

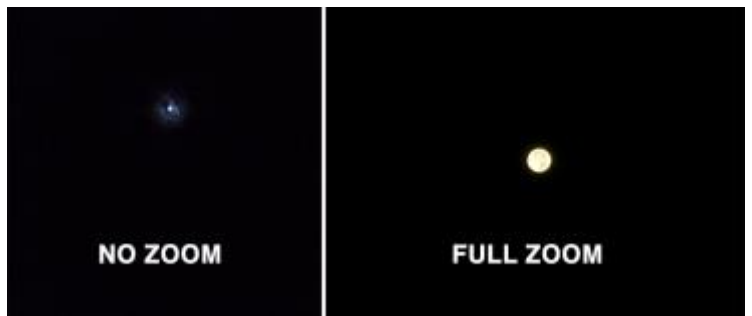
## Measuring the Size of the Moon – Digital

1. Make note of where the full Moon is in the sky. You can use stationary objects (buildings, trees, power poles, etc.) to find a relative location, or measure the Moon's location using altitude (vertical position) and azimuth (horizontal position).

2. Launch your mobile device's camera app. Using the camera's exposure control, reduce the exposure so the Moon doesn't appear overexposed. It should appear dim, perhaps with grey areas (the Moon's mare), not bright white. An overexposed Moon image will make finding the edge and measuring its size impossible.



3. You can use the camera to zoom in on the Moon, but be sure to record the zoom factor (e.g., 2.0x, 3.4x). If your camera does not display zoom factor, you can zoom in all the way. Do not zoom part way if your camera does not display zoom factor as you will not be able to find the exact zoom position in future measurements.



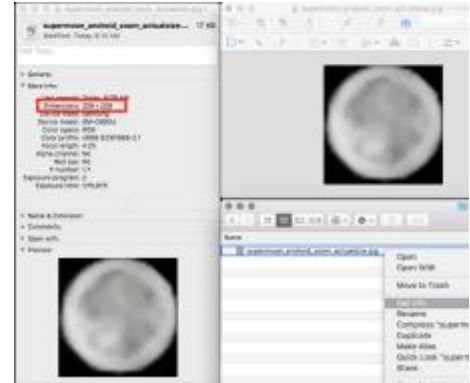
4. Take a picture of the Moon. Consider propping the device on something to hold it steady and capture a sharper image. You might want to take several pictures and work with the best one.
5. Measure the number of pixels across the disk of the Moon. There are several options:

1. Crop the image to the size of the Moon and find the size of the image within the mobile device: Locking the aspect ratio at 1:1 will constrain you to a square, helping to



accurately crop the Moon's dimensions. Within the Android OS, looking at **photo details** or **info** will give you pixel dimensions of an image. If the image is cropped to the size of the Moon, the image size is also the pixel measurement across the Moon. If you are using an iOS device, you may need to download a third-party app such as Photo Investigator or Picture Information Extractor to view the pixel dimensions of the image.

2. Crop the image to the size of the Moon within the mobile device and transfer the image to a computer: Again, locking the aspect ratio at 1:1 will constrain you to a square, helping to accurately crop the Moon's dimensions. Right-click on the file and select Properties (Windows) or Get Info (Mac) to view pixel dimensions.



3. Transfer the uncropped image to a computer and use an on-screen pixel ruler such as PixelRuler or PicPick for Windows, or Preview in MacOS to click and drag a pixel readout over the image. In both cases, make note of how much the image is zoomed (e.g., actual size, 150%, 200%, etc.) and use that same setting each time you measure the pixel dimensions of the Moon.



6. Repeat this procedure during multiple successive full moons, while the Moon is in the same approximate spot in the sky (recorded in Step 1).



<b>Date of Full Moon Observation</b>	<b>Moon Size</b> (in pixels)	<b>Notes</b> (location, time, camera zoom factor, etc.)

1. What is the largest pixel dimension measured?
2. What is the smallest pixel dimension measured?
3. What is the ratio between the largest pixel measurement and the smallest pixel measurement?
4. What percentage change is there between the smallest pixel measurement and the largest pixel measurement?