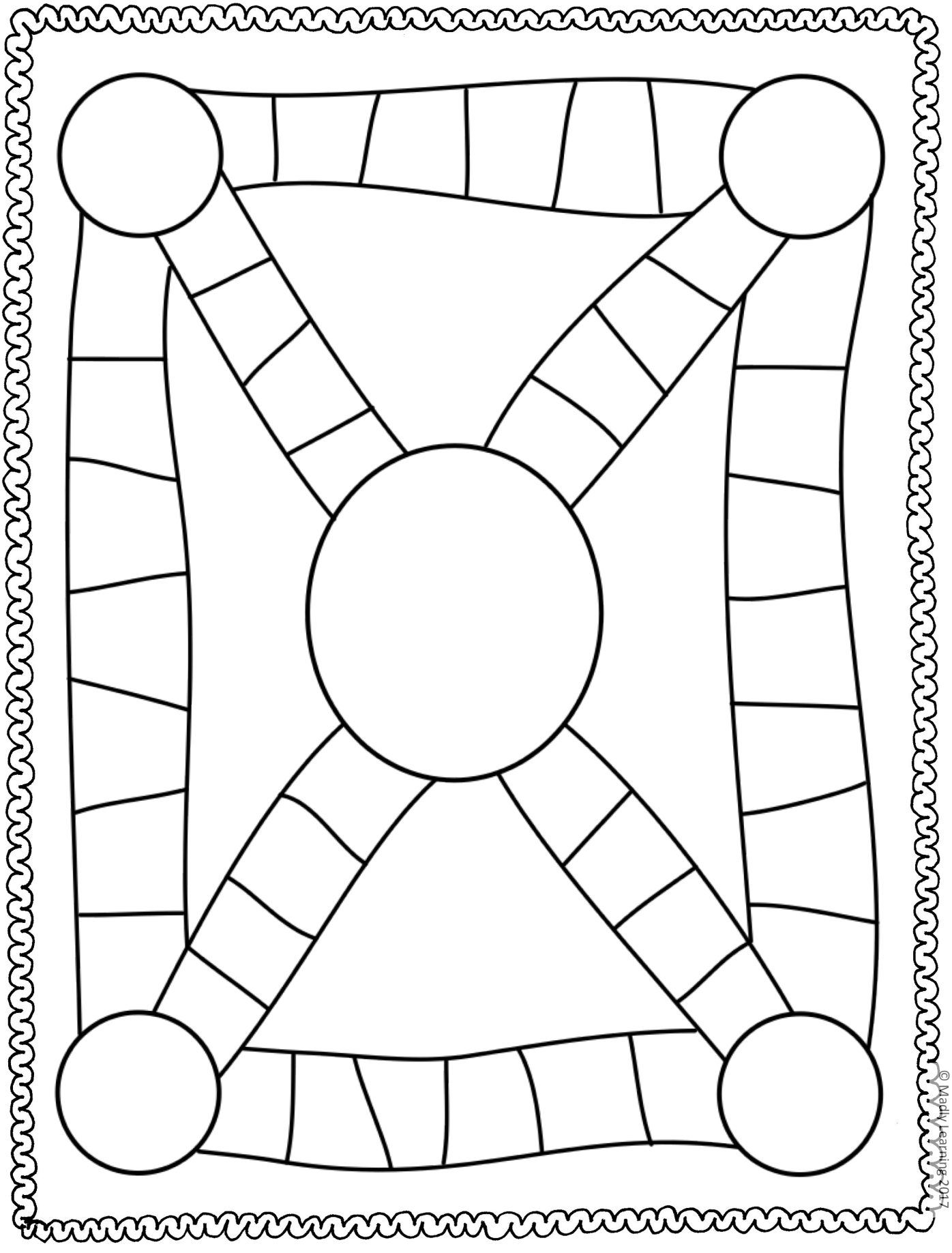
Energy Conservation

STUDENT GAME CARD PLANNER

Use what you learned so far about energy conservation? Plan out your questions that you will contribute to your groups game

#	Question	Answer





Student Game Question Cards

Card #

Question

Answer

Card #

Question

Answer

Copyright Madly Learning 2017

Card #

Question

Answer

Copyright Madly Learning 2017

Card #

Question

Answer

Copyright Madly Learning 2017

Scoot Question Cards

Card #

Question

Card #

Question

Card #

Question

Card #

Question

Scoot Game

Card #	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Card #	Answer
11	
12	
13	
14	
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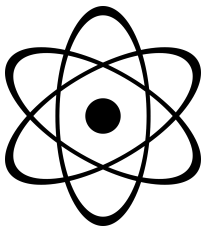
29	
20	



Lesson #10

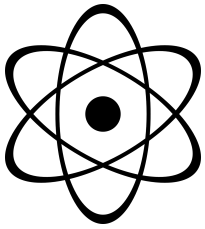
Inquiry Project

4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 10

	First Half	Second Half
Prep	5 - Students will require access to research for their independent inquiry. Some research sources are included in the unit livebinder for popular topics.	
Grade 5	Students Investigate an invention that was designed to conserve energy. Students can search this site or a similar site for a product that helps to conserve energy. http://www.amconservationgroup.com/categories/energy-efficient-products/	Once students choose a product they need to research to find answers to the following questions What is the product? How does this product help someone conserve energy? Do you think that people should or will use this product? Why? Why not?
	Note: *if your students require more of a modeled inquiry instead of an independent inquiry. A topic to consider is insulation. Roxul is a type of insulation that is made out of rocks – Rock Wool - (simply: Melted rock spun into glass similar to process of creating cotton candy)* *Resources: http://www.roxul.com/stone+wool/overview/origin+-c12-+properties* ***http://www.roxul.com/stone+wool/overview/faq***	



Inquiry Project
Teacher Guide

1. Use the following pages to print out: Staple the pages together so that students have all pages together. More research pages can be added if necessary.
2. Each step in the inquiry process should be modelled for the students: Perhaps choose a social issue to model how to follow the inquiry process and complete the pages before students are expected to do it by themselves.
3. Model how to write inquiry questions: Pick a local topic that is relevant to your unit of study. Write inquiry questions following the same process as the "my questions" organizer
    - "Whose perspectives should be considered when considering the location of the garbage dump?"
    - "What are the costs and benefits of locating the garbage dump outside the city?"
    - "What impact will the garbage dump have on the local habitat?"
4. Students pick their topic and issues: Complete the "Making my Questions" on their own.
5. Time to begin researching: Instruct students to use a variety of sources. Google news search, books, internet sources. Read the book like "But I read it on the Internet"
6. After their data is organized: Have students analyze and evaluate what they have learned from their research. Complete the Summarize my readings and My Thoughts and opinions.
7. Create a presentation of their information using the data in their inquiry package.

Inquiry Assignment

Grade 5

Energy is everywhere in today's world. It is necessary to operate and make the things we rely on. Think of a space or room that might need to conserve more energy. Conduct an energy audit to help you determine areas of need. Find and investigate a product that is designed to conserve energy in this room or space.

Conservation Products
http://bit.ly/ML-SciCOEinq

Areas to Focus on:

1. Choose a room in a house or other space where you might need to save energy? Conduct an energy audit to help you determine space that need to conserve more energy.
2. Develop your INQUIRY QUESTION.
3. Choose a product that could help you conserve energy in this room.
    - What is the product?
    - How does the product work?
    - How does the product conserve energy?
    - Why do we need this product and What is it meant to replace?
    - Why should we encourage people to purchase this product?
4. Apply this to your life. How and why would you encourage people to use this product?

Inquiry Booklet

Making My Question

What is your overall topic?

_____

What issue are you focusing on?

_____

What do I want to know about this topic?

_____
_____
_____
_____
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What do I already know about this topic?

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How do I know it?

_____
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Inquiry Booklet

Making My Question

Brainstorm some inquiry questions:

- _____
- _____
- _____
- _____

Pick your best question:

_____

_____

What do I need to know?

_____

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What could an answer to your inquiry question be?

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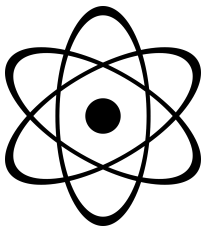


Inquiry Booklet

Good Inquiry Questions

- ❑ Are about something you are interested in.
- ❑ Have multiple answers.
- ❑ You don't know the answer already.
- ❑ Are not based on belief, opinion, or personal thoughts.
- ❑ Can be easily researched.
- ❑ Cannot be answered with just a yes or no.
- ❑ Are clear, focused and specific.

My Ponder Point
Research

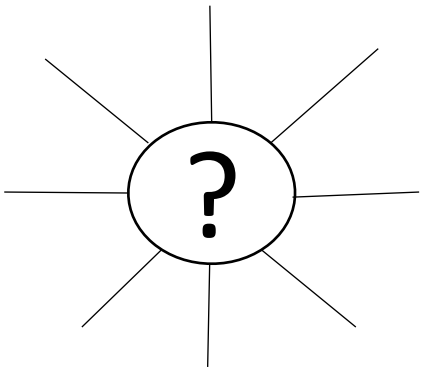
My Question: _____

_____

_____

Source:

_____



Fill in
the middle
with quick facts
from your research.
Include the page# or
Paragraph# to quickly reference
where you found this fact.

Inquiry Booklet

Summarize Your Findings

Pick your four main ideas or subtopics and summarize your findings

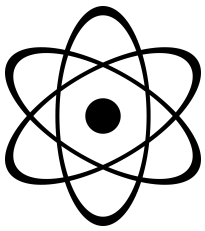
What is the product?

How does it Work?

How does it conserve energy?

My Conclusion

Why should people use this product?



Inquiry Booklet

Evaluating and Drawing Conclusions

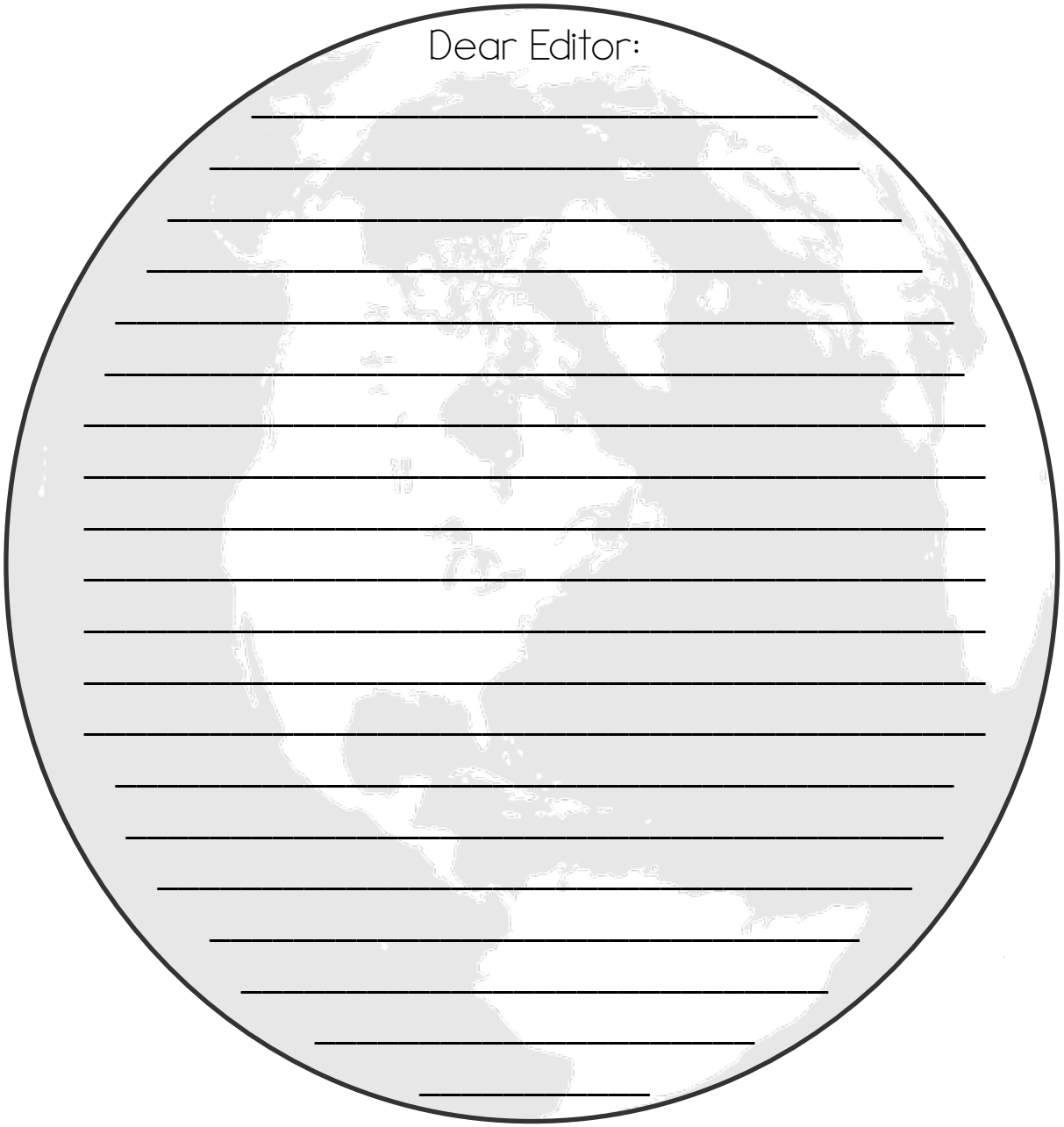
After looking at your research, consider the following questions:

- I think?
- If I could choose I would?
- Do you agree or disagree?
- My Opinion is?
- I would recommend?
- It would be better if?

Inquiry Booklet

Application to the World

Write a letter to your local newspaper persuading people to use the product of your choice to conserve energy.



Dear Editor:

Energy is either renewable or non renewable. Give examples of three sources of energy and describe the positive and negative consequences for each.

Energy cannot be created or destroyed it can only be transformed.

Describe how this statement is true and give examples.

Why should we conserve energy?

List three things that could be done at home, at school or in the community to conserve more energy. Explain why this is important to do.

Describe the different types of energy and give an example of how it is used:

* Heat Energy
* Electrical Energy
* Chemical Energy
* Kinetic and Potential Energy

Assessment Tracking

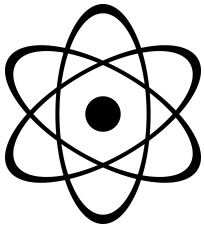
4 – Excellent 3 - Good 2 - Satisfactory 1 - Poor

Lesson 1	I can identify what energy Is. I can explain that energy cannot be lost, created or destroyed it is; only transformed.
Lesson 2	I can identify and describe different **Forms of Energy.** I can describe how energy is stored and transferred.
Lesson 3	I can identify **Renewable** and **Non Renewable.** I can identify ways that we get energy.
Lesson 4	I can describe how we use energy in our daily Lives. I can identify how humans use energy and analyze the impact this has on society and the environment.
Lesson 5	I can identify how humans use energy and analyze the impact this has on society and the environment. I can suggest ways to conserve energy.
Lesson 6	INQUIRY: I can evaluate different technologies that relate to energy consumption and Propose ways to conserve energy.

	Lesson / Learning Goal:					
Name	1	2	3	4	5	6

Inquiry Rubric:
Conservation of Energy

	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding: • **Identifies conservation need** • **Chooses a product to fit need** • **Explains purpose of product**	Student is unaware of many of these components. Many important parts are missing. Lacks sufficient understanding of content.	Student shows a surface understanding of these concepts. Some important parts are missing but student appears to understand the Gist of research. Beginning to understand content.	Student demonstrates considerable understanding of these concepts. Student may be missing minor components or some information may be incomplete. General understanding of content is solid.	Student demonstrates a high degree of understanding. Student has a thorough understanding with no missing information. Depth of understanding of content exceeds expectations.
Thinking: **Student has followed the inquiry research process to formulate questions and gather relevant data to determine which product would solve conservation need.**	A high degree of support is required to find and use appropriate resources. Research is disorganized.	Student requires some assistance to use and find appropriate resources. Research is somewhat disorganized.	Student has used mostly appropriate resources. Research shows good organization.	Student has evaluated research and use appropriate sources to include in their research. Research is well organized.
Thinking: **Student is able to evaluate and analyze the usefulness of the product by:**	Student lacks the ability to evaluate and analyze their topic and research effectively.	Student evaluation and analysis is simple and requires more support to complete effectively.	Student evaluation and analysis is effective and is beginning to show thoughtful reflection.	Student evaluation and analysis is thoughtful and shows a depth exceeding expectations.
Communication: **Student is able to communicate their research about their product to others by expressing their opinions about why their product should be used.**	Student struggles to convey a simple knowledge of the researched content by using correct terminology, vocabulary and their opinions of the product.	Student conveys a simple knowledge of the researched content by using correct terminology, vocabulary and their opinions of the product.	Student conveys a solid knowledge of the researched content by using correct terminology, vocabulary and their opinions of the product.	Student conveys an in-depth knowledge of the researched content by using correct terminology, vocabulary and their opinions of the product.
Application: **Student is able to make connections to the world around them and identify how their research is related to their daily life by persuading others to use their product.**	Student makes irrelevant connections that show a lack of understanding of the impacts in our world.	Student makes simple connections that show a basic understanding of the impacts in our world.	Student makes good connections that show a good understanding of the impacts in our world.	Student makes strong meaningful connections that show a deeper understanding of the impacts in our world in multiple ways.



Forms of Energy Sources:

1. http://www.eschooltoday.com/energy/kinds-of-energy/what-is-electrical-energy.html
2. http://www.ehow.com/info_8484153_thermal-energy-science-experiments-kids.html
3. http://violet.pha.jhu.edu/~wpb/spectroscopy/basics.html
4. http://www.childrensuniversity.manchester.ac.uk/interactives/science/energy/what-is-energy/
5. http://scienceforkids.kidipede.com/physics/electricity/
6. http://www.qrg.northwestern.edu/projects/vss/docs/power/2-whats-electron-flow.html
7. http://momof5moreorless.hubpages.com/hub/thirdgrade
8. http://www.topscience.org/activities_print/FreeDownload19.pdf