**Teaching Science as Inquiry (TSI) Lesson Plan**

**Module 1: Physical Aquatic Science**

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Activity: Kinesthetic Moon Model

Why did you choose to do this activity?

I chose this activity because it fit perfectly into the scope and sequence of my space science curriculum. We had just wrapped up a unit on Earth motions, Sun angle, and seasons and were moving into a unit on the moon. The unit started with this activity, and then moved on to three weeks of lessons focused on moon phases, tides and eclipses. This activity proved to be a great lead-in lesson to my moon unit!

What are your classroom learning goals?

I will be able to:

* + Review Earth’s ROTATION and REVOLUTION.
	+ Answer the question: “Why does the moon have phases?”
	+ Accurately draw and label the moon phases and their relationship to the Earth and Sun.

How does this activity tie into your classroom learning goals?

 The activity directly addressed all 3 learning goals. I followed the activity with an activity in which we diagramed what we had just experienced first-hand to help solidify learning goal 3.

What date do you plan to start this activity?

 October 15 – October 16

*If applicable:* HIDOE standards this lesson will address

 **SCI8.8.9 – Describe the predictable motions of the Earth and moon.**

**Ocean**

1. Describe how you will connect this activity to the ocean:

I related the lesson to the ocean in two ways:

* In introducing the Moon unit, we discussed that the relationship between the Earth and the Moon is what gives us Moon phases, tides, and eclipses.
* During the Moon model activity, I briefly mentioned that the moon helps to cause tides.

It is hard to say if connecting the activity to the ocean enhanced student engagement as the connection was brief and superficial.

1. Select the Ocean Literacy Principle(s) that you anticipate this activity will address. (check all that apply)

□ 1. The Earth has one big ocean with many features.

□ 2. The ocean and life in the ocean shape the features of the Earth.

□ 3. The ocean is a major influence on weather and climate.

□ 4. The ocean makes earth habitable

□ 5. The ocean supports a great diversity of life and ecosystems.

□ 6. The ocean and humans are inextricably interconnected

□ 7. The ocean is largely unexplored

**Preparation**

1. How will you prepare your students for this activity? (For example, review of prior knowledge.)

This activity was used to introduce the moon unit, so students entered it with minimal preparation. Prior to the activity, the lesson started with a quick discussion of moon phases in which I asked students who had seen different shapes of the moon and if they knew what they were called. This led directly into the activity and me asking students to predict what caused the phases of the moon.

1. Explain any instructional struggles that you foresee and how you will address these issues. (For example, student misconceptions, classroom discussion, aspects most difficult for students to grasp, etc.)

I foresee students having misconceptions about what causes the phases of the moon. I can see students believing that phases of the moon are a result of shadows. I can also see students predicting that the rotation of the Earth and the Moon and perhaps clouds would contribute to the formation of phases of the moon. I foresee there being slight management issues in having all 30 students standing in a circle exploring how phases of the moon are formed. To combat this concern, I am making sure my expectations of students are crystal clear and I am making sure that I know exactly how to run the activity (basically with a script and a timed agenda) so that I can keep students moving, attentive, and occupied (NO free time).

1. Select the TSI Mode(s) of Inquiry that you will focus on for this activity. (check all that apply)

□ Curiosity

□ Description

□ Authoritative knowledge

□ Experimentation

□ Product evaluation

□ Technology

□ Replication

□ Induction

□ Deduction

□ Transitive Knowledge

**Questioning and Assessment Strategies**

1. What *questioning strategies* will you use to help your students meet your learning goals?

I opened the lesson by asking students to describe “different moons” they had seen in the night sky and having them try to name them. This led into me posing the question: “What causes the phases of the moon?” Students generated predictions prior to engaging in the lesson. The activity started with students exploring this question and trying to generate an answer. The activity itself was facilitated largely by teacher questions. After a student modeled the “system” they discovered for production of the moon phases, we did it as a class together. At each moon phase, I would pause and ask the students to describe what they saw from Earth. I would also tell them to look around the room and observe how much of the moon is lit by the Sun for that particular phase. I would then have them name the phase before we moved on to the next one. The activity concluded with one last quick revolution of our moon models around our heads (Earth model), pausing at each moon phase to say and echo it.

1. What *assessment strategies* will you use to help your students meet your learning goals and monitor their progress?

Students were given an “exit slip” at the conclusion of the lesson. The exit slip was aligned to the learning goals of the lesson, assessing how effectively the lesson taught students what they were supposed to learn.

**Phase Diagram**



Students spent the most time in the “invention” and “investigation” phases due to the inventive and manipulative aspects of the activity model. They engaged in the initiation phase the least because it was planned to be a minute portion of the lesson.

I believe the strength of this activity is in the design that allows students to explore and interact with the phases of the moon in a hands-on fashion, allowing them to spend the majority of time in the “invention” and “investigation” phases and less in teacher-led “initiation” and “instruction”. I believe the planning and execution of the lesson allowed students to amply explore every phase of inquiry.