Here's your FREE lesson!

We hope you enjoy it!

Get full access to all of our lessons, join our membership at www.onthemarkcurriculum.com

We give you the lessons, so you can do what you love! TEACH!

Join Now!

Earth Science Curriculum Map

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

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

The activities in this book have two intentions:

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

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

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

Introduction:

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

Lesson Topics:

Lesson One: Forms of Energy

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

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

Lesson Two: Energy Transformation

Learning Intention: Students will learn that energy can be transformed from one form to another form.

Success Criteria:
- determine the energy input and output of objects in everyday life
- make predictions about energy form and transformation
- conduct explorations about energy transfer; record observations using written descriptions, illustrations, and picture images
- make and record conclusions about energy transformation

Lesson Three: Invention Fair

Learning Intention: Students will learn how energy is stored and lost as it transforms into another form of energy.

Success Criteria:
- design and construct devices that store, use, and transform energy forms
- test for movement of objects using an energy form
- record observations of the final products through diagrams and written descriptions
- make conclusions about the storage, usage, and transformation of energy in order to facilitate movement of an object

Lesson Four: Energy Sources

Learning Intention: Students will learn about various renewable and non-renewable sources of energy.

Success Criteria:
- identify and describe different sources of energy that produce electricity
- determine which sources of energy are renewable or non-renewable
- research and record the advantages and disadvantages of the production of electricity using different energy sources

Lesson Five: Energy Conservation

Learning Intention: Students will learn about the effects of modern-day technologies on energy consumption and assess opportunities for reducing their own consumption.

Success Criteria:
- consider and record reasons for an increase in energy consumption today
- contrast energy uses for household activities in modern day and 50 years ago
- conduct an energy audit of a home, then record findings in a chart
- make connections to the environment and energy usage by detailing ways to reduce personal consumption

Lesson Six: Researching Resources

Learning Intention: Students will learn about local resources and how they are harvested and developed into products.

Success Criteria:
- list local resources and classify them as living or non-living
- research and complete a written report about harvesting a resource, developing it, the impact on the environment to harvest and develop, and possibilities to lessen the impact
- conduct an interview with a First Nations speaker to learn how these people demonstrate respect for the land and its resources
- make connections to the environment by considering personal actions to lessening the environmental impact of resource harvesting and development

Lesson Seven: Weather Patterns

Learning Intention: Students will learn about different types of weather and daily weather patterns.

Success Criteria:
- discuss different types of weather that is experienced on the Earth
- provide written descriptions of different types of weather
- research and record daily weather patterns
- determine temperature readings and make connections to weather
- determine appropriate clothing needs for each season
- take daily temperature readings, record and compare them to predicted daily highs

Lesson Eight: The Heat of the Sun

Learning Intention: Students will learn about the effects of the sun's heat energy.

Success Criteria:
- identify the benefits of the sun
- recognize and feel the strength of the sun's heat
- determine the effect of the sun on certain materials and colors
- make connections to their daily lives

Lesson Nine: Precipitation

Learning Intention: Students will learn about the water cycle and measure weather in terms of precipitation.

Success Criteria:
- describe how the water cycle creates precipitation in our natural environment
- recreate the water cycle
- construct a rain/snow gauge to measure precipitation amounts
- collect data and display results in a graph
- make conclusions and connections to the Environment

Lesson Ten: Cloud Formation

Learning Intention: Students will learn about the basic cloud types and how clouds are created.

Success Criteria:
- describe the three basic cloud types that appear in the sky
- observe and illustrate the cloud types that appear in the sky for one week
- recreate cloud formation
- make conclusions and connections to natural events in the environment

Lesson Eleven: Weather Instruments

Learning Intention: Students will learn about the measure of weather in terms of wind speed and direction.

Success Criteria:
- construct a wind vane to measure wind direction
- observe wind direction and record it in a diagram
- construct an anemometer to measure wind speed
- determine wind speed through observation of RPM and calculations
- determine wind chill factors from a set of given data

Lesson Twelve: Extreme Weather

Learning Intention: Students will learn about weather vs. climate, and changes that cause severe weather to occur.

Success Criteria:
- recognize the difference between weather and climate
- determine what clothing would be suitable to wear in certain climates
- participate in a discussion about the effects of climate change to the environment
- research and complete a report about an extreme weather event that includes a description, technologies used to track it, indicators, warnings, and preparations for it

THE HEAT OF THE SUN

Learning Intention:

Students will learn about the effects of the sun's heat energy.

Success Criteria:

- identify the benefits of the sun
- recognize and feel the strength of the sun's heat
- determine the effect of the sun on certain materials and colors
- make connections to their daily lives

Materials Needed:

- a copy of "Help From the Sun" Worksheet 1 for each student
- a copy of "Feel the Heat" Worksheets 2 and 3 for each student
- a copy of "Experimenting with Radiant Heat" Worksheets 4 and 5 for each student
- a warm sunny day; **students are to wear sunscreen, hat, and sunglasses**
- a large thermometer (teaching thermometer)
- a sheet of black paper, a sheet of white paper, a piece of aluminum foil, a piece of cellophane, 4 outdoor thermometers (a set for each pair)
- clipboards (one for each student), chart paper, markers, rulers, pencils, pencil crayons

Procedure:

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

1. Discuss with students the idea that the sun is the Earth's main source of heat and light. Divide students into pairs and give them Worksheet 1. They will work with a partner to think-pair-share an answer to the question. A next step would be to encourage students to share their responses to the large group. This would lead to some rich discussion about the impact that the sun has on our lives.
2. On a warm sunny day, take students out for a walk. (Ensure they wear sunscreen, a hat, and sunglasses). Give them Worksheets 2 and 3, a clipboard, and a pencil. It may be beneficial to discuss what '**describe**' and '**predict**' mean before starting this activity. Inform students that they are to make some observations about how the sun feels on their skin. Once the observation is completed, an option would be to return to the classroom and discuss their findings.
3. Students will experiment with radiant heat energy that we get from the sun. Give pairs of students Worksheets 4 and 5, and the materials to conduct the experiment. After experimenting, students will record observations on a chart, graph the results, and make a conclusion about the transfer of heat from the sun to certain materials.

Differentiation:

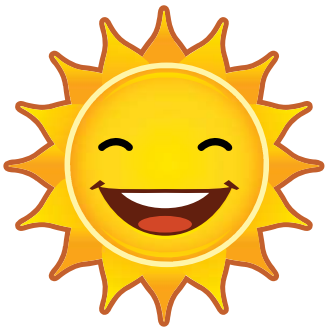
Slower learners may benefit by working in a small group with teacher direction to ensure accurate temperature readings are obtained for Worksheets 4 and 5. Omission of the graphing activity on Worksheet 5 is an additional accommodation.

For enrichment, faster learners could research about the effects of radiant heat from the sun on different kinds of surfaces, such as roads, vegetation, and bodies of water. A further extension would be to have these learners work in a group or individually to create a poster in order to share their research with the large group.

OTM2156 ISBN: 9781771585279

Worksheet 1 | Name:

Help From the Sun



Think Pair Share

With a partner, do some thinking and sharing of ideas about the question below. Use pictures and words when recording your ideas in the chart.

"How does the sun help us?"

My Thinking

My Partner's Thinking

OTM2156 ISBN: 9781771585279

Worksheet 2 Name:

Feel the Heat

Take a walk in the sun on a warm sunny day. Observe how the sun feels on your skin. Come on, let's go!

Describe how your skin feels after a few minutes in the sun.

When you stay in the sun for a long time on a **hot** day, what happens to your body?

OTM2156 ISBN: 9781771585279

Worksheet 3 Name:

Let's Predict

Predict how you will feel if you go into the shade.

Let's Observe

Now find a place in the shade. Observe how your skin feels.
Describe how your skin feels after a few minutes in the shade.

Let's Conclude

What can you conclude about the heat of the sun?

OTM2156 ISBN: 9781771585279

Experimenting with Radiant Heat

Radiant heat travels through empty space in waves of energy. Radiant heat can come to us from the sun. Certain materials and colors attract this radiant heat better than others. Let's experiment further with this idea!

Materials Needed:

- a sheet of black paper
- a sheet of white paper
- a piece of aluminum foil
- a piece of cellophane
- 4 thermometers
- a clipboard
- colored pencils
- a sunny day!

What to Do:

1. Take the materials and go outside into the sun.
2. Place the sheet of black paper on top of one thermometer, the white paper on top of a second thermometer, the foil on top of a third thermometer, and the cellophane on top of the last thermometer.
3. After 5 minutes, quickly read the temperature on each thermometer (covering the thermometers back up again). Record the temperature readings on Worksheet 5.
4. After 25 minutes, read the temperature on each thermometer again. Record the readings on Worksheet 5.
5. Display the data that you collected in a graph on Worksheet 5.
6. Record your conclusion on Worksheet 5.

OTM2156 ISBN: 9781771585279

Let's Predict

Record the temperature readings that you took in the chart below.

Coverings	Temperature Readings (at 5 minutes)	Temperature Readings (at 25 minutes)
black paper		
white paper		
aluminum foil		
cellophane		

Create a graph to display your data.

Let's Conclude

If you were going to use radiant heat energy from the sun to heat your home, what color/material would you use? Explain your thinking.

OTM2156 ISBN: 9781771585279