

Background for Teachers

Note: This information is provided to serve as a foundation for teachers. It is NOT expected that students understand all of this material. Expectations for students are delineated in the “Main Goals” below, and in the section “Important Concepts for Students to Understand.”

Concepts related to the moon can be very difficult for students to learn. One of the major contributing causes of this challenge is the lack of a solid base of careful observations and memorable experiences. Most people, if they notice the moon at all, simply give it a quick glance. They rarely ever become familiar with the appearance of the moon. There are 4 main goals in this activity. Note that we are NOT trying to teach WHY the moon goes through its phases.

Main Goals: use the Jack and Jill nursery rhyme to...

- Draw students’ attention to the moon, and make observations.
- Help students recognize features on the moon, and give them a way to communicate about them.
- Introduce to the students that there is a repeating pattern in order of the phases.
- Show the students that the moon is visible in the daytime in order to help dispel the misconception that the moon and nighttime go together.

**Jack and Jill went up the hill
To fetch a pail of water;
Jack fell down and broke his crown,
And Jill came tumbling after.**

Some folklorists have traced the origin of the Jack and Jill nursery rhyme to a Scandinavian story about two children who were kidnapped by Mani, the moon. Their names were Hjuki (pronounced “juk-ee”) and Bil. Changing cultures, Hjuki became Jack, and Bil was changed to Jill. At first, this connection may seem like a stretch, but linguists have determined that Hjuki (a.k.a. Jack) might have been derived from the Swedish verb “jakka”, which means assemble, or increase. And Bil (a.k.a. Jill) might have come from “bila”, which means to breakup, dissolve, or decrease.

Just like the constellations of stars in the sky, people have also looked at the dark spots on the moon (maria) and have imagined many things, including Jack and Jill. If we imagine Jack on the right half, and Jill on the left half, this matches nicely with the monthly cycle of the moon phases.

While the moon is “waxing” (astronomy term) from New Moon to Full Moon, the illuminated (lighted) portion of the side of the moon we see is increasing, and Jack is the first to appear, and remains the whole time. While the moon is “waning” from Full Moon back to New Moon, the illuminated portion is decreasing, and Jill is the last to disappear. So while the moon is waxing, Jack is the one that is visible the most, and when the moon is waning, Jill is the one that is visible the most.

And the nursery rhyme itself fits the order of the phases even better. Starting at a New Moon phase, Jack appears first, followed by Jill, so they are then visible on “the hill” together when the moon is full. Then Jack disappears, or “falls” first, and Jill “comes tumbling after,” and you are back to a New Moon again. It takes about a month for the moon to go from a New Moon phase back to a New Moon phase again.



Materials: total for the class

- copies of student pages
- assortment of crayons
- Jack and Jill on the Moon Story Book (laminating is optional)
- Moon globe (optional: see page 3)

Vocabulary:

(for teacher’s information only)

Phases: Over about a month, the moon’s appearance seems to change. Each stage or form in this cycle is called a phase.

Illuminate: to brighten with light. In the case of the moon, it is (mostly) lit up by the sun.

Waxing: The moon shows progressively more of its lighted side as it “waxes” from New Moon to Full Moon.

Waning: The moon shows progressively less of its lighted side as it “wanes” from Full Moon to New Moon.

New Moon: When the moon is positioned between the earth and the sun, the lighted side of the moon is facing away from the earth, so we can’t see the moon.

Full Moon: When the moon is positioned exactly opposite the sun from the earth’s perspective, and so the entire side that is facing the earth is illuminated.

First Quarter Moon: When the moon is 90° from the sun in the sky, and the right half of the side of the moon that we see is illuminated.

Last Quarter: When the moon is 90° from the sun in the sky, and the left half of the side of the moon that we see is illuminated.

Important Points for Students to Understand

- The moon doesn't always look the same up in the sky.
- Sometimes we see the moon in the daytime, and sometimes we see the moon at night.
- There is a pattern in the changes of what the moon looks like, and that pattern matches the Jack and Jill nursery rhyme.

Misconceptions

Entering into this activity, your students may have misconceptions such as “you can only see the moon at night.” This can be addressed by having the students observe the moon in the daytime sky. They may also have misconceptions related to how the moon changes phases. These do not need to be dealt with directly.

Time Management

The main part of the activity (steps 1-8) can be completed in 1 hour. Subsequent observations (step 9) can be completed in 15 minutes each.

Preparation

- **Timing:** Go to the planetarium web site (www.mmsd.org/planetarium) and click on the button for the Daytime Moon Calendar. Pick 2-3 days coming up in which you could see the moon in the daytime sky near either First or Last Quarter. You only need one day, but planning for 2-3 possible days will make it more likely that you will have a clear sky.
- **Copy:** Make enough copies of the student page so that each student will get at least one.
- **Gather materials:** enough crayons for step #5, and consider laminating the story book.

Procedures

1. **Introduce:** Introduce this activity by explaining that we will be learning about the moon. Give the students a chance to share their experiences of seeing the moon. Ask them if they have ever seen the moon in the daytime.
2. **Observe:** Go outside during class time and help the students to find the moon in the sky during the day. It's best if you can time this near a first quarter, gibbous, or last quarter phase. [Use the Daytime Moon Calendar on our web site. See Preparation section.]
3. **Discuss:** Ask the students if they think the moon looks the same every day, and if the moon is in the same spot in the sky all of the time.
4. **Nursery rhyme:** Teach the students the Jack and Jill nursery rhyme.
5. **Read:** Read the *Jack and Jill on the Moon Story Book*.
6. **Color:** Have the students color in the details on the student page for Jack on the right side, and Jill on the left side.
7. **Observe:** Take the Jack and Jill on the Moon Story Book outside and find the moon in the sky again. Show them the pictures of Jack alone, and Jill alone, and ask them to tell you who they are seeing on the moon right now. [Answer: Jack if it is near First Quarter; Jill if it is near Last (or Third) Quarter].
8. **Discuss:** Encourage the students to talk about what they've learned regarding the moon today. And encourage them to keep looking for the moon — during recess, after school, and at night, and to check and see if they are seeing Jack, Jill, or both.
9. **More observations:** Go out as a class and observe the moon again in other phases. Take the story book with you again, and ask them to tell you if they are seeing Jack, or Jill.

Variations

- If it's a nice day, do most of this activity outside! Simply leave the coloring for when you are back in the classroom.

Suggestions for Further Study

- Consider keeping track of your Jack and Jill observations on the classroom calendar.
- Follow-up this activity with the Moon Matching activity in which you go out as a class on a regular basis and match pictures of the moon to what they are seeing in the sky, and then record their observations on the class calendar with smaller pictures.
- Learn the easiest names of the phases of the moon: First Quarter, Full Moon, Last Quarter.

Moon Globe

If you have access to a moon globe, incorporate it into this activity. Allow the students to hold it, spin it around so that they can see all sides, and look for Jack and Jill. This will help the students to remember that the moon is always round like a ball, and will allow them to practice recognizing Jack and Jill.

Buying a Moon Globe

You can buy a classroom display globe for approximately \$50. You may be able to find them locally, but many science supply companies carry them, and you can order them on the Internet.

Jack and Jill Tag! (with a soft moon globe)

Reinforce their recognition skills, and have fun too! First, give everyone a chance to find Jack and Jill on the inflatable moon. Then follow these steps:

1. Gather together. The person holding the ball says “I see Jack and Jill and ____.” And they fill in the blank with the name of someone in the class. When the thrower says the name, they throw the moon straight up in the air, and everybody that wasn't called tries to run (or walk) away. The person who's name was called retrieves the moon.
2. When they have the moon, they say “Stop!” And everyone must freeze where they are.
3. The person holding the moon first finds Jack and Jill (important step), and then they can take one step toward anyone for each word as they say “I see Jack and Jill.”
4. Then they can throw the moon at someone to try to tag them.
5. If that person gets tagged, then he/she is the next thrower. If the tagger is not able to hit the person, then they are the next thrower.

Enjoy!

Jack and Jill on the Moon

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Name: _____



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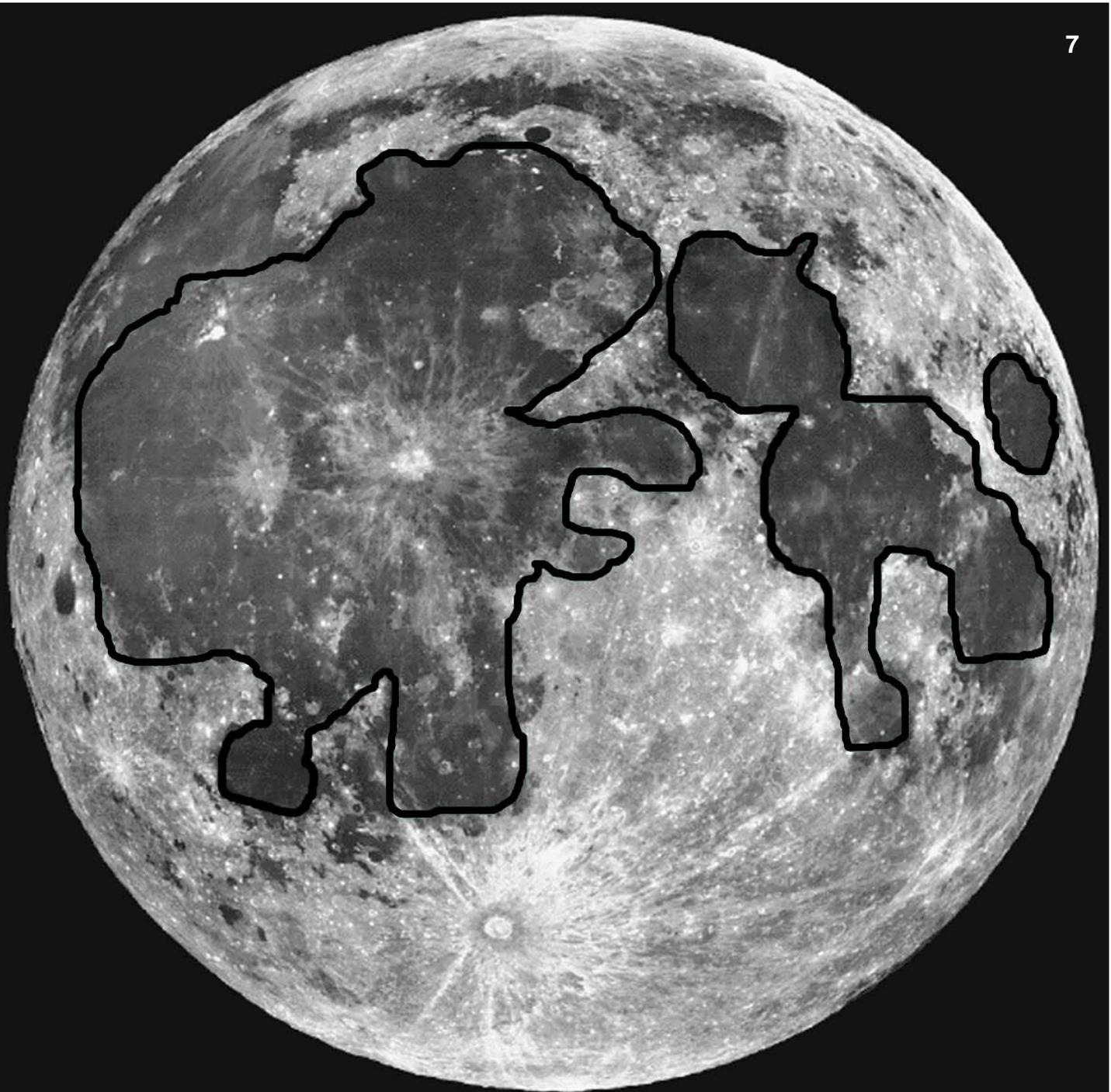
Jack and Jill on the Moon

Story Book

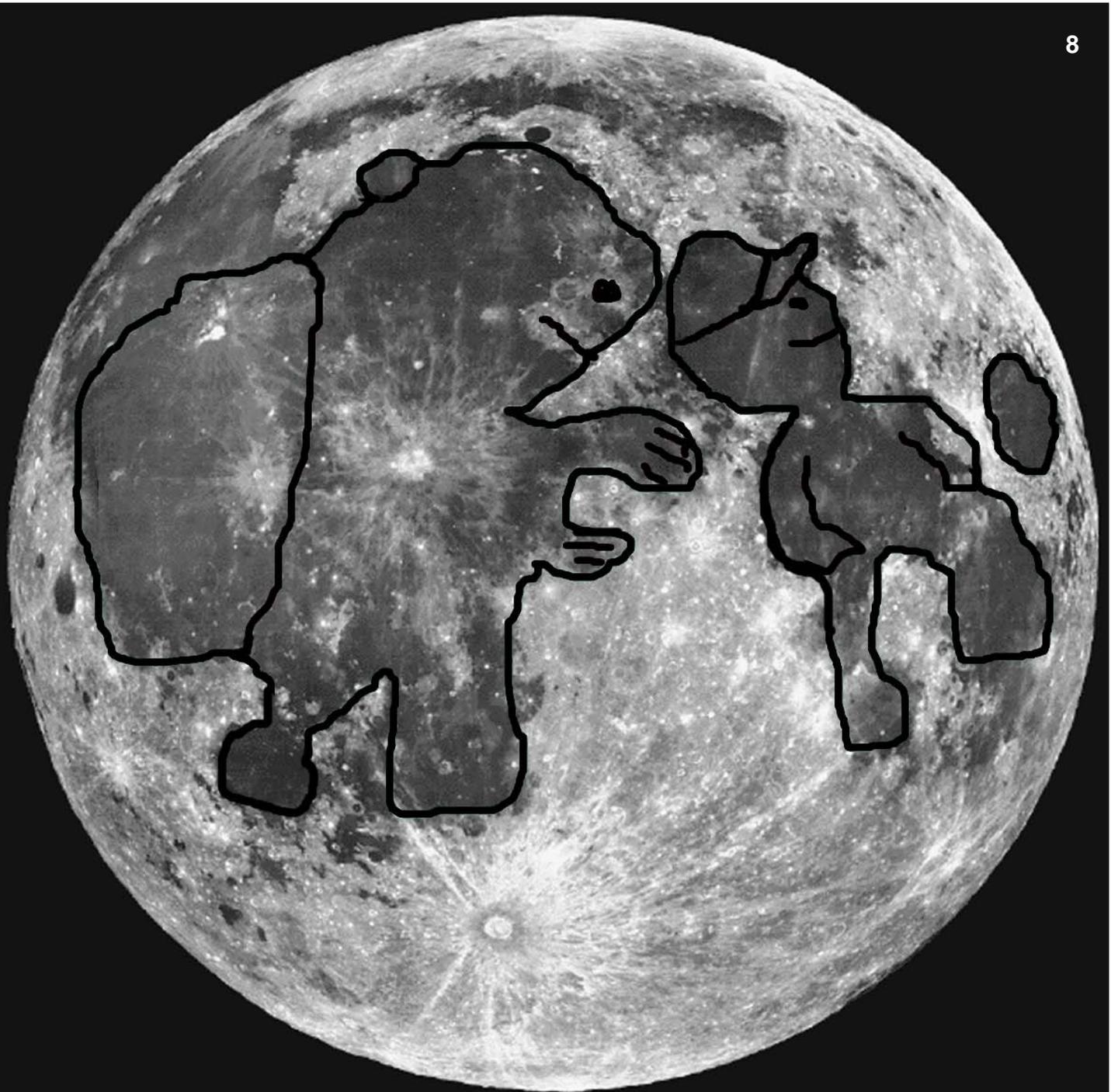
Madison Metropolitan School District Planetarium



Have you ever looked up at the moon and seen those dark patches? Those dark patches are called maria (“mar-ee-a”). Many people imagine those patches make a picture. What picture do you imagine those patches make? Do you know the nursery rhyme Jack and Jill? Some people imagine that they can see Jack and Jill on the moon. Can you?

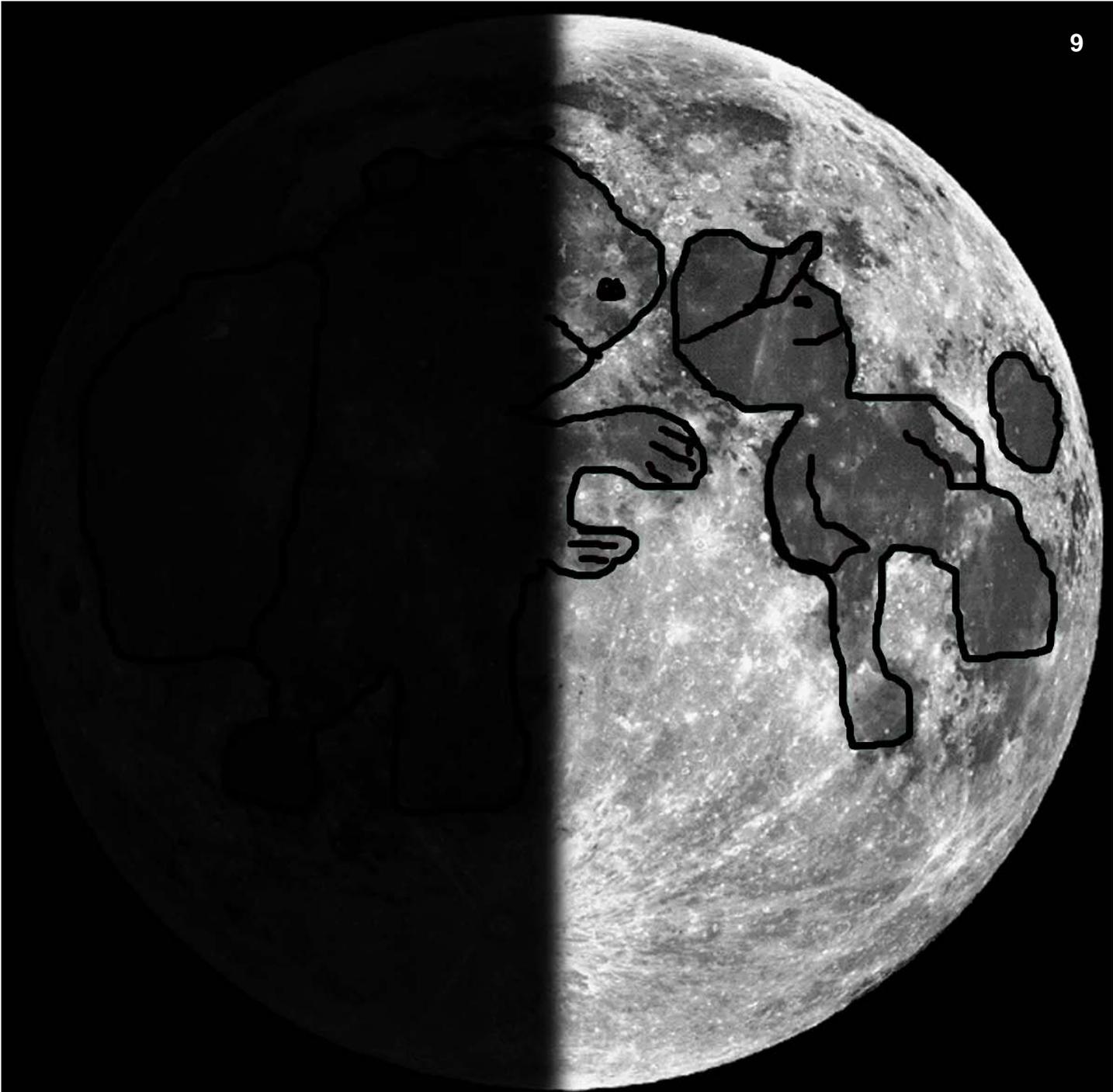


If you trace around the edges of the dark patches, you can make shapes like these. Try to imagine Jack on the right side, wearing a baseball cap, and with his hands in his pockets. Now try to imagine Jill on the left side, facing toward Jack, wearing a backpack, and reaching out toward Jack. The pail could be the dark circle on the far right side.



Maybe you can imagine Jack and Jill like this.

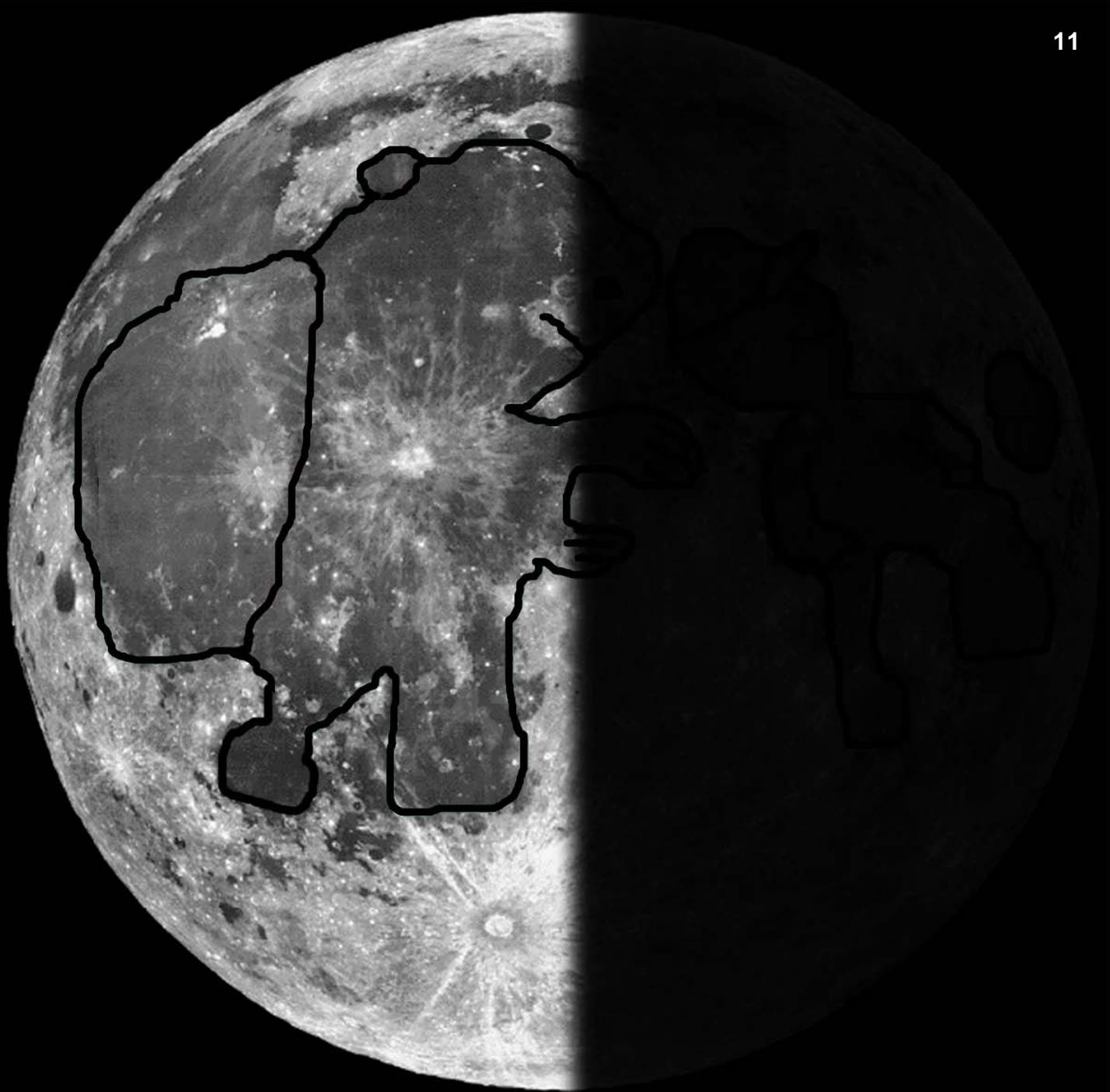
But sometimes when you see the moon in the sky, you can't see all of Jack and Jill. The changes we see in what the moon looks like in the sky are called the moon's phases. These phases happen in a certain order. And that order matches with the Jack and Jill nursery rhyme. Follow along and you'll see.



Jack...



...and Jill, went up the hill, to fetch a pail of water.



Jack fell down, and broke his crown...

...and Jill came tumbling after.

Sometimes the moon is in a phase where we can't see either Jack or Jill.

And then the nursery rhyme and the moon's phases start again.



When you can see the moon looking round like a ball, like you see in this picture, the phase is called a Full Moon. You can only see a Full Moon at night. But there are many times that you can see the moon during the day. Have you seen the moon in the sky in the daytime?

Next time you see the moon in the sky, look to see if you can see Jack, or Jill, or maybe both!