

Lunar phases, Lesson sequence using 5Es (Engage, Explore, Explain, Elaborate, Evaluate)

Key:

Blue boxes highlight the parts of the lesson sequence that demonstrate Standard focus area 3.2.1 in particular.

Lesson sequence – Addressing Misconceptions about Lunar Phases

What is the purpose of this lesson sequence?

To identify misconceptions students may have about the phases of the moon.
To correctly identify the science concepts behind moon phases and to eliminate any false understandings.

5Es Model	What students do	Why this supports their learning	What you do	Organization & Resources
Engage	<p>1. Students are given <i>Recourse One</i> to fill out over the course of two weeks. This involves looking towards the moon at the same time every night for the course of two weeks and drawing in the space provided what they see.</p> <p>2. Students must record the time they saw the moon.</p> <p>3. Suggest students setting a reminder alarm each night.</p> <p>If cloudy tell students to research the lunar phase for that day.</p>	<p>Engages students- This activity creates schema for students to gather a personal understanding of the night sky in case they have not paid much attention in the past to the sky. It also creates interest and allows students to develop questions. This is a very simple activity that although is homework, and many students will most likely forget to do it, the activity will take a minute to do each night.</p>	<p>1. The teacher must explain this activity how to do this activity and address that science is about understanding the world around us. The teacher must also state that the activity is homework and must be filled out every night at the same time.</p> <p>2. As this activity will run over the course of two weeks, it is important that the teacher reminds the students of the activity at the beginning or end of each lesson.</p> <p>3. At the end of the two weeks, the teacher must lead a class discussion analyzing the findings.</p>	<p><i>Organization-</i> This is an individual task student will fill out at home. After the task is complete the teacher will bring the class together and have a class discussion about the results that each student achieved.</p> <p><i>Recourse-</i> Recourse One attached in Appendices.</p> <p><i>Note:</i> The recourse goes for a 28-lunar cycle, tell students they will be completing the sheet later and to stop after two weeks.</p>

<p>Engage</p>	<p>1. Students are given a think pair share activity to discuss why they believe the moon changes shape over the month. Students in pairs will be given <i>Recourse Two</i> to help them explain of desired. Balls can also be used.</p> <p>3. When the teacher leads back into class discussion the student will need to contribute their ideas to the class.</p>	<p>Engages students- This supports student learning as it promotes students to reflect on what they already know. It also helps the teacher detect any misconceptions students may have of the moon.</p>	<p>1. The teacher must bring the class back for a class led discussion on why the moon changes shape. Some questions the teacher may ask include: -does the moon create its own light? -is it the earth's shadow that causes lunar phases?</p>	<p><i>Organization-</i> This is a paired activity and then a class lead discussion activity.</p> <p><i>Recourse-</i> Recourse Two attached in Appendices. Three distinct balls can also be used. This recourse is to help students visualize.</p>
<p>Explore</p>	<p>1. Students will be told to stand in pairs, in a circle around the teacher who is holding a foam ball. The teacher will then nominate a student to shine a torch on the soccer ball without moving the torch.</p> <p>2. The students as a pair will then be told to draw the amount of light touching the ball that they see in their position.</p> <p>3. When this is done the students in a circle will show everyone what they have seen.</p>	<p>Allows students to explore- This activity is an introduction activity about perception. And gives a hands-on experience of how moon phases work.</p> <p>It also eliminates any misconceptions of clouds covering the moon for lunar phases or Earths shadow.</p> <p>Working in pairs allows students to feel safe if they make a mistake as they need to show their results.</p>	<p>1. After this activity is carried out the teacher will need to explain how this model reflects how lunar phases work. However, it is important to explain that each location of the students stands for a different day in the lunar cycle and not a different location on Earth as the moon phases are the same no matter where you are on the Earth.</p> <p>2. Explain that this is a model of what occurs in lunar phases.</p>	<p><i>Organization-</i> This is a group task.</p> <p><i>Recourses-</i> The teacher will need a foam ball on a stick and a large torch. Students will need a piece of paper with a circle drawn on it to colour in.</p>
<p>Explain</p>	<p>1. Students are given a foam ball on a stick to represent the moon.</p> <p>2. Students are told they are the earth and to spin slowly in the same spot around the light and take note of how the light changes shape on the circle.</p>	<p>Explains the phenomena- This is an accurate model of why moon phases occur. Students get to see how the moon orbits the earth and from earth you see only the part of the moon that is illuminated by the sun.</p>	<p>1. Teacher is to explain this is a model and that the light is the sun, the student is the earth and the foam ball is the moon.</p> <p>2. This is an example of what the students will be doing: https://www.youtube.com/watch?v=wz01pTvuMa0</p> <p>3. Teacher will then lead a class discussion of how this is a</p>	<p><i>Organization-</i> This is an individual task every student must complete. Then it will be a group discussion.</p> <p><i>Recourses-</i> The teacher will need a bright light, foam ball with stick. Depending on resources students may need to share foam balls and stick.</p>

			representation on how moon changes shape.	
Elaborate & Evaluate	1. Students will be told to use the torch, and two balls (one representing earth and one representing the moon) to explain lunar and solar eclipses.	Elaborates on given information and evaluates students- Students will work together to create the correct model on how lunar and solar eclipses are formed. This activity also annihilates the misconception that the Earth's shadow causes lunar phases when in fact that causes lunar eclipse.	1. Teacher will walk around the class and assists students on how to create these models. 2. Teacher will nominate two groups that did the correct model to show the rest of the class.	<i>Organization-</i> This is a group task. <i>Recourses-</i> each group will need a torch, a ball on stick to represent earth and another to represent the moon. .
Elaborate & Evaluate	1. Students, in pairs or individual, will need to reflect upon their two-week lunar observation sheets. 2. Students will then need to go online and fill in the rest of the lunar phases and name the correct phase using the website provided.	Elaborates on given information and evaluates students- This gives students to learn the names of all the phases of the moon. It also uses their own gathered evidence and see how it aligns with online data.	1. Teacher explains task and marks the task at the end. 2. note: students can use their own found websites if desired.	<i>Organization-</i> This is an individual task for students to complete using the internet and their own findings. <i>Recourses-</i> http://www.moongiant.com/calendar/October/2017 Or other online lunar month calendrrers.
Evaluate	1. Students will work individually and be given a packet of "Oreos Minnie's" 2. Students will need to create the 8 faces of the moon with the Mini packet and label the 8 phases and place in a circle on a plate. They must take a picture of the labels plate with cookies after or draw the cookies on the plate.	Is a fun way to evaluate what the students have learnt about moon phases. This allows students to receive a fun accessible activity and can eat the cookies if they do the task correctly.	1. Teacher must walk around the class and make sure the students are on track. 2. Teacher must make sure no students are allergies to Oreos brand cookies. 3. Teacher may have a ready-made plate for students to view.	<i>Organization -</i> This is an individual assessment task. <i>Recourses-</i> Oreo mini packets (not normal full-size Oreos) as this makes the task easier to do. Plastic knives and paper plates.