UNIT PLANNING - Terri Wilkinson, Julie Bradford, Trang Nguyen

|  | **Unit Topic / Guiding Question:** Exploring the Solar SystemHow do the different components of our solar system interact and affect Earth? |
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|  | **Rationale:** This unit will provide students with an engaging exploration of the solar system. Through experimental activities and analytical thinking, students will learn that the moon orbits Earth while other celestial objects orbit other planets. They will also develop their understanding of the relationship between the Earth and the moon as well as the impact of the Sun and the moon on our planet. It aims to spark curiosity, critical thinking, and promote a rich educational experience. |
|  | **STAGE 1: Desired Results**  |
|  | **UNDERSTAND** | **Big Ideas** | **Essential Questions** |
| [The motions of Earth and the moon cause observable patterns that affect living and non-living systems](https://curriculum.gov.bc.ca/curriculum/science/4/core). | * Understand the basic structure and components of the solar system.
* Identify and describe the characteristics of the sun, planets, and moon.
* Explain the concepts of orbits
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|  | **DO** | **Core Competencies:**  |
| **Communication** | **Thinking** | **Personal & Social** |
| X Communicating X Collaborating* Students will engage in discussions and contribute to group activities
* Students will present information and ideas
* Students will work together in groups
* Students will share and reflect
 | X Creative ThinkingX Critical & Reflective Thinking* Students brainstorm and create ideas
* Students will be encouraged to ask questions and conduct research
* Students will create models or designs
 | X Personal Awareness & ResponsibilityX Positive Personal & Cultural IdentityX Social Awareness & Responsibility* Students will work towards their own learning
* Students will plan and use time wisely
* Students will learn their values
* Students will interact in the group respectively
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|  | **Learning Standards – Curricular Competencies:**[Questioning and predicting](https://curriculum.gov.bc.ca/curriculum/science/4/core)* Demonstrate curiosity about the natural world

Processing and analyzing data and information* Identify First Peoples perspectives and knowledge as sources of information

Applying and innovating* Cooperatively design projects

Communicating* Represent and communicate ideas and findings in a variety of ways, such as diagrams and simple reports, using digital technologies as appropriate
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|  | **KNOW** | **Learning Standards - Content:*** Local changes caused by [Earth’s axis, rotation, and orbit](https://curriculum.gov.bc.ca/curriculum/science/4/core)
* T[he effects of the relative positions of the sun, moon, and Earth](https://curriculum.gov.bc.ca/curriculum/science/4/core#;) including [local First Peoples perspectives](https://curriculum.gov.bc.ca/curriculum/science/4/core#;)
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|  | **First Peoples Principles of Learning** | * *Learning ultimately supports the well-being of the self, the family, the community, the land, the spirits, and the ancestors.*
* *Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place).*
* *Learning involves recognizing the consequences of one’s actions.*
* *Learning involves generational roles and responsibilities.*
* *Learning recognizes the role of indigenous knowledge.*
* *Learning is embedded in memory, history, and story.*
* *Learning involves patience and time.*
* *Learning requires exploration of one’s identity.*
* *Learning involves recognizing that some knowledge is sacred and only shared with permission and/or in certain situations.*
 | **Comments on how you will address the FPPL:*** Teaching and learning about the solar system's planets, moons, the sun, and how they can interact and depend on each other can support students to understand the interconnectedness of the community and environment.
* Through hands-on activities and fun games using ADST, students are encouraged to make a direct connection with the universe, fostering a sense of wonder and curiosity. Also, students could develop their perception of their place in the world and their responsibilities to the environment and community.
* Teachers can share an Indigenous story about how First Nation Peoples view the planets or the sun. This manifests their cultural interpretations, highlighting the relevance and importance of memory and story as well as acknowledging Indigenous knowledge in learning.
* Students will have opportunities to do a craft project manifesting the solar system as a class project, which enhances their involvement in group work. They will create a project to reflect their understanding about the solar system and share it with their friends and families. It is a way to pass on knowledge and reflect on the roles and responsibilities that come with learning. Also, the time needed for this unit reminds both teacher and students that learning requires patience and time.
* The First Peoples Principles of Learning can be integrated into teaching the solar system to foster a deeper, more meaningful connection to the subject matter, and eventually encouraging students to see the universe through a holistic and interconnected lens.
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|  | **STAGE 2: Assessment Plan** |
|  | **Formative Assessment (Assessment as Learning and Assessment for Learning):** |
|  | * KWL chart
* Class discussion and participation
* A quiz to help students recall learned knowledge. Students will use white boards to show their answers.
* Observing students during work times
* Student teacher check ins
* Student demonstrations
* Peer feedback
* Exit tickets
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|  | **Summative Assessment (Assessment of Learning):** |
|  | * Research project
* KWL completion
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|  | **Stage 3: Learning Plan** |
| **Date/Lesson** | **Learning Intentions** | **Instructional Activities** **(brief description here – lesson plans will be used to flesh out each lesson)**  |
|  | Introduction of the solar system and the sun | * Through class discussion on whiteboard use KWL chart to check students’ prior knowledge about the solar system.
* Referring to KWL charts class will have a brief discussion about what they wonder about the Planets, Solar system and other objects in solar system
* Introduce video: <https://www.youtube.com/watch?v=libKVRa01L8> have students fill in a notes worksheet while watching video. *attached*
* Present slideshow
* <https://docs.google.com/presentation/d/1Fd1RZreOOvz5FEscZ9APbS1b2C2x3mBTZj4otTcOM-Q/edit#slide=id.p1>
* Quick memory recall of the planet names and order.
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|  | Planets of the solar system | * Re-Introduce the planets in the solar system.
* Present some facts about planets.
* <https://science.nasa.gov/solar-system/planets/>
* Students can choose one from two kinds of planet worksheets
	+ <http://www.teacherspayteachers.com/Product/Daily-Planet-Report-375857?st=cb5ad8943df13d7cb308527245ce>
	+ <https://drive.google.com/file/d/1j656LfyzvCVOYO28cQM8YxHRAX2z9gdy/view?usp=drive_link>
* Use a craft project to create a scale model of the solar system using playdough and balloons.
* <https://www.sciencebuddies.org/teacher-resources/lesson-plans/solar-system-model>
* Exit ticket: use a quiz (multiple choices) to help students recall what they have learned from the lesson.
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|  | Moons phases | * Introduce moon phases with a video
* <https://youtu.be/f592IgRzq2E>
* Have discussion about video and what else students know about the moon, asking open ended questions
* Do oreo moon phases activity
* <https://www.teacherspayteachers.com/Product/FREEBIE-Moon-Phases-OREO-Activity-4085217?st=9f2e55787c6fdffd3bd435fc9eabf1e2>
* Finish with discussion about indigenous peoples relying on the sun, moon stars in their life, read a story to go with the discussion - Taan’s Moons, 13 moons of Wsanec or 13 moons on turtles back, Hobiyee
* Exit ticket - ask students what is one thing you remember about the moon phases?
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|  | Student projects and Review | * In groups of 3-4 student groups will choose a random planet and organize presentations- slides, written report, pamphlet or poster on their planet.
* Including - examples: characteristics, distance, size, facts, picture or model.
* Will present through “gallery walkabout” to peers

Class will complete Learning portion of KWL chart |
|  |  | **( insert more rows as needed)**  |
|  | **Resources needed:** |
|  | * <https://www.youtube.com/watch?v=libKVRa01L8>
* <https://docs.google.com/presentation/d/1Fd1RZreOOvz5FEscZ9APbS1b2C2x3mBTZj4otTcOM-Q/edit#slide=id.p1>
* <https://science.nasa.gov/solar-system/planets/>
* [https://www.sciencebuddies.org/teacher-resources/lesson-plans/solar-system-mod](https://www.sciencebuddies.org/teacher-resources/lesson-plans/solar-system-model)
* <https://drive.google.com/file/d/1j656LfyzvCVOYO28cQM8YxHRAX2z9gdy/view?usp=drive_link>
* <http://www.teacherspayteachers.com/Product/Daily-Planet-Report-375857?st=cb5ad8943df13d7cb308527245ce>
* <https://youtu.be/f592IgRzq2E>
* <https://www.teacherspayteachers.com/Product/FREEBIE-Moon-Phases-OREO-Activity-4085217?st=9f2e55787c6fdffd3bd435fc9eabf1e2>
* Art supplies
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|  | **Interdisciplinary connections:** (e.g. How did you weave ELA, Social Studies, Science, Math, Fine Arts, and/or ADST together in this instructional sequence?) |
|  | Students are encouraged to use their understanding about the solar system to make connections with other subjects. They can demonstrate their knowledge through an art project, drawing, making a poster, or a craft project to showcase the solar system. They can compare the distances among planets and the sun, which involves using math knowledge. |
|  | **Reflection** |
|  | **How did the unit go? How do I know?** |
|  | **Where to next?** |

**Solar System Notes**

Our Solar system is one of over \_\_500\_\_ in the Milky Way galaxy.

Our solar system came into being about \_\_\_\_4.5 billion \_\_\_ years ago.

Revolving around the sun are \_\_\_8\_\_\_\_ planets which are divided into two Categories \_\_Terrestrial\_\_\_ and \_\_\_Jovian\_\_\_\_

Terrestrial Planets: Mercury, Venus, Earth and \_\_Mars\_\_\_.

Terrestrial planets are primarily made of \_\_\_Rocky\_\_\_\_ Material and have solid surfaces with no ring systems. They have very few or no \_\_Moons\_\_ or are relatively small.

**TERRESTRIAL PLANETS**

Mercury: Closest to the \_sun\_\_ which has the shortest orbit.

Venus: the hottest planet with an atmosphere of carbon dioxide and \_\_lava\_\_\_ flows.

Earth: Water systems help create the only known environment able to sustain \_life\_\_.

 Mars: May have also supported life about 3.7 billion years ago, when the planet had a watery surface and \_\_\_moist\_\_\_ atmosphere.

**JOVIAN PLANETS**

Jupiter and Saturn are \_\_Gas\_\_\_ Giants made mostly of helium and hydrogen.

Uranus and Neptune are \_\_Ice\_\_ giants which contain rock, ice and a mixture of water, methane, and ammonia.

All four planets have multiple \_\_moons\_ , support ring systems, have no solid surface and are immense in size.

Jupiter: is the largest planet in our solar system.

Saturn: \_\_second\_\_ largest in the solar system with large rings.

 Uranus: an ice giant which rotates on its \_\_side\_\_.

Neptune: the outermost planet in the solar system and the coldest.

The Asteroid \_\_belt\_ orbits the planets. It is a flat disc of rocky objects from dust particles to the largest object: Ceres.

**Five multiple-choice questions about the eight planets in the solar system**

1. Which of the following lists the eight planets in our solar system in order from the closest to the farthest from the Sun?
	* A) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
	* B) Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, Mercury
	* C) Earth, Mars, Mercury, Venus, Jupiter, Saturn, Uranus, Neptune
	* D) Jupiter, Saturn, Uranus, Neptune, Mars, Earth, Venus, Mercury
2. Which planet is known as the "Red Planet"?
	* A) Earth
	* B) Jupiter
	* C) Mars
	* D) Venus
3. Which is the largest planet in our solar system?
	* A) Earth
	* B) Neptune
	* C) Saturn
	* D) Jupiter
4. Which planet has a thick atmosphere that traps heat, making it the hottest planet in our solar system?
	* A) Venus
	* B) Mercury
	* C) Mars
	* D) Saturn
5. Which of the following planets have rings around them?
	* A) Mars and Jupiter
	* B) Earth and Venus
	* C) Saturn and Uranus
	* D) Mercury and Neptune

Answers

1. A) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
2. C) Mars
3. D) Jupiter
4. A) Venus
5. C) Saturn and Uranus