AI and Digital Literacy Teaching and Learning Story

TASK DESIGN	
Learning Experience Title	*Exploring The Motions of the Earth, Moon and Sun Through Different Mediums*
Grade	3/4
Learning Area(s)	Science 4
Curricular Competencies	• Suggest ways to plan and conduct an inquiry to find answers to their questions • Safely use appropriate tools to make observations and measurements, using formal measurements and digital technology as appropriate • Make observations about living and non-living things in the local environment • Observe objects and events in familiar contexts
Curricular Content	• the effects of the relative positions of the sun, moon, and Earth
Links to Core Competencies	Thinking • Critical and Reflective Thinking – Questioning and Investigating
Links to First Peoples principles of learning	• Learning is holistic, reflexive, reflective, experiential, and relational (focused on connectedness, on reciprocal relationships, and a sense of place)

TASK SUMMARY

Students will explore four different ways of learning about the motions of the Earth.

1. Research: Teacher-led research with students. We will explore a variety of tools (Online databases and Online searches).
2. Observe: Students will observe the position of the sun during the school day.
3. Make: Students will make a model of the Earth, Moon and Sun (orrery)
4. AI: AI search tools and AI generators.

Teacher reflections
To effectively develop digital literacy in their students, teachers require a good understanding of student privacy and data. validity of images.

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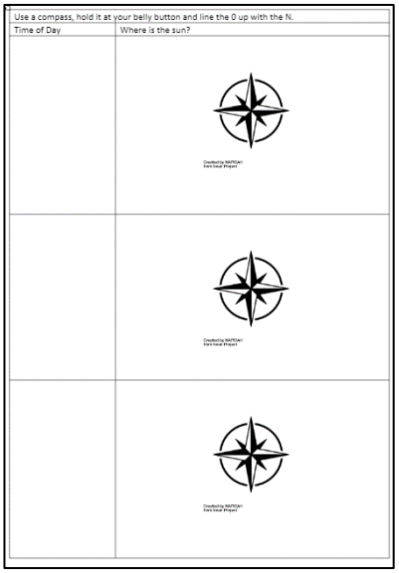
LEARNING STORY

PLANNING

Materials:

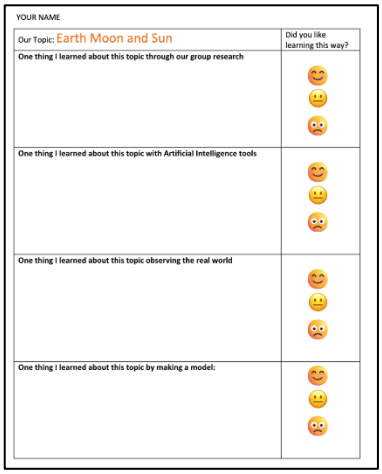
- Student Compass Data Worksheet & Student Learning Worksheet
- Class set of compasses & Class set of flashlights
- Lego (e.g: Lego Spike Essentials kit. Regular Lego or crafting materials could be used)
- School iPads and computers
- QR codes for accessing various resources


Use a compass, hold it at your belly button and line the 0 up with the N.

Time of Day	Where is the sun?

The lesson occurred in our Design Lab, which is set up with tables and open space. Students have a workspace at a table shared with one other group. One large smartboard in the room is used to project directions and instructions for group learning. The lab also has access to the school yard.

For the entirety of the project, students worked with the same partner.


YOUR NAME

Our Topic: Earth Moon and Sun	Did you like learning this way?
One thing I learned about this topic through our group research	
One thing I learned about this topic with Artificial Intelligence tools	
One thing I learned about this topic observing the real world	
One thing I learned about this topic by making a model:	

A pre-lesson was taught using a Valentine Day theme where students learned about AI image generators, language generative tools and some basic Lego building and coding skills for the target lesson. They also learned how to use the compass and noted their first data entry of the position of the Sun and Moon.

In this lesson, students used a Lego Robotics kit for their orrery model. Teacher direction and an online tutorial were used to help students build the base model with Lego. Following this, students were given a challenge to design a holder for the flashlight so that they could project light on their model Earth and Moon.

Teacher reflections

AI should be an enhancement of the learning process. In this case, AI worked well at answering additional questions that the students had by writing it in language that students were able to understand.

Teacher reflections

The image generators were an effective and unforeseen formative assessment of the learning. In most cases, students were able to explain what was wrong with the generated image, which helped demonstrate their actual understanding of the topic.

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TEACHING

Students learned relevant digital literacy skills during a preceding lesson. It was Valentine's Day, so we used the theme to practice some of the processes they would need for the target lesson. Students used coding and basic Lego building to create Valentine's themed artifacts. They also navigated an AI image generator where they learned how to give prompts using voice to text to create an image related to their theme. During the target lesson, students explored the motions of the Earth, Moon, Sun and planets in four different ways.

Student AI Generated Valentines Day Image

Outside: The class went outside three times to observe the changing position of the Sun and Moon. We used compasses to orient ourselves and to ensure consistent observations. Students learned the basics of how the Earth's magnetic field works.

Building and Coding a Model: Students followed a tutorial to build a Lego orrery (a model of the Solar System); a working model of the Earth, Moon and Sun. Students used basic block-based coding to program motors on their orrery to spin at different rates and mimic the motions of the Earth, Moon and Sun. They were asked to redesign their Sun to hold a flashlight which allowed them to see how light shines on the Earth. We also conducted a class simulation in which students held a piece of fabric taut at all ends. Then, we observed how various objects moved on the fabric and how objects with different masses affected one another.

Using online sources: As a class, we used district approved online resources from the Focused Education Resources Digital Classroom series (Twig Science, World Book Kids, National Geographic Kids) to watch videos and read about the Earth, Moon and Sun.

Artificial Intelligence: As a class, we used generative language tools to ask new questions that arose from the three activities. The first questions were answered in language that was too advanced for grade three and four. We demonstrated that the language can be simplified if you give the model additional context. For example, asking the questions in the following way: "I'm in grade three and I want to know how gravity works."

Finally, Students applied the knowledge acquired throughout the unit to generate AI images representing their learning.

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ASSESSMENT
STUDENT A
TEACHER OBSERVATIONS AND STUDENT WORK

Students were keen to switch tasks and explore the topic in different ways.

Students noted a meaningful difference to the AI generated text answers when they were taught how to give context. The AI answers, when noting that they were only in grade three, gave answers with language that was closer to their level. It also gave comparative examples that allowed students to make connections.

One of the last activities of the day was generating AI images surrounding the topic. Students were guided to prompt the image generator to either demonstrate something they still "wondered" about or to try and get it to depict something that they learned. In both instances, students noted immediate errors such as the size, shape and even context of the images was inaccurate compared to what they had learned.

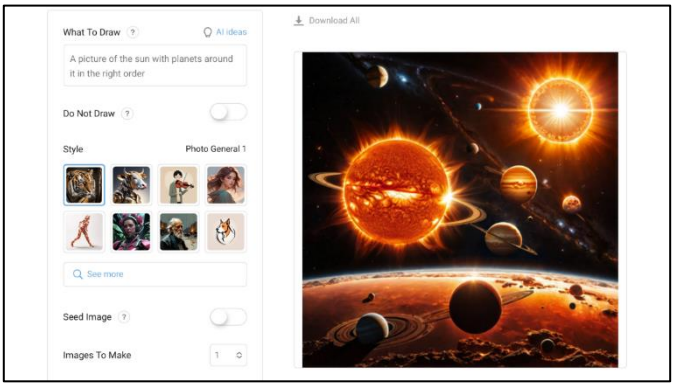
Interestingly, the student-built models were not at scale, nor did they rotate in a mathematically correct way compared to our solar system (24hrs, 365 rotations per orbit etc.) but they did not see this as an issue. Comparatively, they had higher expectations for the AI and often found the generated images to be comical, or frustrating.

Throughout the day, students used both voice to text, and text to voice but were only made aware that these tools also rely on AI as an aside. They were comfortable and proficient at using these tools.

Student AI Generated Images (Students attempted to have AI depict what they learned about the Sun, Moon, Earth and Planets.

Student prompt: "Show a comparison of the difference in size between the Sun Moon and Earth"

The student was frustrated that the image generator depicted the Earth as a similar size as the Sun.



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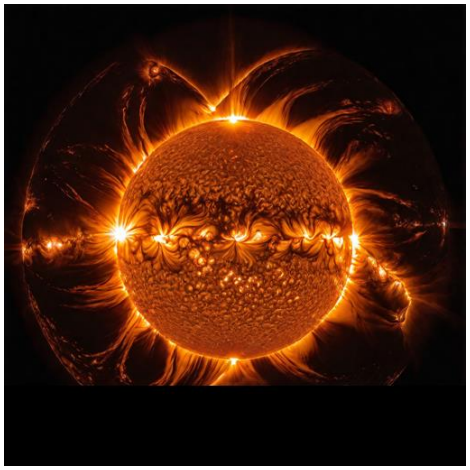
TEACHER OBSERVATIONS AND STUDENT WORK CONTINUED

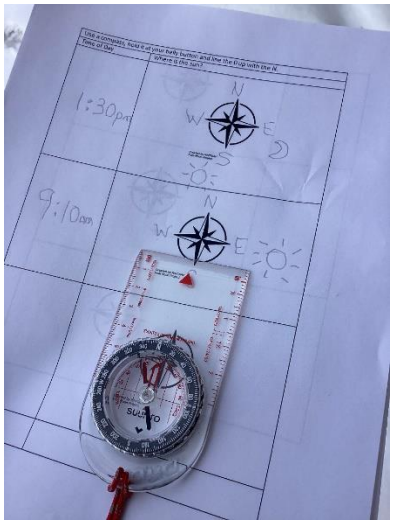
The student noted that the number of planets was close but there were still things wrong with the generated image such as: it has two suns, and the scale of what appears to be the Earth.

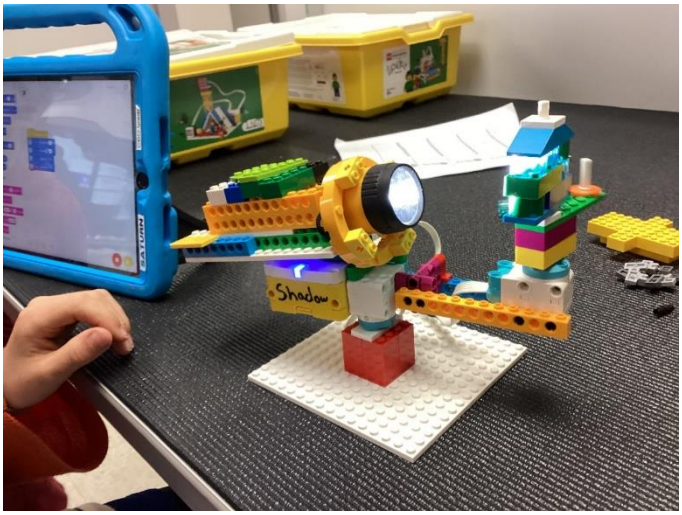


Student Prompt: “A scientific image of the sun”

This was one of the most accurate AI generated images. The student noted the solar radiation and questioned why different areas were darker than others. It is, however, a good example of plausible errors in AI and likely contains many inaccuracies.

Student created Lego Model (Orrery) of the Sun, Earth and Moon:





Teacher reflections

Exposing students to the same topic in a variety of ways holds immense value. By experiencing the subject matter through different modalities, Students can make connections between their learning, which naturally prompts questioning and keeps them engaged.

Teacher reflections

AI supported the students to develop the Core Competencies of Communication and Critical Thinking. They were continuously finding new ways to reword their prompts to try and get what they were hoping for, while also questioning the validity of images.