

## World of Wonder

Lesson plan level: secondary education

Common core standards met: CC.3.5.9-10.A. and CC.3.5.9-10.F. and (reading text with scientific terms)

### ● Essential Questions?

- Who was Hevelius?
- What was Selenographia
- How did Hevelius make his detailed lunar maps?
- What are the lunar phases and what causes them to happen?

### ● Objectives

- Students will consider who Hevelius is and what his contributions to science were?
- Students will understand that lunar phases depend on the angle from which we see light reflected off of the moon from the sun.
- Students will apply what they learn from Hevelius' *Selenographia* to create a lunar phases chart of their own.

### ● Anticipatory set

- Students will write one paragraph in response to the following questions.
  - What is the oldest book you own?
  - How old is it? What kind of information does it contain?
  - Is it especially important to you?

### ● Teaching and modeling

- *Read opening paragraph with the class (From Library Company website):* The Age of Enlightenment filled the minds of men and women with wonder. It

was a period of observation and discovery. Books furnished an avid public with new knowledge of the earth and the heavens. Information was presented in novel ways to captivate and educate the reader. These books inspire and delight. Geometric forms rise up out of the page, the moon spins on a turning wheel, and the invisible is rendered visible.

- The teacher should show Hevelius' *Selenographia* from the Library Company website and show and play the video of the lunar map spinning.
- The teacher should explain some background on Hevelius and explain that *Selenographia* was all about Hevelius mapping of lunar geography and moon phases.
- Explain that *Selenographia* was published in 1647 (370 years old!) and have ask the students to share how that compares to the book they wrote about in the anticipatory set.
- Show YouTube video that graphically shows how the moon phases work.

### ● Guided Practice

- Hevelius reading
  - <http://www.ancient-origins.net/history-famous-people/magnificent-observatory-and-discoveries-johannes-hevelius-005288>
- Questions to go with the reading
  - Where is Hevelius from?
  - Describe the telescope Hevelius used and identify how it is different from telescopes we use today.
  - Where did Hevelius get financial support from to carry out his work?

- What type of astronomy is Hevelius known as the father of?
- Waxing and waning moon worksheet
  - The teacher should display labeled images of moon phases in front of the classroom (found below)
  - The teacher should hand out blank moon phases worksheet (found below) and have students fill out moon phase pictures and labels.

● **Independent practice**

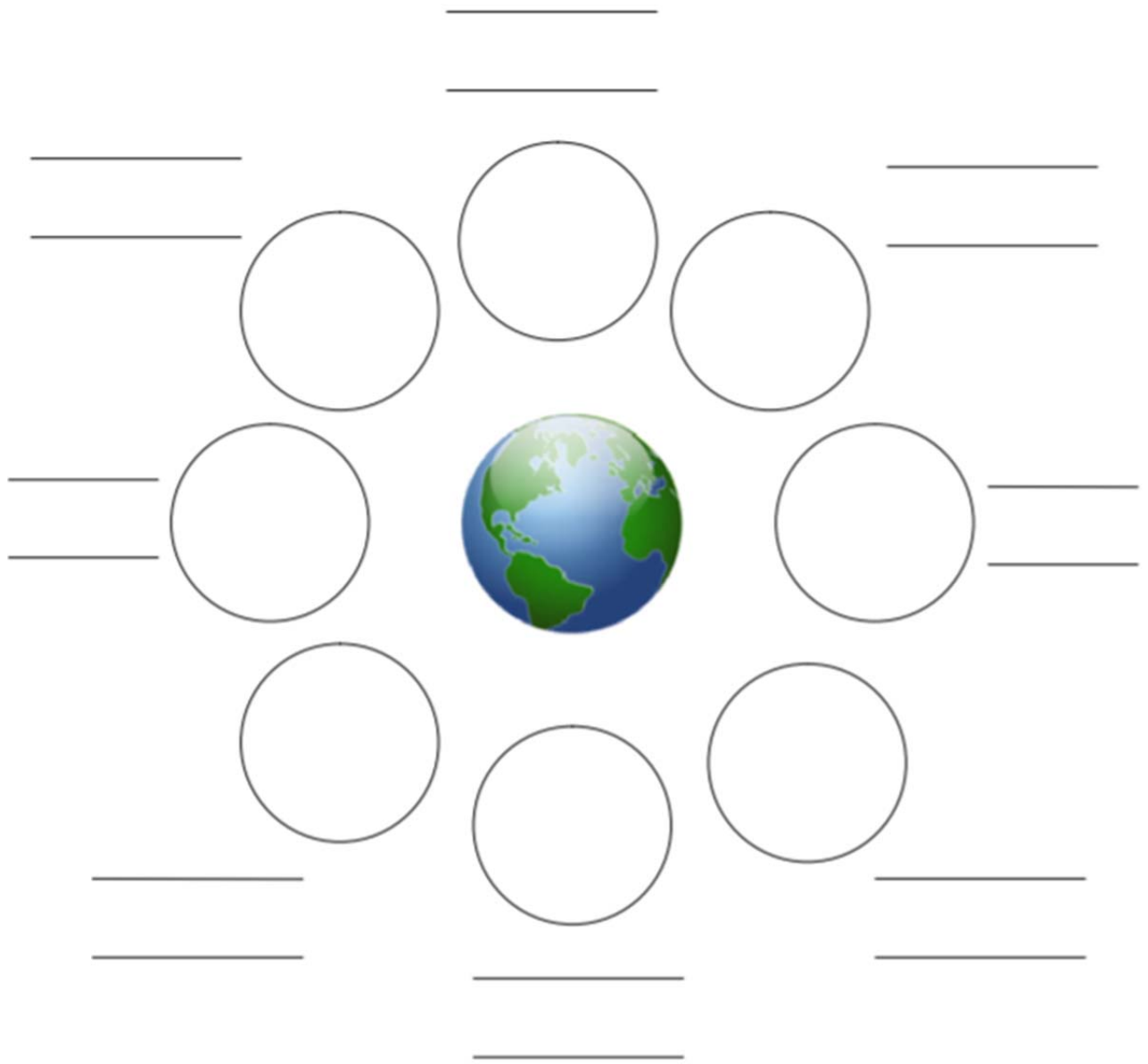
- In class essay on Hevelius
  - Students will respond to the following prompt. Answers should be around one page double spaced.
    - *Hevelius mapped the lunar surface in the mid 1600s using only the telescope at personal observatory. If you wanted to examine the surface of the moon during the 1600s, you could have looked it up in 'Selenographia' thanks to Hevelius. Today we have much more detailed images of the moon. How has technology changed the way you are able to look at the moon? Where would you go to find a picture on the moon? In a broad sense, how has technology changed the way you work and study? Where do you go to find reliable information?*
- Create your own lunar map
  - Students will create their own lunar maps on a large piece of construction paper (18x12 preferably).
  - First choose one of the moon phases to model.

- label the phase you choose.
- also describe the phases that come before and after your phase.
- Search on google for a clear, high definition picture of the moon.
- With as much detail as possible, do your best to map the surface of the moon on your construction paper, accounting for craters and other features much like Hevelius would have done during the 1600s.
  - *Optional: teacher could pre-cut perfect circles for students to trace.*

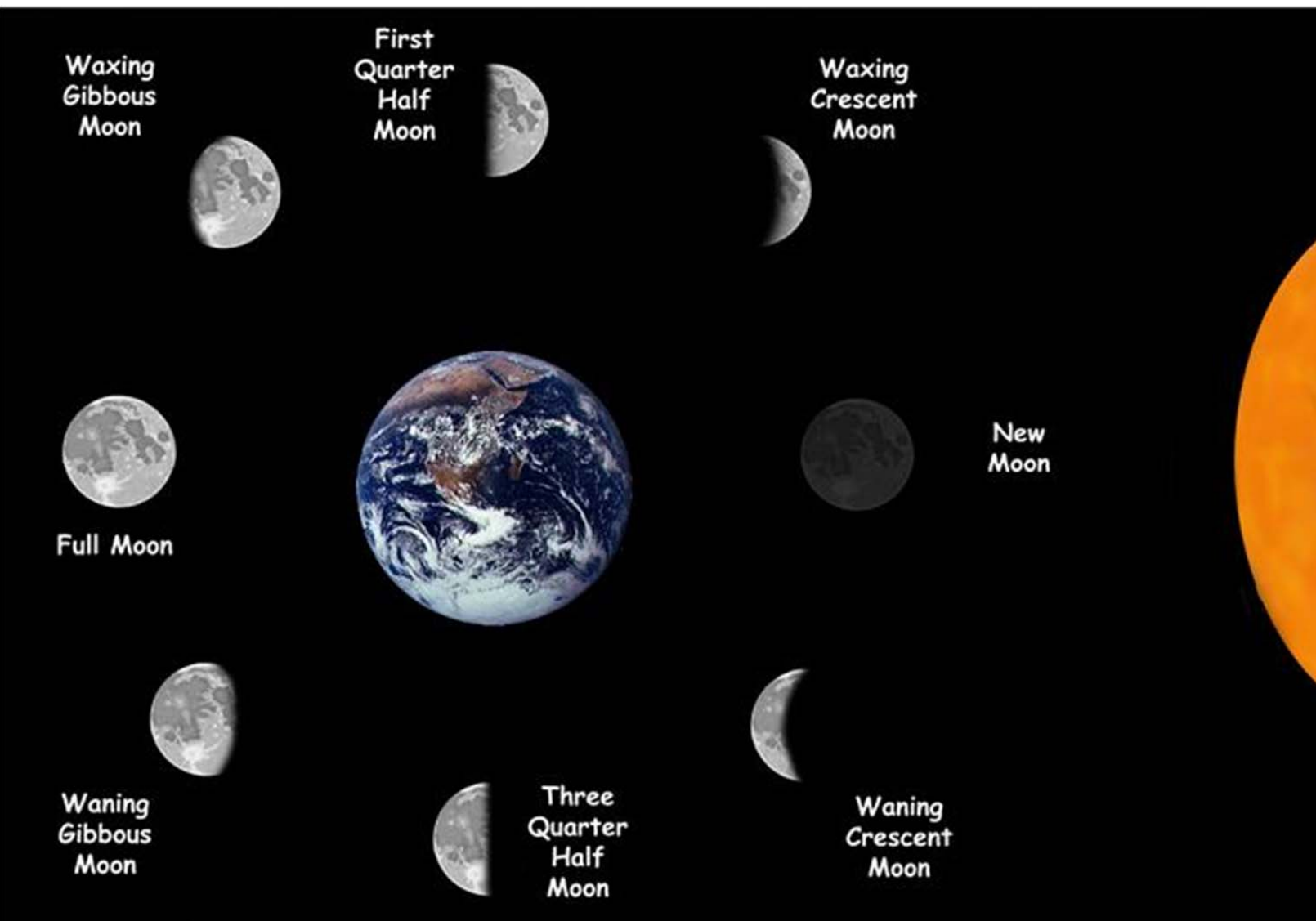
● **Materials**

- laptops
- access to the internet
- construction paper (18x12)
- paper
- pencils
- projector
- worksheet and image below:

# Moon Phases



Name: \_\_\_\_\_



Lesson plans created by Dan Staiber

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