

Our Solar System

5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom

- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



Complete Teacher Instructions

Our Solar System – 5E Lesson

Engagement Phase

Our Solar System – 5E Lesson

Grades 7-10	Our Solar System
Essential Questions:	Ongoing Lesson (7-9 hours)
Lesson Objective: Students will: - Learn about the major components of our solar system including the planets, our Moon and the Sun - Learn the differences between the inner and outer planets - Learn why Pluto was demoted in 2006 - Create a dual-scale model which will provide a visual representation of our solar system including its vastness - Gain an understanding of the distances in space as well as what a luminous and non-luminous object is	
Possible Student Misconceptions: - Objects in space aren't that far apart - The Sun is not a star - Pluto is still a planet - The Earth is the center of our solar system - The Earth is similar in size to the Sun and the rest of the planets - The solar system only includes the Earth, the Sun and the Moon - All planets are rocky balls	
Materials: 1 device (smartphone, chromebook, laptop, tablet, or computer) per 3 students - A means of projecting a PowerPoint presentation - Internet access - If you choose to do <i>Evaluate – Model Solar System</i>, you will need paper, markers (or crayons/pencil crayons), ticker tape (you can get this at any business supply (UPS, Staples, etc.), glue, tape, scissors - If you choose to do <i>Evaluate – Space Newsletter</i>, you will need a non-Apple device, as the site requires Flash, which isn't supported by Apple products. → Note: I usually use colored paper to cut down on the time they use to color their planets. Also, I get them to use glue instead of tape	
Teacher Notes: - All videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If it doesn't for some reason, right-click on the image and click Edit Hyperlink or something similar. - I've created a video walkthrough if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I don't believe in long lessons. If you feel your students are losing their focus, don't force it. Stop the PowerPoint and give them a 5-minute break. If you'd like to show a quick video, I'd recommend my video collection here - http://www.teachwithfergy.com/science-videos/. There are tons of brain-break videos to choose from all grouped by category.	

Duration 10-15 min.

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Connect student's experiences
- ☐ Create interest
- ☐ Ask questions
- ☐ Understand the objectives of the lesson

Students answers the following three questions in the video:
 1. What is our solar system that you can think of?
 2. What object in our solar system?
 3. What is that object compared to Earth?

Students will complete *Solar System Body Scale* which can be found at <http://www.teachwithfergy.com/solar-system-body-scale/>

Students will be asked to review and revise their understanding of the size of objects in our solar system (old and new) to discuss the size of objects in our solar system.

The video is 10 minutes long and you may want to show it in segments. The video shows the dwarf planets and the outer planets to my students as the video progresses.

If the video doesn't play, go to the video icon and type in "Solar System Body Scale" to locate it.

Activity

Students will complete *Exploration – Lab Station* activity. When they're done, they will submit their passport.

Instructions for my Lab Station activity can be found in the *Lab Station – Instructions* file.

Duration: 55-60 min.

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Students receive real experience with the topic
- ☐ Students use and develop creative thinking skills
- ☐ Students make observations, record results, and make connections

Elaboration Phase

Elaboration – Our Solar System Lesson

Students will complete – *Elaboration – Solar System Lesson*. This lesson is designed to be completed over one – two days. There are many embedded videos and opportunities to engage students.

This lesson covers the following topics:

Our Solar System
 The Sun
 The Inner Planets
 The Outer Planets
 Why was Pluto demoted?
 Observing Stars and Planets
 The Moon

Notes:

Students will need prior knowledge is required. Videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If they don't open, right-click on the image and select Edit Hyperlink or something similar. I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>. I've also enclosed a .PDF version of both the teacher and student versions.

Evaluate Phase

Evaluate – Scavenger Hunt Activity

Students will complete – *Elaborate – Scavenger Hunt Activity*. This activity requires your students to move beyond what was covered in the lesson and allow them to demonstrate why learning about our solar system is so applicable and important.

Notes:

Students will work in groups of two or three. Each group will only require a single device (smartphone, tablet, chromebook, laptop, etc.).

Evaluate Phase

Evaluate

I've included two assignments with two variations of the Space Newsletter Assignment. The first version goes into more depth while the second is simply a research assignment. Students will complete one of the evaluations – *Evaluate – Model Solar System* (preferred) or *Evaluate – Space Newsletter*.

Notes:

- Answer key is located within each document
- For the Newsletter assignment, I sometimes have my students peer evaluate the research section

Duration: 1 - 2 hours

Teacher Role – Explain the concepts by presenting the material found in the presentation.

Goals

- ☐ Students develop understanding of the content
- ☐ Observations and experiences are discussed and critiqued
- ☐ Students develop vocabulary
- ☐ Students are able to connect the content presented to previous experiences

Duration: 1 hour

Teacher Role – Facilitate learning and keep students focused

Goal

- ☐ Students use their newly obtained knowledge to propose solutions and extend their learning to new situations

Duration: 1-2 hours

Teacher Role – Distribute and collect evaluation

Goal

- ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

Each phase is clearly described

Complete Lesson

Space – Our Solar System

- Our Solar System
- The Sun
- The Inner Planets
- The Outer Planets
- Why was Pluto demoted?
- Observing Stars and Planets
- The Moon

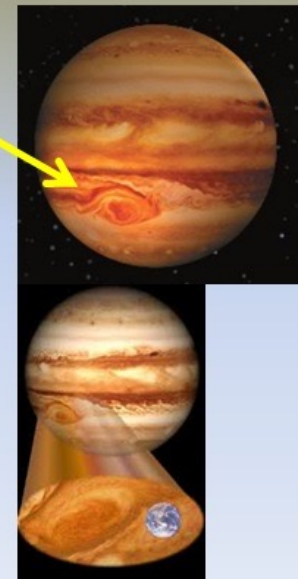


Jupiter's Great Red Spot

- Has a great red spot
- It is a storm that has been going on for at least 400 years
- The storm is larger than the Earth



Jupiter's Super Storm



PLUTO



- No longer considered a Planet
- Is the second most massive known dwarf planet in the Solar System (after Eris)



Interactive and Engaging Activities

Device-Based Scavenger Hunt Our Solar System



Includes

- 5 Unique Locations
- Online form submission
- Answer Key

Works on all smartphones, tablets, Chromebooks and Laptops

- **100% Digital**
- Simulations
- Quizzes
- Videos
- Games
- Word Scramble
- and more

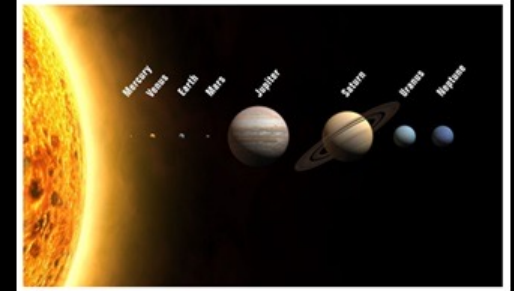


Our Solar System Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Scale Model Solar System Activity



- THREE VERSIONS – Great for any grade level
- Metric and Imperial measurements included

Space Newsletter



- Inquiry-Based Learning
- Utilizing Technology
- Life-long learning
- Guided Research
- Rubric & Answer Key

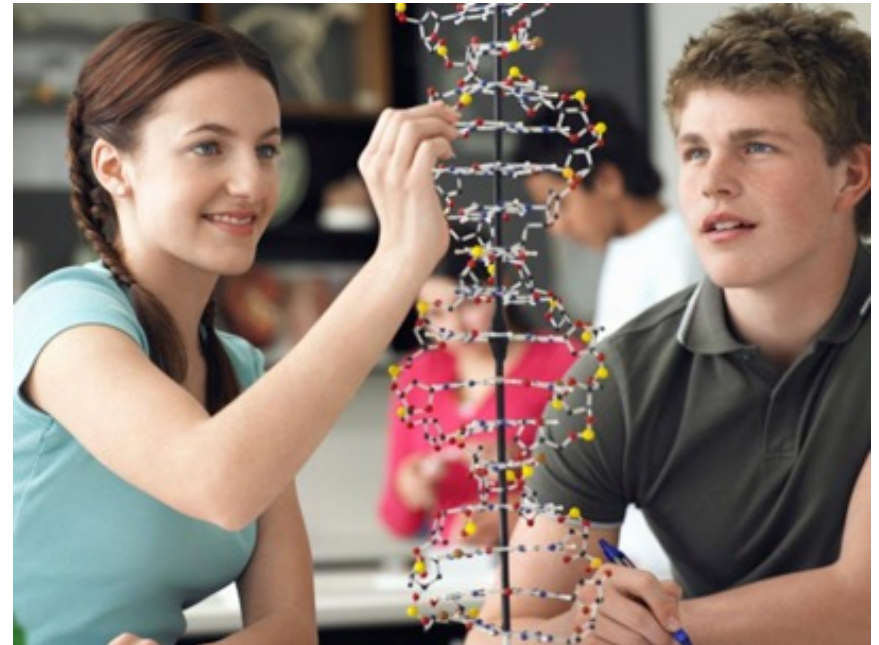


Space News Rubric			
Criteria	Excellent (4)	Good (3)	Needs Improvement (2)
Content Accuracy	Content is accurate and up-to-date.	Content is mostly accurate.	Content contains several errors.
Research Quality	Research is thorough and well-documented.	Research is decent.	Research is superficial.
Writing Style	Writing is clear, concise, and engaging.	Writing is clear but lacks engagement.	Writing is unclear and repetitive.
Visual Appeal	Visuals are high quality and relevant.	Visuals are decent.	Visuals are low quality or irrelevant.
Overall Impression	Excellent work, well above expectations.	Good work, meets expectations.	Needs improvement, below expectations.

Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration



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to START