

# *Anglophone School District - North*



*Grade 6 Science - Unit Lesson Guide*

*Space*

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# **The Aim of Science Education - Scientific Literacy**

The aim of science education in the Atlantic Provinces is to develop scientific literacy.

Scientific Literacy is an evolving combination of the science-related attitudes, skills, and knowledge students need to develop inquiry, problem-solving, and decision-making abilities; to become lifelong learners; and to maintain a sense of wonder about the world around them. To develop scientific literacy, students require diverse learning experiences that provide opportunities to explore, analyze, evaluate, synthesize, appreciate, and understand the interrelationships among science, technology, society, and the environment.

## **The Three Processes of Scientific Literacy**

An individual can be considered Scientifically Literate when he/she is familiar with, and able to engage in, three processes: Inquiry, problem solving, and decision making.

### **Inquiry**

Scientific inquiry involves posing questions and developing explanation for phenomena. While there is a general agreement that there is no such thing as the scientific method, students require certain skills to participate in the activities of science. Skills such as questioning, observing, inferring, predicting, measuring, hypothesizing, classifying, designing experiments, collecting data, analysing data, and interpreting data are fundamental to engaging science. These activities provide students with opportunities to understand and practise the process of theory development in science and the nature of science.

### **Problem Solving**

The process of problem solving involves seeking solutions to human problems. It consists of proposing, creating, and testing prototypes, products, and techniques to determine the best solution to a given problem.

### **Decision Making**

The process of decision making involves determining what we, as citizens, should do in a particular context or in response to a given situation. Decision-making situations are important to their own right, and they also provide a relevant context for engaging in scientific inquiry and/or problem solving.

# Science Assessment Overview

Science is a hybrid term that houses different disciplines such as: Physics, Chemistry, Biology, Environmental Studies, Engineering, Math, etc. Given this broad spectrum, it is not realistic that we can paint science assessment with a single brush in terms of probes that work for every science activity. However, regardless of school subject, let alone science, the frequency of assessment should be unbalanced with formative assessment occupying 80% of practise and summative with the remaining 20%.

**80% Formative - 20% Summative**

## **Formative Assessment**

Formative assessment is a range of formal and informal assessment procedures employed by teachers during their learning process in order to modify teaching and learning activities to improve student attainment. It typically involves qualitative feedback (rather than scores) for both students and teacher that focuses on the detail of content and performance. Feedback is the central function of formative assessment. It typically involves a focus on the detailed content of what is being learnt.

Science Formative Assessment falls into 2 distinct categories, and they are divided about how feedback is given. Please be aware that an activity could be informal or formal, it is the purpose of the task that determines purpose.

## **Informal Formative**

Informal Formative Science Assessment acts as a monitoring probe and is distinct because it is not graded.

## **Formal Formative**

Formal Formative Science Assessment provides specific feedback to students, the teachers corresponds via anecdotal feedback, rubrics, and written responses to offer progress to student attainment.

## **Summative Assessment**

Summative assessment seeks to monitor educational outcomes, often for the purposes of external accountability. Usually occurring at the end of a learning unit and determines if the content being taught was retained.

## Space

### Focus and Context

The focus of this unity is inquiry. Students can create and use models to simulate and explore the interactions within major components of the solar system and universe. By constructing models, students can investigate, for example, the causes for the seasons. A second focus is on giving students opportunities to find up-to-date information about space exploration, about various components of the solar system, and constellations. Students will be exposed to electronic and print resources that can illustrate the wealth of knowledge that has been accumulated about space, and learn skills for searching out and personalizing this knowledge.



## Unit Instructional Overview

Space Exploration	Relative Position and Motion of the Earth, Moon, and Sun	The Solar System	Stars and Constellations
Activity - Life of an Astronaut	Prior Learning - Lunar Log	Activity - Build a Model of the Solar System	Activity - Understanding Constellations
Activity - Examining Astronauts	Access Prior Knowledge	Activity - Studying Components of the Solar System	Activity - Cultural Significance of Stars
Activity - Current Issues in Space	1st Cycle - Activity - Movement of the Earth and Sun Activity		
	2nd Cycle - Activity - Day and Night Activity		
	3rd Cycle - Activity - Seasons Activity and Discussion		
	Day, Night, and Seasons - SPARK		
	4th Cycle - Activity - Sun Shining on the Moon Activities (moon phases)		

\* - EECD Grade 6 Inquiry package - available at <https://portal.nbed.nb.ca/tr/lr/k-8Science/Pages/default.aspx>

## Space - Curriculum Outcomes

Space Exploration	Relative Position and Motion of the Earth, Moon, and Sun	The Solar System	Stars and Constellations
301-21 describe how astronauts are able to meet their basic needs in space	105-6 Describe how peoples' conceptions of the Earth and its position in the solar system have been continually questioned and changed over time	205-2 select and use tools in building models of the solar system that show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun	302-13 identify constellations from diagrams, pictures and/or representations of the night sky
107-12 provide examples of Canadians who have contributed to the science and technology of space exploration			
106-3 describe examples of improvements to the tools and techniques of exploring the solar system that have led to discoveries and scientific information	301-19 Demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons	104-8, 300-23 describe the physical characteristics of components of the solar system	205-8 use electronic, print resources and/or visit a planetarium to gather information on the visual characteristics and mythology of constellations
107-15 describe scientific/ technological achievements in space science that are the result of contributions by people from around the world	301-20 Observe and explain how the relative position of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides	105-1, 205-8, 207-2 identify and use a variety of sources and technologies to gather pertinent information about a planet, moon, asteroid, or comet, and display their findings using diagrams, pictures and/or descriptions form recent explorations	107-3 compare how different cultures have used the positions of stars for such things as the appropriate time to plant and harvest crops, navigate the oceans, and/or foretell significant events
		206-4, 204-6 evaluate the usefulness of different information sources when getting information about the components of the solar system	
105-1 Identify examples of scientific questions and technological problems about space and space exploration that are currently being studied			

# Space

## Strand - Space Exploration

<b>General Curriculum Outcomes</b>	<b>Specific Curriculum Outcomes</b>
301-21 describe how astronauts are able to meet their basic needs in space	301-21 describe how astronauts are able to meet their basic needs in space
107-12 provide examples of Canadians who have contributed to science and technology	107-12 provide examples of Canadians who have contributed to the science and technology of space exploration
106-3 describe examples of improvements to the tools and techniques of scientific investigation that have led to new discoveries	106-3 describe examples of improvements to the tools and techniques of exploring the solar system that have led to discoveries and scientific information
107-15 describe scientific and technological achievements that are the result of contributions by people from around the world	107-15 describe scientific/technological achievements in space science that are the result of contributions by people from around the world
105-1 identify examples of scientific questions and technological problems that are currently being studied	105-1 identify examples of scientific questions and technological problems about space and space exploration that are currently being studied



# Life of an Astronaut

## Outcomes:

301-21 Describe how astronauts are able to meet their basic needs in space

## Lesson Activity Overview:

As an introduction to the unit, rather than jumping into the structure of the universe, the curriculum wants the students to understand what an astronaut goes through when they are in space. This lesson is intended to allow students to understand the differences that a human goes through on Earth vs Space.

1. Begin with a brainstorm discussion - topic: What things are different in space than on Earth?
2. From student responses, group answers into separate discussion pods. Each discussion pod should focus on developing what the student thinks happens on Earth vs in Space. It is important to note that this is NOT the time to correct misconceptions. The goal is that students will talk items through and if misconceptions still exist, they will be corrected using the web (step 3).
3. Once students have completed their own prior knowledge of how astronauts are able to meet their basic needs then it is time to reinforce this by using the web link:  
<http://iss.jaxa.jp/kids/en/life/index.html>
4. Students should journal - Describe how astronauts are able to meet their basic needs in space. Remember to remind students that they should be including their original thoughts and how it has changed because of this lesson.

## Assessment: Informal Formative

Ensure students have created a journal entry related to how astronauts are able to meet their basic needs in space (301-21)

# Examining Astronauts

## Outcomes:

107-12 Provide examples of Canadians who have contributed to the science and technology of space exploration

107-15 describe scientific/technological achievements in space science that are the results of contribution by people around the world

## Lesson Activity Overview:

Now that students have an understanding of how astronauts meet their basic needs in space. The focus can shift to actual contributions of people to the development of the understanding of what we know about Space.

The two outcomes that will be investigated most likely the students will have limited previous knowledge. The intention of any STSE (100) outcome is to relate what is happening in society to science.

## Computer Research

1. Students should be given 2 questions to find as much information as possible:
  - a. Find examples of Canadians who have work in space exploration and explain what their job is and how it help space exploration
  - b. Find examples of people from around the world who work in space exploration and explain what their job is and how it helps space exploration (the focus here should be Major accomplishment to space exploration)

## Assessment: Formal Formative

Ensure that students have identified at least 3 Canadians who have contributed to space exploration and they can identify each persons specific contribution - 107-12

Ensure that students can identify 3 major accomplishments to space exploration (not from Canadians). 107-15

Canadians who have contributed to Space Exploration

<b>Name:</b> _____	<b>Name:</b> _____	<b>Name:</b> _____
Description of Contributions	Description of Contributions	Description of Contributions

Contributions to Space Exploration from Countries Around the World

<b>Name:</b> _____	<b>Name:</b> _____	<b>Name:</b> _____
Description of Contributions	Description of Contributions	Description of Contributions

# Current Issues in Space

## Outcomes:

106-3 Describe examples of improvements to the tools and techniques of exploring the solar system that have led to discoveries and scientific information

105-1 identify examples of scientific questions and technological problems about space and space exploration that are currently being studied

## Lesson Activity Overview:

At this point students have learned about the conditions to live in space as well as major contributions of people from Canada and around the world. Now the focus will shift to understanding the Current issues in space exploration.

This lesson would again be best accomplished with the students investigating the issues via research

Begin by having students visit CSA website as well as <http://iss.jaxa.jp/kids/en/station/01.html> -to explore understanding of International Space Station (ISS). Students should pay specific attention to Canada Arm and our work in Robotic Engineering on the ISS. Goal here is to have students understand improvements to tools (Canada Arm) that have led to discoveries.

We can now use the understanding of the ISS to research other Current Issues being studied. Students should create a journal entry with their findings

\*This lesson should be molded around current issues being studied about the ISS

## Assessment: Formal Formative

Ensure students can explain the role of the Canada Arm on the ISS - 106-3

Ensure that students can explain, via journal entry, 3 current issues in space that are currently being studied. - 105-1

# Space

## Strand - Relative Position and Motion of the Earth, Moon, and Sun

General Curriculum Outcomes	Specific Curriculum Outcomes
105-6 describe how evidence must be continually questioned in order to validate scientific knowledge	105-6 describe how peoples' conception of the Earth and its position in the solar system have been continually questioned and changed over time
301-19 demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons	301-19 demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons
301-20 observe and explain how the relative positions of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides	301-20 observe and explain how the relative positions of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides

Science Resource Package: Grade 6

***Space:***

***Relative Position and  
Motion of the Earth,  
Moon, and Sun***

## ◀◀ Prior to unit

Have students keep a lunar log for about a month. One option for recording information is to provide students with a calendar page with circles to colour in and mark the time observed for each day. Add dates to the lunar log calendar sheet on page 29. This template already has circles in which students can draw the portion of the moon observed.

It is also possible to have a lunar log kept for each month from the beginning of the year, dividing the months among the class.

The Nova Scotia curriculum outlines a similar activity. [http://www.ednet.ns.ca/pdfdocs/curriculum/Science6\\_Web.pdf](http://www.ednet.ns.ca/pdfdocs/curriculum/Science6_Web.pdf) Activity 33, page 147 of the document.

## **Access Prior Knowledge**

Using a “Think, Pair, Share” method, ask students to list three or more facts about each of the sun, the moon, and the Earth. Students may include patterns they have observed with respect to the sun and the moon.




































Make a class list or chart of ideas for each of the sun, moon and Earth. Record these in a way that they can be revisited several times over the next series of lessons.

Accept all ideas and note any questions or conflicts of opinion that come up in the process. Questions/conflicting ideas can be recorded and put off to the side to see if students can revisit them and answer the questions later in the unit. The discussion tips on pages 25-26 may help you encourage discussion.

### ✓ **Assessment:**

Note the concepts and misconceptions students are expressing. You will need to know these to plan effective questions for subsequent activities and discussions so that students will examine and adjust their alternate conceptions.

# Lunar Log


				
				
				
				
				
				
				



**Possible extension:**

Have students read myths about the sun and/or the moon from a variety of cultures. These stories are early explanations of the patterns observed in the sky. Ask students what patterns are being explained in the stories (day-night, seasons, lunar cycle).

Some myth summaries can be found at <http://school.familyeducation.com/mythology/sun/37490.html>

 **Post student versions of curricular outcomes on chart paper (see page 28). Inform students that these outcomes will be addressed over the next portion of the unit. Point out to students which outcomes are being addressed in each activity.**

## 1<sup>st</sup> Cycle

### Curriculum Outcomes

- 206-4 Evaluate the usefulness of different information sources in answering a given question.
- 207-2 Communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language.
- 301-19 Demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons.

### Movement of the Earth and Sun Activity

The students will go outside to measure the change in shadow size and location over the course of a day. Having students plot this information on a circle (see page 30) will help them see the movement of their shadows over the course of the day. Alternatively, you could have the students measure shadow direction with a compass and record; or students could take digital pictures, which might lead to the idea that the direction changes.

#### **Materials:**

- Space for all the students to stand to measure
- Measuring tape or other method for measuring such as length of string
- Chalk
- Sunlight
- Compass (optional)

#### **Option 1:**

Have all students go outside and measure their shadow every hour if possible and keep a record.

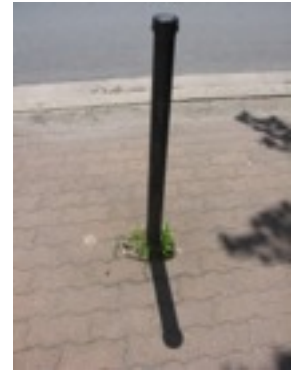
Students will observe and measure their own shadows. They will need a sunny day to perform this activity and a location they will be able to return to throughout the day, without it becoming shaded by trees or a building. Students will need to mark exactly where they choose to stand so they can return to this exact location each time during the day.

Students should start this experiment around 9 a.m. on a sunny day. Once they have chosen a location, students should draw a circle around their shoes (with chalk). Students then get a partner to measure the length of their shadow. The time of day and the measurement are to be recorded in their notebooks.

**Option 2:**

Have pairs or groups of students take turns going out every hour and measuring the shadow of a flagpole, tree or long stick, and then record that information in a running record.

By drawing the shadow line and marking the time where the shadow is each hour, students will end up making a sundial. Depending on your situation, students could make a more permanent sundial by using paint to record the centreline of the shadow each hour.



Both Option 1 and Option 2 could be done over more than one day to show this happens consistently.

**✓ Assessment:**

During the student activity, make notes on outcomes (or parts of outcomes) you observe being addressed. Process skill outcomes are part of the curriculum and should be assessed. Using the observation chart or the checklist (see pages 33 to 35) on a clipboard may be helpful to you. Develop your own code for quick notes.

*A suggested code:*

- ✓ observed and appropriate,
- WD with difficulty,
- RTT refused to try,
- A absent.

This chart may be used on multiple days, using a different coloured pen or pencil each day and putting the date in the corner. You may not have a symbol or note for every child every day. Some teachers like to focus on a group or two each time. However you choose to make note of your observations, you will always have a sense of who you need to take more notice of and who might need extra support. The information will also help you when it is reporting time.

Websites to help with this section:

<http://www.nsta.org/publications/interactive/aws-din/aws-u1a1.aspx> has described a similar activity

<http://www.kidseclipse.com/pages/a1b3c0d0.htm>

<http://www.astronomycafe.net/>

[http://www.boscobel.k12.wi.us/~schnrich/eath's\\_revolution.htm](http://www.boscobel.k12.wi.us/~schnrich/eath's_revolution.htm)

## Reflection: Class Discussion

Tell students: *Talk with a partner about your shadow observations. What did you observe? How did your observations differ? How were they the same?*

Have students share their insights with the whole class. Ask them:

*How did the length of your shadow change?  
When was your shadow the longest? Shortest?  
Did it change direction?  
Why do you think this happens?*

Allow individuals/groups to change/modify their ideas as more thoughts are shared. Point out that science is often collaborative, and that discussion also helps real scientists improve their understanding.

Look back at ideas in the chart from the Accessing Prior Knowledge activity (page 6). Ask: *Do we need to revise or add to any of these? Are there other things that we should add?*

## Reflection: Journaling

Discuss why the length of your shadow changed and why it changed the way it did. Predict how your shadow will change after school hours.

### ✓ **Assessment:**

Journal entries should not receive a score or mark. A positive comment followed by a question to refocus attention or suggest the next step in learning is very effective.

When reading the journal entries, note whether students are talking about how the shadow movement relates to the movement of the sun and its height above the horizon.

## **Possible extension :**

Sites with information about making sundials:

[http://www.mysundial.ca/sdu/sdu\\_sundial\\_kits.html](http://www.mysundial.ca/sdu/sdu_sundial_kits.html) has PDF templates you can print

[http://www.bbc.co.uk/norfolk/kids/summer\\_activities/make\\_sundial.shtml](http://www.bbc.co.uk/norfolk/kids/summer_activities/make_sundial.shtml)

<http://www.sundials.co.uk/projects.htm>

[http://www.skyandtelescope.com/letsgo/familyfun/Make\\_Your\\_Own\\_Sundial.html](http://www.skyandtelescope.com/letsgo/familyfun/Make_Your_Own_Sundial.html)

# Measuring your Shadow

Find a location where you can stand away from the building, trees or other structures that may cast a shadow during the school day.

Stand in the place you found, with your back to the sun.

Draw a circle around your shoes with the chalk.

Observe your shadow. Is it long or short?

Mark the far end of the shadow.

Measure the distance from where you stood to the end of the shadow.

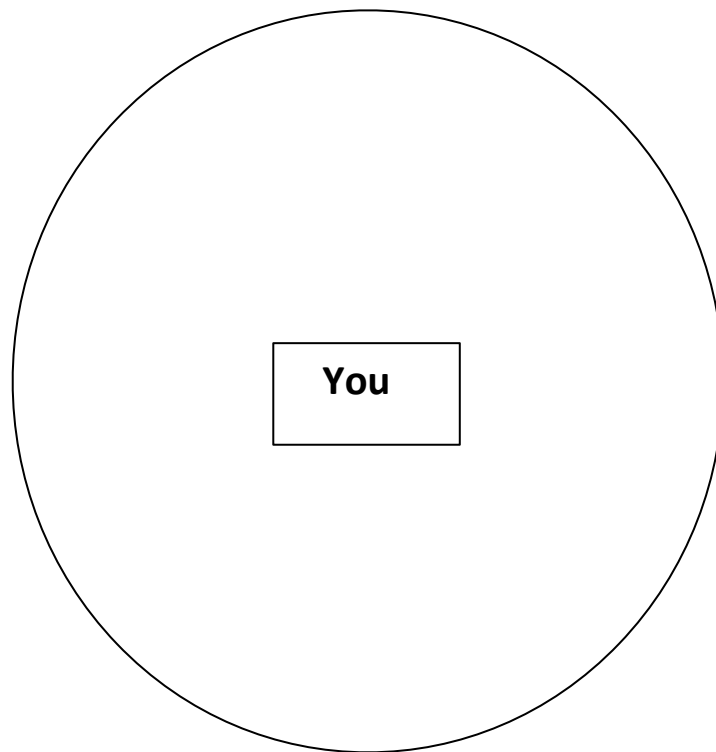
Write the time of day and the distance in your notebook.

Continue to do this every one or two hours until the end of the school day.

Record in your notebook what you observed about your shadow.

For instance:

- Did it get longer or shorter throughout the day or did it increase and then decrease in size?
- When was your shadow the longest? Shortest?
- Did it change direction?
- Why is this happening?



## 2<sup>nd</sup> Cycle

### Curriculum Outcomes

- 206-4 Evaluate the usefulness of different information sources in answering a given question.
- 207-2 Communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language.
- 301-19 Demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons.

### Day and Night Activity

To introduce this activity, open Google Earth and choose the sun icon at the top of the screen. (Google Earth may be downloaded free at <http://earth.google.com/download-earth.html>) When the cursor is put at the sliding bar, you may observe additional options. Clicking on the wrench will allow you to choose any date of the year. The fast forward button will let you control the sun's movement. Gradually move the sunlight and ask students what time of day it is in New Brunswick (use qualitative descriptors for time – dawn, early morning, mid morning, late morning, noon, early afternoon, mid afternoon, late afternoon, evening, sunset).

In the activity, students will compare the movement of the sunlight across the Earth to the length of shadows created by the sun as observed in the previous cycle.

Materials (for each pair or group of students):

- Globe, Styrofoam ball, or other round object to represent the Earth
- Flashlight to represent light from sun
- Push pin, toothpick or little cut-out person



#### Part 1

Put a push pin or tape a little cut-out person where NB is located. Use a flashlight to shine light onto the push pin or cut out. Rotate the Earth to the right so the "sun" travels from east to west and have students see how the flashlight (sun) causes the push pin to cast a shadow in the same way that the flagpole or students cast a shadow in the last investigation.



Have students stop the globe at a variety of positions and ask: *Where is the sun? What time of day is it? What is the shadow like? Is this like what we saw outside?* Let students discuss their ideas and express their confusions. This is not a concept to rush. It is a hard one to fully understand and must be fully explored.

Bring the class together to have a discussion about what they are noticing. See the tips on supporting discussion on pages 25-26. Discuss the different ways of looking at the movement of the sunlight on the Earth – measuring shadows, Google Earth image, globe/ball model with lamp/flashlight. Discuss the usefulness of each model. How are they helpful? How is one more helpful than another?

## Part 2

Choose a second location (or more) on another part of the Earth - put students back into pairs or small groups, each with a globe.

Have students rotate the Earth and ask the same questions comparing the new location to New Brunswick. Make a chart of observations (use as many rows as necessary). *Where is the sun? What time of day is it?* (use qualitative descriptors for time – dawn, early morning, mid morning, late morning, noon, early afternoon, mid afternoon, late afternoon, evening, sunset)

	New Brunswick	Second location
Where is the sun? What time of day is it?		
(Rotate Earth a bit) where is the sun? What time of day is it?		

### ✓ **Assessment:**

On observation chart (or other record), note how students are performing on the skill outcomes.

Bring the class together to have a discussion about what they are noticing. Again, do not rush discussion. Let all ideas be explored fully. Is it still possible to confuse students with your questions or is their understanding firm?

This site may be helpful. [www.timeanddate.com/worldclock/sunearth.html](http://www.timeanddate.com/worldclock/sunearth.html) It shows a map of the Earth with light and dark areas (day and night). The time can be adjusted.

Look back at ideas in the chart from the Accessing Prior Knowledge activity (page 6).  
Ask: *Do we need to revise or add to any of these? Are there other things that we should add?*

### **Reflection: Journaling**

Draw and explain why it is different times of day at the same moment for (choose 2 Earth locations).

✓ **Assessment:**

Journal entries should not receive a score or mark. A positive comment followed by a question to refocus attention or suggest the next step in learning is very effective.  
Can students describe the position of the sun from two different locations on Earth?

✓ **Assessment:**

Explain what you think might happen in New Brunswick if the Earth stopped rotating?



## 3<sup>rd</sup> Cycle

### Curriculum Outcomes

- 206-4 Evaluate the usefulness of different information sources in answering a given question.
- 207-2 Communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language.
- 301-19 Demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons.

### Seasons Activity and Discussion

Ask: *A day is 24 hours. What happens to make each day 24 hours long?*

Ask: *How long is a year? What is this based on? Why was this number picked?* (Elicit that the Earth takes a year to go around the sun.)

This activity is described in the teacher's guide for *Out of This World* (page 41) but a brief description has been included here for reference. It is also described in the Nova Scotia curriculum documents, Activity 31, on page 143 of the document: [http://www.ednet.ns.ca/pdfdocs/curriculum/Science6\\_Web.pdf](http://www.ednet.ns.ca/pdfdocs/curriculum/Science6_Web.pdf)

Materials:

- Globe
- Lamp

Have students standing or sitting in a circle with a lamp in the center in a darkened room. Students pass the globe around ensuring the base of the globe is parallel to the floor if they are holding it, or that the globe is resting on a table or the floor. Keep the northern end of the axis pointing toward the same end of the room.

Each student, on their turn, shows the group where NB is located during the day. Ask each student: *How is the sun's light shining on the globe at your spot? How hot might the sun feel? Why do you think that?*

### Assessment:

On observation chart (or other record), note how students are performing on the skill outcomes.

If the sunlight is more direct on a location, the heat energy is less spread out and it is warmer.

To better illustrate the differences in temperature due to the changing angle of the sun during the year, take a white piece of paper and hold a flashlight so the light rays are perpendicular to the surface (the light shines directly onto the paper). Have a student trace the pool of light.

Now shine the light on the paper from a 30-45° angle. Have a student trace the pool of light. *What difference do you notice about the concentration of the light rays? How do you think the change in angle will affect the temperature?*



Revisit/repeat the circle activity adding the intensity piece and talking about temperature. Have students explain how the intensity of the light changes and what that means. Each student in the circle should be able to come up with the season in NB by observing how the sun's intensity changes as the globe moves around the circle.

<http://www.usno.navy.mil/USNO/astronomical-applications/data-services/earthview> This site allows you to select a time of year and see how much sun each part of the Earth receives. It is interesting to compare the solstices (about Dec. 21 and June 21) and equinoxes (about Sept. 21 and March 21). It is possible to save the images.

[http://www.classzone.com/books/earth\\_science/terc/content/visualizations/es0408/es0408page01.cfm](http://www.classzone.com/books/earth_science/terc/content/visualizations/es0408/es0408page01.cfm) shows how much sunlight different parts of Earth receive through the year

<http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=300>

Choose “Seasons: Earth, Moon, and Sun” for a useful simulation showing sun, Earth, and moon positions. “Seasons in 3D” and “Seasons around the World” appear to be the same simulation if you need more time.

Each simulation is available free to unregistered users for five minutes a day. It is also possible to sign up for a free trial. There is a cost for membership.

The Bill Nye video “Earth’s Seasons” is a good summary video you may wish to use at this time. It can be found at <http://learning.aliant.net/school/index.asp> Type the title into the search box. When you click on the picture, the video will start with a table of contents to the right of it. Note that you can click on any part of the contents list to go to that portion. There is no need to view the entire video. (You need to register to use the videos on the Aliant site. Registration is free. If you try to watch the video without logging in, you are prompted to do so.)

## Reflection: Class Discussion

Look back at ideas in the chart from the Accessing Prior Knowledge activity (page 6).  
Ask: *Do we need to revise or add to any of these? Are there other things that we should add?*

## Reflection: Journaling

Draw diagrams showing NB (on the Earth) and the sun to contrast summer and winter and explain.

Students can be given the Earth pictures to cut out and use in their diagrams (on page 31).

### ✓ **Assessment:**

Journal entries should not receive a score or mark. A positive comment followed by a question to refocus attention or suggest the next step in learning is very effective.

Which students understand that seasons result from the orientation of the Earth with respect to the sun?



## Think like a scientist

Asking good questions is an important skill in science. Initially students will need support. Model the skill with the whole class and students will begin to have the confidence to contribute. After some practice, students will be able to generate questions successfully individually.

Present students with a situation and ask them to generate questions that could be investigated scientifically. (These situations and questions do not have to be limited to those that can be done in a classroom.)

Situation:

Alternatives to fossil energy are being explored by many. Some solar panels collect the sun's energy and store it in batteries. The energy can then be used when the sun is no longer shining. More and more homes have solar energy as one of their energy sources. In New Brunswick, the amount of solar radiation varies throughout the year.

What is a question concerning the different amounts of solar energy in New Brunswick that could be investigated scientifically?

# Earth pictures



### **Possible extension:**

<http://www.learner.org/jnorth/tm/mclass/indexCurrent.html> is a site which every year has students record their sunrise and sunset times on Mondays (in 2010 from February 1 to April 12). On the same days in ten Mystery Class locations, students are doing the same. Their data is posted online on Fridays. The challenge for your class is to determine the locations of the mystery classes. Other clues are given beginning in March.

The site has suggested recording sheets, teaching tips and ideas to help. It has a series of optional lessons to build understanding of daily and seasonal cycles.

# Day, Night, and Seasons - SPARK

## Outcomes

301-19 demonstrate how Earth's rotation causes the day and night cycle and how Earth's revolution causes the yearly cycle of seasons

207-2 communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language

## Question

- How does the earth's rotation cause the day and night cycle? (301-19)
- How does the earth's revolution cause the yearly cycle of the seasons? (301-19)

## Materials

- Globe (or a basketball with a point marked for New Brunswick and the equator) (It is ideal to have a globe that rotates on a vertical and horizontal axis but not necessary)
- Fast Response Temperature Sensor PS2153
- Spark Unit
- Passport General Science Sensor
- Strong light Source (Floodlight)

## **Lesson Activity Overview**

- Place globe approximately 30-40cms away from light source
- Turn on light source (Light Source should be level with globe or ball and pointing directly at it)
- Tape heat sensor to New Brunswick or other areas to explore such as the equator. (If you have two or more sensors you may try collecting data from several points at the same time)
- Turn the Spark Unit on

## **Cycle 1**

- Ask students to position the globe (with temperature sensor taped to NB) in several positions and record their results. (They may rotate the globe on the horizontal or vertical axis...some may even want to position the globe closer to the light source)
- Students should be certain to allow the probe to adjust before recording results
- What is the hottest temperature they can get in NB? What is the coldest they can get?
- Have students draw a diagram of the position of the globe for the warmest and coolest temperatures and share their results
- Begin on conversation about what positions may represent night, day, summer, winter, etc.

## **Cycle 2**

- Choose a second location (or more) on another part of the Earth - put students back into pairs or small groups, each with a globe.
- Have students rotate the Earth on the vertical axis and ask the same questions comparing the new location to New Brunswick. Make a chart of observations (use as many rows as necessary). *Where is the sun? What time of day is it?* (use qualitative descriptors for time – dawn, early morning, mid morning, late morning, noon, early afternoon, mid afternoon, late afternoon, evening, sunset)

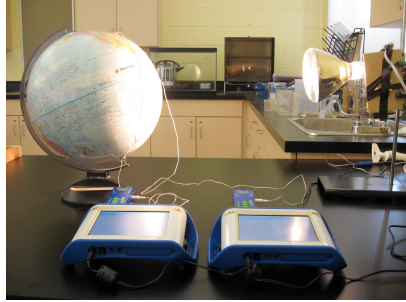
	<b>New Brunswick</b>	<b>Second Location</b>
Where is the Sun? What time of day is it?		
(Rotate Earth a bit) where is the sun? What time of day is it?		
What is the temperature on the Probe?		

\*Adapted from Department of Education Resource Package Sept. 2009

- Assessment could be conducted through an exit card where students answer the question: How does the earth's rotation cause the day and night cycle? (301-19)

## **Cycle 3**

- Have students read the following article: <http://www.factmonster.com/spot/solsticeforkids.html> (or print this article off if access to computers are limited)
- After they have read the article have ask students to explain how the tilt of the earth effects the seasons
- Have students design an experiment using the probes, light source and globe to determine what effect the angle of the earth has on places like New Brunswick, the equator, etc.
- The focus of their experiment should be to answer the question: How does the earth's revolution cause the yearly cycle of the seasons? (301-19)



• Assessment could be conducted through a journal activity where students report their data, observations and findings. Students may also choose to demonstrate they have met the outcome by capturing digital pictures of their experiment showing summer in N.B., Winter in N.B. and showing the temperature data they recorded and comparing this with the a place in the Southern Hemisphere and equator.



## 4<sup>th</sup> Cycle

### Curriculum Outcomes

- 207-2 Communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language.
- 301-20 Observe and explain how the relative positions of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides.

### Sun Shining on the Moon Activities (moon phases)

Prior to this cycle have students keep a lunar log for about a month.

The Nova Scotia curriculum outlines a similar activity. [http://www.ednet.ns.ca/pdfdocs/curriculum/Science6\\_Web.pdf](http://www.ednet.ns.ca/pdfdocs/curriculum/Science6_Web.pdf) Activity 33, p. 147 of guide.

*Ask: How could we better visualize or model the solar system to investigate moon phases?*

#### **Part 1 Moon phases with a ball and lamp**

Materials:

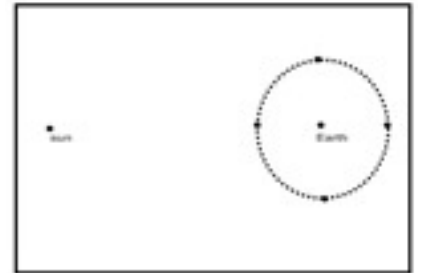
- Lamp,
- one small ball with an X on one side for each student or group of students



Have the class set up in the same way as with the “Seasons” activity – in a circle with a lamp in the middle of the room.

*Ask: Where is the moon in all this? Discuss the orbit of the moon and how long it takes to repeat the pattern.*

Provide each student or group of students with a small ball with an X on one side. Each student is now the Earth. The small ball is the moon and the X shows the side that faces the Earth.



Have students (pretending to be the Earth) hold the ball (the moon) at arm's length and slowly spin in a circle. Ask students: *Using this model, explain the evidence recorded in your lunar log.* They should make observations about the portion of the lit moon visible from Earth.

Alternatively, place a Styrofoam ball on a stick and take outside during the day when the moon is visible. The best time to do this at school is in the morning when the moon is waning. Hold the ball up so it blocks the moon from view. Compare the way light is

shining on the ball to the way it is shining on the moon. The same side will be illuminated by the sun.

Ask students: *Using this model, explain the evidence recorded in your lunar log.* They should make observations about the portion of the lit moon visible from Earth.

✓ **Assessment:**

On observation chart (or other record), note how students are performing on the skill outcomes.



**Discuss:** *What you notice about the light from the sun (the lamp) on the moon? How does this compare to your lunar logs?*

## **Part 2 Position of the Sun, Earth and Moon**

Ask: *Does this model give an accurate picture of how the sun, moon, and Earth appear?* This is a good time to raise or reinforce that even though scientific models give insights to how things are, they rarely represent reality totally accurately.

Materials:

Water bottle caps

Balls to represent sun, moon and Earth

Moon - ping pong balls or plastic golf balls coloured half white and half black (a permanent marker works well)

Sun – tennis ball or other yellow ball

Earth – green, blue or multi-coloured ball

Paper with positions marked for sun, Earth, and orbit for moon

Have students explore in small groups. Students will observe and draw the positions of Earth, sun, moon and the portion of the moon visible from Earth. See the student sheet on page 32.

✓ **Assessment:**

On observation chart (or other record), note how students are performing on the skill outcomes.

An effective follow up activity is for students to use this model to demonstrate the relative positions of the sun, Earth and moon with the moon observations they made in their lunar log.

## Reflection: Class Discussion

Have students share their insights with the whole class. Ask them:


*How did the visible part of the moon change?*

*Where was the sun and the Earth and the moon when the moon was full?*

*Where was the sun and the Earth and the moon when the moon was not visible (new moon)?*

*Why do you think this happens?*

Allow individuals/groups to change/modify their ideas as more thoughts are shared. Point out that science is often collaborative, and that discussion also helps real scientists improve their understanding.

 **Teacher note:** A way to remember the order of the moon phases and to determine if the moon is waxing (appearing larger each night) or waning (appearing smaller each night) is to think of “DOC”. If the part of the moon circle visible is shaped like the curve in a “D” the moon is waxing. The “O” is for the full moon. The “C” is the shape of the curve of the moon as it wanes.

[http://www.harcourtschool.com/activity/moon\\_phases/](http://www.harcourtschool.com/activity/moon_phases/) This site shows the position of the sun, the movement of the moon around the Earth and which phase would be seen from Earth.

<http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=300>

Choose “Moon Phases” for a useful simulation showing sun, Earth, and moon positions. “Moonrise, Moonset and Phases” appears to be the same simulation if you need another five minutes.

This site has simulations each of which are available free to unregistered users for five minutes a day. It is also possible to sign up for a free trial. There is a cost for membership.

Look back at ideas in the chart from the Accessing Prior Knowledge activity (page 6). Ask: *Do we need to revise or add to any of these? Are there other things that we should add?*

### **Extend the discussion to eclipses.**

Ask students (give time for small group discussions before sharing ideas with the class): *Would there ever be a time when the moon blocked the sun from being seen on Earth?*

*What do you think the positions of the sun, earth and moon would be to make that happen?*

*Would there ever be a time when the Earth blocked the sun from shining on the moon? What do you think the positions of the sun, earth and moon would be to make that happen?*

<http://www.kidseclipse.com/pages/a1b3c1d0.htm> shows and explains what an eclipse is

<http://www.kidseclipse.com/future/future.html> gives a list of future solar eclipses

<http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=300>

Choose “2D Eclipse” and “3D Eclipse” for a useful simulation showing sun, Earth, moon positions.

This site has simulations each of which are available free to unregistered users for five minutes a day. It is also possible to sign up for a free trial. There is a cost for membership.

The Bill Nye video “The Sun” has a good section on solar eclipses. It can be found at <http://learning.aliant.net/school/index.asp> Type the sun into the search box. When you click on the picture, the video will start with a table of contents to the right of it. Click on “A solar eclipse” in the contents list to go to that portion. (You need to register to use the videos on the Aliant site. Registration is free. If you try to watch the video without logging in, you are prompted to do so.)

Look back at ideas in the chart from the Accessing Prior Knowledge activity (page 6). Ask: *Do we need to revise or add to any of these? Are there other things that we should add?*

## Reflection: Journaling

Explain a solar eclipse using words and drawings. Explain how a lunar eclipse is different using words and drawings.

### ✓ **Assessment:**

Journal entries should not receive a score or mark. A positive comment followed by a question to refocus attention or suggest the next step in learning is very effective.

Which students understand the relative positions of the sun and the Earth that result in the solar and lunar eclipses?

# Position of the Sun, Earth and Moon

Use the paper guide to set the sun, Earth and moons in their relative positions. The bottle covers will keep them from rolling around. The moon balls are half white and half black. The white represents the side with the sun shining on it and the black is the side in shadow (away from the sun).



Remembering that in real life the sun is a long distance from the Earth and the moon, are your moons placed with the lit sides (white) toward the sun?

Imagine you are standing on the Earth looking towards one of the moon positions. If you can only see the lit (white) part of the moon, what shape do you see? Record the moon position and the part of the moon visible in the chart.

Now the Earth has turned and you are looking at the next moon position. What shape is the part of the moon you can see?

Continue with the next two moon positions.

Moon shape	The sun, Earth and moon positions

## Possible extension:

Research: *Why does the moon look larger near the horizon?*

## Possible next steps and resources:

301-20 Observe and explain how the relative positions of Earth, the moon, and the sun are responsible for the moon phases, eclipses, and tides

This site has a good clip about how the moon causes tides. See if your students notice the misspelling of Fundy.

<http://videos.howstuffworks.com/hsw/10000-the-moon-tides-video.htm>

<http://www.explorelearning.com/index.cfm?method=cResource.dspResourcesForCourse&CourseID=300>

Choose “tides” for a useful simulation showing sun, Earth, moon positions and the corresponding tide. The bar chart shows the water level rising and falling at the person. The graph (change the scale) shows tidal fluctuations throughout a month (neap and spring tides).

This site has simulations each of which are available free to unregistered users for five minutes a day. It is also possible to sign up for a free trial. There is a cost for membership.

105-6 Describe how peoples’ conceptions of the Earth and its position in the solar system have been continually questioned and changed over time

Have students research in pairs to develop a timeline of the history of people’s view of the solar system.

205-2 select and use tools in building models of the solar system that show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun

104-8, 300-23 describe the physical characteristics of components of the solar system

An activity described in the article “Solar System in the Hallway” (*Science Scope*, April/ May 2009) would be a useful way for students to explore the solar system. A model is created in the hallway and students determine the relative distances between the planets, that the sun appears small from the outermost planet, and that the solar system is mostly empty space.

The model has a picture of the sun at one end of the hallway and pictures of the planets are located along the hallway to scale. The following chart gives the distance of each planet from the sun in astronomical units. Note that while the distances between the solar system objects are to scale, the size of the objects are not. Another example of how models can be useful while not reflecting all aspects of reality.

object	Distance from the sun (AU)
Sun	0.0
Mercury	0.39
Venus	0.79
Earth	1.0
Mars	1.52
Asteroids	2.67
Jupiter	5.20
Saturn	9.54
Uranus	19.2
Neptune	30.1

It is recommended that only a small group of students work with the model at a time so that they can really see the distances and space in the solar system.

Colour pictures of the sun and planets (and fact sheets) may be downloaded from <http://teachspacescience.org/cgi-bin/search.plex?keywords=Solar+System+Lithograph+set>

The following questions from the article may guide the exploration:

#### **Pre-activity**

- Can you state the order of the planets from nearest to the sun to farthest away?
- Do you think the distances between neighbouring planets are uniform?  
If not, is there a pattern to the intervals or are the differences random?
- Suppose we say the sun is at one end of the hall and we scale the solar system so the Earth is ten tiles from the sun. Do you think all of the solar system will fit in the hallway?  
If so, where will the farthest planet from the sun be located?

#### **During activity**

- Record some general observations about the solar system in the hallway, including the order of the planets from nearest to the sun to farthest away.
- By sight, what is the closest object-to-object distance? Record the names of the objects and estimate the distance in number of tiles.

- By sight, what is the greatest distance between two adjacent objects? Record the names of the objects and estimate the distance in number of tiles.
- Record the distance from the sun to Mercury (in number of tiles).
- How far (in tiles) is it from the sun to the Earth?
- When you are at Earth, record how big the sun appears using your ruler. Hold the ruler at arm's length to determine the apparent diameter of the sun picture.
- How far (in tiles) is it from the Earth to Jupiter?
- How long does it take to get from the sun to Neptune using the heel-to-toe method?
- How far is Uranus from Neptune in our model (in tiles)?
- When you are at Neptune, record how big the sun appears using your ruler. Hold the ruler at arm's length to determine the apparent diameter of the sun picture.

### **Post activity**

- In the pre activity questions, how well did you predict the overall size of the solar system?
- Are the inter-planet distances uniform?
- Is there a pattern to the inter-planet distances?
- If the distance from the sun to Neptune is \_\_ tiles, what was your average velocity during your heel-to-toe walk? Based on your speed, how long would it take you to go from Earth to Jupiter?
- The average distance from the sun to Earth is 149 597 890 km. What is the scale of the hallway solar system? What distance does each tile represent?
- What is the actual distance from the sun to Neptune (in km)?

107-12 provide examples of Canadians who have contributed to science and technology  
 107-15 describe scientific and technological achievements that are the result of contributions by people around the world  
 301-21 describe how astronauts are able to meet their basic needs in space

The Canadian Space Agency bilingual materials included in the school kit may be helpful with these outcomes: ROBOMATH Educator Kit – elementary level and International Space Station Science – Elementary. Included in ROBOMATH is a poster with the Canadarm, a teacher guide and disk with many views of the space station with tidbits about Canadian and international contributions. The science disks have a simulation of a science experiment aboard the space station related to living conditions.

<http://sciencehack.com/videos/category/3> This site really explains how a space toilet works. Lots of other topics available as well.



# Space

## Strand - The Solar System

General Curriculum Outcomes	Specific Curriculum Outcomes
205-2 select and use tools in manipulating materials and in building models	205-2 select and use tools in building models of the solar system that show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun
104-8 demonstrate the importance of using the languages of science and technology to compare and communicate ideas, processes, and results	104-8, 300-23 describe the physical characteristics of components of the solar system
300-23 describe the physical characteristics of components of the solar system- specifically, the sun, planets, moon, comets, asteroids, and meteors	
105-1 identify examples of scientific questions and technological problems that are currently being studied	105-1, 205-8, 207-2 identify and use a variety of sources and technologies to gather pertinent information about a planet, moon, asteroid, or comet, and display their findings using diagrams, pictures and/or descriptions from recent explorations
205-8 identify a variety of sources and technologies to gather pertinent information	
207-2 communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language	
206-4 evaluate the usefulness of different information sources in answering a given question	206-4, 204-6 evaluate the usefulness of different information sources when getting information about the components of the solar system
204-6 identify various methods for finding answers to given questions and solutions to given problems, and select one that is appropriate	

# Build a Model of the Solar System

## Outcomes:

205-2 select and use tools in building models of the solar system that show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun

104-8 demonstrate the importance of using the languages of science and technology to compare and communicate ideas, processes, and results

300-23 describe the physical characteristics of components of the solar system- specifically, the sun, planets, moon, comets, asteroids, and meteors

## Lesson Activity Overview:

The knowledge outcome for this section indicates that students be able to describe the physical characteristics of the solar system. Along with that, students should be able to differentiate the terms related to the solar system, such as asteroid and meteors. In order to do this, students will create a model of the solar system to demonstrate their understanding physical lay out of the solar system. Students should be able to identify each planet and there location relative to the sun. However, there is no requirement that students be able to individually identify each planet characteristics and history.

1. Keeping with the model of inquiry, do not give a model of the solar system and ask them to replicate it.
2. Instead, have a discussion to brainstorm what students already know about the physical layout of the solar system. The discussion will greatly vary depending on the previous knowledge of the students.
3. It is advised to separate learning as follows:

Physical Characteristics of the Solar System	Other Things found in the Solar System
Planets	Comets
Sun	Asteroids
Moon	Meteors

4. Have students create a physical or virtual model of the physical characteristics of the solar system hat show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun. 205-2 (please note that this task should take some time, it should not be a quick sketch)
5. Based on the initial brainstorm, have students classify the difference between comets, asteroids, and meteors. The focus here should be the use the correct term for the appropriate phenomena - 104-8. Students may be required to do some research if they do not have a solid understanding of these solar system components.

**Assessment: Formal Formative**

Ensure that students have created a physical model of the solar system - 205-2

Ensure that the physical model of the solar system that show approximate relative size of the planets and sun, and the approximate relative orbits of the planets around the sun - 300-23

Ensure that students are able to correctly identify the scientific terms: comets, asteroids, meteors - 104-8

# Studying Components of the Solar System

## Outcomes:

105-1 identify examples of scientific questions and technological problems that are currently being studied

205-8 identify a variety of sources and technologies to gather pertinent information

207-2 communicate procedures and results, using lists, notes in point form, sentences, charts, graphs, drawings, and oral language

206-4 evaluate the usefulness of different information sources in answering a given question

204-6 identify various methods for finding answers to given questions and solutions to given problems, and select one that is appropriate

## Lesson Activity Overview:

Perviously, students did a small investigation related to the current issues being studied at the International Space Station (ISS). The purpose of this lesson is do an in-depth investigation to a current issue being studied in space. It is suggested that it not be the same issues that initially studied.

## Requirements/Assessment

Each requirement should be evaluated individually - the criteria/rubric should be develop with the students before the task begins

1. Students will explore various space related issues that are currently being studied.  
Once they have had sufficient time, they should choose a specific issue that will be investigated. - 105-1
2. Students are expected to use at least 5 trusted sources of research. Please use attached guidelines for understanding trusted sites. - 205-8
3. Once all research is gathered, students will evaluate the usefulness of each web site. - 206-4
4. As part of the evaluation process, students will vet all sources and select ones that are appropriate. - 204-6 This is not to say that students can say that items are false, rather they should categorize the different information that is being presented about the subject.
5. Students will present their findings to the class. -207-2. The method in which the information can be presented can be differentiated (using lists, notes in point form, sentences, charts, graphs, drawings, and oral language)

## How Can I Tell if a Website is Reliable?

The Internet contains some extremely valuable, high-quality information sources – and it also contains some very unreliable, biased sources of misinformation. That is its nature; anyone who can manage to finagle some webspace can post a website. That puts a higher burden on you as a researcher to evaluate the quality of each website you use, whether it's for a class assignment or your personal use. Sometimes Internet sources can be more accurate than print sources. Sometimes it is better to stick with print sources. Different courses may require research of different levels of academic rigor. This tutorial is designed as a guide to help you evaluate whether a particular Internet site is appropriate for your purposes.

### 1. Who authored (wrote) the site? **How to find out:**

Look for an “About” or “More about the Author” link at the top, bottom or sidebar of the webpage. Some pages will have a corporate author rather than a single person as an author. If no information about the author(s) of the page is provided, be suspicious.

Does the author provide his/her credentials? What type of expertise does s/he have on the subject s/he is writing about? Does s/he indicate what his/her education is? What type of experience s/he has? Should you trust his/her knowledge of the subject?

Try “Googling” the author – search his/her name at [www.google.com](http://www.google.com). What kinds of websites are associated with your author's name? Is s/he affiliated with any education institutions? Do commercial sites come up? Do the websites associated with the author give you any clues to particular biases the author might have? “Google” with caution – remember that sometimes more than one person can share the same name.

### **How to find out:**

- **Look at the domain name of the website** – that will tell you who is hosting the site. For instance, the Lee College Library website is: <http://www.lee.edu/library>. The domain name is "lee.edu." That tells you that the library website is hosted by Lee College.
- Do a search on the domain name at <http://www.whois.sc/>. This site provides information about the owners of registered domain names. What is the organization's main purpose? Check the organization's main website, if it has one. Is it educational? Commercial? Is it a reputable organization?
- Don't ignore **the suffix on the domain name** (the three-letter part that comes after the “.”). The suffix is usually (but not always) descriptive of what type of entity hosts the website. Keep in mind that it is possible for sites to obtain suffixes that are misleading. Here are some examples:  
.edu = educational .com = commercial .mil = military .gov = government .org = nonprofit  
.gov = government .org = nonprofit

3. What is the main purpose of the site? Why did the author write it and the publisher post it?

To sell a product?

As a personal hobby?

As a public service?

To further scholarship on a topic?

To provide general information on a topic?

To persuade you of a particular point of view?

**How to find out:** Scan the homepage of the website. Is it cluttered with advertising? Does the page appear to be professionally designed? Is the writing trying to persuade you to buy something?

4. Who is the intended audience?

• Scholars or the general public?

• Which age group is it written for?

• Is it aimed at people from a particular geographic area?

• Is it aimed at members of a particular profession or with specific training?

5. What is the quality of information provided on the website?

**Timeliness:** when was the website first published? Is it regularly updated? Check for dates at the bottom of each page on the site.

Different publication dates will be acceptable depending on which type of information you're looking for. If you're looking for statistics, information on current events, or information in fields like science, technology or healthcare, you probably need the most up-to-date information available. If you're looking for information that doesn't change, such as Mark Twain's date of birth or who led the Union Army in the Civil War, it may not matter as much if the website is a little older as long as it is published/authored by a reputable source.

**Does the author cite sources?** Just as in print sources, web sources that cite their sources are considered more reliable. It shows that the author has done his/her homework and is familiar with scholarship in the field. **What type of other sites does the website link to?** Are they reputable sites? If the author references online material, does s/he provides links to the material referenced?

**What type of sites link to the website you're evaluating?** Is the website being cited by others?

Go to either [www.yahoo.com](http://www.yahoo.com) or [www.google.com](http://www.google.com). In the search box, type “link:[name of your website]” with no space after the colon. An example using the Lee College library website would look like:

link:<http://www.lee.edu/library>

The resulting search will contain websites that link to your site. Does it include reputable or well-known sites?

6. How does it all add up?

Compare the information you’ve gathered about your website to your information needs -- does this website provide an appropriateness of fit? Not all websites will work for all purposes – a website that is fine for finding general information on a disease may not work for a nursing student’s paper.

If you are in doubt, ask your instructor or a librarian for help!

# Space

## Strand - Stars and Constellations

General Curriculum Outcomes	Specific Curriculum Outcomes
302-13 identify constellations in the night sky	302-13 identify constellations from diagrams, pictures and/or representations of the night sky
205-8 identify and use a variety of sources and technologies to gather pertinent information	205-8 use electronic, print resources and/or visit a planetarium to gather information on the visual characteristics and mythology of constellations
107-3 compare tools, techniques, and scientific ideas used by different people around the world to interpret natural phenomena and meet their needs	107-3 compare how different cultures have used the positions of stars for such things as the appropriate time to plant and harvest crops, navigate the oceans, and/or foretell significant events



# Understanding Constellations

## Outcomes:

302-13 Identify constellations from diagrams, pictures and/or representations of the night sky

205-8 use electronic, print resources and/or visit a planetarium to gather information on the visual characteristics and mythology of constellations

## Lesson Activity Overview:

There are many different options to accomplish these outcomes. The intent of the lesson is to have student create a representation of a constellation(s) based on some research that they have done.

### *Tech Option*

If the teachers has access to an Apple iPad or iPhone, an apps called Star Walk does a great job of showing how stars form Constellations. 205-8

A simpler way to for any teacher is to use the night view of google earth. <http://www.google.com/earth/index.html>

Google Earth allows teachers to use the SMART Board to display the night sky in their classroom. Google Earth is a very intuitive tool that shows much more then just the night sky. 205-8

Allowing students the opportunity to interact with either software will grant them the ability to identify constellations from representations of the night sky - 302-13

Using dark construction paper, draw a constellation, and mark the stars that define it.

**Caution: Using a pin or sharp point of a pencil or pen put holes in the paper where the stars appear.** Using an overhead projector, show your class your constellation. (205-8)

### *Research Option*

Research and write a brief report on a constellation. Refer to the origin of its name, and its importance to ancient and/or modern culture. (205-8)

## Extension

ASD-N has access to an observatory located at Miramichi Rural School. Please coordinate any visits with Adam Hayward or a School Administrator.

### **Assessment:Informal Formative** - Tech Option

Ensure that students have used an electronic resource to gather information about characteristics of constellations - 205-8

### **Assessment:Formal Formative** - Tech Option

Ensure students have created and identified a constellation - 302-13

### **Assessment:Formal Formative** - Research Option

Ensure students have written a research paper related to constellations - 205-8

# Cultural Significance of Stars

## **Outcomes:**

107-3 compare how different cultures have used the positions of stars for such things as the appropriate time to plant or harvest crops, navigate the oceans, and/or foretell significant events.

## **Lesson Activity Overview:**

The intent of this lesson is to have students understand that ancient cultures understood the science of the sun and stars to plant crops and navigate the ocean. Teachers should be cautious to put much stalk in the portion related to foretelling of significant events and focus on the scientific areas.

Teachers have two different approaches that they can take.

First, they can have students work with specific ancient civilizations to determine which natural scientific phenomena they used the sun and stars.

Research how the Egyptians, Aztecs, and other cultures used the Sun and stars to explain natural phenomena. - 107-3

Second option, have students begin with the scientific events to determine which cultures used them

Research which ancient cultures used the sun and stars to plant and harvest their crops and which navigated the oceans. - 107-3

## **Assessment:Formal Formative**

Ensure students can identify ancient civilizations that used scientific phenomena related to sun, moon and stars for a specific purpose. - 107-3