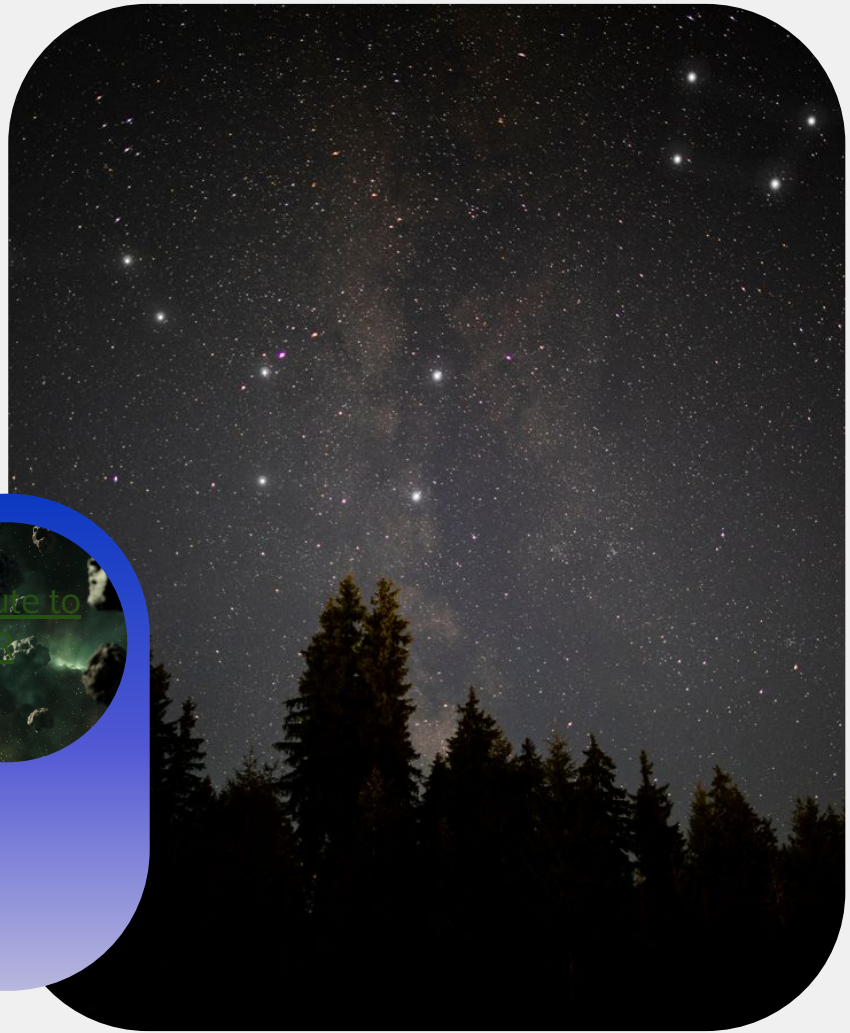
New Science Curriculum

Grade 5

Space

February 6, 2024



Facilitators
Chris Zarski
Ted Zarowny

Alberta Regional Professional Development Consortia
Adult learning for students' sake

Land Acknowledgement

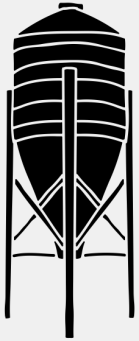
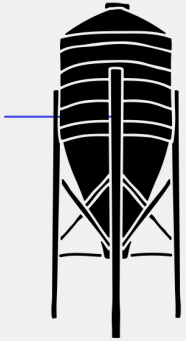
In the spirit of reconciliation, we want to acknowledge that this gathering is taking place on traditional lands across the province of Alberta, home to many diverse First Nations, Métis and Inuit peoples. We acknowledge that this land is a traditional meeting ground giving voice to its original peoples and the story of creation of this country in a way that history has forgotten.

“Canada's Indigenous people looked to the sky for guidance in practical endeavours but also spiritual identity. They look to the sky as a map, clock and calendar for thousands of years. The movement of celestial objects were observed and followed using the stars as a compass, for orientation and direction.” (ROA, University of Calgary)
Tipiskawi Kisik: Night Sky Star Stories by Wilfred Buck

Agenda

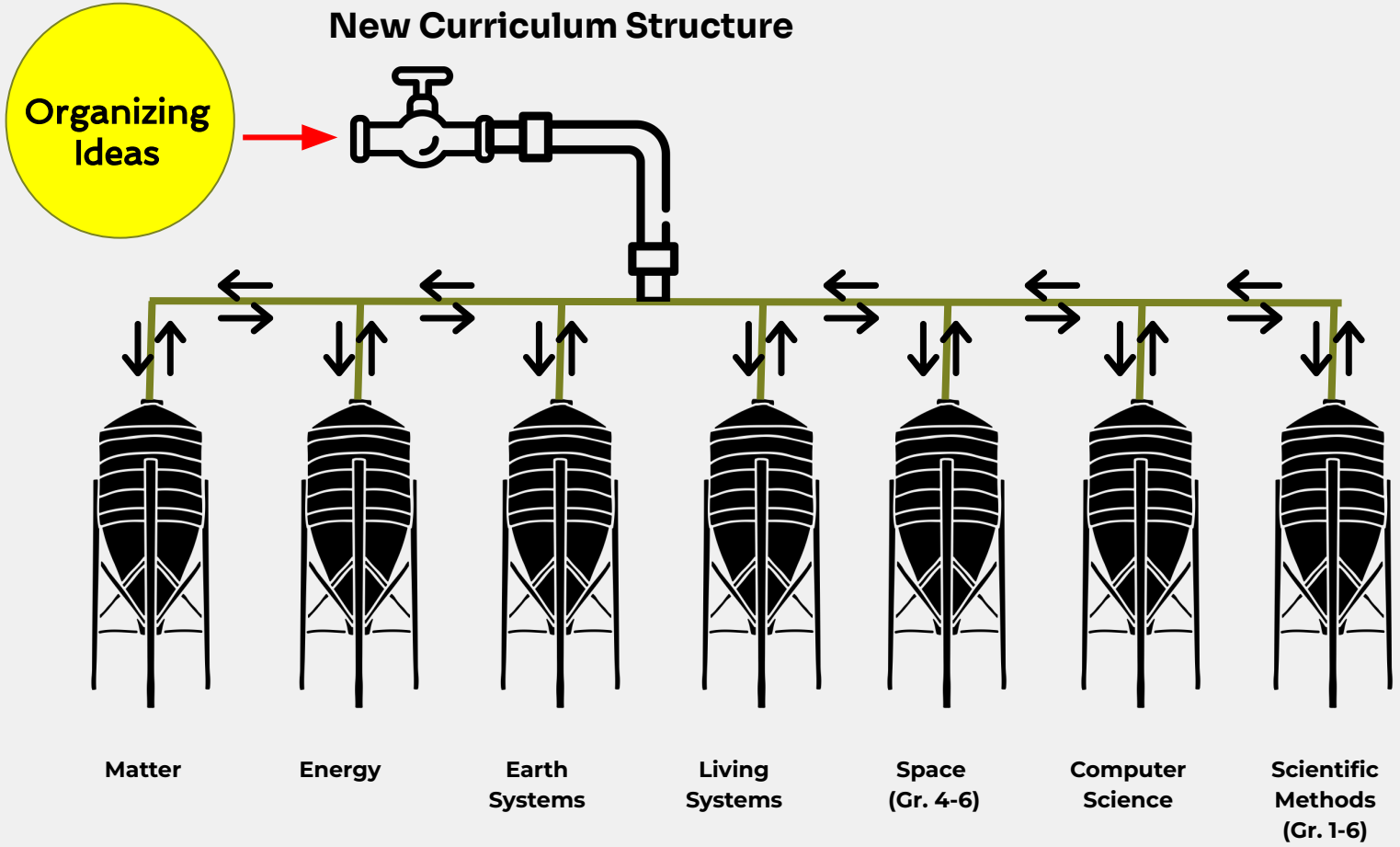
1. The New and Old Science Curriculum
2. What do Students need to Know?
3. What do Students need to be able to Do?
4. What do Students need to Know Understand?
5. Planning for Instruction (Surface - Deep - Transfer)
6. Sample Surface Level Activities
7. Sample Deep Level Activities
8. Transfer/Assessment
9. Resources

Previous Science Curriculum: Topics

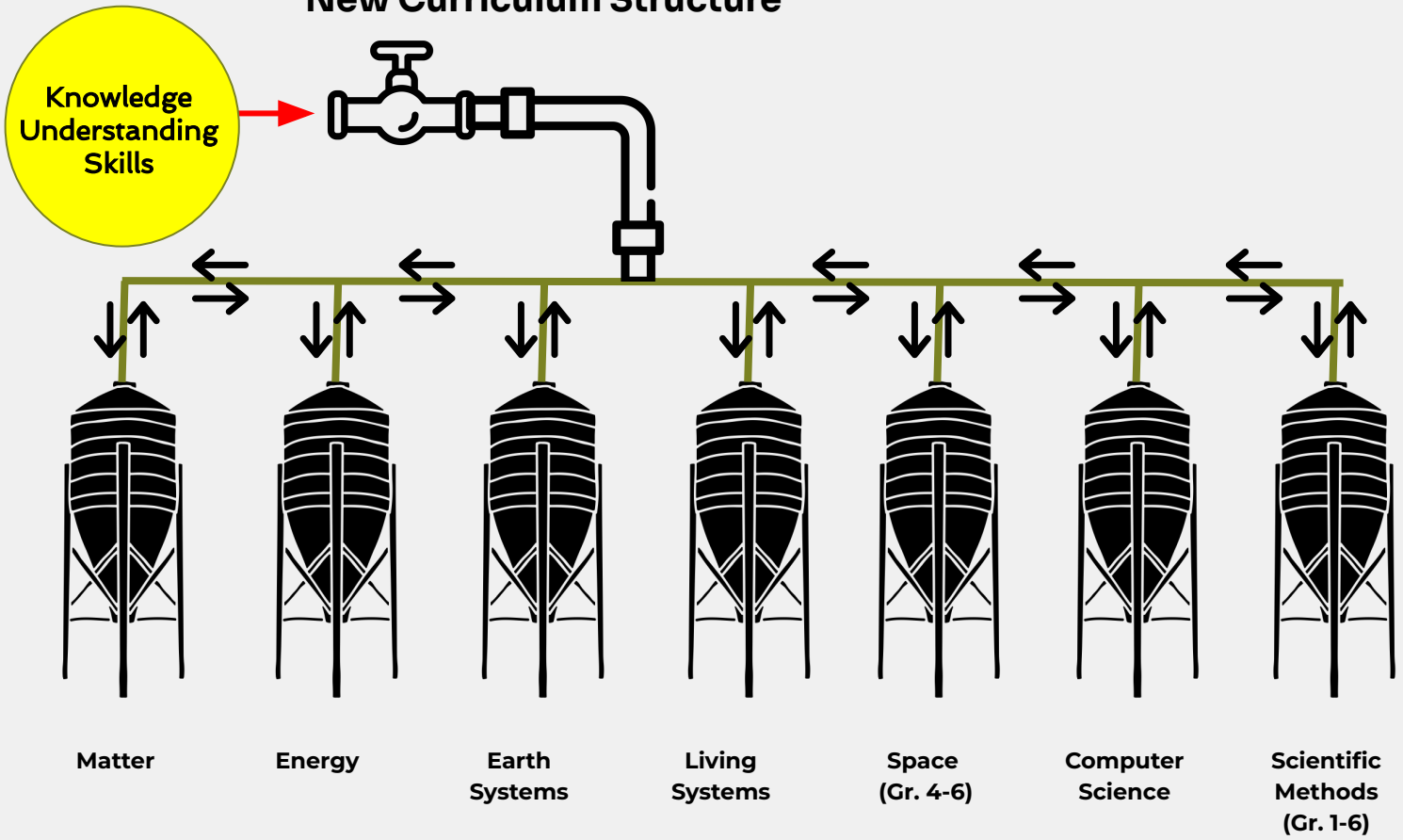




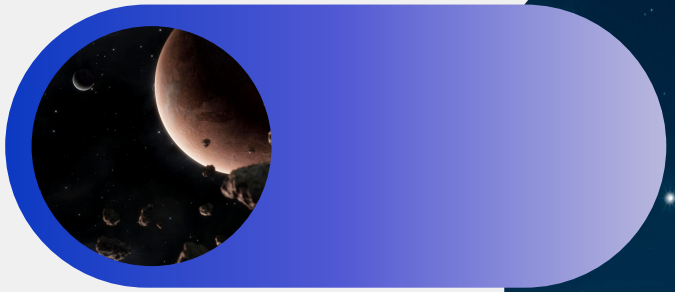
GR. 1	Seasonal Changes	Needs of Animals and Plants	Creating Colour	Building Things	Senses
GR. 2	Small Crawling and Flying Animals	Buoyancy and Boats	Magnetism	Exploring Liquids	Hot and Cold Temperature
GR. 3	Building with a Variety of Materials	Testing Materials and Designs	Rocks and Minerals	Hearing and Sound	Animal Life Cycles
GR. 4	Building Devices and Vehicles	Light and Shadows	Plant Growth and Changes	Waste and Our World	Wheels and Levers
GR. 5	Electricity and Magnetism	Mechanisms using Electricity	Classroom Chemistry	Weather Watch	Wetlands Ecosystems
GR. 6	Air and Aerodynamics	Flight	Sky Science	Evidence and Investigation	Trees and Forests

New Curriculum Structure



New Curriculum Structure





Learner Outcome:
Students investigate and interpret astronomical phenomena.

Guiding Question

How are astronomical phenomena observed and interpreted?

What Do Students Need to Know?

KNOWLEDGE

Concept Knowledge

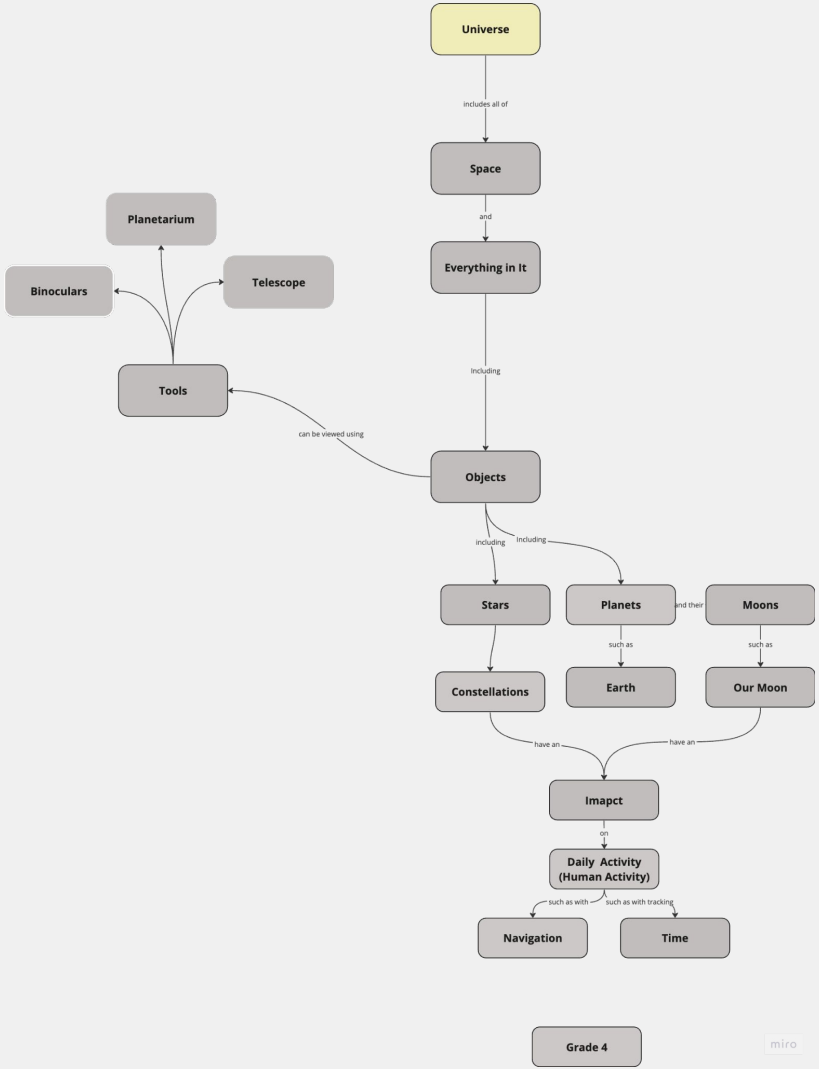
Students need to know certain concepts and their attributes related to space such as star and constellation. Some concepts are related to skills such as a prediction.

Facts

Facts are objective, verifiable pieces of information about the world such as “Earth revolves around the sun.”

Skill/Procedure Knowledge

Students need to know how to do certain skills and procedures such as the steps in an investigation, how to sort, or how to compare.

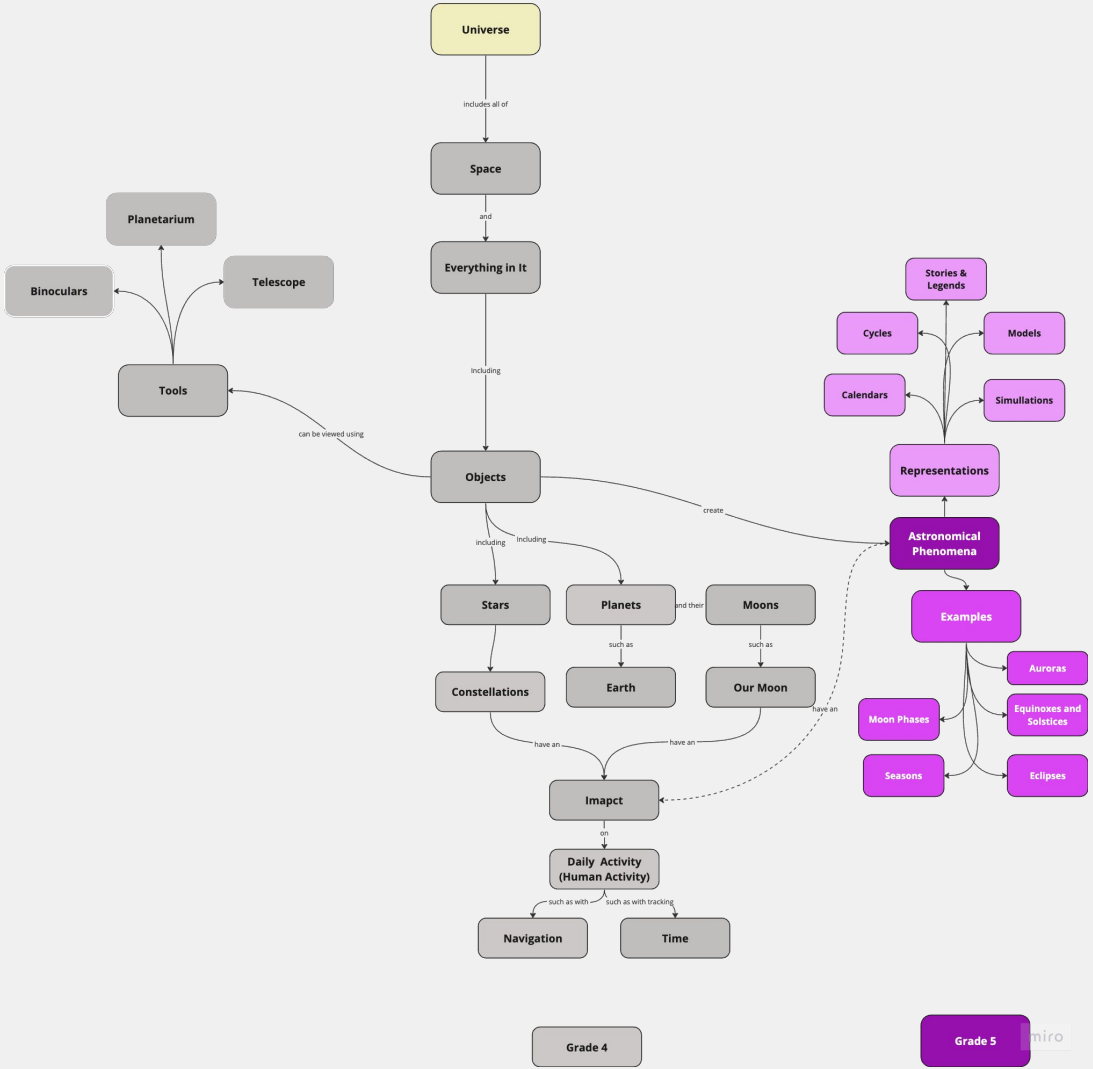


KNOWLEDGE

Grade 4 Science:Space Concept Map

"Grasping the structure of a subject is understanding it in a way that permits many other things to be related to it meaningfully. To learn the structure in short, is to learn how things are related."

-Jerome Bruner



KNOWLEDGE

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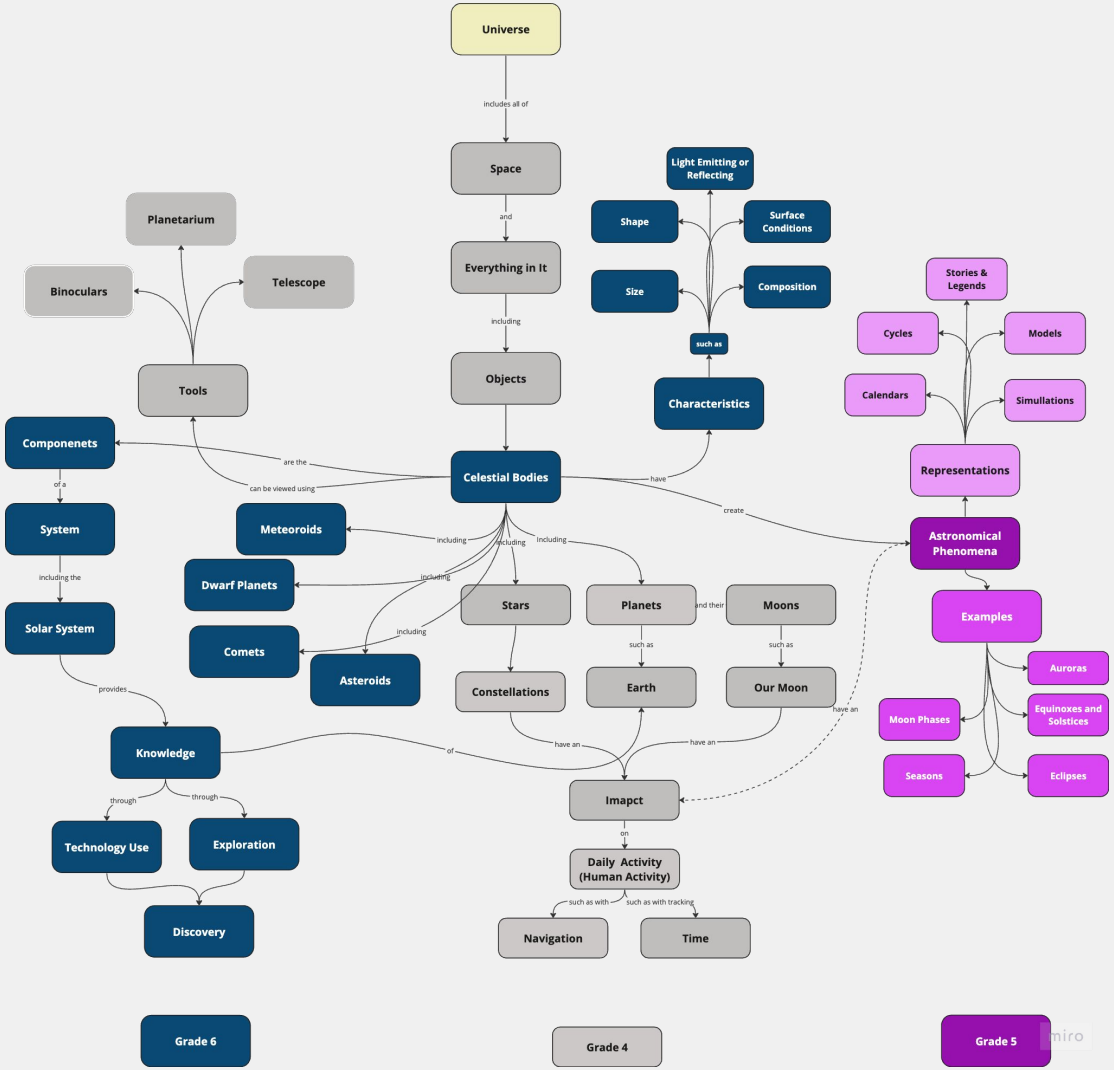
KNOWLEDGE

Grade 6 Science: Space Concept Map



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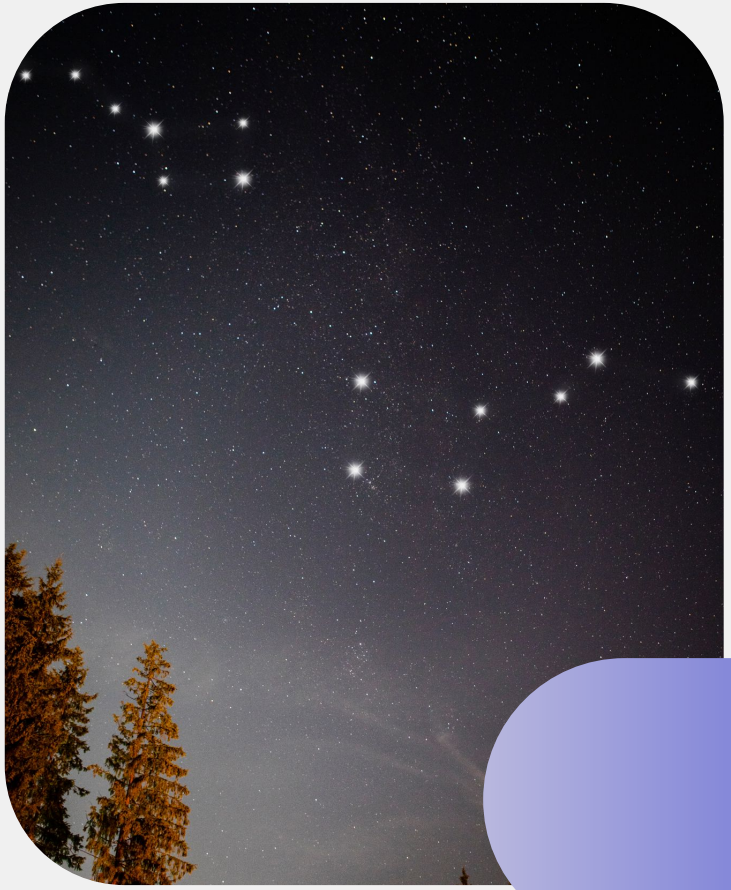
-Jerome Bruner

Skills & Procedures

What students do to demonstrate their learning.

Grade 5 Skills and Procedure Verbs	
Skill/Procedure	Frequency
Discuss	13
Compare	7
Relate	7
Investigate/Experiment	9
Examine	6
Identify	6
Describe	4
Represent	4
Explain	3
Apply	2
Classify	2
Design	2
Interpret	2
Test	2
Construct Graphs and Tables	1
Demonstrate	1
Divergent Thinking	1
Evaluate	1
Hypothesize	1
Order	1
Predict	1
Research	1
Use tools	1

Grade 4-6 Skills and Procedure Verbs			
Skill/Procedure	Frequency	Skill/Procedure	Frequency
Discuss	30	Observe	3
Relate	22	Safety	3
Compare	20	Analyze	2
Investigation/Experiment	17	Collect Data	2
Examine	13	Record Observations	2
Explain	12	Measure	2
Identify	12	Test	2
Describe	11	Conclude	1
Represent	9	Decide	1
Create	6	Magnetize	1
Demonstrate	5	Test	1
Interpret	5	Construct Weather map	1
Design	5	Defend	1
Collaborate	4	Translate	1
Evaluate	4	Divergent Thinking	1
Explore	4	Hypothesize	1
Apply	3	Order	1
Classify	3	Predict	1
Plan	3	Research	1
Observe	3	Use tools	1



Skills from Scientific Methods

Investigation Progression

The steps of an investigation are introduced in **Grade 2 Scientific Methods.**

Grades 3, 4, 5 and 6 build on those steps.

Investigations 1-6 Progression

The information presented here is not intended to be a detailed summary of the Scientific Methods Organizing Idea. The intent is to highlight how the **steps of an investigation** grow in **complexity** and **depth** from Grade 1 to Grade 6

Grade 1

Steps followed during an investigation include:

1) Asking **Questions**
2) Making **Predictions**
3) Gathering **Data**
4) Forming **Conclusions**

Grade 2

Procedures scientists use to guide investigations include:

1) Asking **Questions**
2) Making **Predictions**
3) **Planning** the Investigation
4) **Observing** and **Recording Data**
5) **Analyzing** Data
6) Reaching **Conclusions**
7) **Discussing** Observations and Conclusions

Grade 3

Data

- Accuracy
- Objectivity
- Sources (Accurate & Trustworthy)

Analyzing

- Techniques

Grade 4

Data

- Descriptive (qualitative)
- Numbers (quantitative)
- Relevance

Evidence

- Data that supports the conclusion becomes evidence
- Reliability
- Validity

Système international d'unités

- international system of units

Grade 5

Phenomena

- facts or events that can be observed

Bias

Variables

- Manipulated (independent)
- Responding (dependent)
- Controlled

Experiment

- Controlled Experiment

Evidence

Communication

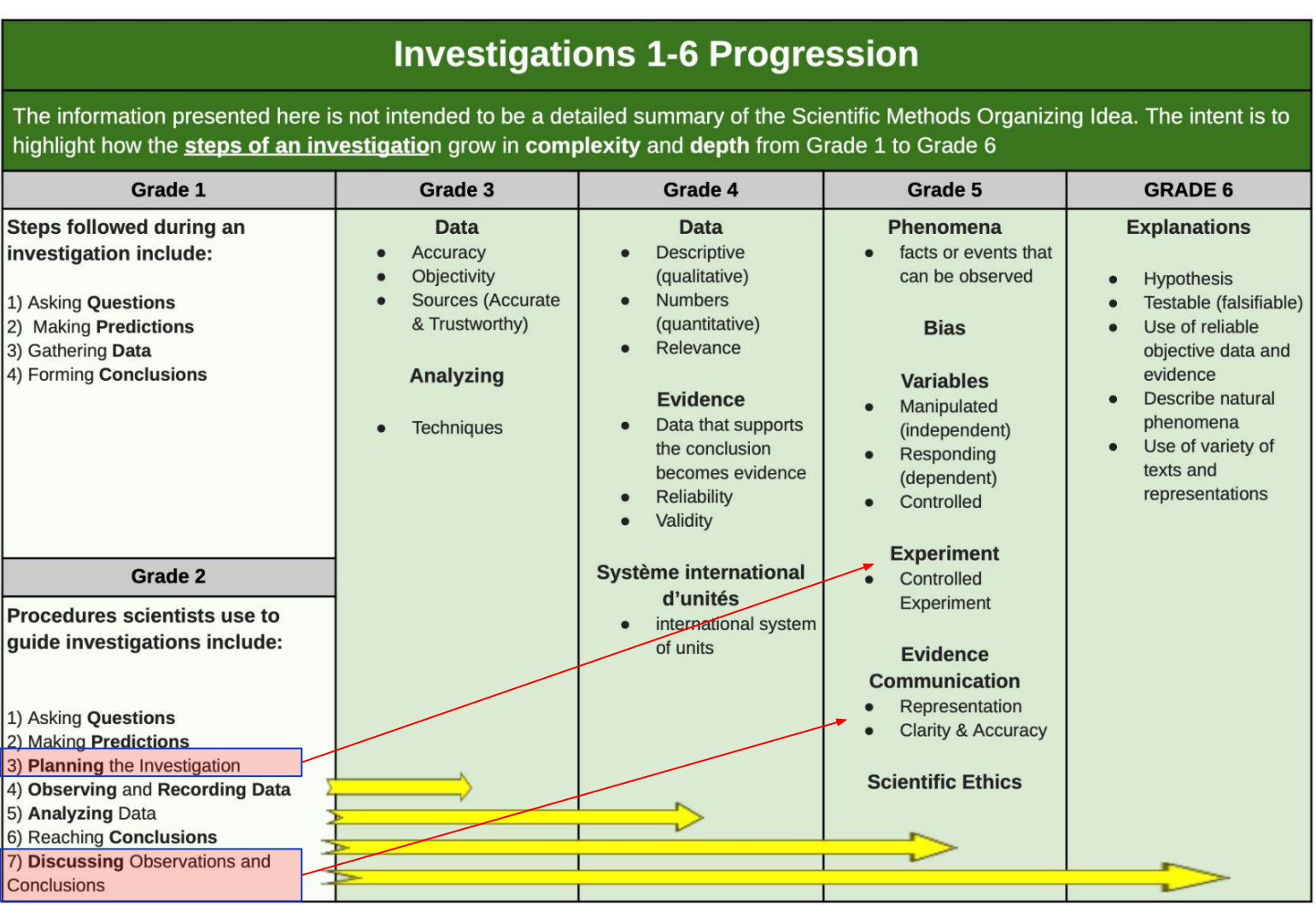
- Representation
- Clarity & Accuracy

Scientific Ethics

GRADE 6

Explanations

- Hypothesis
- Testable (falsifiable)
- Use of reliable objective data and evidence
- Describe natural phenomena
- Use of variety of texts and representations



Skills from Computer Science

Grade	Skills
K-1	Following/ Creating Instructions
2	Creativity - Originality
3	Creativity - Divergent Thinking & Computational Thinking
4	Design Thinking

Computational Thinking (Gr. 3)

Sub-Skill
Break a task into smaller chunks. **(Decomposition)**
Identify the important details when reading or solving a problem. **(Abstraction)**
Find patterns and similarities in tasks. **(Pattern Recognition)**
Design instructions. **(Algorithmic Thinking)**
Working backward if a mistake is made. **(Debugging)**

Science Grade 3 Computer Science - Curriculum Planning & Assessment Resource.pdf

Application:

Create a set of instructions that could be followed by a human or a machine to complete a task.

Examples:

- Planning an Investigation.
- Planning the construction of something related to the organizing idea.

Design Thinking (Gr. 4)

A Problem-Solving Approach

Sub-Skill
Understand the Problem
Form Ideas *(Divergent Thinking)*
Plan
Create
Analyze
Test
Troubleshoot

Science Grade 4 Computer Science - Curriculum Planning & Assessment Resource.pdf

Design involves processes that can transform ideas into artifacts that meet needs by creating artifacts.

Application Example

Design can produce many artifacts, including

- algorithms (instructions)
- models
- prototypes
- blueprints
- programs
- experiments/investigations
- objects

Design Thinking ... continued (Gr. 5)

A Problem-Solving Approach

Sub-Skill
Understand the Problem
Form Ideas *(Divergent Thinking)*
Plan
Create
Analyze
Test
Troubleshoot

Science Grade 5 Computer Science - Curriculum Planning & Assessment Resource.pdf

Students apply design processes when creating **artifacts** that can be used by a human or machine to address a need.

Students are introduced to the concept “computational artifact” which as anything created by a human using a computer.

Using Verbs to deepen learning and demonstrate understanding.

Existing Skills and Procedure

5S1.1: Identify astronomical phenomena that occur cyclically.

Alternative Tasks

Investigate an astronomical phenomena that occur cyclically.

Design a representation of astronomical phenomena that occur cyclically.

Grade 4-6 Skills and Procedure Verbs			
Skill/Procedure	Frequency	Skill/Procedure	Frequency
Discuss	30	Observe	3
Relate	22	Safety	3
Compare	20	Analyze	2
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Explore	4	Hypothesize	1
Apply	3	Order	1
Classify	3	Predict	1
Plan	3	Research	1
Observe	3	Use tools	1

Understandings

Understanding is “how facts and knowledge fit together in a logical and meaningful order.”

Interpretation

Observation

Daily Living

Astronomical Phenomena

What is a logical and meaningful way these concepts can be related?

Understandings

5S1.1: Observations and interpretations of astronomical phenomena can inform daily living.


PLANNING
Begin with the end in mind.

Summative Assessment

Sample Assessment:

Compare the Indigenous **interpretation** of the aurora to the western science **interpretation** of the aurora. **Explain** whether comparison supports the understanding that **observations** and **interpretations** of **astronomical phenomena** can inform **daily living**.

Possible Sources Of Information:

- Auroras: Indigenous Interpretation
- Auroras: Cree Interpretation
- Auroras: Western Science Interpretation

Hattie, Fisher & Frey: *Visible Learning for Literacy* (2016)

Phases of Learning

Surface

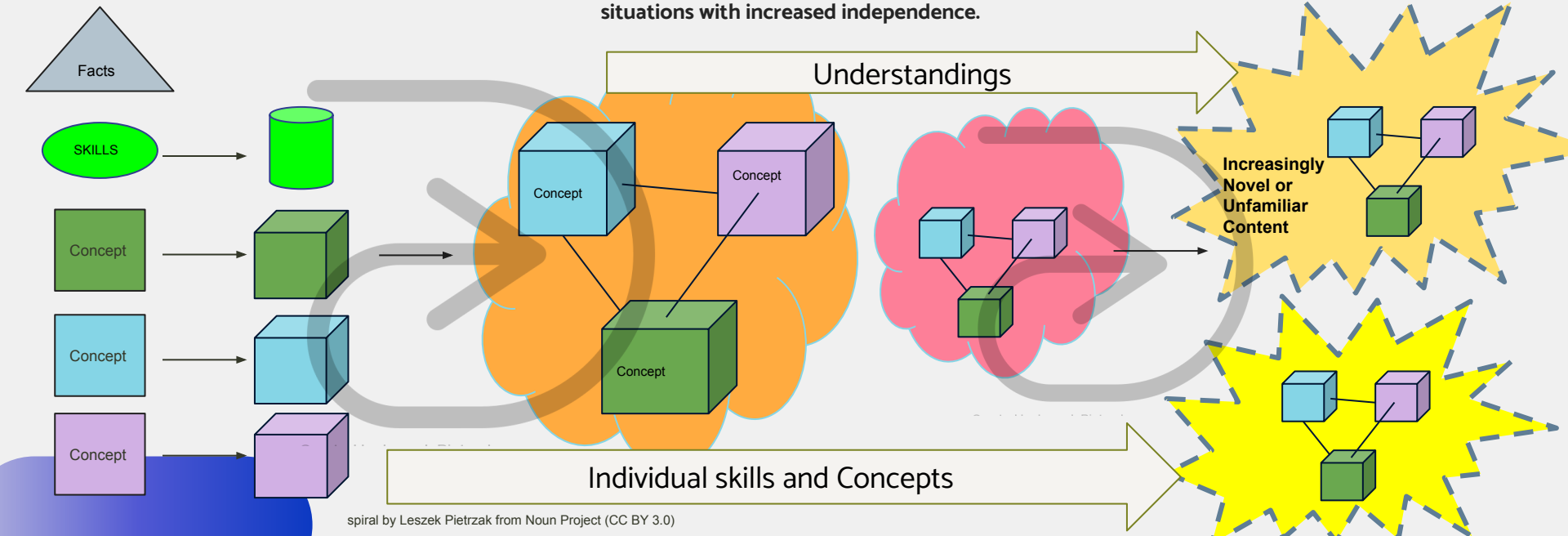
Students are first exposed to individual skills, concepts and their related knowledge.

Deep

Students make connections between concepts to create deeper understanding and appropriately skills/ procedures to new situations with increased independence.

Transfer

Students apply concepts, understandings and skills to a variety of novel and unfamiliar contexts.



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Surface Level

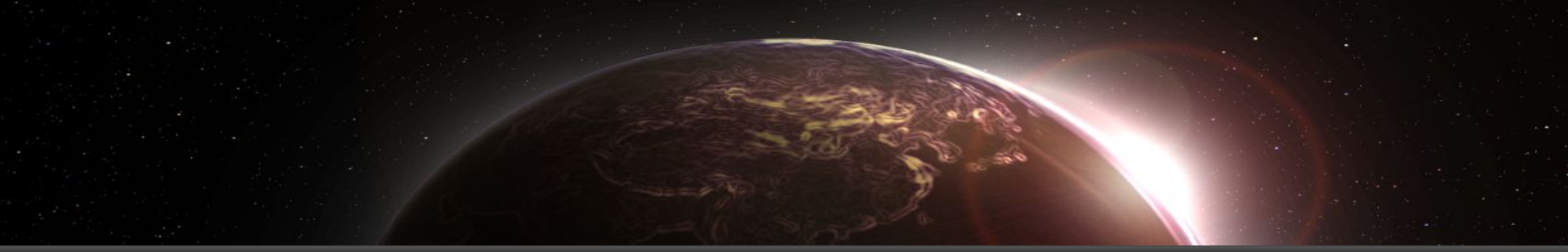
Students are first exposed to individual skills, concepts and their related knowledge.

Learner Outcome:
Students investigate and describe objects in space in connection to daily life.

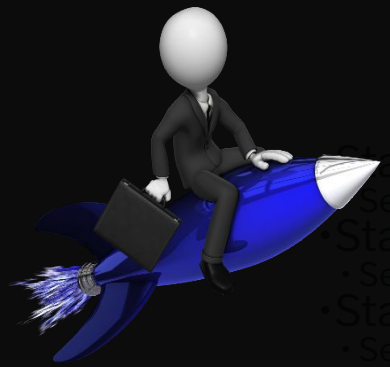
Grade 4 Background

Guiding Question

How do objects in space impact daily life?



Why do humans study and explore space?



Have students work with a partner and make a list.

What are the advantages and disadvantages of this exploration?

Advantages	Disadvantages
helps to address questions about our place in the Universe	danger/risk
history of our solar system	higher exposure to radiation
collaboration with other countries	cost
expands technology and create new industries	gravity, closed environment

What do we mean when we say “The Universe”?

The Universe is everything! It includes planets, stars, the smallest particles to the largest galaxy.

Photo: NASA Adapted from *The Universe*

What are some of the space objects we see in the sky?

- moon
- sun (is a star)
- stars
- planets (appear as stars without assistance to see them.

Create an infographic describing each.

Infographic

- What is an Infographic?
- Infographic Examples
- 5 Key Elements of a Successful Infographic

Surface Level Practice Ideas:

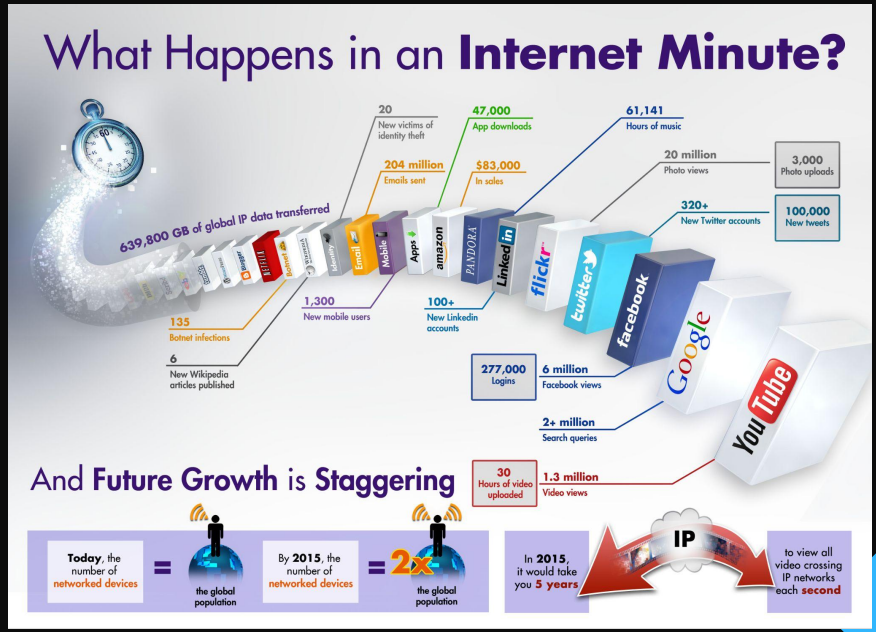
~ Best Sandwich Ever
~ Recess Do's and Don'ts
~ How to Watch a Hockey Game
~ etc.

Create an infographic describing objects in space.

How can DESIGN THINKING be used here?

- Understand the problem.
- Form ideas (ideating). (Divergent Thinking)
- Plan
- Create
- Analyze
- Test
- Troubleshoot

Infographic Example



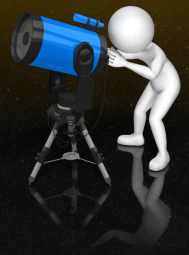
What technologies do we have to view objects in space?

- moon
- sun (is a star)
- stars
- planets (appear as stars without assistance to see them.

Can we see stars with our eyes just by looking up? (discuss when is the best time to see Stars (night); are there any safety concerns to be discussed (can't look at the sun directly sometimes a double layer of sunglasses allows you to see a solar eclipse)
What is light pollution?
What other technologies assist us in seeing objects in space?

Stargazing tips

Dreamstime.com ID#29143802



Dreamstime.com ID#6097954 Jeff Whyte

What are binoculars? How do they help us see stars?

How does a telescope work?

Compare the observations you would get from a telescope pictured above with the one at the Hesje Observatory at Miquelon Lake Provincial Park. (Dark Sky Reserve)

Telus World of Science

Research this centre or one closer to you and determine where and how you can view space objects.

4S1.2

Stars and constellations are recognizable from Earth and can be used for navigation and tracking the passage of time.

Resource- look to the bottom of each linked page for individual resources.

Astronomy: Student Resource

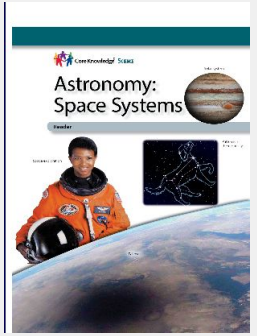
Chapter 6: Constellations

Astronomy :Teacher's Guide

Lessons 8, 11 & 12.
AP (Activity Pages located at the end of the Teacher's Guide.

Astronomy : Space Systems

Online resource links



Sun, Moon and Stars: Student resources

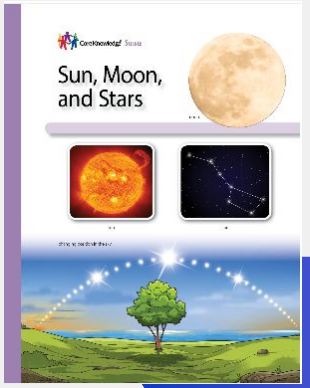
Chapters 5 & 6: How Does the Starry Sky Change? & Astronomers

Sun, Moon and Stars: Teacher's guide

Lesson 4

Sun, Moon and Stars

Online resource links



Other Sample Activities (Surface)

*While planning surface activities, keep in mind that many skills have related **concepts.***

Broad Concepts & Skills

- System (Under Revision)
- Relationship
  - Concept Map
  - Cause and Effect
  - Dependence
  - Affect/Effect
  - Interaction
  - Interconnection
- Change
  - What is Change?
  - What is Significant Change?
  - Change & Time
  - Physical Change
- Representation
- Human Activity
- Impact (Under Construction)
- Compare and Contrast
  - Criteria
  - Similarity and Difference
- Investigation Steps
  - Asking Questions (Notice and Wonder)
  - Observing (Using senses)
  - Analyzing
  - Prediction and Predicting
  - Conclusion
  - Sample Introduction to Research as an Investigation (Gr. 3)
    - One Point Research Rubric (Gr. 4-6)
    - Research Information Gathering
- Div 2 Discussing Checklist
- Evaluating (Under Construction)

STEAM Challenge - Getting Telescopes to Space!

STEAM CHALLENGE

Define the Problem

Scientists have developed a new infrared telescope. The images will provide more data about stars and the Milky Way. Now, they must use a spacecraft to send it into space. Your task is to design and build a shield for the spacecraft. It must block radiation from the sun and other objects in space.

Constraints: You may only use types of paper to build the shield.

Criteria: You will test your design by placing the shield on top of a flashlight. The materials must prevent the light from traveling through.

1 Research and Brainstorm

How do infrared telescopes work? Why are infrared telescopes used mostly in space? What types of materials absorb light?

2 Design and Build

Sketch your design. What purpose will each part serve? Which types of paper will work best? Build the model.

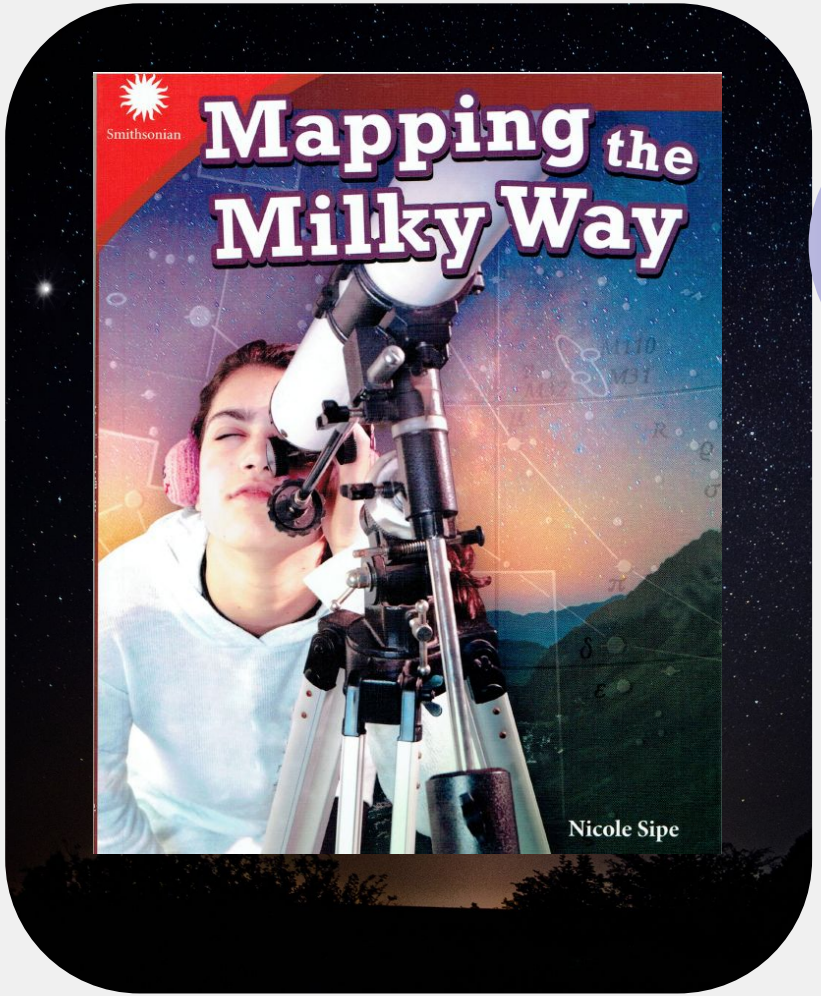
3 Test and Improve

Test your design by shining a light on the model. Did the materials work to shield the light? How can you improve it? Modify your design, and try again.

4 Reflect and Share

Could it work with less paper? Does the model also shield heat? How could you test this? How do you think scientists test space instruments on Earth?

Mapping the Milky Way by Nicole Sype. Teacher Created materias Inc., 2019. Pg. 28-29



When it comes to mapping the Milky Way, scientists know one thing for sure. They know that there is still a lot that they do not know! Discover how they study the Milky Way, and learn about the galaxy that we call home. Created in collaboration with the Smithsonian Institution, this Smithsonian Informational Text builds students' reading skills while engaging their curiosity about STEAM topics through real-world examples. It features a hands-on STEAM challenge that guides students through every step of the engineering design process and is perfect for makerspace activities. It makes STEAM career connections by providing a glimpse into the lives of real-life Smithsonian employees currently working in STEAM fields. Discover engineering innovations that solve real-world problems with this book that touches on all aspects of STEAM: Science, Technology, Engineering, the Arts, and Math!

EPIC

Compare Binoculars and Telescopes

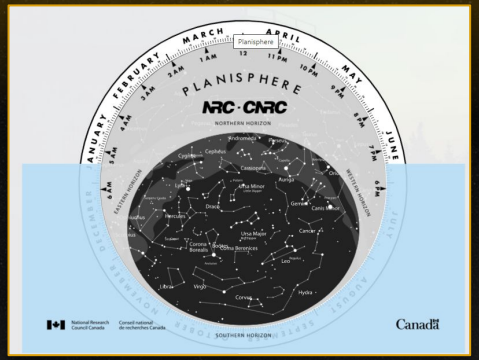
- What You Can See In A Telescope
  - https://www.youtube.com/watch?v=-gF0kp2EK20
  - https://www.youtube.com/shorts/pNhJwQzaHPM
- Telescope Expectation and Reality #1: https://www.youtube.com/watch?v=Z6NIBBldy8U
- Telescope Expectation and Reality #2 : https://www.youtube.com/watch?v=jI7IPPmu76U
- Binoculars: https://www.youtube.com/watch?v=b61hchvp8es (begin at 3:25)

Hubble Telescope

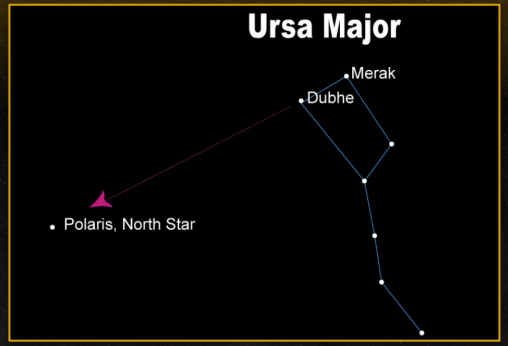
- Hubble: Tour: https://www.youtube.com/watch?v=XZ_WeTGCU90
- Visible Light vs. ultraviolet light: https://www.nasa.gov/content/explore-light
- Hubble https://www.nasa.gov/content/discoveries-hubbles-deep-fields
- Example of Hubble observation: https://www.youtube.com/watch?v=yfWYXY85mBk

How can stars and constellations be used for navigation and the passage of time?

Shutterstock: ID 1451142569



Canada Under the Stars © ASTROLab du parc national du Mont-Mégantic 2023



EarthSky.org

Record and compare observations of objects in space during the day and night.

Safety caution!

How do the objects in space change position over time?

Planisphere

Why is polaris an important star?

Do you know the name of any stars or constellations?
Who created the constellations? Why are they important?

Use if students did not engage in the research earlier.

Polaris is part of the Big Dipper. Why is it an important star to know how to find?
Orion also has an important star to help find locations. Explain?
Find one of the 88 constellations located along the belt used by scientists and research it. How did it gets its name, where and when would we see it?

Star Finder - Find Constellations based on date and time

First Nations & Other Cultures

Makinak: The Turtle by Wilfred Buck

Star Stories: The Never-ending Bear Hunt Smithsonian

Star Stories: Quillwork Girl and Her New Seven Brothers (Cheyenne Story)

Star Stories: The Girl and Her Seven Brothers (Native American)

Star Stories: The Star That Does Not Move (Paiute)

What is Inuit Mythology? |

Night Sky Network

Real Time Night Sky Planner

Sky and Telescope

Interactive Sky Chart - enter your postal code

Virtual Planetarium provide a 27 minute overview of many of the key concepts contained in Grade 4. Could be used as an opening video to Grade 5 with no previous Space study.

Understanding Astronomical Phenomena

Space Grade 5

Anchoring Concepts

PHENOMENON & ASTRONOMICAL PHENOMENON

Guiding Question: How are astronomical phenomena observed and interpreted?

Learning Outcome Students investigate and interpret astronomical phenomena.

OBSERVATION

Click on the box for a sample surface-level activity.

HUMAN ACTIVITY

DAILY LIVING
(Daily Human Activity)

REPRESENTATION

INTERPRETATION

Key Skills

Learning Outcome Students **investigate** and **interpret** astronomical phenomena.

COMPARING

Criteria

INTERPRET

RELATING

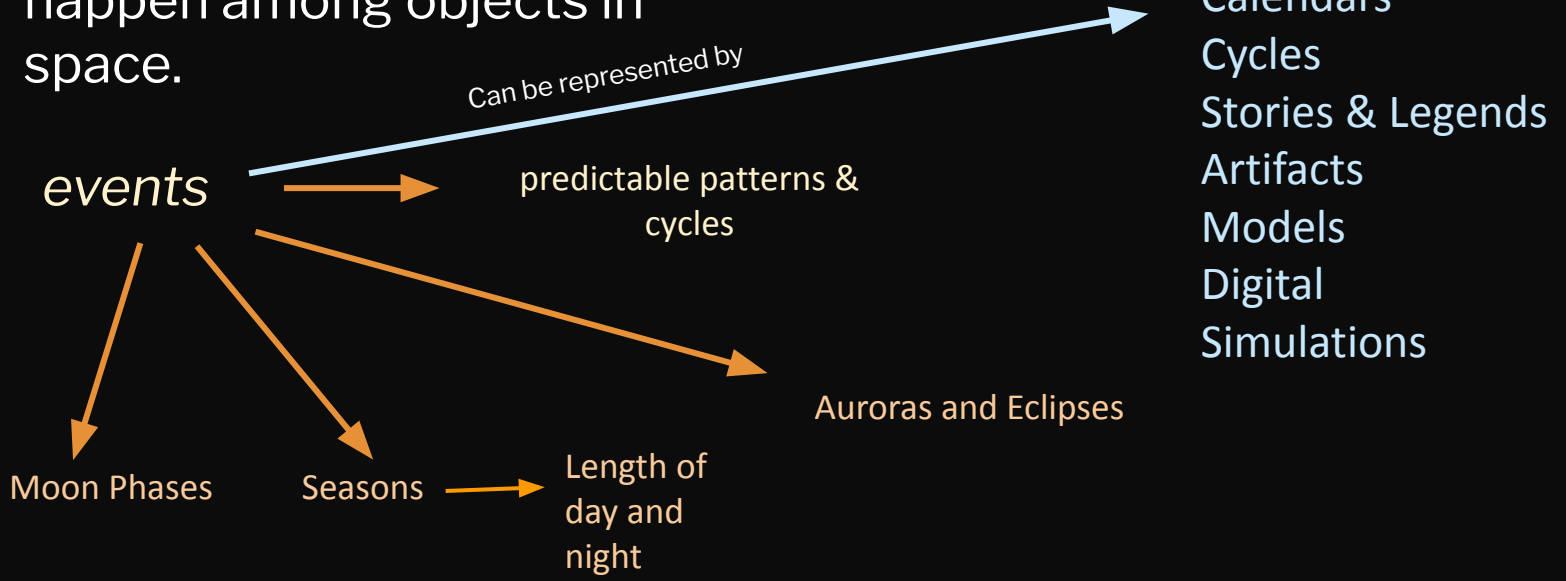
Relationship

Concept Mapping

Click on the box for a sample surface-level activity.

Astro Who? What are Astronomical Phenomena?

Astronomical Phenomena are observable *events* that happen among objects in space.



What are Your Interpretations?

How does the earth's rotation and revolution contribute to day and night?

What is the relationship between the earth's tilt and our seasons?

Design and Build!

How Can You Model Day and Night or the Seasons?

Problem: Design and build a device to model either day and night or the seasons.

Be an engineer:
generate possible solutions and choose one, identify tools and materials, construct, test, evaluate solution, make changes, collaborate

You will need:
- materials of your choice
- recording device (optional)

What to Do

1. Brainstorm a list of ways to model your choice. Then choose the best idea.
2. Make a list of tools and materials you will need.
3. Decide how you will test your device. How will you know if it works well? What criteria does it need to meet?
4. Carry out your plan. Test your device by demonstrating it to your classmates.
5. Use your observations and your classmates' feedback to improve your device. Build a final version of your device.

Record

Present your model to the class and explain it. Or, make a video of your model in action. Or, draw labelled sketches showing how your model works.

Explain and Conclude

What changes could you make to improve your model? How well did your device model Earth's motions? How might your model help a younger student understand day and night or the seasons?

Think of Another Question

What else could you model about Earth and the Sun?

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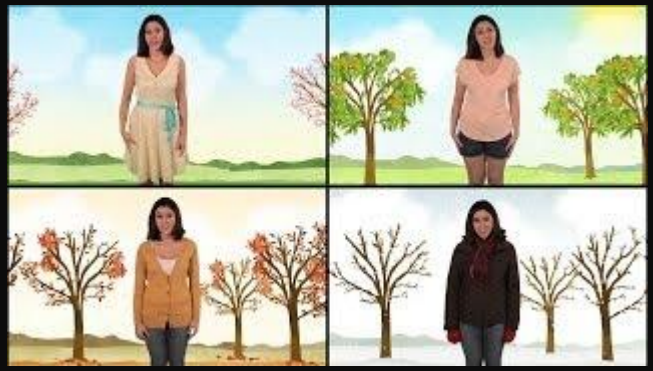
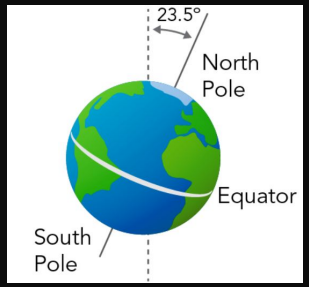
15

Chapman, A., Hayhoe, C., & Power, A. *Science 6 - Unit 1 Space*. Science Resource from Newfoundland and Labrador. Nelson Education Ltd. 2018.p 14-15

How do the seasons vary between the two hemispheres?



Why do we have Seasons? Spring, Summer, Fall, Winter - Science for Kids



Source: *Let's Talk Science* using an image by **shoo_arts via iStockphoto**.

Why do we have Seasons? - Lessons & Google Classroom links (PBS in conjunction with NASA Learning Series)

What is the relationship between the earth's tilt and experiencing changes in the length of a day? How does this relate to the seasons? Model your thinking.

(Flashlight and a basketball)

or

Why do the northern hemisphere and southern hemisphere experience opposite seasons at different times of the year? Explain or model your thinking.

or

Relate the terms equinox and solstice to the seasons.

Deep Strategies: Concept Maps

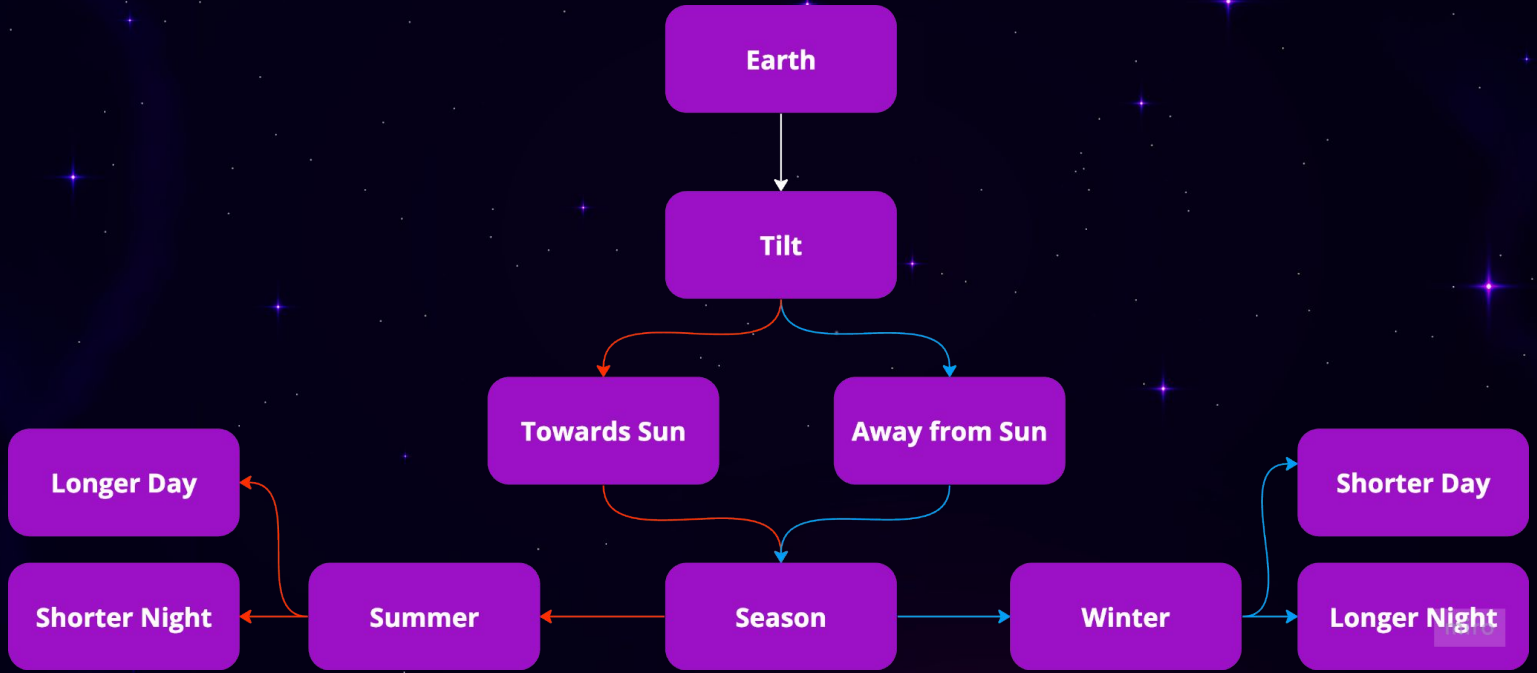
5S1.1: **Connect** the direction of **Earth's tilt** in relation to the **Sun** to the **length of day** and **night** in each **season.**

Example: *Show the connection between the direction of Earth's tilt in relation to the Sun to the length of day and night in each season by arranging the following ideas into a meaningful concept map.*

Shorter Day	Towards Sun	Winter	
Summer	Season	Longer Night	Shorter Night
Earth	Away from Sun	Longer Day	Tilt

Skills and Procedures: Connect

5S1.1: **Connect** the direction of Earth's tilt in relation to the Sun to the length of day and night in each season.



Let’s Explore the Moon and Its Phases

Photo by Rotheny Astrophysical Observatory, University of Calgary. *The Moon and Indigenous Skylore* .

The Moon's Phases

Phases of the Moon: Astronomy and Space for Kids - FreeSchool

What causes the phases of the moon?

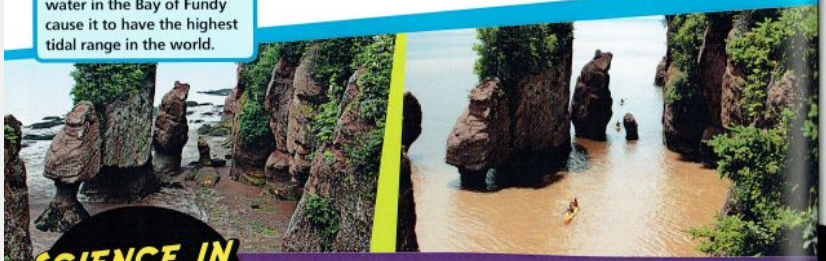
Makinak: The Turtle by Wilfred Buck

Lunar Cycle, Why The Moon Change Shapes, 8 Phases Of The Moon, Learning Videos For Children This video also has an interactive component to challenge students learning.

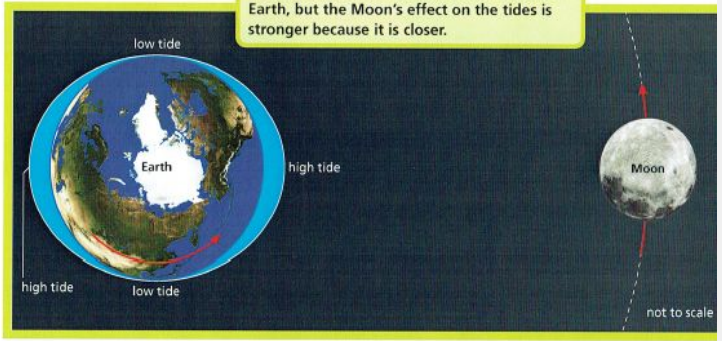
WHAT CAUSES TIDES?

If you live near a coastline, you know that the level of the ocean changes approximately every six hours. These regular changes in the level of the ocean are called **tides**. What do you think a high tide is? What is a low tide? What else do you know about tides?

The shape and movement of water in the Bay of Fundy cause it to have the highest tidal range in the world.



The gravitational pull of the Moon on Earth and Earth's oceans causes high and low tides. As Earth rotates, and as the Moon orbits Earth, the tides change. The Sun also pulls at Earth, but the Moon's effect on the tides is stronger because it is closer.



SCIENCE IN ACTION!

What Causes the Patterns of the Tides?

Be a scientist: conduct research, compile and display data, analyze data, draw conclusions

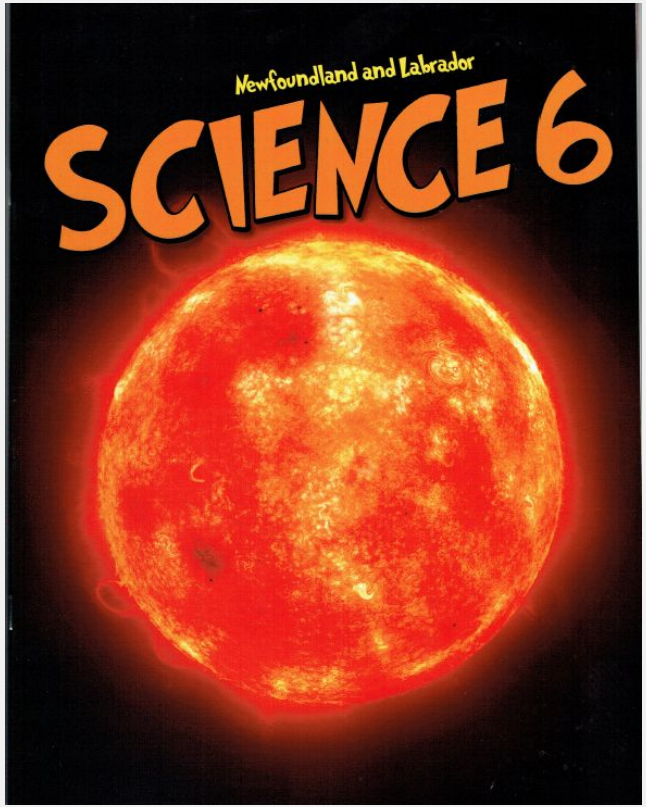
You will need: tide graph; Moon calendar; pencil; Internet access; computer (optional)

1. Examine the tide graph. What information does it tell you? Who might find this information important?
2. What patterns do you see in the tide graph?
3. Examine the Moon calendar. On what date is the full Moon? The two half Moons? The new Moon?
4. Sketch the phases of the Moon on your tide graph. Be sure to match the correct dates.
5. What patterns do you see? Infer a possible cause for the tides.

WHAT DO YOU THINK? 4C

1. Use words and sketches to explain what causes tides.
2. Interview a fisher to find out how tides affect his or her job. When is the best time to launch a boat? When is the best time to fish?
3. When do you think a higher tide would occur: when the Sun and Moon are lined up, as in the diagram or when the Sun and Moon are not lined up? Why?

Chapman, A., Hayhoe, C., & Power, A. *Science 6 - Unit 1 Space.* Science Resource from Newfoundland and Labrador. Nelson Education Ltd. 2018.p 22-23



Chapman, A., Hayhoe, C., & Power, A. *Science 6 - Unit 1 Space.* Science Resource from Newfoundland and Labrador. Nelson Education Ltd. 2018

Lunar Calendar

How the Moon Makes Calendars

What's the difference between lunar and solar years?

Gregorian Calendar

Turtle Island

You may wish to revisit the video of *Makinak: The Turtle by Wilfred Buck*

The full story of each Moon from a Cree Culture perspective can be found here.

Transfer:
What is the relationship between the lunar calendar and Makinak?

How do people use both the Solar and Lunar calendars at the same time? Explain.

“Traditional First Nations and Inuit ceremonial gatherings are tied to a seasonal time frame rather than specific dates. In the Pacific Northwest, First Nations held various ceremonies to celebrate the gift of salmon when the first fish of the year was caught. Similarly, eastern First Nations had regular ceremonies to show gratitude for the plants that fed them, with celebrations for green corn, strawberries, and the maple tree, for example.” (Walking Together. *First Nations, Metis and Inuit Perspectives in Curriculum: Symbolism and Traditions.* Government of Alberta. p.2 of 4*)*

Auroras

What are the [Northern Lights]

(Credits: Canadian Space Agency, NASA, Neil Zeller)

First Nations & Other Cultures

Makinak: The Turtle by Wilfred Buck

Star Stories: The Never-ending Bear Hunt Smithsonian

Star Stories: Quillwork Girl and Her New Seven Brothers (Cheyenne Story)

Star Stories: The Girl and Her Seven Brothers (Native American)

Star Stories: The Star That Does Not Move (Paiute)

What is Inuit Mythology? |

Many cultures connect observations of objects in space to time, place, and daily life in various ways.

What legends related to astronomical phenomena have you heard?
Research a legend or story and select a way to present your information.

STAR STORIES: The Pleiades

STAR STORIES: Orion

Star Stories: The Fox and the Stars

Additional Resources

NASA STEM Engagement

Virtual Planetarium: Sun Moon Stars
In this show, we'll observe the sun's daily path across the sky, classify bright and faint stars, note shapes of common constellations, and learn more about the universe around us!

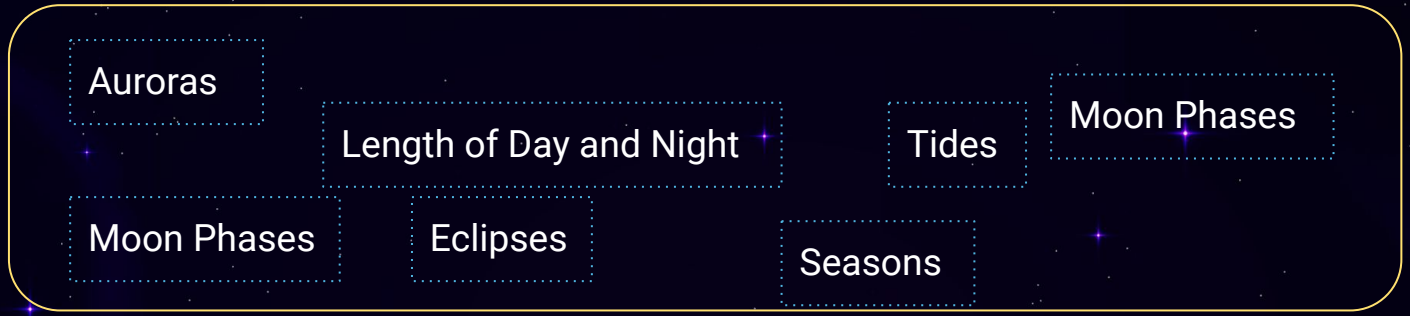
A brief history of Time Measurement.

Native Skywatchers
This site provides both Native American and Canadian resources related to Indigenous Astronomy.

Relearning the Star Stories of Indigenous Peoples
Taylor, C. Science Friday: *Relearning the Star Stories of Indigenous People's. 2019.*

TRANSFER/ ASSESSMENT

Surface/Deep Strategies: Spectrum Sort



LEAST

MOST

Impact on Daily Living

Understanding 5S1.1

Observations and **interpretations** of **astronomical phenomena** can inform **daily living**.

Change the Understanding to a Conceptual Question

What is the relationship between **observations**, **interpretation**, and **astronomical phenomena** and **daily living**?

Sample “Deep” Learning Task

Skills & Procedures 5S1.1e (Surface)
Explore First Nations, Métis, and Inuit understandings of phases and cycles within astronomical phenomena that inform ways of living and community activities.

Conceptual Question (Deep)

1) What is the relationship between **observations,** **interpretation,** and **astronomical phenomena** and **daily living**? Justify your response using
   - your life and experiences and
   - what you learned after your First Nations, Métis, and Inuit exploration.

2) Choose a way to **represent** your understanding.

Resources

UNIVERSITY OF CALGARY

ROTHNEY ASTROPHYSICAL OBSERVATORY

The Rothney Astrophysical Observatory is located under the starry skies of the traditional territories of the peoples of Treaty 7, which include the Blackfoot Confederacy (comprised of the Siksika, the Piikani, and the Kainai First Nations), the Tsuut'ina First Nation, and the Stoney Nakoda (including Chiniki, Bearspaw, and Goodstoney First Nations). The City of Calgary is also home to the Métis Nation of Alberta (Districts 5 and 6).
This site offers a wealth of information for teachers and students to use in the study of Space.

Resource- look to the bottom of each linked page for individual resources.

Astronomy: Student Resource

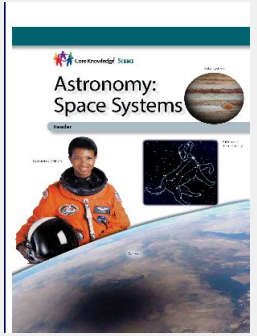
Chapter 6: Constellations

Astronomy :Teacher's Guide

Lessons 8, 11 & 12.
AP (Activity Pages located at the end of the Teacher's Guide.

Astronomy : Space Systems

Online resource links



Sun, Moon and Stars: Student resources

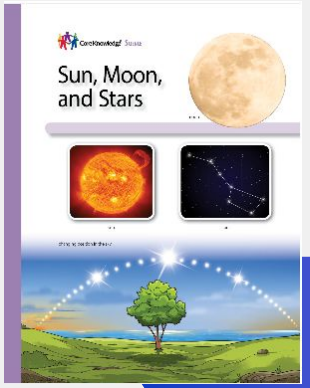
Chapters 5 & 6: How Does the Starry Sky Change? & Astronomers

Sun, Moon and Stars: Teacher's guide

Lesson 4

Sun, Moon and Stars

Online resource links



The Night Sky

Wilfred Buck
Melissa Purcell

Pearson

Contents

Stories in the sky

At night, the sky covers us like a blanket. From beneath this twinkling blanket come stories that remind us of who we are and where we came from. Our Elders have told us these stories.

Across Canada, Elders from First Nations, Métis, and Inuit communities share different stories about the sky at night. Stories differ from one community to another but they all help us to understand and learn about our **culture**.

Dans le ciel

Wilfred Buck
Melissa Purcell

Traduit et adapté par
Johanne Proulx

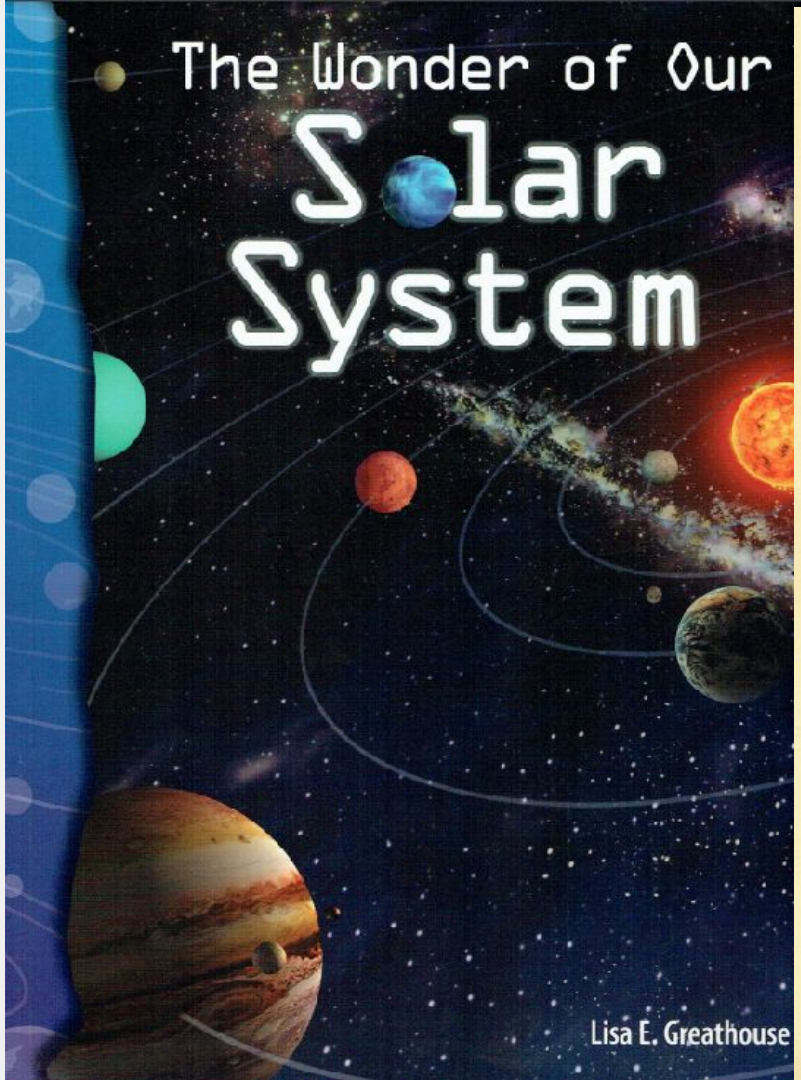
Vivre
AU CANADA

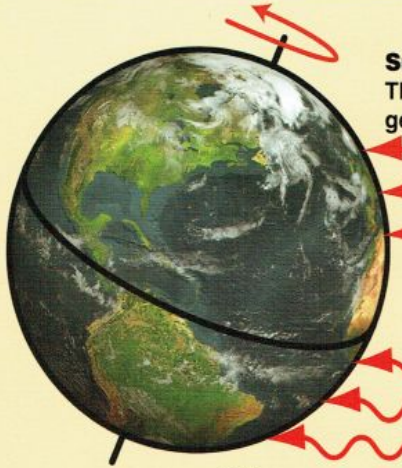
Table des matières

Les histoires dans le ciel

La nuit, le ciel nous enveloppe, comme une couverture. Les étoiles nous racontent des histoires sur nos **origines** et sur notre culture. Nos aînés ont raconté ces histoires.

Les aînés inuits, métis et des peuples des Premières Nations partagent des histoires sur les étoiles et les **constellations**. Les histoires sont différentes d'un peuple à l'autre. Chaque histoire contribue à notre culture.





Four Seasons

The way Earth is tilted causes the seasons. For part of the year, the northern half of Earth leans toward the sun and gets direct sunlight. So, it's summer there. At the same time, the southern half leans away from the sun and gets less sunlight. So, it's winter there.

The tilt doesn't change. It is the position of the planet around the sun that changes. As Earth goes around the sun, different parts get more sunlight. That makes the seasons.

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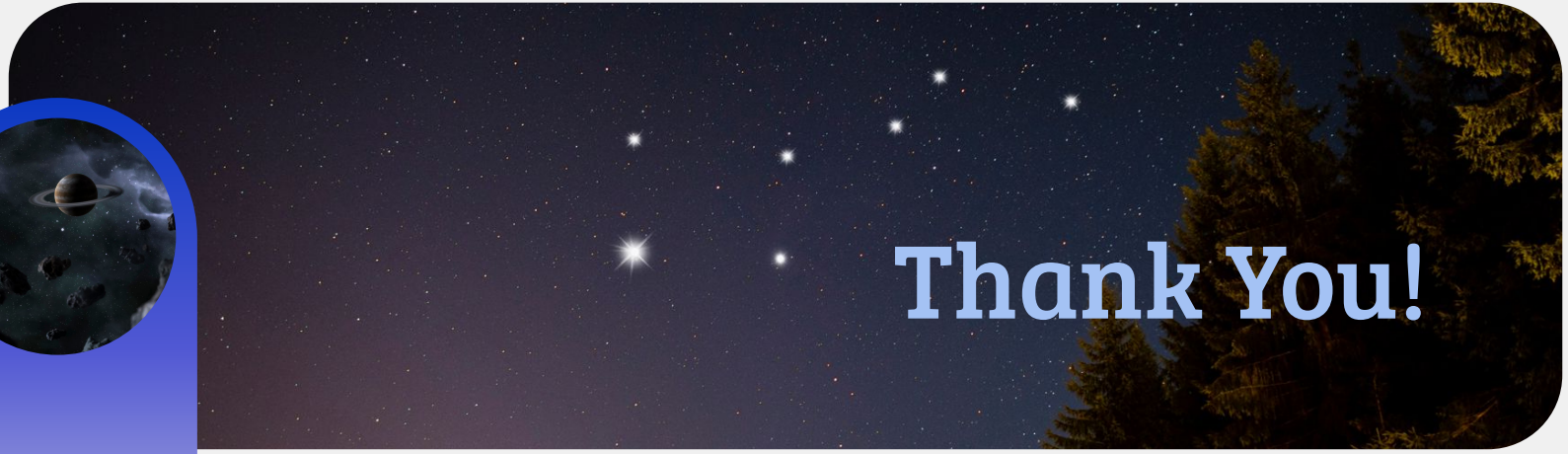
Alberta Regional Consortia



Thank You!

Assessment in Grade 5 Science (February 27 & April 9) - full days
This session will be one of two sessions in which we will look at Transfer (Summative) Assessment development to meet the new Grade 5 Science Curriculum. It would be helpful to have Piloted or Optionally Implemented the Grade 5 Science Curriculum or parts thereof. Participants will collaborate as a large group and in smaller breakout groups as we work through and review each Organizing Idea. Come and share your great thinking!

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Chris Zarski **chris.zarski@arpdc.ab.ca**