Big Ideas related to the Moon’s phases:

1. The Moon’s phases are due to the orbit of the moon around the earth.
2. Interpreting how the moon looks based upon the position of the sun, moon and earth.
3. Arrangements of the sun, moon and earth during a solar or lunar eclipse.
4. Tides are due to the gravitational force of the moon pulling on the earth’s oceans.
5. The moon’s rotation and revolution both take about the same amount of time. This causes the same side of the moon to always face the earth.

Ideas for lesson activities:
This is a list of several activities that would be good for teaching about the Moon’s phases and the above Big Ideas. They get at the ideas from a variety of angles, as they may be tough for students to conceptualize/internalize.

1. Have them keep a moon phase chart each night (addresses #2 & gives a “sense” of change over time). Ideally, you would begin 1 week before the lessons begin. It could be revisited 3-4 times over a 2-week period. I am attaching a sample chart that could be used for 2 weeks of tracking. This would have to take place as a homework assignment, of course.

2. View video/animations or listen to music about lunar phases and eclipses. (#1, #2, #3)
   - Option 1: Have an in-class activity using the computers where they look on youtube, etc. for the best videos. This is more student-centered than doing it for them.
   - Option 2: Have the students search for videos about the moon phases for homework and email them to you or bring them in. That would allow them to take more time and would avoid the risk of mischief in class but would be less guided.
   - Option 3: View one or more videos of your choosing, followed by questions for them to answer.
     Some good ones I found:
     - Moon Phases: [http://www.youtube.com/watch?v=8V-atMqjYrk](http://www.youtube.com/watch?v=8V-atMqjYrk) (really good)
       - [http://www.youtube.com/watch?v=2aFGNGEcDOk](http://www.youtube.com/watch?v=2aFGNGEcDOk)
       - [http://www.youtube.com/watch?v=LHD4Pk0D8_g](http://www.youtube.com/watch?v=LHD4Pk0D8_g)
     - Lunar Eclipse: [http://www.youtube.com/watch?v=wuhNZejHeBg](http://www.youtube.com/watch?v=wuhNZejHeBg)
     - Solar Eclipse: [http://www.youtube.com/watch?v=_201ttTSG3O](http://www.youtube.com/watch?v=_201ttTSG3O)
     - Tides: [http://www.youtube.com/watch?v=CTQ6ciHENgl](http://www.youtube.com/watch?v=CTQ6ciHENgl) (really good)

3. Guided notes (#1 - #5). I would just take the descriptions above and make them into the notes.

4. MC Questions to answer, naming moon phases, predicting what will happen next (#1 - #5). I’ve attached some questions to start with. What’s needed is more free response stuff.

5. Hands-on modeling activity: (#1, #2, #3)
   - Take tennis balls (or ping-pong balls, etc). Paint one half black, leaving the other half its original color. Have the kids can view it from different angles to see how the crescent, quarter & gibbous is created. Can be a pretty quick and simple activity for groups of 2, 3 or 4.
Build a model out of cardboard and brads. It works to model eclipses as well as moon phases. [http://www.enchantedlearning.com/crafts/astronomy/sunearthmoon/](http://www.enchantedlearning.com/crafts/astronomy/sunearthmoon/)

6. Mnemonic Device: As you progress through the moon's phases, beginning with a New Moon, through 1st quarter, full, 3rd quarter and back around to New, the following mnemonic device can help you to remember whether you're looking at a waxing or waning moon.

**DOC:**
The waxing crescent looks like a capital D.
The full moon looks like an O.
The waning crescent looks like a C.

Thus, if your moon is waxing it will be D-shaped. If it is waning it will be C-shaped. Just remember DOC, and you'll always know exactly where you are in the progression of moon phases (without having to memorize, which of course you will forget next year, if not next week).

7. Have them read the story of the girl about the moon phases (this may be too elementary for middle schoolers, though). I like this because it's just a different learning mode (story).

- **New Moon** — A girl earns a new job . . .
- **Waxing Crescent** — where she is asked to wax the crescent.
- **First Quarter** — Her boss is pleased so she earns her first quarter.
- **Waxing Gibbous** — Her next job is to wax the gibbous.
- **Full Moon** — Again, the boss is pleased, so she earns her first full paycheck.
- **Waning Gibbous** — Then she gets lazy. She begins to wane the gibbous.
- **Last Quarter** — So the boss says, "You're fired. This is your last quarter. Finish the job and leave."
- **Waning Crescent** — She wanes the crescent before leaving . . .
- **New Moon** — to find a new job.

8. Optional/More Complex/Extra Credit: Construct a model on foam poster board with a hole cut in the middle, 8 balls and a flashlight taped to a ruler, etc. (#2, #2) This is not essential but could be a great extension activity for a passionate student. (from [https://www.scholastic.com/teachers/top-teaching/2011/03/ready-edit-teaching-moon-phases-seems-be-one-those-skills-taught-across-grade-l](https://www.scholastic.com/teachers/top-teaching/2011/03/ready-edit-teaching-moon-phases-seems-be-one-those-skills-taught-across-grade-l))

**Description (copied from the above website):**

- My students were mesmerized by this simple gadget, and of course, everyone wanted to try it out. The cool name — "moon phase transporter" — counts. One of my students came up with it, and it has stuck with me. To build one of your own, you need these materials:
- ~8 ping-pong balls.
- A large foam poster-board.
- 8 medium screws.
- A box cutter.
- Strong flashlight (to represent the sun).
- The "sun" is optional, but can be placed on a ruler.

Directions: Find the center of the board and strategically place eight balls around it in a circle. You can go the glueless route by sticking screws up through the board and pushing balls onto them. Mine are very secure. Once that is completed, cut a circle in the middle for viewing.

- You are now ready for the viewing. Using one student to hold the flashlight, two to hold the board, and one to get into the moon phase transporter, you can actually see the moon phases lit by the flashlight. For example, in the picture below, I can see the new moon and waxing crescent. The student, not the board, turns around to see the phases. Rotate students out, if you have time.

Above: From this angle, the viewer sees the new moon and waxing crescent.

All the cool kids are wearing it.
My view of the new moon using the moon phase transporter.

Note: The toothpick signs are not needed. In fact, they may block light from the flashlight.