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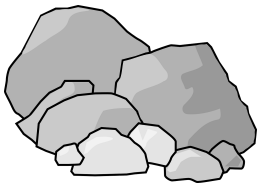
Forms of Energy

LINK TO LIVE BINDER RESEARCH FILES

bit.ly/ML-energy

ACCESS CODE: MLSS&S

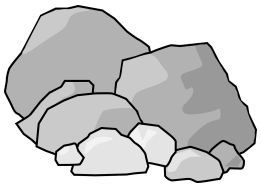


Links and Resources

LINK TO LIVE BINDER RESEARCH FILES

bit.ly/MLrocks-minerals

ACCESS CODE: MLSS&S



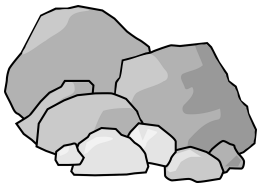
Information about these Lessons

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

- Understand the difference between rocks and minerals.
- Exploring the uses rocks and minerals play in our everyday life.
- Describe the properties that are used to identify minerals (colour, lustre, streak, transparency, hardness)
- Describe how igneous, sedimentary and metamorphic rocks are formed in the rock cycle.
- Describe the characteristics of the three classes of rocks.
- Investigate types of materials that are made of rocks and minerals.
- Choose a product that is made using rocks and/or minerals to explore for an inquiry project.
- Explore the environmental costs of using rocks and minerals.

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

Lessons include: standard lessons, interactive notebook activities, foldables, student research and scaffolded research guides.



Information about these lessons

Materials:

- **A Set of Rock and Mineral Samples** (Although this unit can be used without them it is highly recommended that samples of rocks and minerals be used. This will allow a much better experience for students in their learning)
- A Notebook (I use a fully lined notebook) Students can make notes and add their foldable activities from their interactive notebook to this book much easier.
- Chart paper for anchor charts.

Learning Goals:

Ensure that students are told what the learning goals are for each lesson. Post these learning goals on an anchor chart/Word Wall 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.

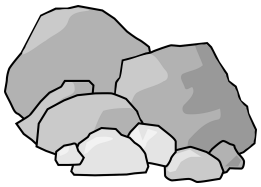
Interactive Notebook:

Many 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 specific to this unit but can also be used for other inquiry studies. Students begin to explore rocks and minerals 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 reference my video series at **bit.ly/ML-inquiry**



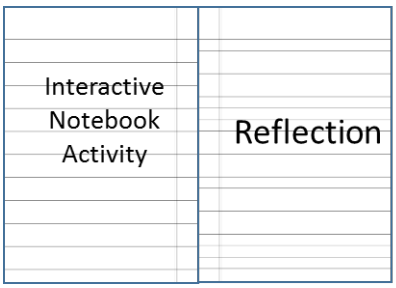
Interactive Notebook

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

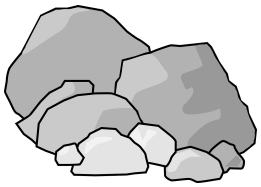
It is important to have students participate in a lesson and get the gist of the lesson instead of an insignificant factoid being their take away. To ensure that students learn what you intend to teach them it is important to give them a learning goal to work towards, activities in which to learn this, 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 the sample page provided.



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



Lesson Reflection

My learning goal was:

Our activity was:

My reflection on today's learning goal:

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

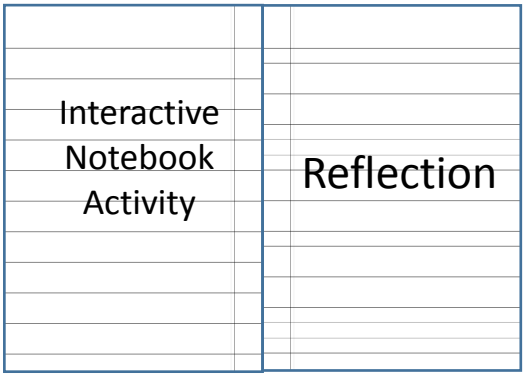
The purpose of this interactive notebook is to allow students to reflect and consolidate their learning.

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.

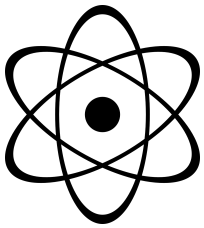
G – Goal What should students accomplish by completing this task?	Students should consolidate their learning about energy and apply it to instructing other about what they have learned throughout the unit.
R – Role What role (perspective) will your students be taking?	Students will be taking the role 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.



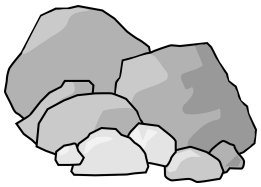
Provocation

4/5 Combined Lesson

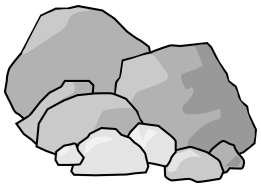
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 1

	First Half	Second Half
Prep	Photocopy K WL chart for each student Prepare sort cards for each student including labeled pocket Page for interactive notebook	
Grade 4	**Teacher Directed** Complete the KWL chart for Rocks and Minerals in the world around us. **LG: "What do you know about Rocks and Minerals?"**	**Independent Work** Complete the rocks and minerals sort Ask students to complete an exit card explaining what they learned from this activity.
Grade 5	***Provocation*** ***LG: What do you wonder about energy?*** 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 on their STW chart.
	Students to the sort either independently in a small group or in a knowledge building circle as a whole group.	



Grade 4



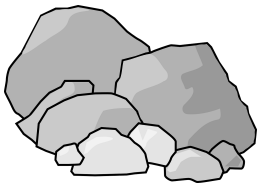
Rocks and Minerals

All Around Us

K What I KNOW

W What I WANT to know

L What I LEARNED



Rocks and Minerals
What's the Difference?

Instructions:

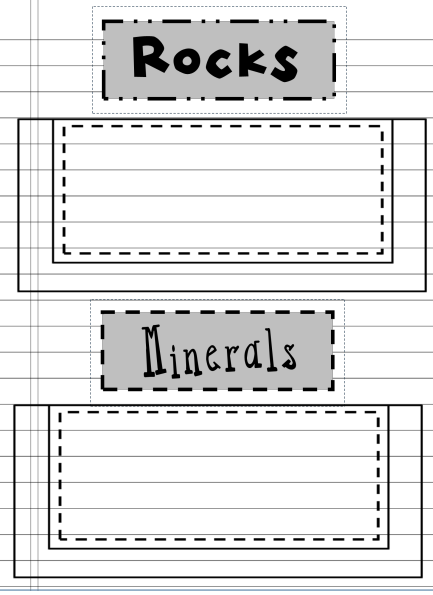
1. Cut out and place these headings on your desk
2. Cut out the "sort cards".
3. Begin to sort the cards into two categories (rocks and minerals).
4. Discuss your sort with a group or partner.
5. Create your Interactive Notebook for this activity:
   - Follow the instructions to create pockets for your sort cards
6. Write your exit card for this lesson. "What did you learn about rocks and minerals from this activity?"

My Learning Goal Today is:

Activity Today

Reflection

What I learned about today's learning goal



Inconsistent mixture of minerals

Not made by humans.

Are grouped or classified based on how they are formed. There are three different groups.

They do not contain fossils.

They may contain fossils.

Grows in a crystal formation.

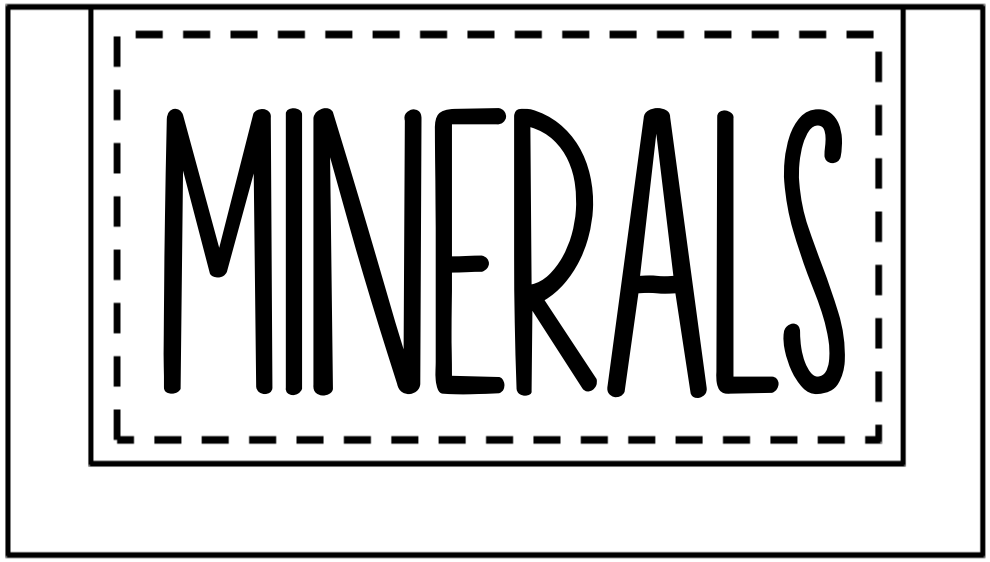
Some are formed by magma from a volcano.

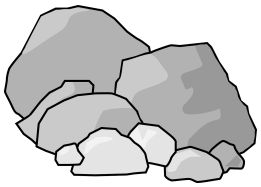
Made up of a precise combination of chemicals.

Makes up the earth's crust.

Can be found in food.


Rocks

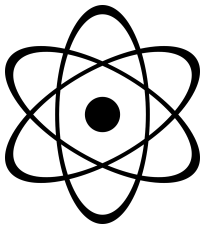

MINERALS



Rock and Mineral Sort

ANSWERS

Rock	Mineral
Inconcsistent mixture of minerals	not made by humans
grouped or classified based on how they were formed	Do not contain fossils
They contain fossils	Grow in crystal formation
Some are formed by magma	made up of a precise combination of chemicals
Makes up the earth's crust	Can be found in food



Grade 5

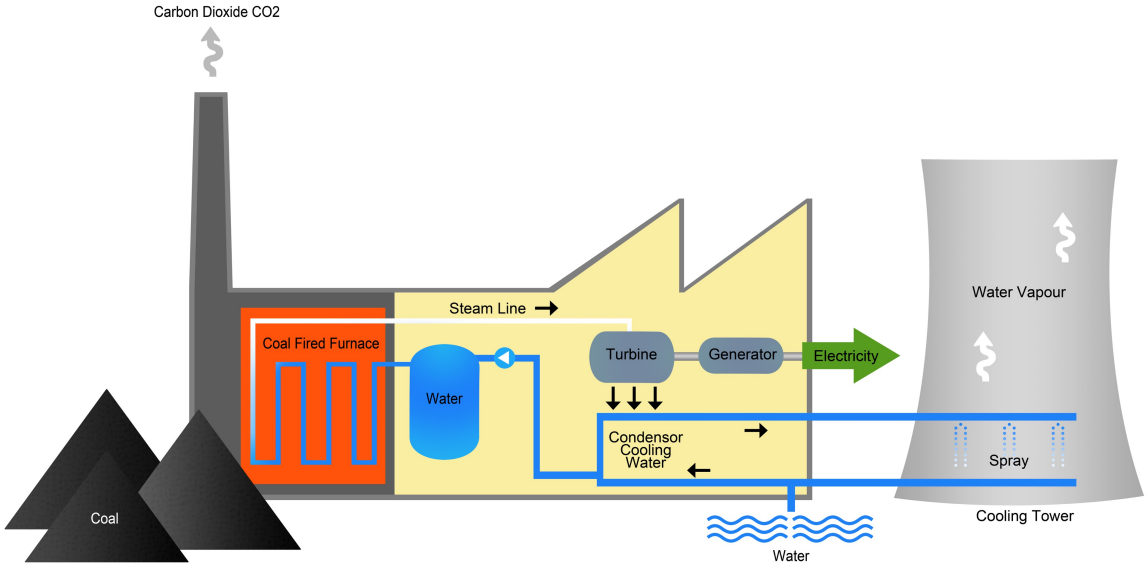
Wonder Wall

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.



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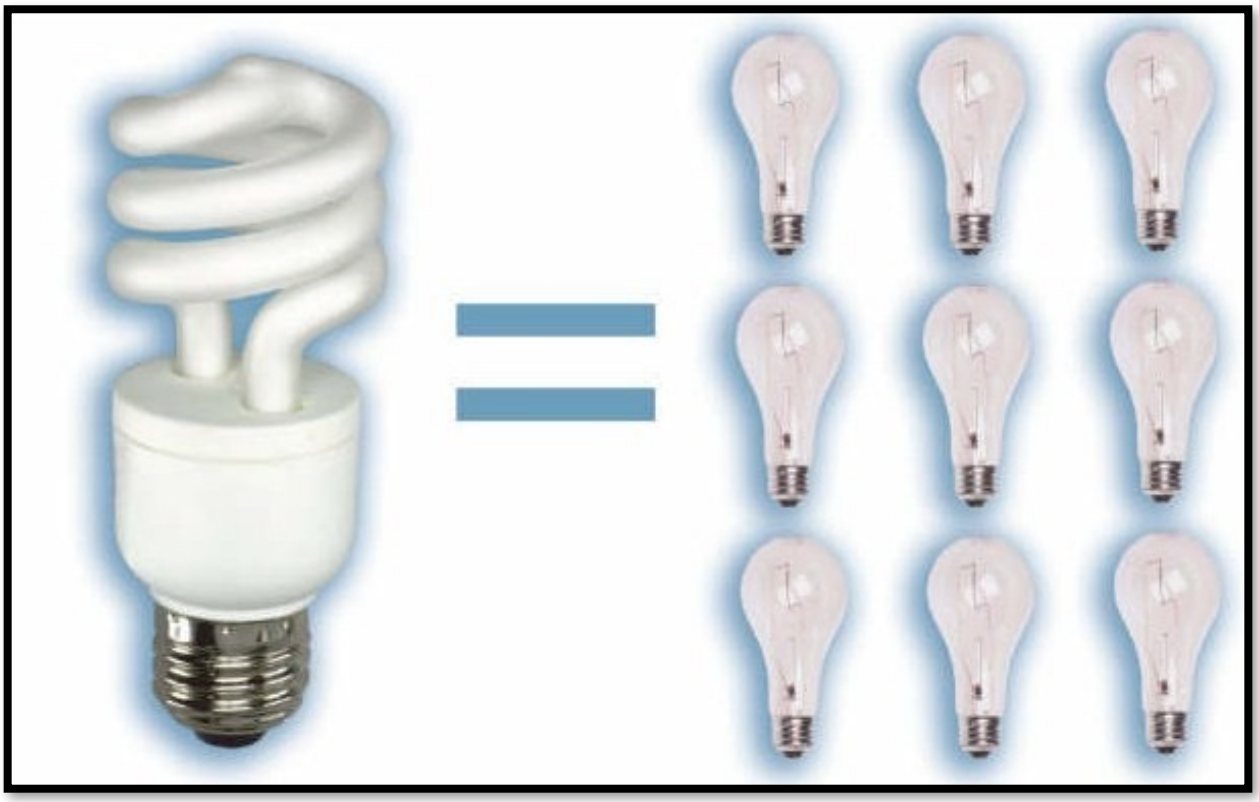
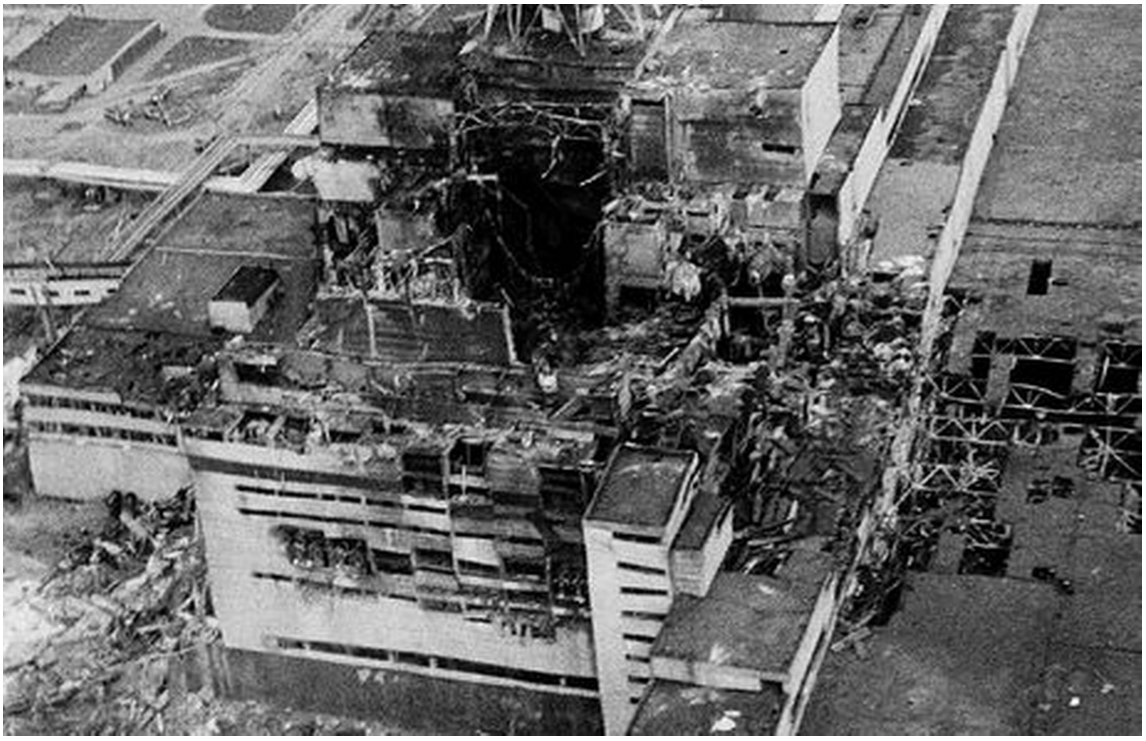
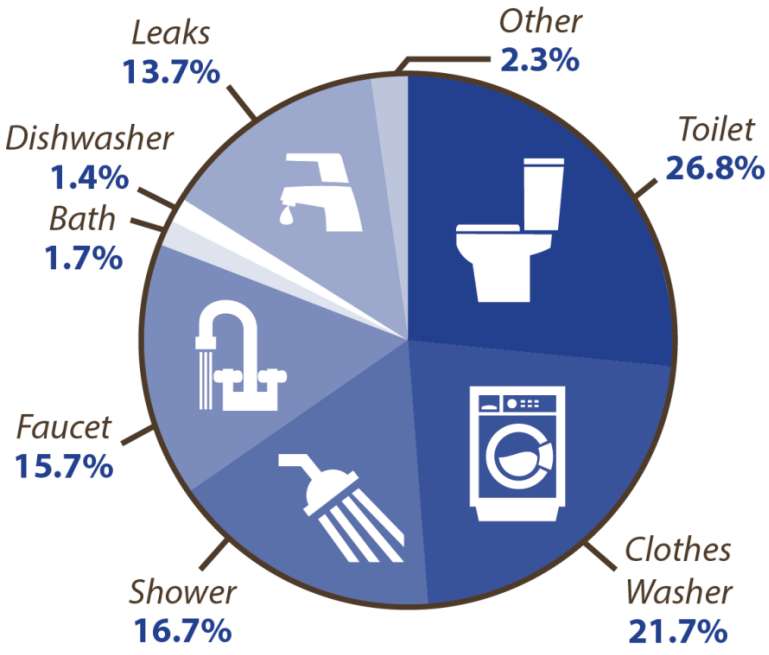
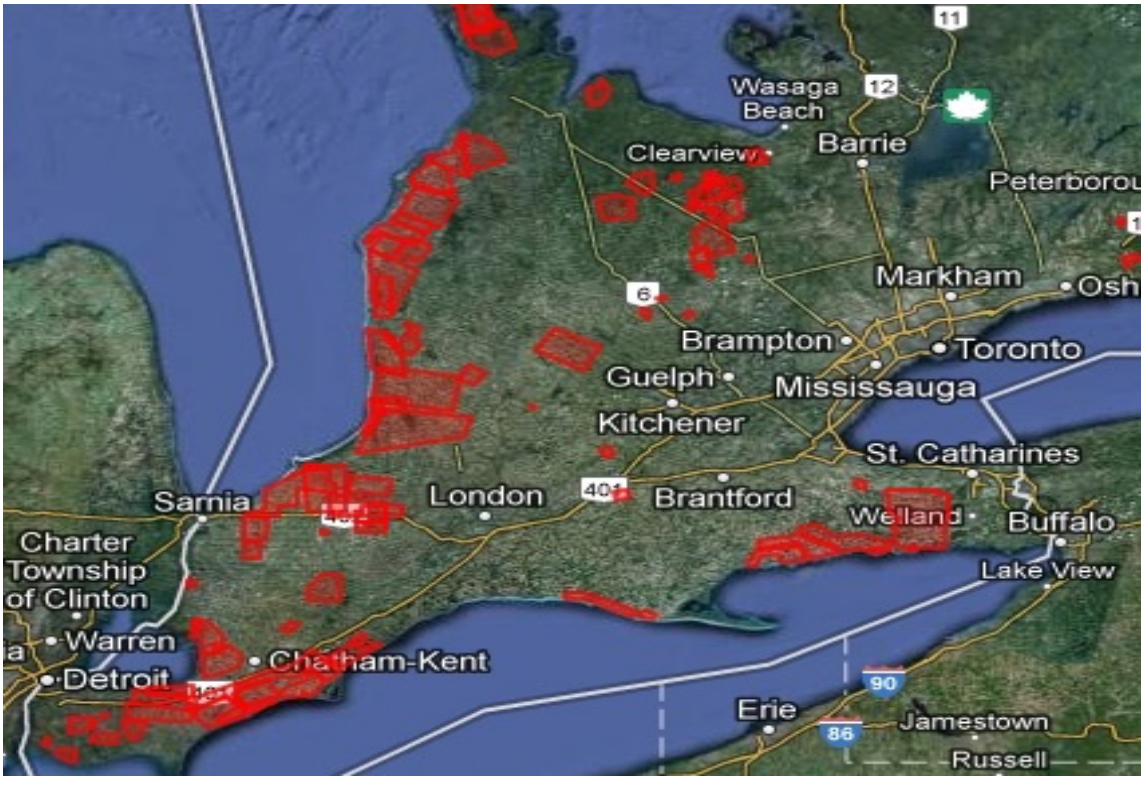


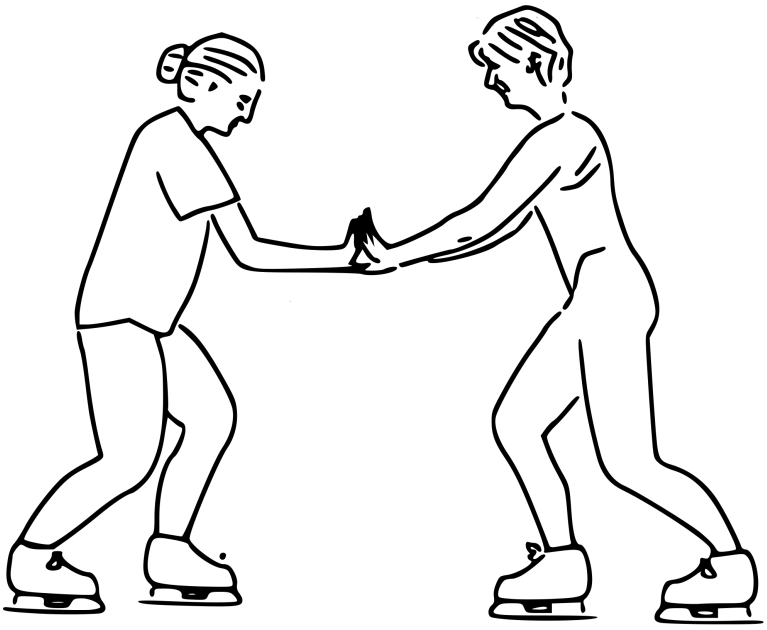


Average Indoor Household Water Use



Source: AWWA Research Foundation, 1999





For every action there is an equal and opposite reaction

Kinetic

Stored

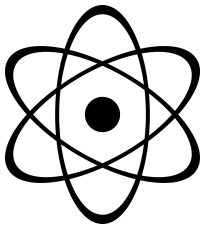
Potential

Energy

Conservation

Renewable Energy

Non-Renewable Energy

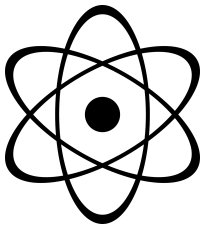


Energy Conservation

S What I SEE

T What I THINK I know

W What I WONDER



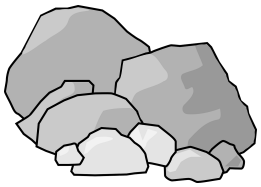
Lesson #2

4/5 Combined Lesson

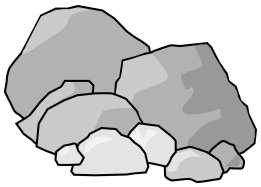
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 2

	First Half	Second Half
Prep	Student access to research is required for this activity. This can be done by accessing research in the lifebinder associated with this unit or through the teacher accessing the same information and printing articles for students to use off-line. Photocopy and prepare rocks and minerals pockets. <u>5-From this Unit</u> • What is energy: Instructions. • What is energy: true and false. • What is energy: corrected anchor chart. • What is Energy: Foldable. <u>Classroom Resources</u> • Online audio/video equipment • Chart paper and markers • Scissors, glue.	
Grade 4	**Teacher Directed** **LG: How are rocks and minerals used in our daily life.** Brainstorm students how rocks and minerals are used in their daily life. Create an anchor chart with students and have them copy the thinker chart onto the graphic organizer provided (rocks and minerals in our daily life)	**<u>Independent Work</u>** Students will build on their background knowledge gained through the knowledge building circle and conduct further research on 2-4 common rocks and minerals. Students will record this information on the interactive pockets provided following this lesson.
Grade 5	**<u>LG: WHAT IS ENERGY:</u>** 1. <u>Watch three videos from the unit live binder. "What is Energy" tab</u> (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).



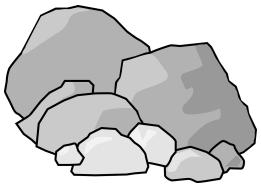
Grade 4



Rocks and Minerals

In Our Daily Life

How are rocks and minerals used in our Daily Life?



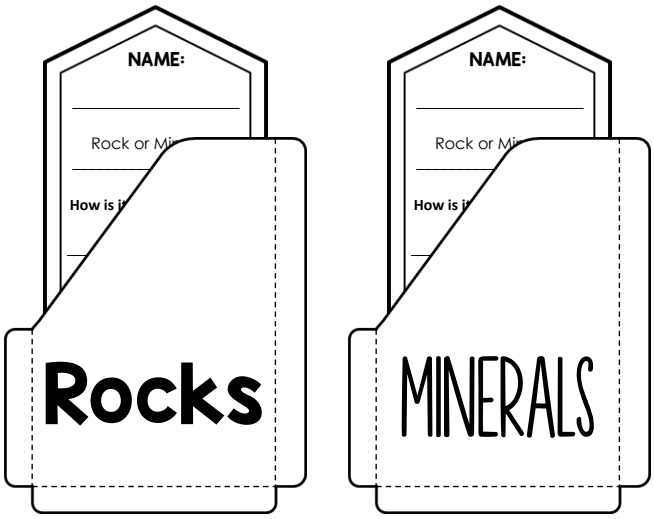
Rocks and Minerals

In Our Daily Life

Instructions

The previous page's graphic organizer can be printed and used or it can be created by students in their notebooks

1. Record your learning goal and activity instructions.
2. Read about different uses for rocks in our daily life.
3. Cut out the tab pockets.
4. Glue the pockets in your notebook.



5. Find 3-5 examples of rocks used in our daily life and complete the tabs for each rock. Do the same for the minerals.
6. What did you learn today about how rocks and minerals are used in our daily life?

Rocks

MINERALS

Identify some rocks or minerals used in our daily life. Some examples are: salt, diamonds, platinum, marble, soapstone. Identify how they are used by people.

NAME: _____

Rock or Mineral? _____

How is it used in our daily life?

_____

_____

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NAME: _____

Rock or Mineral? _____

How is it used in our daily life?

_____

_____

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_____

Sample Answers - Student answers will be dependent on their interest and research

identify how they are used by people.

NAME:

Diamonds

Rock or Mineral?

How is it used in our daily life?

Diamonds are used by people for jewelry, tips of cutting blades, and electronics. Diamonds are very valuable and sometime there is lots of conflict around how they are minded from the ground and used by people.

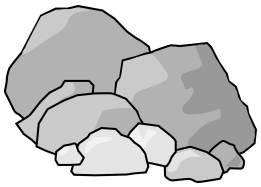
NAME:

Granite

Rock or Mineral?

How is it used in our daily life?

Granite is used in our daily life in our homes. It is used to make kitchen and bathroom counters. It is also used to make tiles for floors. Granite comes in many different colours and styles. It is cut into flat slabs and shaped and polished to make flat counter tops and tiles

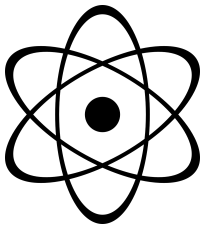


Lesson Reflection

My learning goal was:

Our activity was:

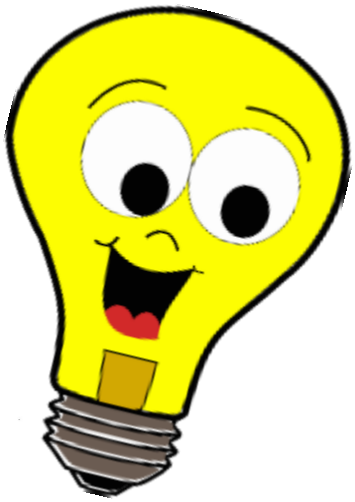
My reflection on today's learning goal:

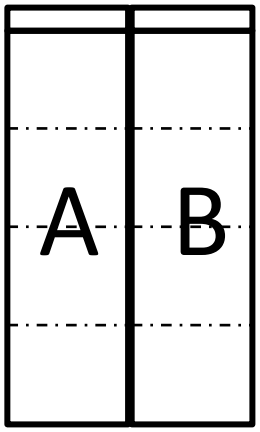


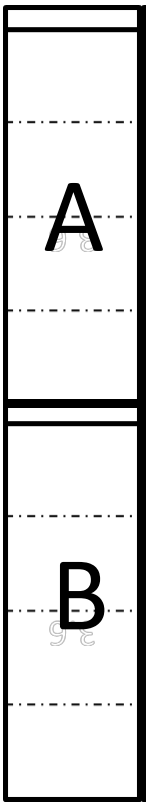
Grade 5

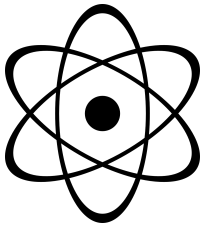
What is Energy?

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.
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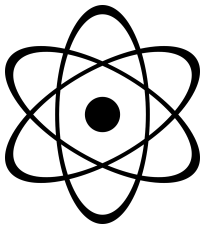


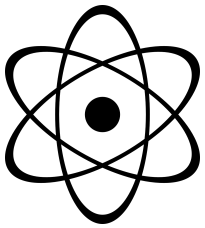
What is Energy?

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.



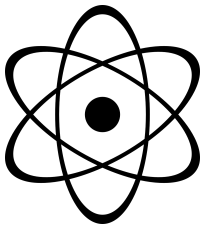
What is Energy?

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.

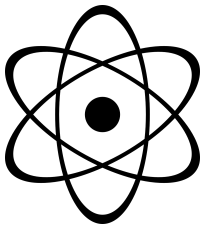
Energy can be transformed and converted. Electrical Energy can be turned into light energy, heat energy or back into kinetic energy.



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.

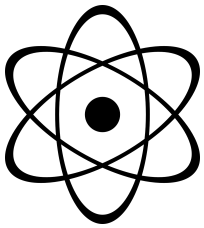
What is Energy?	By: _____
Energy makes things happen, it makes things go and makes things move.	Energy can be made from many different sources. Energy is created easily.
POTENTIAL ENERGY is when something is moving and KINETIC ENERGY means energy that is stored.	POTENTIAL ENERGY is stored energy KINETIC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



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.

Answers

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.

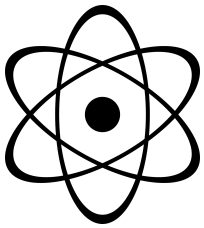
POTENTIAL ENERGY is when something is moving and KINETIC ENERGY means energy that is stored.

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

What is Energy?

Answers

Energy can NOT be created, destroyed or lost. Energy can only be transformed from one kind of energy to another.	Energy [illegible] when you move [illegible] and it is destroy[illegible] the thing [illegible] move sl[illegible]
We get electrical energy from falling water, burning coal, nuclear fission, wind turbines, solar panels and burning natural gas.	Sol[illegible]anels [illegible] wind turbine[illegible] create electric[illegible] power pla[illegible] make ele[illegible]city.
When energy is transformed it is never really lost. It has been transformed to heat.	When en[illegible] converted some ene[illegible] always lost.
Energy can be transformed and converted. Electrical Energy can be turned into light energy, heat energy or back into kinetic energy.	There [illegible] ma[illegible] different types of e[illegible]city. Once it is use[illegible] it d[illegible]pears.



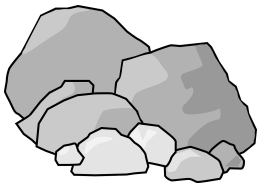
Lesson #3

4/5 Combined Lesson

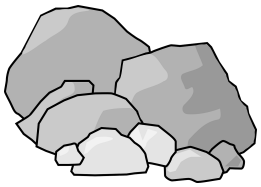
ENERGY CONSERVATION & ROCKS AND MINERALS

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	4- Common mineral samples are required for this activity. If you do not have access to these please see the notes below. 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 4	**LG: How to test a mineral** **Independent Work** • Students or teacher read the poster "How to test a mineral" • Students then cut out the properties flip tabs and record what they learned about each property • (to see the scale of hardness see the scale in the next lesson)	**Teacher Directed** Review how to test rock or mineral samples following appropriate saftey procedures With the teacher guidance and support students will test samples by completing a series of tests on the minerals.
Grade 5	LG: What is Energy? TEACHER DIRECTED 1. First read the text reading FORMS OF ENERGY. **A** 2. Outline the expectations for the experiments. 3. Tell students what the question this experiment is hoping to answer. **How does this experiment show energy?**	***Then students follow instructions on the experiment card to conduct the experiment.*** ***There are multiple versions of the experiment recording page. Teachers may choose the one best suited to their class.*** ***Question: How does this experiment show energy?*** ***1) Record questions and hypothesis*** ***2) Conduct Experiment and record observations during the experiment*** ***3) Record their results and conclusions about the answer to the question asked.***
	Notes: 4- in order for students to test mineral samples it is important to have access to the minerals listed in the Mohs' hardness scale. If you do not have pure mineral samples than a variety of rocks can be tested as well however the results may not be as precise. One sample kit will last many years. Hardness test kits can be ordered online for a reasonable price. http://geology.com/store/collections/hardness-kit.shtml Additionally try contacting a local college and university geology department to see if they have any samples they would be willing to lend you for the duration of your unit.	



Grade 4



How to Test a Mineral

Colour

Minerals come in many different colours. The colour test for minerals involves you looking at the colour that you see with your eye. Sometimes this is a reliable way to determine what mineral you have. For example Sulphur is always yellow. But most of the time colour alone is not the most reliable way to identify minerals.

Lustre

Lustre is a visual test that describes how shiny a mineral is. Scientifically it is about how much light is reflected. Some words that describe lustre include waxy, greasy, pearly, glassy, metallic, and milky.

Transparency

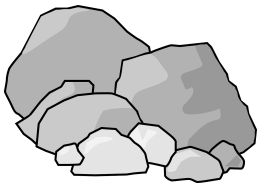
This mineral test determines if light passes through the mineral. If only a partial amount of light passes through it is considered translucent. If no light gets through it is considered opaque.

Streak

This is a more reliable test than the colour test. A mineral when rubbed to create a streak will always make a streak of the same colour. Scraping a mineral on a porcelain tile will make a streak. The colour of the streak then can be examined.

Hardness

Some minerals are harder than others. We use Mohs scale of Hardness to test a minerals hardness. Moh was a mineralogist who designed a series of tests to see the hardness of a mineral. It was based on the ability of one harder mineral to scratch another softer mineral. To do the test you scratch the mineral with an object like a fingernail, penny, or a steel nail. A harder mineral can always scratch a mineral lower on the hardness scale.



How to Test a Mineral

Instructions

1. Cut out around the outside of the shape. (dotted arrow lines)
2. Cut the middle lines between the words (grey highlighted lines) Do not cut into the blue area!
3. Glue down the outside tab (striped area on the left) in your notebook
4. Read the "**How to test a mineral**" Article.
5. Lift each tab. Then under each tab write what you learned about the properties used to identify minerals.

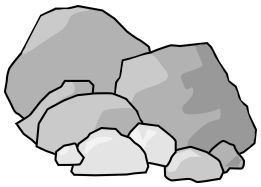
Colour

Lustre

Streak

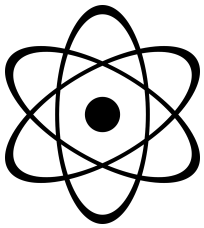
Transparency

Hardness



Mineral Test

	Colour
	Lustre
	Streak
	Transparency
	Hardness



Grade 5

Forms of Energy

Conducting an Experiment

Before You Begin

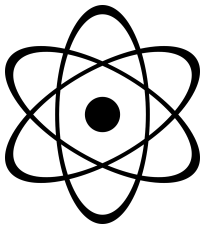
- ❑ First read the text called **FORMS OF ENERGY**
- ❑ Next read the experiment Instructions Card.
- ❑ Check to make sure that you have all of your materials.
- ❑ Record your **Questions: "How does this experiment show energy"**
- ❑ Record your hypothesis - What do you think will happen? Write your **Hypothesis** before you begin.

During The Experiment:

- ❑ Follow the instructions to complete each experiment. Follow the directions on the experiment card.
- ❑ Draw a picture to record your **OBSERVATIONS** for the experiment.

After The Experiment

- ❑ Think about it? Answer the questions that were asked.
  - ❑ How did the experiment answer the questions (the question asked at the top of the experiment page)
  - ❑ How did the results of the experiment match the hypothesis you wrote down at the top of your experiment page.



ENERGY EXPERIMENT
recording my results

My Experiment Is:

BEFORE

Question: What science am I trying to learn	**Hypothesis:** What I think will happen

DURING

Draw what happens	Tell what happened

AFTER

How did this experiment answer the question asked	How did your results match your hypothesis?

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:

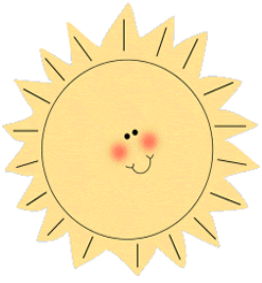
This is the energy stored in an object. The object has the potential for energy. For example, if you are holding a basketball in your hands, then the basketball is full of potential energy.

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.

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5. Record what happens
6. Repeat the test on different flooring surfaces.

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A) 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.

A) 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.
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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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A) Forms of Energy

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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

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2. Ping - pong ball
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Test #2

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6. Record your observations.

BE SAFE

PLEASE SHOOT AT THE IDENTIFIED TARGET ONLY

© Madly Learning 2017

A1) 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.
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A2) Forms of Energy

A Ping Pong Ball Shooter

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1. Cup
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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?
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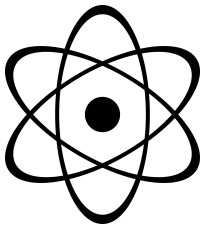


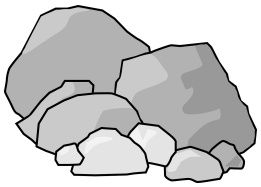
Lesson #4

4/5 Combined Lesson

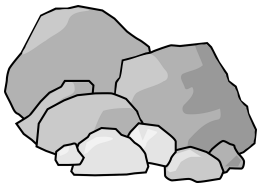
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 4

	First Half	Second Half
Prep	Gather mineral materials and testing materials. (penny, glass, knife, nail) 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 4	LG: How are Rocks and Minerals Tested Teacher directed review the terms used to describe rocks and minerals and how they are tested. Place mineral samples in a bag and group students into groups so that you have one sample per group.	Using the "Mineral Test Results Page" student will describe the mineral they choose. They will need to test their mineral sample with the tools required
Grade 5	LG: What is Energy? 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.
	Since both groups are conducting experiments you can start them together to review the expectations of todays experiments. Experiments can be run in centers. 4- Due to the materials used for testing it may be necessary for you to do the testing with the glass, and knife.	



Grade 4



Mineral Test Results

First complete your mineral test and use this page to help you guide your testing. Record your results below. When your test is complete you can cut around the outside of the circle. Then cut into the circle on the solid lines and fold in the outer tab to the centre. This will allow you to test and complete a page for more than one mineral at a time.

DRAW YOUR SAMPLE

I THINK MY MINERAL IS

Describe the colour you see when looking at it

COLOUR

When you scratch on a streak plate what do you see?

STREAK

LUSTRE

- ☐ SILKY
- ☐ GLASSY
- ☐ SMOOTH
- ☐ SHINY
- ☐ SPARKLING

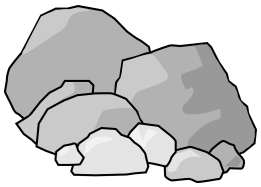
TRANSPERENCY

- ☐ TRANSPARENT
- ☐ TRANSLUCENT
- ☐ OPAQUE

HARDNESS

Can it be scratched

- ☐ FINGERNAIL
- ☐ PENNY
- ☐ NAIL
- ☐ GLASS
- ☐ KNIFE



Mineral Test Results

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Answers will depend on student's testing results. Results should match Moh's testing guide on the next page

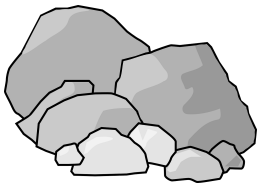
Describe the colour you see when looking at it

…n you scratch on a …what do you see?

GLASS
SMOOTH
SHINY
SPARKLING

…LUCENT
…AQUE

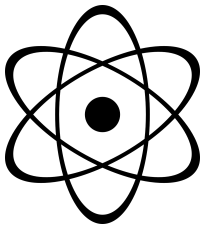
PENNY
NAIL
GLASS
KNIFE



Testing Minerals

Mohs scale reference guide

Mineral	Hardness	Hardness Test	Streak	Colour	Lustre
Talc	1	Fingernail	White/pale Green	Green, white, grey, brown	Pearly
Gypsum	2	Fingernail	White	White, grey, yellow, red, brown, clear.	Silky sugary
Calcite	3	Penny	White	White, colourless, gray	Glassy
Fluorite	4	Steel nail	White	Purple, green, yellow	Glassy
Apatite	5	Glass	White	Green, brown, blue, yellow, violet	Glassy to smooth
Feldspar	6	Knife blade	White	Pink, white grey, brown	Glassy
Quartz	7	Topaz, Corundum or diamond	Colourless	Every colour	Glassy
Topaz	8	Corundum or diamond	Colourless	Colourless, white, yellow, amber	Normally glassy
Corundum	9	Diamond	Colourless	Grey to brown	Shiny, sparkling
Diamond	10	Not possible	None	Colourless, pink, gold	Shiny, sparkling



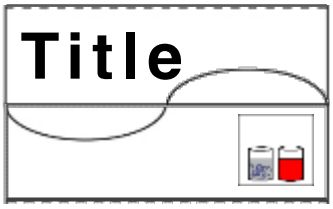
Grade 5

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.

ENERGY EXPERIMENT
recording my results

My Experiment Is:

BEFORE

Question: What science am I trying to learn	**Hypothesis:** What I think will happen

DURING

Draw what happens	Tell what happened

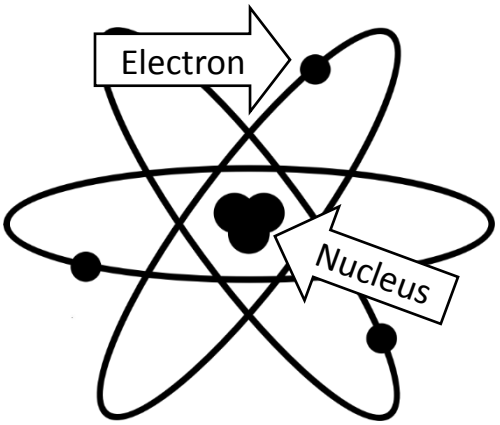
AFTER

How did this experiment answer the question asked	How did your results match your hypothesis?

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

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B1) Forms of Energy

Salt and Pepper

Read the information page before you begin your experiment

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1. **Balloon**
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3. **Pepper**

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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.

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.

B) 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.

B) 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?
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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?
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4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

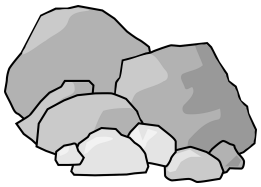
Lesson 5

4/5 Combined Lesson

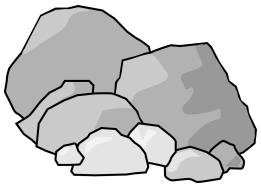
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 5

	First Half	Second Half
Prep	Five different colors of crayons, cheese grater, aluminum foil, electric kettle, textbooks or other heavy objects, toothpicks, pasta strainer) 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 Both groups will need boiling water for this experiment.	
Grade 4	Continue from previous lesson students can test another mineral. Using the "Mineral Test Results Page" student will describe the mineral they choose. They will need to test their mineral sample with the tools required	Meet with the group of students to discuss their findings. What did they notice about their samples. Why is this test helpful in identifying minerals? What might cause some minerals to be harder than others?
Grade 5	LG: What is Energy? 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.
	Since both groups are conducting experiments you can start them together to review the expectations of todays experiments. Experiments can be run in centers. **You may want to invite a volunteer in to help you with this lesson.**	



Grade 4



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- ☐ SPARKLING

TRANSPERENCY

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HARDNESS

Can it be scratched

- ☐ FINGERNAIL
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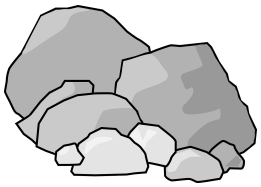
- ☐ NAIL
- ☐ GLASS
- ☐ KNIFE



Mineral Test Results

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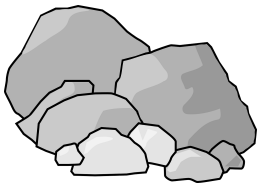

Testing Minerals

Mohs scale reference guide

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Apatite	5	Glass	White	Green, brown, blue, yellow, violet	Glassy to smooth
Feldspar	6	Knife blade	White	Pink, white grey, brown	Glassy
Quartz	7	Topaz, Corundum or diamond	Colourless	Every colour	Glassy
Topaz	8	Corundum or diamond	Colourless	Colourless, white, yellow, amber	Normally glassy
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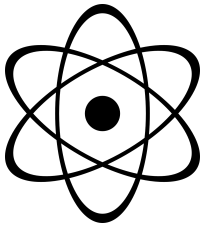

Grade 5

Forms of Energy

Conducting an Experiment

Getting Started:

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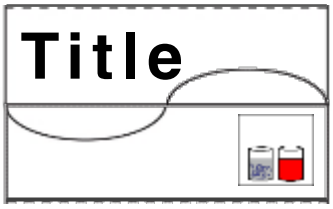

Get Working:

- ❑ 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.

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

ENERGY EXPERIMENT
recording my results

My Experiment Is:

BEFORE

Question: What science am I trying to learn	**Hypothesis:** What I think will happen

DURING

Draw what happens	Tell what happened

AFTER

How did this experiment answer the question asked	How did your results match your hypothesis?

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

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C1) Forms of Energy

A Chemical Balloon

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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.

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?

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.

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

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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

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- 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.

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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.

4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

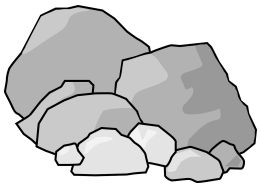
Lesson 6

4/5 Combined Lesson

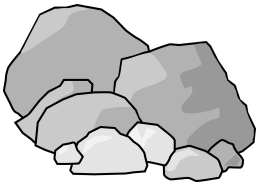
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 6

	First Half	Second Half
Prep		
Grade 4	**LG: What is the Rock Cycle?** **INDEPENDENTLY** using the live binder link have student research **what is the rock cycle.** Students will complete the interactive notebook activity based on their research. https://www.youtube.com/watch?v=jYElV6_8n6s	Use the following teacher instruction page and the youtube video from madly learning to help you to demonstrate how to show the rock cycle using crayons. Students should be able to tell you what is happening and which stage of the rock cycle they are witnessing.
Grade 5	**LG: How is energy transformed?** 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.
	For more information or as an alternate activity to the teacher demonstration: Watch the KHAN Academy Video Based on the video students match the type of rock with the definition. Other lessons for the rock cycle include: A Great Lesson for demonstrating this can be found here Rock Cycle Simulation: Crayola Crayon	



Grade 4



Make the Rock Cycle
WITH CRAYONS

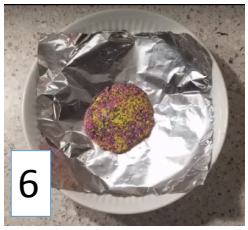
Choose five different colours of minerals that make up many rocks. Brown for biotite, black for muscovite, yellow for feldspar, purple for quartz, and pink for orthoclase. Use an old cheese grinder/ grader to break up the crayon pieces.

mix all of the colours together on a piece of aluminium foil.

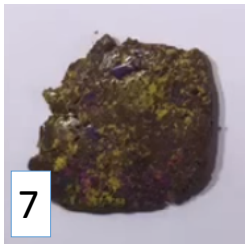
Wrap up the crayon pieces in the piece of aluminium foil and begin to compress this together. Stepping on it or pressing it between textbooks may help. This may take a few tries to fully compress the sample.

you should now have the sample pushed together. This is now a sedimentary rock sample. Made of mixing and compression of minerals.

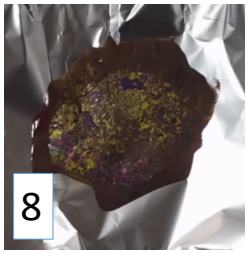
Boil water and place it in a bowl. for it to cool slightly 1-2 min you want warm water.



Quickly float the rock sample on top of the foil an flip it over. You do not want to melt the sample completely only to soften the outside surface area.



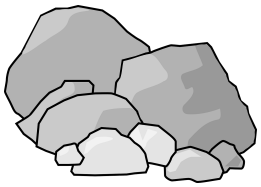
You now have a metamorphic rock sample.



With boiled water in a bowl again, float the sample upon aluminum foil in the water until it is melted completely. Set the sample aside and let cool until hard.

This sample is now an example of an igneous rock

Break the sample apart to show how it returns to the beginning of the rock cycle.



Rock Cycle Foldable

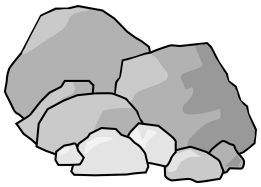
Instructions

- Cut out the large circle.
- Cut out the definitions and glue them in the correct place.
- Glue the back of the triangle in your notebook.
- Fold the rounded flaps over the triangle.

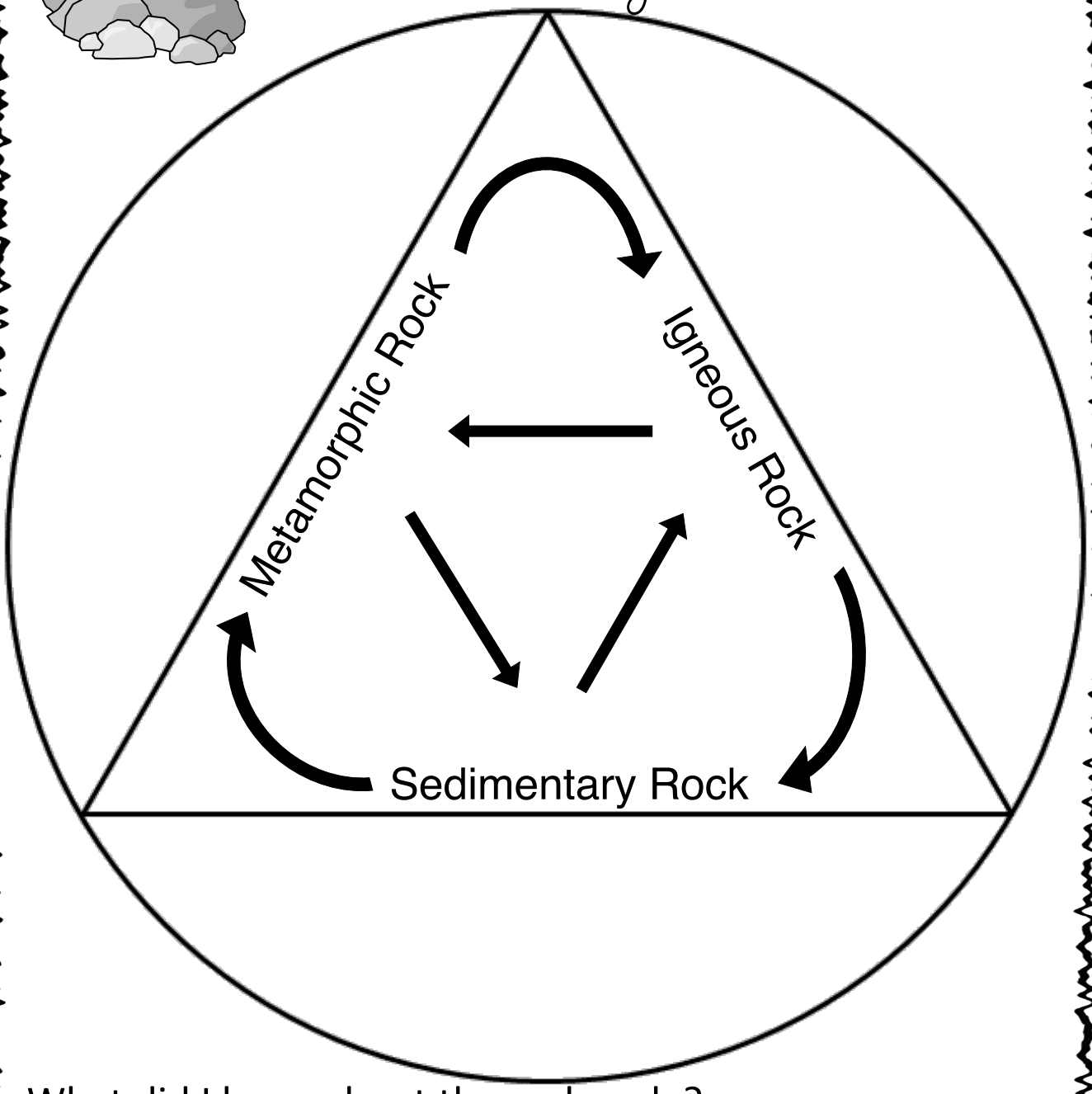
Parts of rocks that are broken down by Wind, Water and Erosion. Over time these are pushed together to form a rock.

Over time this new rock changes form when HEAT and PRESSURE are put on the rock from deep within the earth.

These rocks are formed a rock is super-heated deep within the earth to form magma. When this magma cools a new rock is formed.



The Rock Cycle

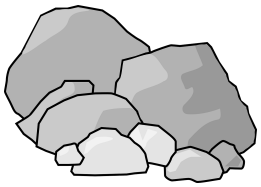


What did I learn about the rock cycle?

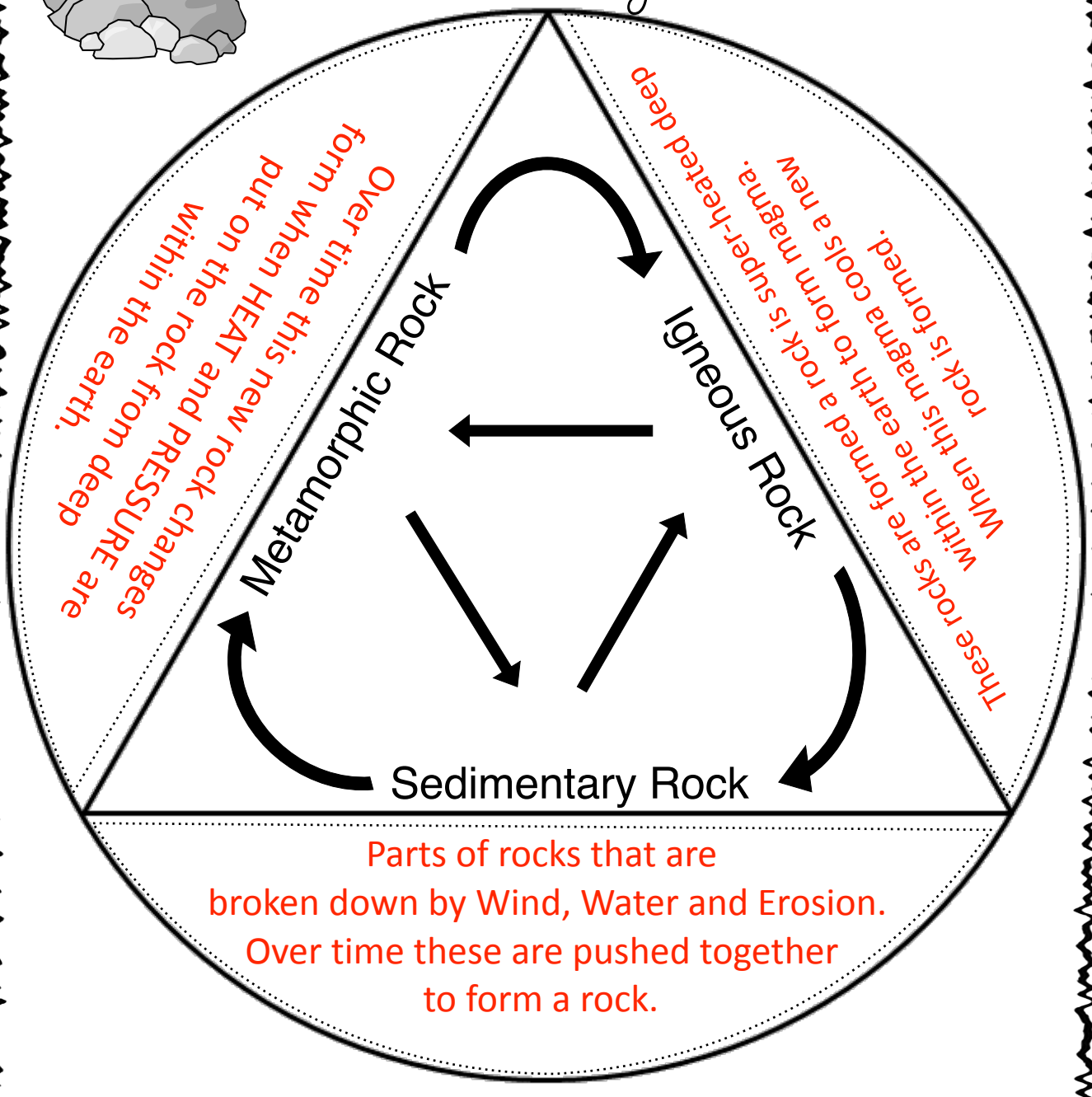
_____

_____

_____

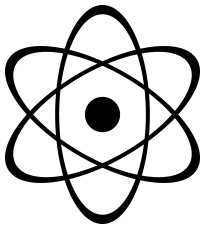


The Rock Cycle



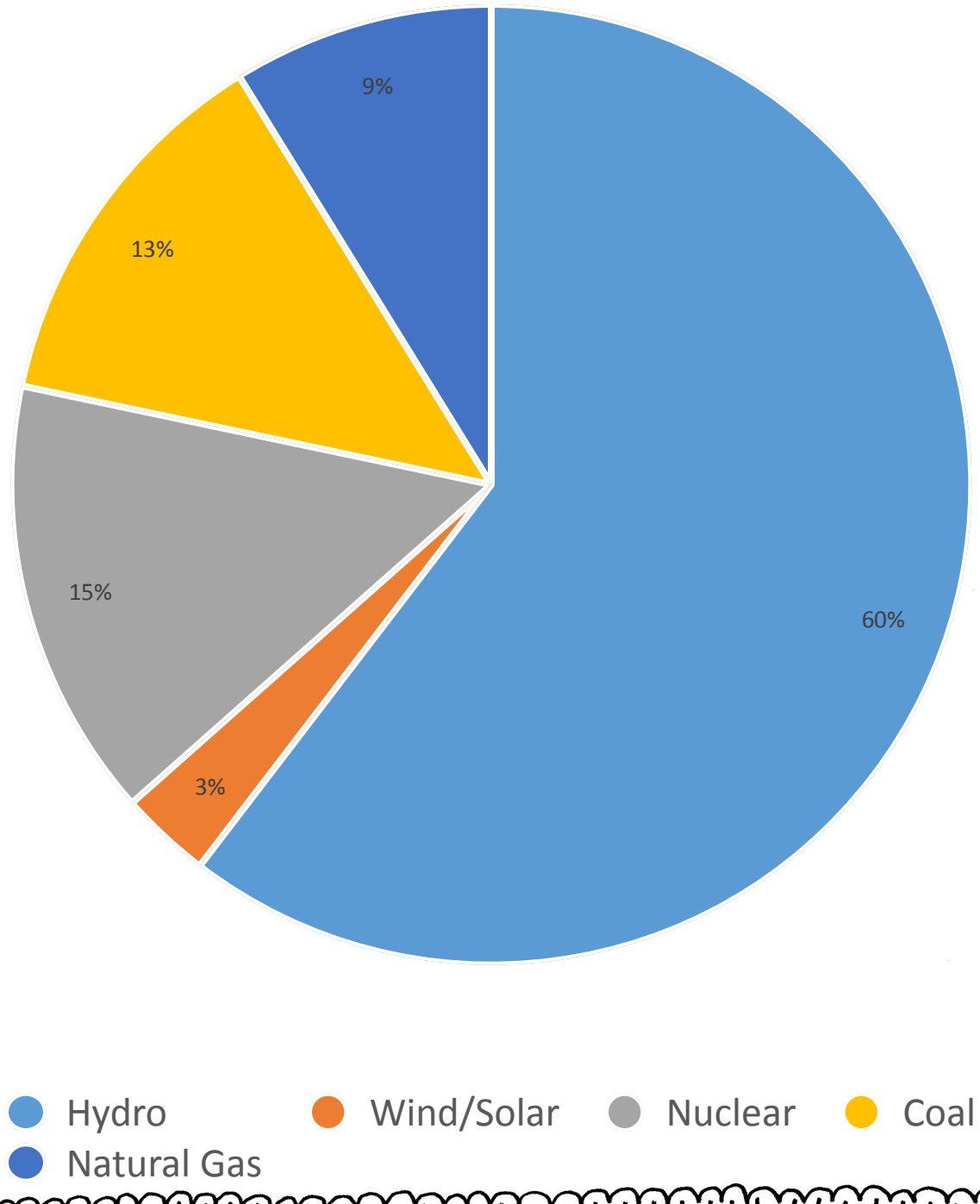
What did I learn about the rock cycle?

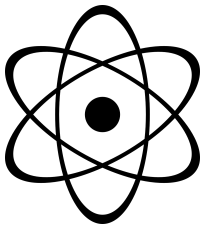
answers will vary



Grade 5

Where does Energy Come From?





Sources of Energy:
Organize your Research

NAME:

My Source of Energy is:

Where does it come

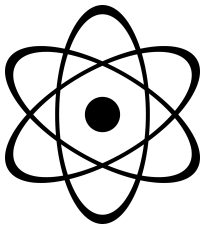
Definition

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) Nuclear

JIGSAW Student Cards

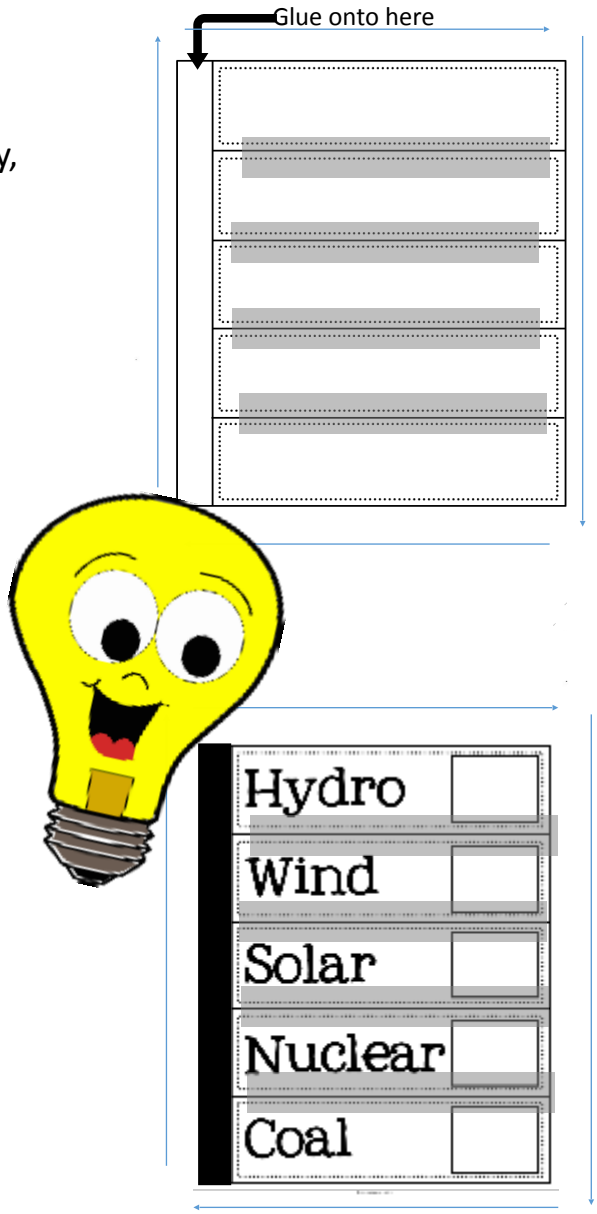
Home Group #1 Expert Group A - Hydro	Home Group #1 Expert Group B- Wind	Home Group #1 Expert Group C - Solar	Home Group #1 Expert Group D - Nuclear	Home Group #1 Expert Group E – Coal	Home Group #1 Expert Group F – Natural Gas
Home Group #2 Expert Group A - Hydro	Home Group #2 Expert Group B- Wind	Home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

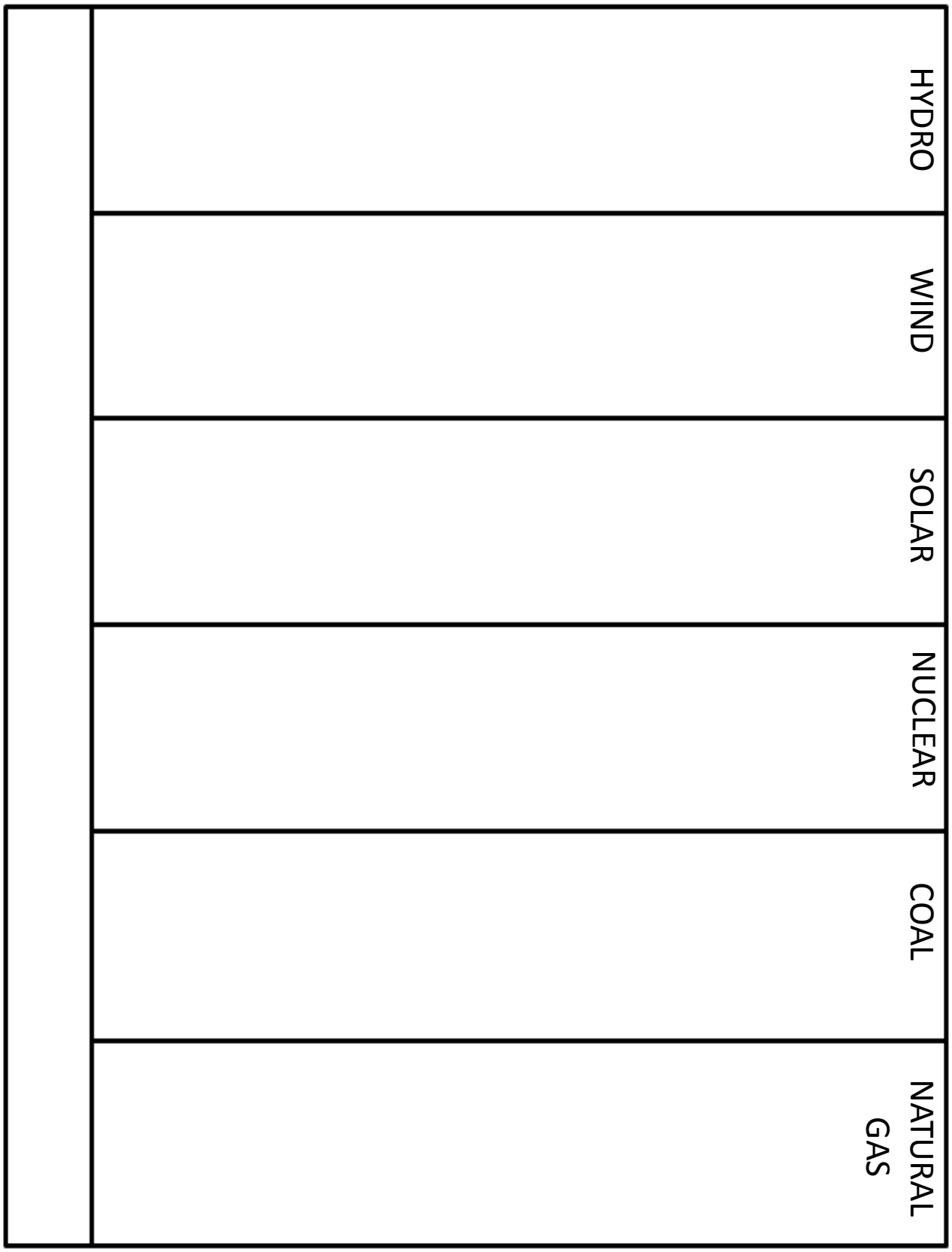
1. Make sure you have the three templates found on the following pages. Template 1 for your summary, template 2 for your reflection and template 3 with the titles.
2. Complete your Templates
   - Draw a picture of the energy source in the box on the titles template.
   - Write your summary of each energy 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

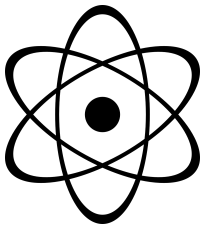
Wind

Solar

Nuclear

Coal

Natural Gas



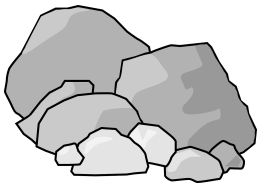
Lesson 7

4/5 Combined Lesson

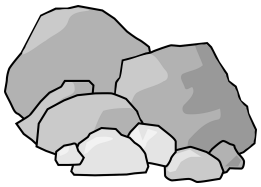
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 7

	First Half	Second Half
Prep	4- A variety of rock samples (both identified an unidentified rock samples can be used for this activity) 5 - Students will require access to research materials	
Grade 4	**LG: What are Rocks and Minerals? Teacher Directed** • Have a class discussion about the types of rocks and the students observations. • Have students create the foldable activity summarizing their learning about these classes of rocks.	Students will investigate the differences between sedimentary, metamorphic, and igneous rocks. Using samples in class, a variety of online sources or the posters I have included following this lesson. • With a partner students will describe what they see; identify some of the features of the different types of rocks on a group chart paper. Encourage students to use words and diagrams to identify the features of a rock sample.
	LG: What is electrical energy? 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."
	Extension activity could include taking your class outside or to a local park and go on a rock hunt. of.	



Grade 4

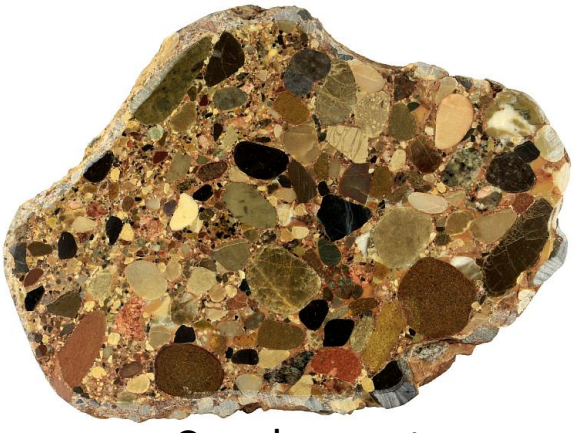


Sedimentary Rocks

Shale

Caliche

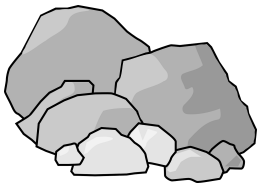
Dolomite



Conglomerate

Sandstone

Limestone



Igneous Rocks

Granite

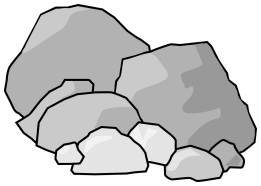
Obsidian

Pumice

Gabbro

Basalt

Scoria



Metamorphic Rocks

Gneiss

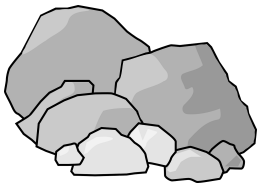
Gneiss

Marble

Phyllite

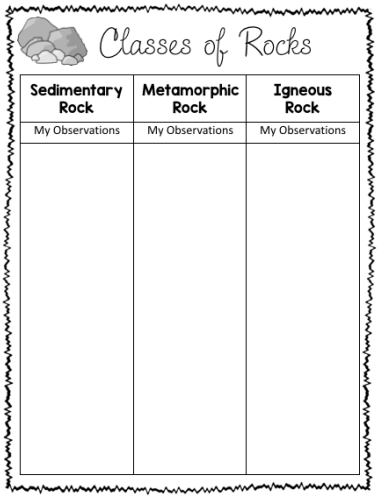
Quartzite

Quartzite



Classes of Rocks

Student Sample



Igneous Rock

When Lava cools above the ground It may look Glassy and cannot see grains with eye. Smooth texture. When it cools underground Some have visible crystals. Grains are visible to the eye. Coarse texture and some appear to have bubbles

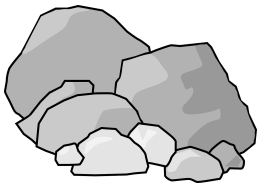
Sedimentary Rock

Rounded grains, compacted layers, may contain fossils. Grains in rocks can be all different sizes or all of the same size.

Metamorphic Rock

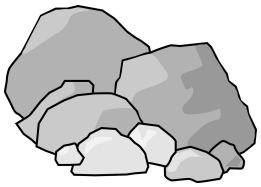
Harder and more dense.
Banding or Striped (the thicker a band is, the more intense the heat and pressure was when the rock was created).

Colour	What colours do you see with your eyes? Do you see crystals?
Texture	• Rough-bumpy feeling • Smooth • Frothy – Bubbly • Glassy – Shiny smooth with no crystals • Foliated – layers from fine to coarse grains
Pattern	• How are the grains organized? • Well Sorted – All of the grains are about the same size • Poorly Sorted – The grains in the Rock are different sizes • Organized or disorganized • Layers – bands of layers looks striped
Grains	• Very coarse – Large grains • Coarse • Fine-Small Grains (you can still see them) • Very Fine (too small to see with the eye). Looks smooth.



Classes of Rocks

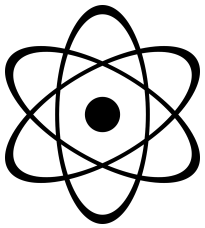
Sedimentary Rock	Metamorphic Rock	Igneous Rock
My Observations	My Observations	My Observations



Classes of Rocks

Sedimentary Rock	Metamorphic Rock	Igneous Rock
My Observations	My Observations	My Observations
look like mixtures many colours have fossils flakey		

Student answers will be dependent on their personal observations and depend on their access to samples



Grade 5

How we use Energy

Interactive Notebook Reflection

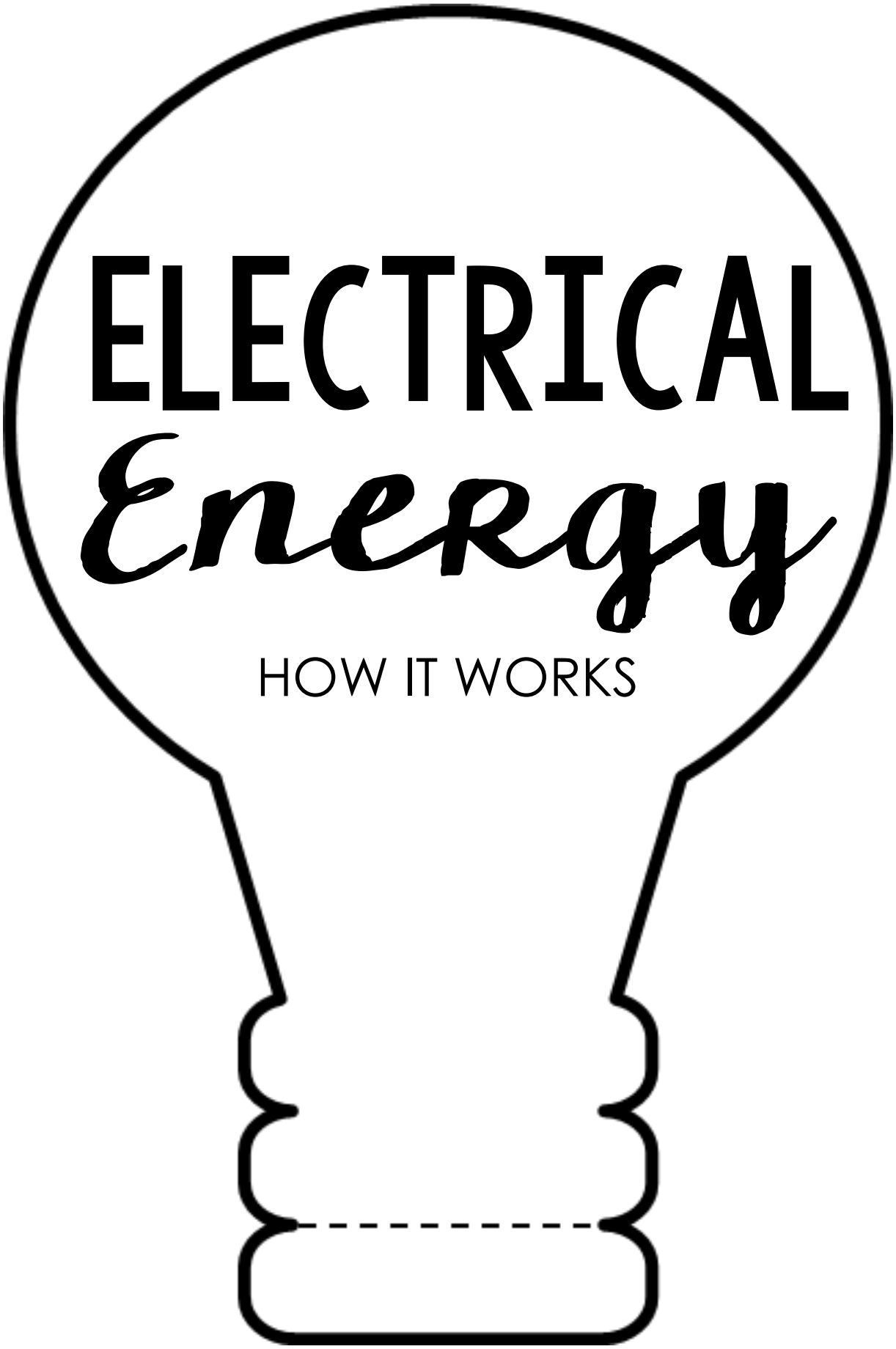
Assembly Instructions:

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."

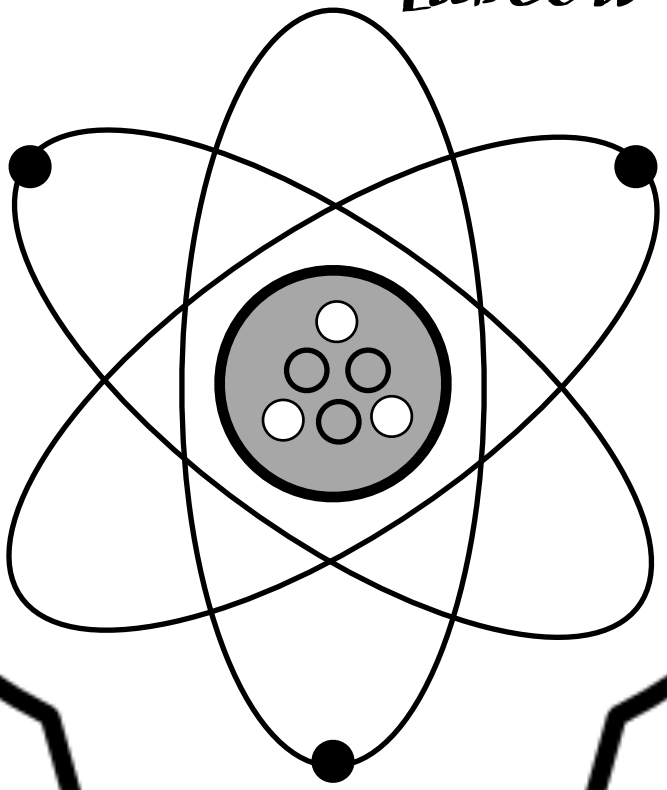

ELECTRICAL
Energy
HOW IT WORKS

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

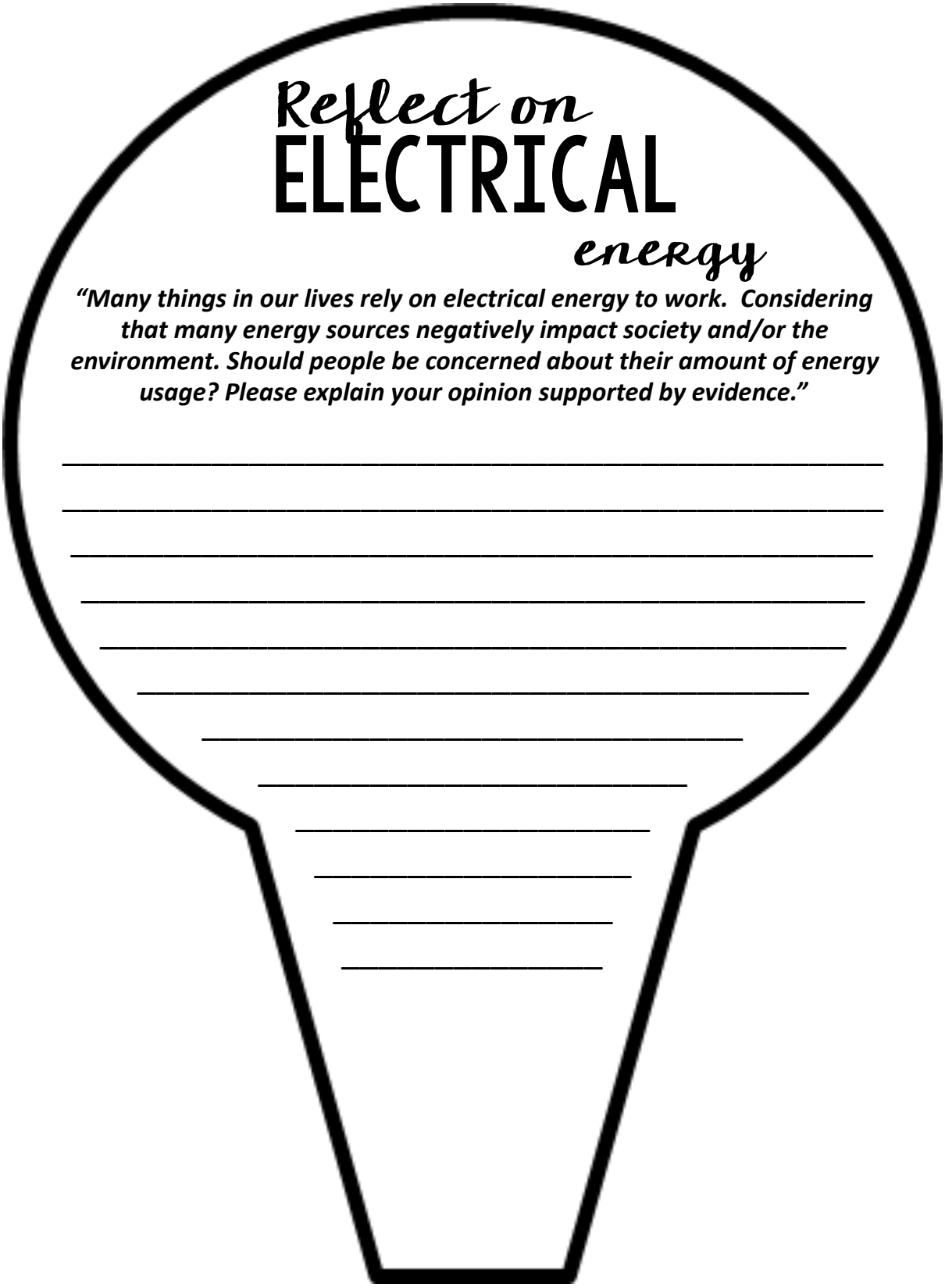
Draw a diagram of how electricity moves down a wire, or how it lights a bulb.

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."



4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

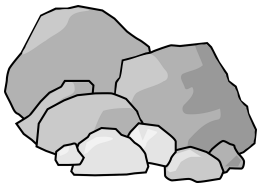
Lesson 8

4/5 Combined Lesson

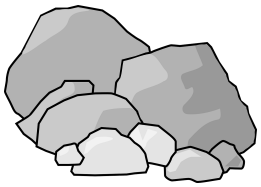
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 8

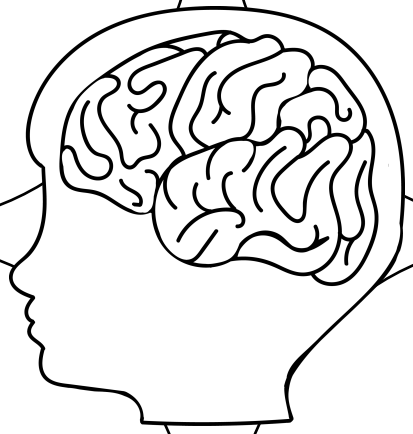
	First Half	Second Half
Prep	Students will require access to research materials	
Grade 4	LG: How are rocks used in our daily life? • Revisit the topic from **Lesson #2** students will independently explore more products that use rocks and Minerals in our daily life. Make an anchor chart of products that I made from minerals and rocks. Some preliminary research maybe required to add more products to your anchor chart	• Students will pick a product that interests them and complete a brainstorming page to identify what they already know about this product. • Students will generate a list of questions that will help them guide to research to meet the success criteria for the inquiry project
Grade 5	**LG: How to conserve energy?** 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?
	4- Success criteria should be co-created with students to identify the different areas that they want to focus on for their inquiry projects an example of some success criteria could include Choose the product • Identify the rock or mineral source of the product • Research and describe how the product is made • Identify how the product is used • Identify how the product is disposed of. 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	

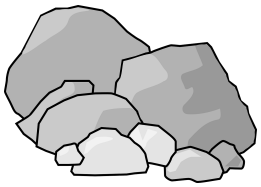


Grade 4



Inquiry Brainstorming



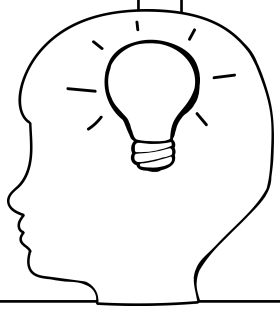


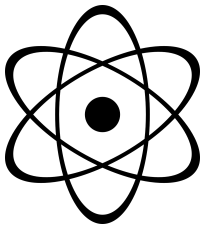
Inquiry Planning

Learning Goal / Big Idea

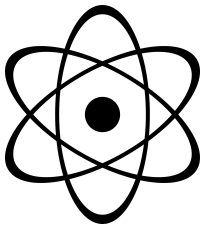
Success Criteria

Questions





Grade 5

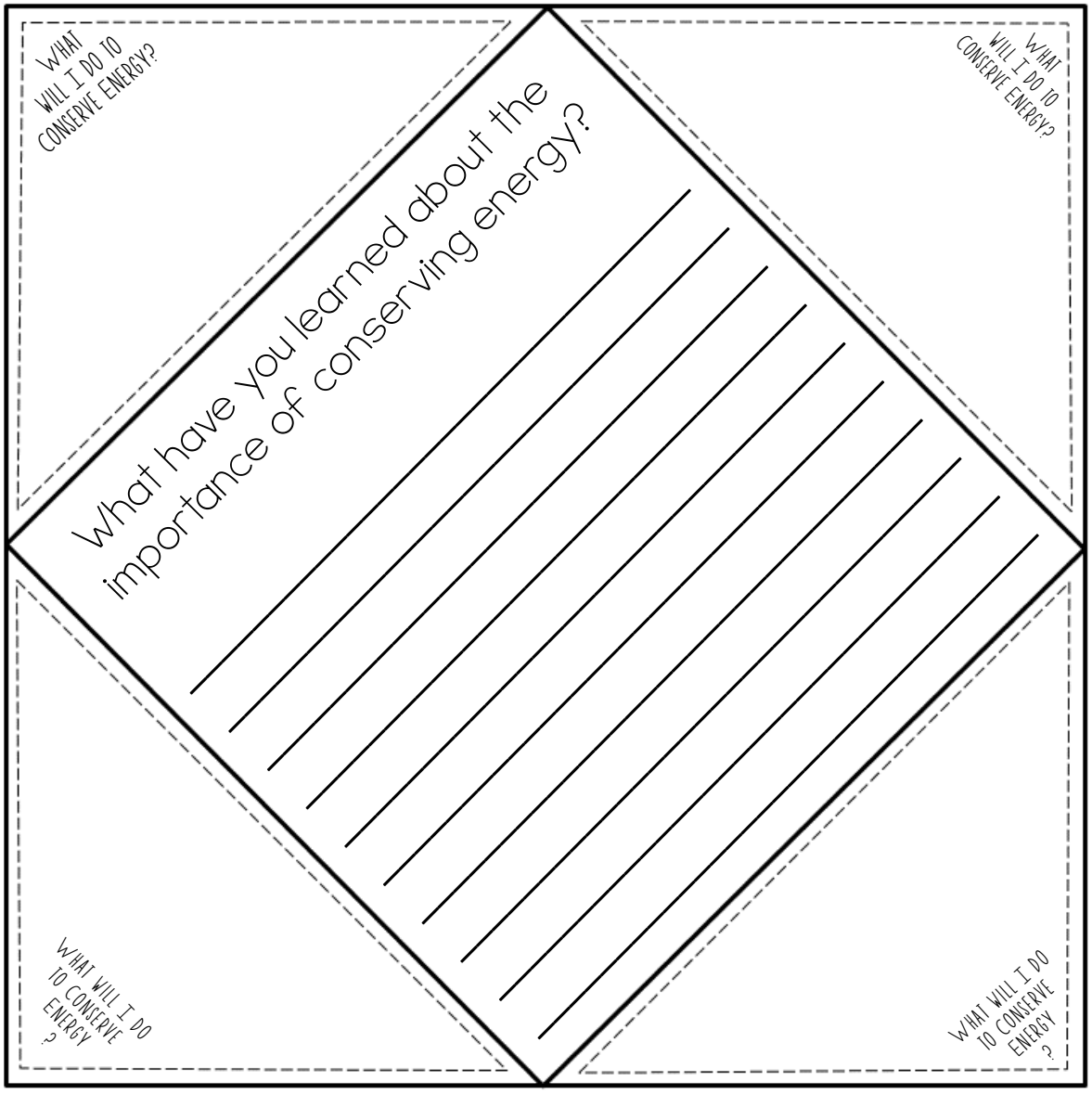


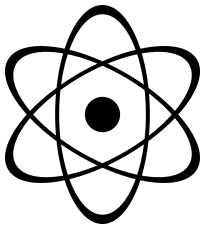
Conserving Energy

WHAT CAN WE DO

Conserving Energy

My Plan to Save Energy





Lesson 9

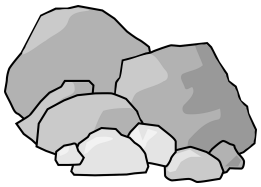
Review: Board Game

4/5 Combined Lesson

ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 9

	First Half	Second Half
Prep	Students will require access to research materials	
Grade 4 and 5	**LG: How can you share what you have learned with other?** 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 for each grade 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. Photocopy each grades cards onto a different colour. 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.	

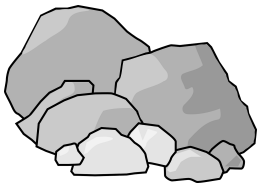


Rocks and Minerals
Board Games

1. Choose a type of board game to model your game after (suggestions below include):
   - Snakes and Ladders (path 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 the following aspects of your research:
   - How is the rock or mineral extracted from the earth?
     - What are the positive and negative consequences of the methods of extraction?
   - What is the process used to turn the Rock or Mineral into the product that is used by people?
   - How is the product used by people? Why is it necessary for people to use?
   - When we are done using it how can it be recycled or reused?
   - How is it disposed of? What impact on the environment does the disposal of this product have?
   - Any other important or interesting information in the life cycle of your rock or mineral. (This should be a small part of your assignment.)

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



Rocks and Minerals
Board Games

PLAN OUT YOUR ROUGH COPY FIRST

1. Choose a type of board game that includes a spinner. Your spinner must be fair

2. Include information in your game board about the following aspects of your research:
    - How is the rock or mineral extracted from the earth?
        - What are the positive and negative consequences of the methods of extraction?
    - What is the process used to turn the Rock or Mineral into the product that is used by people?
    - How is the product used by people? Why is it necessary for people to use?
    - When we are done using it how can it be recycled or reused?
    - How is it disposed of? What impact on the environment does the disposal of this product have?
    - Any other important or interesting information in the life cycle of your rock or mineral. (This should be a small part of your assignment.)

TEACHER APPROVAL OF ROUGH COPY BEFORE GOOD COPY MAY BEGIN

TEACHER SIGNATURE _____

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

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.

Culminating Task

Game Board Information Page
Make an Energy Board Game

MAKE A ROUGH COPY FIRST

1. Choose a type of board game that requires a spinner. Your spinner must be fair.

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?

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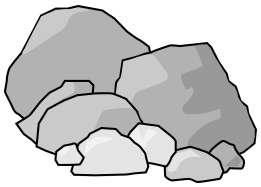
TEACHER SIGNATURE _____

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.

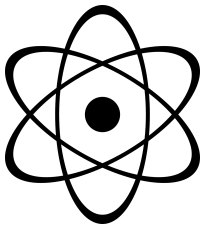


Rocks and Minerals

STUDENT GAME CARD PLANNER

Use what you learned so far about rocks and minerals and plan out your questions that you will contribute for your groups game

#	Question	Answer

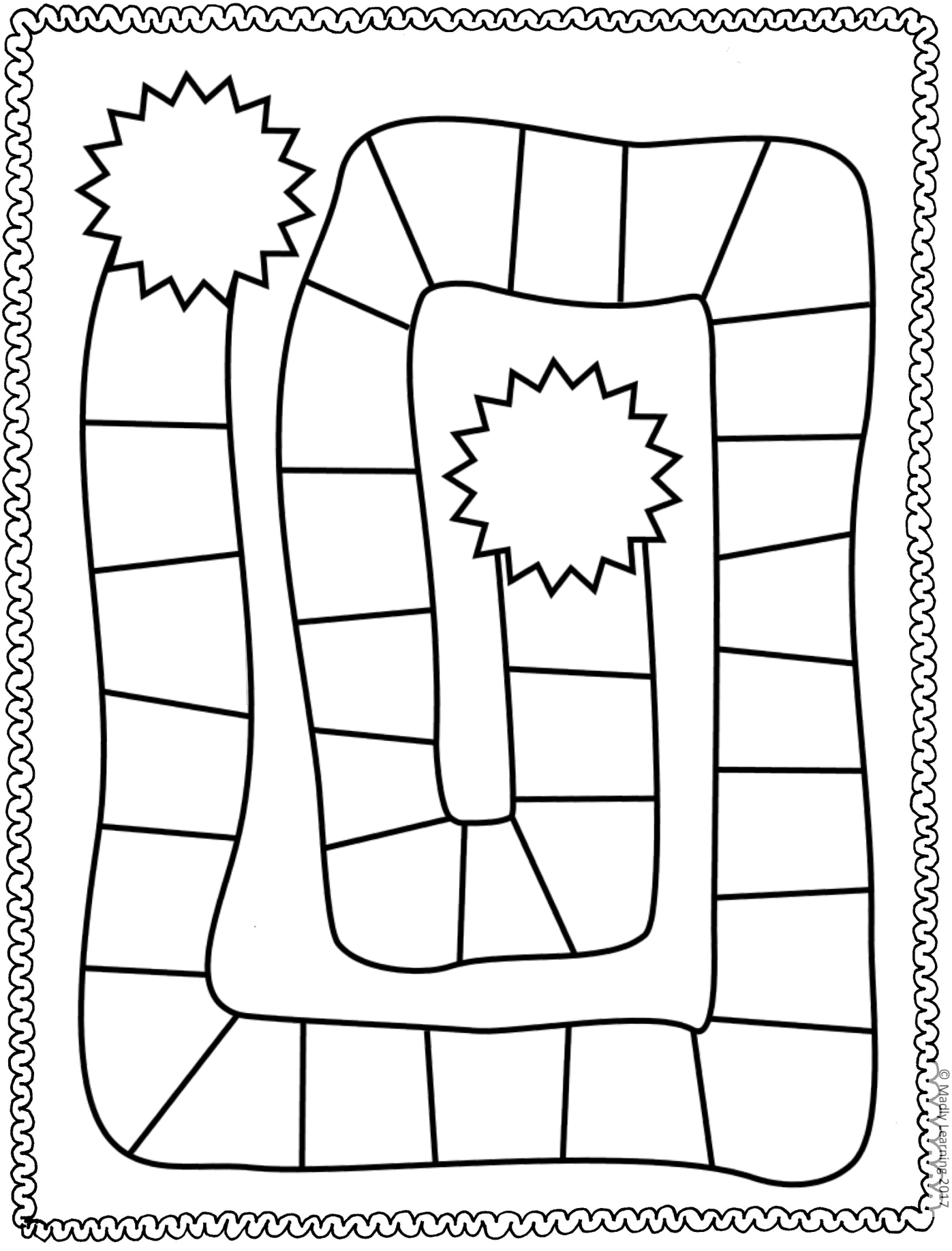


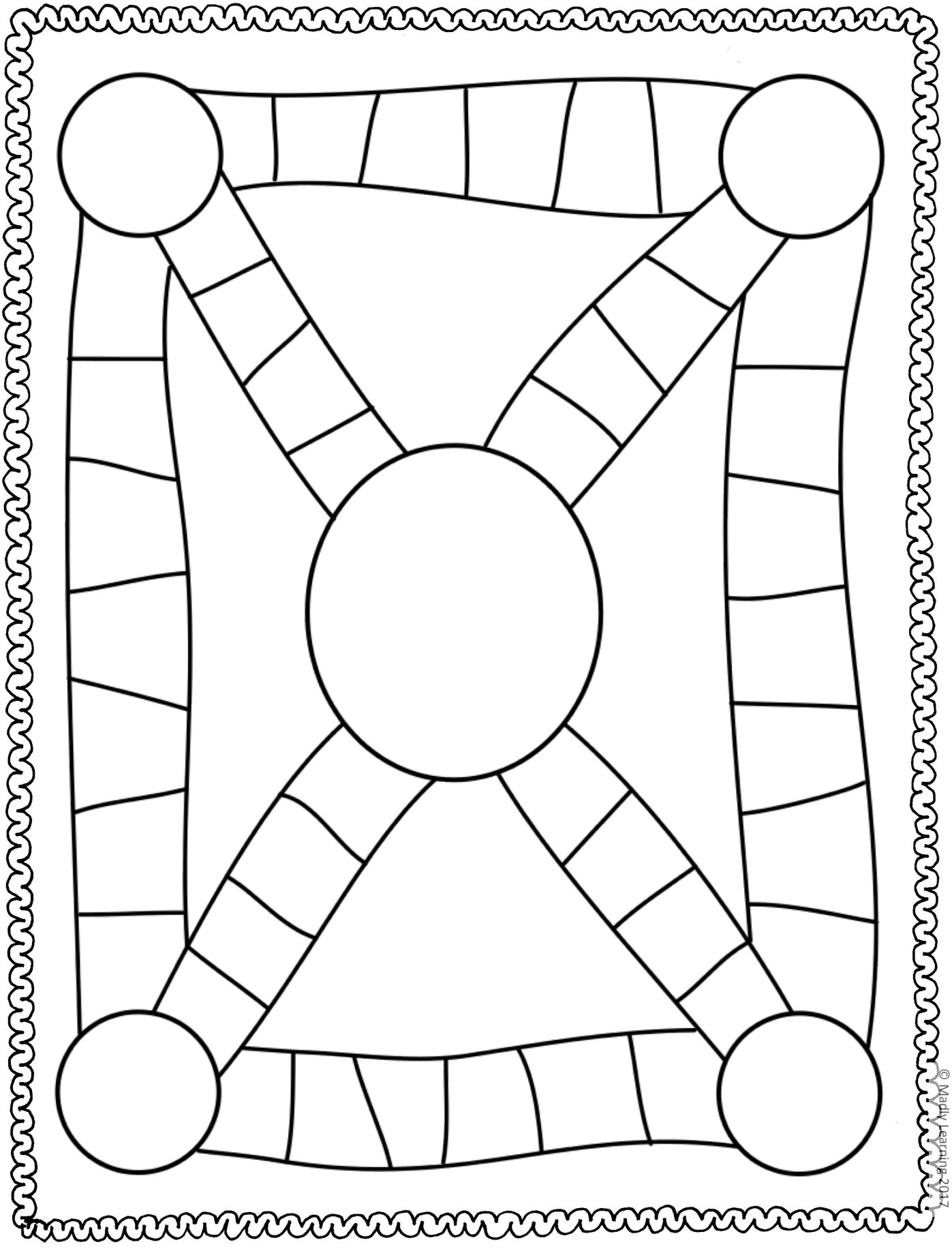
Energy Conservation

STUDENT GAME CARD PLANNER

Use what you learned so far about energy conservation and plan out your questions that you will contribute for 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

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Scoot Question Cards

Card #

Question

Card #

Question

Card #

Question

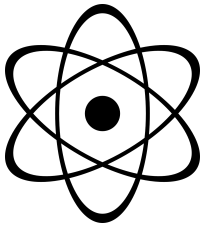
Card #

Question

Scoot Game

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

Card #	Answer
11	
12	
13	
14	
15	
16	
17	
18	
29	
20	



Lesson 10

Inquiry Project

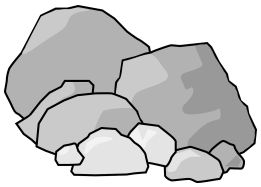
All inquiry answers will be dependent on student interest and research.
Answers will vary

4/5 Combined Lesson

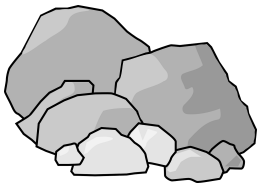
ENERGY CONSERVATION & ROCKS AND MINERALS

Lesson 10

	First Half	Second Half
Prep	4/5 Students will require access to research for their independent inquiry. Some research sources are included in the unit livebinder for popular topics.	
Grade 4	**LG: How are Rocks and Minerals used to make the things we use every day?** • Model Inquiry - Choose a familiar Product such as graphite from a pencil. Model for Students the steps that they will go through to complete their research process. • A sample might include Why is graphite necessary in the production of pencils? http://en.wikipedia.org/wiki/Graphite http://encyclopedia.kids.net.au/page/gr/Graphite http://www.encyclopedia.com/topic/graphite.aspx http://pencils.com/pencil-making-today/ https://www.youtube.com/watch?v=zZHp1fGdAWE	They will conduct independent research on their rock for mineral products using the research page following this lesson. As a final step to this unit allow students to present what they learned. Allow students to choose a variety of different ways to show you what they have learned these could include: traditional presentation, speech, video, poster, biography, Game board, Digital media, or other creative ideas generated by students. Outlines for the biography of a rock and game board aren't included for your use
Grade 5	**LG: How is energy used to make the things we use every day?** 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: *For the purpose of combined teaching and if your students require more of a modeled inquiry instead of an independent inquiry. You can co-teach this section by choosing 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/brochures http://www.roxul.com/stone+wool/overview/faq	

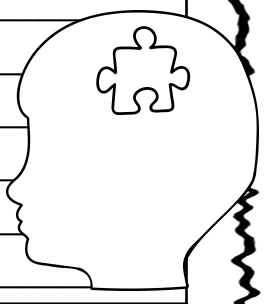


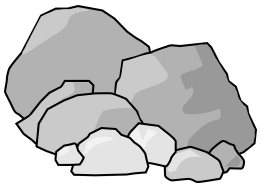
Grade 4



Inquiry Research

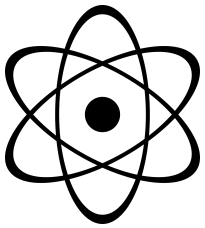
Source/Notes	Research



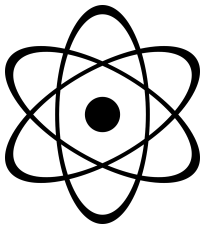


Biography of a Rock

Using the research from your inquiry project write a biography of the rock or mineral that you choose. Make sure to include all of the details from the different phases from mining, to production, to use, to disposal.



Grade 5



(5) 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

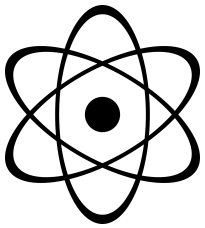
Grade 5

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

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

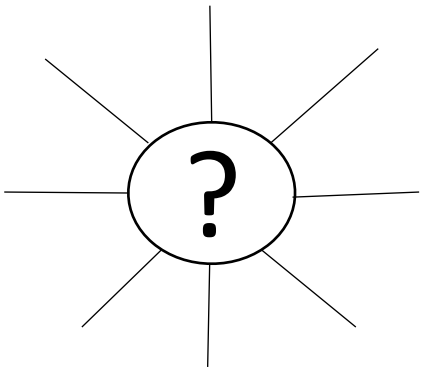
My Question: _____

_____

_____

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

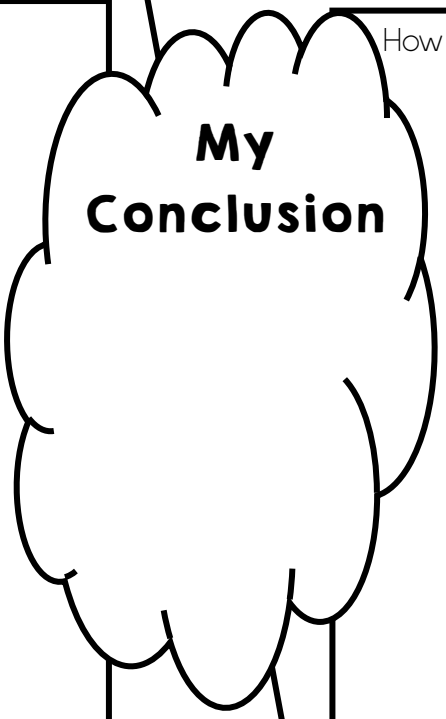
Summarize Your Findings

Pick your four main ideas or subtopics and summarize your findings

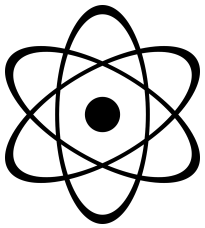
What is the product?

How does it Work?

How does it conserve energy?



Why should people use this product?



Inquiry Booklet

Evaluating and Drawing Conclusions

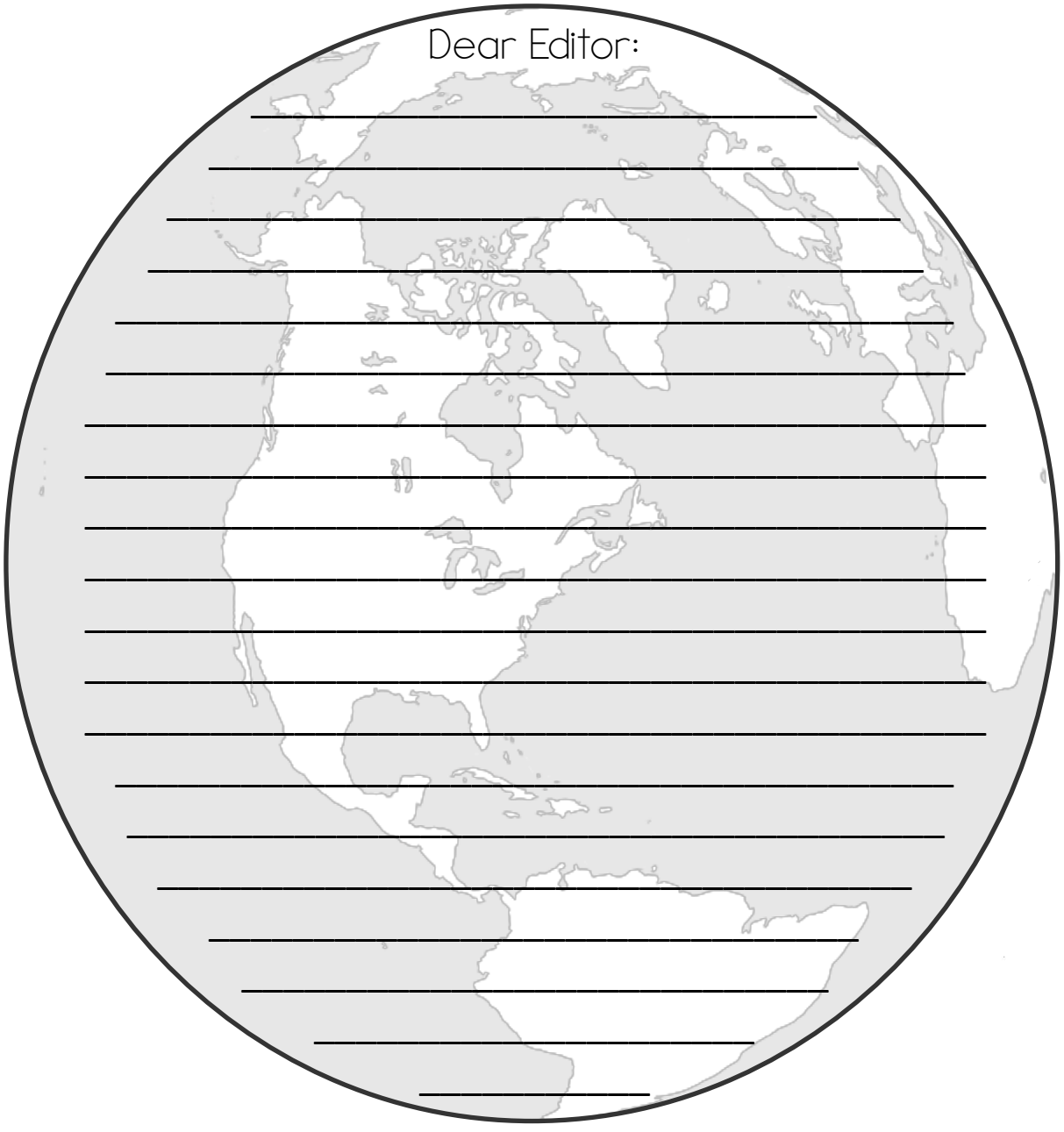
After looking at your research, consider the following questions:

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

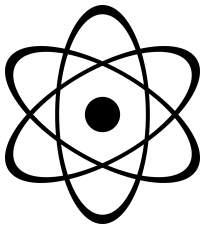
Inquiry Booklet

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:



Assessment
Grade 4

Assessment Tracking

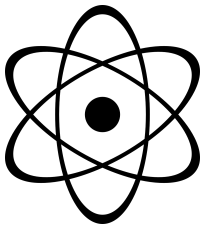
4 – Excellent 3-Good 2-Satisfactory 1 - Poor

1. I can understand the difference between rocks and minerals
2. I can identify how rocks and minerals are used in our everyday life
3. I can describe the properties that are used to identify minerals (colour, lustre, streak, transparency, hardness)
4. I can accurately Test Minerals using a variety methods
5. I can describe how igneous, sedimentary and metamorphic rocks are formed in the Rock Cycle
6. I can describe the characteristics of the three classes of rocks
7. A) I can choose an appropriate product that uses rocks and minerals for my inquiry project.
   - B) I can identify and describe the biography of a product that use mainly Minerals or Rocks as their main ingredient
8. I can assess and evaluate the environmental costs to using rocks and minerals

	Lesson / Learning Goal:								
Name	1	2	3	4	5	6	7A	7B	8

Inquiry Rubric:
Rocks and Minerals

	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding ❑ Understand the difference between rocks and minerals ❑ Uses of rocks and minerals in Daily Life ❑ Describe the properties used to identify minerals ❑ Describe the Rock Cycle ❑ Describe the characteristics of the three classes of rocks ❑ Includes elements of inquiry project ❑ Explores the Environmental Costs to using rocks and minerals	Student is unaware of many of these components. Lots of misinformation. Information focused on insignificant details. Many important parts are missing. Lacks sufficient understanding of content.	Student shows a surface understanding of these concepts Information is somewhat accurate Some Information focused on Main Ideas 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. Information is Accurate. Most information focused on Main Ideas. 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. Information is Accurate and thorough. All information focused on Main Ideas and themes. Student has a thorough understanding with no missing information. Depth of understanding of content exceeds expectations.
Thinking The presentation of information shows evidence of planning skills.	A High degree of support is required to find and use appropriate resources. Lacks evidence of planning.	Student requires some assistance to use and find appropriate resources. Evidence of some planning is evident.	Student has used mostly appropriate resources and shows evidence of good planning skills.	Student has evaluated research and use appropriate sources to include in their research and he/she shows evidence of good planning skills.
Communication Student uses vocabulary and terminology correctly Students presentation communicates to others about rocks and minerals in a clear and logical way	Student uses limited vocabulary and terminology related to this unit and shows rudimentary understanding of the content. The content of the student presentation lacks clarity, poorly organized and illogical.	Student uses some vocabulary and terminology related to this unit appropriately and shows a basic understanding of the content. The content of the student presentation is somewhat clear, partly organized and fairly logical.	Student uses vocabulary and terminology related to this unit appropriately to show a good understanding of content. The content of the student presentation is clear, organized and logical.	Student uses vocabulary and terminology related to this unit that shows a thorough understanding of content. The content of the student presentation is very clear, well organized and very logical.
Application Student applies what was learned throughout the unit to informing others about rocks and minerals with their presentation	Student includes a few facts from the unit, examples, suggestions (includes misinformation or missing information) struggles to apply this to the contexts of informing others through a presentation.	Student includes some facts from the unit, examples, suggestions (may include some misinformation or missing information) that are applied to the contexts of informing others through a presentation.	Student includes facts from the unit, examples, suggestions that are applied to the context of informing others through a presentation.	Student goes beyond facts presented in the unit and includes examples, details, and relevant opinions. May include additional research or extension information that are applied to the context of informing others of the topic through a presentation.



Assessment
Grade 5

(5) Assessment Tracking

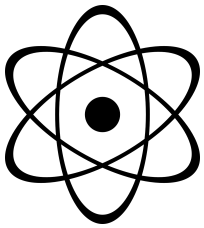
4 – Excellent 3 - Good 2 - Satisfactory 1 - Poor

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