

Grade Six Science

Aligned to the Alberta Curriculum

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The lessons and experiments in this book fall under 5 main topics that relate to the Alberta curriculum for Grade 6 Science – Topic A: Air and Aerodynamics, Topic B: Flight, Topic C: Sky Science, Topic D: Evidence and Investigation E: Trees and Forests. In each lesson, you will find teacher notes designed to provide you guidance with the learning intentions, 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 or accommodation are also included so that all students can be successful in the learning environment.

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At Glance

SKILLS: SCIENCE INQUIRY

6.1 Design and carry out an investigation in which variable are identified and controlled, and that provides a fair test of the question being investigated.

6.2 Recognize the importance of accuracy in observation and measurement; and apply suitable methods to record, compile, interpret and evaluate observations and measurements.

6.3 Design and carry out an investigation of a practical problem, and develop a possible solution.

6.4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

TOPIC A: AIR AND AERODYNAMICS

6.5 Describe properties of air and the interactions of air with objects in flight.

1. Provide evidence that air takes up space and exerts pressure, and identify examples of these properties in everyday applications.
2. Provide evidence that air is a fluid and is capable of being compressed, and identify examples of these properties in everyday applications.
3. Describe and demonstrate instances in which air movement across a surface results in lift - Bernoulli's principle.
4. Recognize that in order for devices or living things to fly, they must have sufficient lift to overcome the downward force of gravity.
5. Identify adaptations that enable birds and insects to fly.
6. Describe the means of propulsion for flying animals and for aircraft.
7. Recognize that streamlining reduces a drag, and predict the effects of specific design changes on the drag of a model aircraft or aircraft components.
8. Recognize that air is composed of different gases, and identify evidence for different gases. Example evidence might include: effects on flames, the "using up" of a particular gas by burning or rusting, animal needs for air exchange.

TOPIC B: FLIGHT

6.6 Construct devices that move through air, and identify adaptations for controlling flight.

1. Conduct test of a model parachute design, and identify design changes to improve the effectiveness of the design.
2. Describe the design of a hot-air balloon and the principles by which its rising and falling are controlled.
3. Conduct test of glider designs; and modify a design so that a glider will go further, stay up longer or fly in a desired way; e.g., fly in a loop, turn to the right.
4. Recognize the importance of stability and control to aircraft flight; and design, construct and test control surfaces.
5. Apply appropriate vocabulary in referring to control surfaces and major components of an aircraft. This vocabulary should include: wing, fuselage, vertical and horizontal stabilizers, elevators, ailerons, rudder.
6. Construct and test propellers and other devices for propelling a model aircraft.
7. Describe differences in design between aircraft and spacecraft, and identify reasons for the design differences.

Note: Model aircraft or rockets may be constructed and used as part of this topic. It is recommended that these models be simple devices of the student's construction, not prefabricated models. Propulsion of rockets by chemical fuels is neither required nor recommended, due to safety considerations.

TOPIC C: SKY SCIENCE

6.7 Observe, describe and interpret the movement of objects in the sky; and identify pattern and order in these movements.

1. Recognize that the Sun and stars emit the light by which they are seen and that most other bodies in space, including Earth's Moon, planets and their moons, comets, and asteroids, are seen by reflected light.
2. Describe the location and movement of individual stars and groups of stars (constellations) as they move through the night sky.
3. Recognize that the apparent movement of objects in the night sky is regular and predictable, and explain how this apparent movement is related to Earth's rotation.

4. Understand that the Sun should never be viewed directly, nor by use of simple telescopes or filters, and that safe viewing requires appropriate methods and safety precautions.
5. Construct and use a device for plotting the apparent movement of the Sun over the course of a day; e.g., construct and use a sundial or shadow stick.
6. Describe seasonal changes in the length of the day and night and in the angle of the Sun above the horizon.
7. Recognize that the Moon's phases are regular and predictable, and describe the cycle of its phases.
8. Illustrate the phases of the Moon in drawings and by using improvised models. An improvised model might involve such things as a table lamp and a sponge ball.
9. Recognize that the other eight known planets, which revolve around the Sun, have characteristics and surface conditions that are different from Earth; and identify examples of those differences.
10. Recognize that not only Earth, but other planets, have moons; and identify examples of similarities and differences in the characteristics of those moons.
11. Identify technologies and procedures by which knowledge, about planets and other objects in the night sky, has been gathered.
12. Understand the Earth, the Sun and the Moon are part of a solar system that occupies only a tiny part of the known universe.

TOPIC D: EVIDENCE AND INVESTIGATION

6.8 Apply observations and inference skills to recognize and interpret patterns and to distinguish a specific pattern from a group of similar patterns.

6.9 Apply knowledge of the properties and interactions of materials to the investigation and identification of a material sample.

1. Recognize evidence of recent human activity, and recognize evidence of animal activity in a natural outdoor setting.
2. Observe a set of footprints, and infer the direction and speed of travel.
3. Recognize that evidence found at the scene of an activity may have unique characteristics that allow an investigator to make inferences about the participants and the nature of the activity, and give examples of how specific evidence may be used.
4. Investigate evidence and link it to a possible source; e.g., by:
 - classifying footprints, tire prints and soil samples from a variety of locations
 - analyzing the ink from different pens, using paper chromatography
 - analyzing handwriting samples to identify the handwriting of a specific person
 - comparing samples of fabric, classifying fingerprints collected from a variety of spaces

TOPIC E: TREES AND FORESTS

6.10 Describe characteristics of trees and the interaction of trees with other living things in the local environment.

Students will:

1. Identify reasons why trees and forests are valued. Students meeting this expectation should be aware that forests serve as habitat for a variety of living things and are important to human needs for recreation, for raw materials and for life-supporting environments.
2. Describe kinds of plants and animals found living on, under and among trees; and identify how trees affect and are affected by those living things.
3. Describe the role of trees in nutrient cycles and in the production of oxygen.
4. Identify general characteristics that distinguish trees from other plants, and characteristics that distinguish deciduous and coniferous trees.
5. Identify characteristics of at least four trees found in the local environment. Students should be familiar with at least two deciduous trees and two coniferous trees. Examples should include native species, such as spruce, birch, poplar, and pine and cultivated species, such as elm and crab apple.
6. Describe and classify leaf shapes, leaf arrangements, branching patterns and the overall form of a tree.
7. Interpret the growth pattern of a young tree, distinguishing this year's growth from that of the previous year and from the year before that. Students meeting this expectation should recognize differences in colouration and texture of new growth and old growth, and locate scars that separate old and new growth.
8. Identify human uses of forests, and compare modern and historical patterns of use.
9. Identify human actions that enhance or threaten the existence of forests.
10. Identify an issue regarding forest use, identify different perspectives on that issue, and identify actions that might be taken.

Taken from the Alberta Education Grade 6 Science Curriculum.

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ASTEROIDS, COMETS, & METEOROIDS

LEARNING INTENTION:

Students will learn about the unique features of asteroids, comets, and meteoroids.

SUCCESS CRITERIA:

- research, record, and describe facts about asteroids
- research, record, and describe facts about comets
- illustrate the transformation of a meteoroid as it enters a planet's atmosphere
- research and record facts about features in our solar system through written descriptions and illustrations

MATERIALS NEEDED:

- a copy of **“Inside the Asteroid Belt”** Worksheet 1 for each student
- a copy of **“Tailing the Comets!”** Worksheet 2 for each student
- a copy of **“From Meteoroids to Meteorites!”** Worksheet 3 for each pair of students
- a copy of **“An Orbiting You Go!”** Worksheet 4 and 5 for each student
- access to the internet
- markers, chart paper, pencils, pencil crayons

PROCEDURE:

***This lesson can be done as a long lesson, or divided into three or four shorter lessons.**

1. Give students Worksheet 1. With access to the internet, students will research facts about asteroids. Navigating students to www.nasa.gov to explore the NASA website would be beneficial for their search. Once students have acquired five facts, they can pair up with a classmate to share their findings. An option is to come together as a large group to continue the discussion and possibly record facts on chart paper that could be posted in the classroom for future reference.
2. Give students Worksheet 2. With access to the internet, students will research facts about comets. Navigating students to www.nasa.gov to explore the NASA website would be beneficial for their search. Once students have acquired five facts, they can pair up with a classmate to share their findings. An option is to come together as a large group to continue the discussion and possibly record facts on chart paper that could be posted in the classroom for future reference.
3. Give students Worksheet 3. They will read through the description of how a meteoroid becomes a meteorite, then use this information to illustrate the process of this change. Students will also formulate a question that they would like to research. Once the research is completed, provide students an opportunity to share their questions and answers with the large group. The facts about this topic that get uncovered could be recorded on chart paper and posted in the classroom for future reference.
4. Give students Worksheets 4 and 5. They will use the internet to research information about asteroids, comets, and meteoroids in our solar system.

DIFFERENTIATION:

Slower learners may benefit by researching and recording only 2 or 3 facts for activities on Worksheets 1 and 2. An additional accommodation is to have these learners work with a strong peer in order to ‘navigate’ the research required to complete Worksheets 4 and 5.

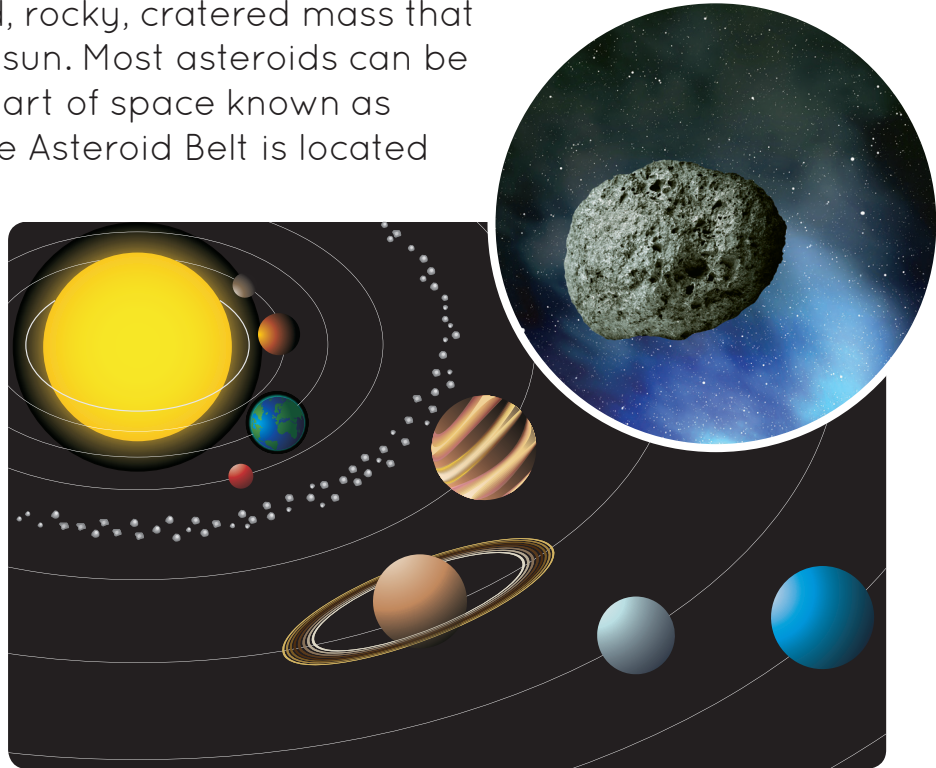
For enrichment, faster learners could work in a small group to create a skit called, “A Meteorite Landed in My Schoolyard!” or “My Ride on a Comet’s Tail”. These titles could also be used for a story writing assignment.

Inside the Asteroid Belt

An asteroid is a solid, rocky, cratered mass that revolves around the sun. Most asteroids can be found orbiting in a part of space known as the Asteroid Belt. The Asteroid Belt is located between the orbits of Mars and Jupiter.

Get the Facts!

Use the internet to research five fast facts about asteroids. Record your findings below.



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

Discuss with a classmate the facts that you discovered about asteroids.



Tailing the Comets!

A comet is like a snowball of frozen gases, rock, and dust. As a comet orbits the sun, its proximity to the sun allows the sunlight to force some gases and dust out of the head of the comet, causing a bright tail to appear behind it.



Get the Facts!

Use the internet to research five fast facts about comets. Record your findings below.

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

Discuss with a classmate the facts that you discovered about comets.



Did you know?

Comets travel in orbits like an elongated egg shape, making loops around the sun. Scientists can calculate the path a comet will travel in, and its distance. This is how they are able to figure out when a comet will pass by our planet Earth!

From Meteoroids to Meteorites!

From meteoroid to meteorite, let's track this development!

Meteoroids are particles of rock or metal in the solar system.



When a meteoroid comes in contact with a planet's atmosphere, it becomes a meteor which looks like a shooting star in the night sky.



The pieces of the meteor that fall to the surface of a planet are called meteorites. A meteorite looks like burned iron rock with big holes in it.

Can you illustrate this transformation?

Formulate a question about meteoroids, meteors, or meteorites that you would like to research.

An Orbiting You Go!

You are on a space mission to find out more about what is orbiting in our space. The internet is a galaxy of information. Away you go!

On a Mission!

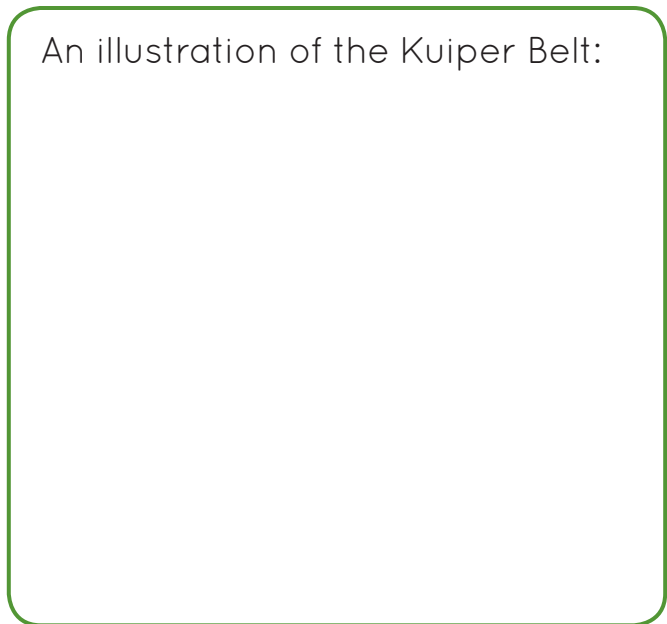
What is Ceres and where is it?

The next phase of your mission:

Find out about comet Halley's next visit past Earth.

What can you discover about the Kuiper Belt?

An illustration of the Kuiper Belt:



An Orbiting You Go!

What can you discover about the Oort Cloud?

An illustration of the Oort Cloud:



The final phase of your mission:

Give a detailed explanation of the Leonids.

When to watch for them on planet Earth: _____

Challenge question:

What is a satellite and what purpose could it have?
