LAB 4

UNAR SURFACE

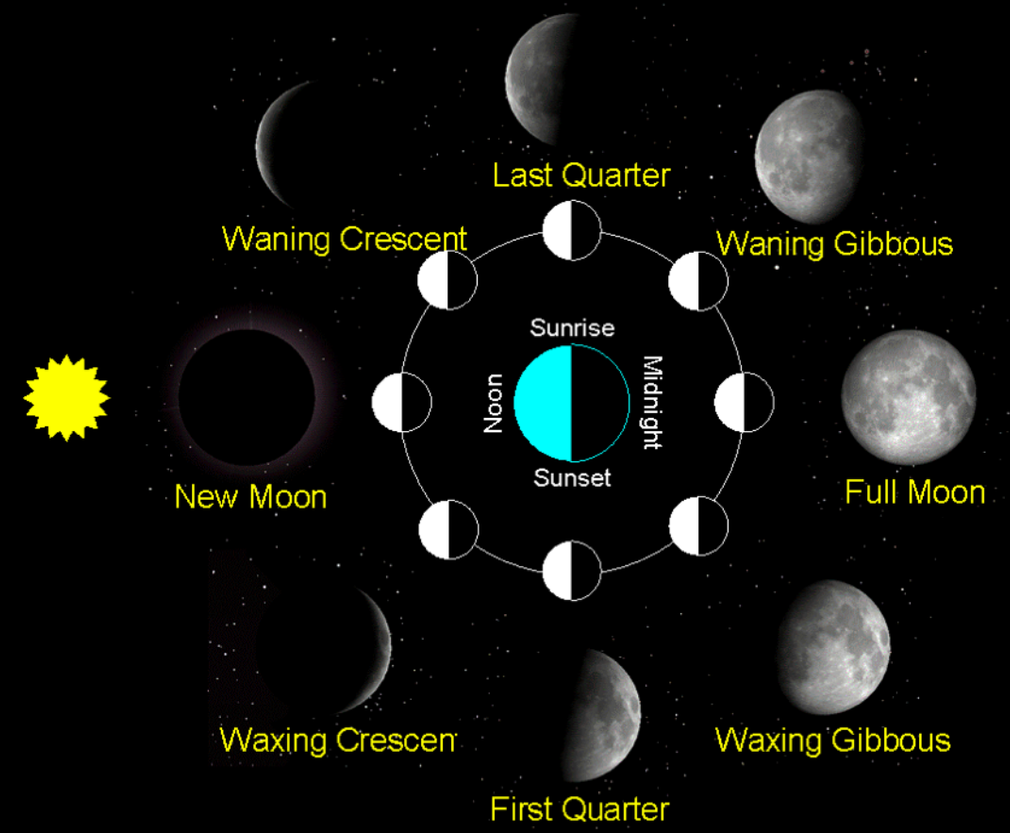
RUBRIC

Astronomy 101 Lunar Rubric /15 + /6 + /3 + /45 + /15 + /6 + /10(neatness) = /100

Grade Value	0	1	2	3	Weight
Objective & Introduction	Content missing	Basic content. Non-scientific jargon and wording. Difficult to understand sentences.	Acceptable content. Some attempt at scientific terminology. Sentences acceptable.	Excellent content. Proper use of jargon and scientific wording. Assumptions noted and justified.	5
Grade Value	0	1	2	3	Weight
Procedure	Content missing	Basic content. No special equipment described, minimal description of procedure, no discussion of measurement uncertainties.	Acceptable content. Special equipment noted, important points of procedure noted, basic discussion of measurement uncertainties.	Excellent content. Special equipment addressed and discussed, procedure detailed and informative, measurement uncertainties noted.	2
Grade Value	0	1	2	3	Weight
Observations, Tables & Graphs	Content missing	Basic content. Incomplete information. Tables missing title, or other details. Graphs missing titles, labels, and/or too small. Sketches lacking detail.	Acceptable content. Minor details missing from graphs, tables and sketches, but all major details present.	Excellent content. Tables and graphs complete. Observations thorough.	1
Grade Value	0	1	2	3	Weight
Answers	Content missing.	Basic content. Questions answered simplistically; answers show lack of insight. Results not clearly discussed. Units neglected. No link between objective and results.	Acceptable content. Questions mostly answered correctly. Results mentioned, with spotty units. Weak link provided between objective and results.	Excellent content. Questions answered in detail. Clear connection between objective and results. Units clearly included.	15
Grade Value	0	1	2	3	Weight
Discussion	Content missing.	Basic content. Lacking discussion about expectations, assumptions, and consistency. No discussion about broader context.	Acceptable content. Limited discussion of expectations, assumptions and consistency. Limited discussion of broader context.	Excellent content. Expectations, assumptions and consistency clearly and correctly addressed. Broader context discussed.	5
Grade Value	0	1	2	3	Weight
Conclusion & References	Content missing.	Basic content. Conclusion unclear or lacking insight. References limited or missing.	Acceptable content. Correct conclusion but limited. Some references included.	Excellent content. Conclusion correct and focused. Detailed references included.	2

MOON FACTS

- The lunar cycle is 29.53 days (How we decided the length of a month).
- Moon is tidally locked.
- Moon phase depends on position of moon with respect to the Earth and Sun.
- Distance from Earth is ~384,400 km. We could fit every planet (w/Saturn on its side) within this distance.
- Has a diameter of 3,475 km (bigger than Pluto), and is the 5th largest moon in the Solar System.

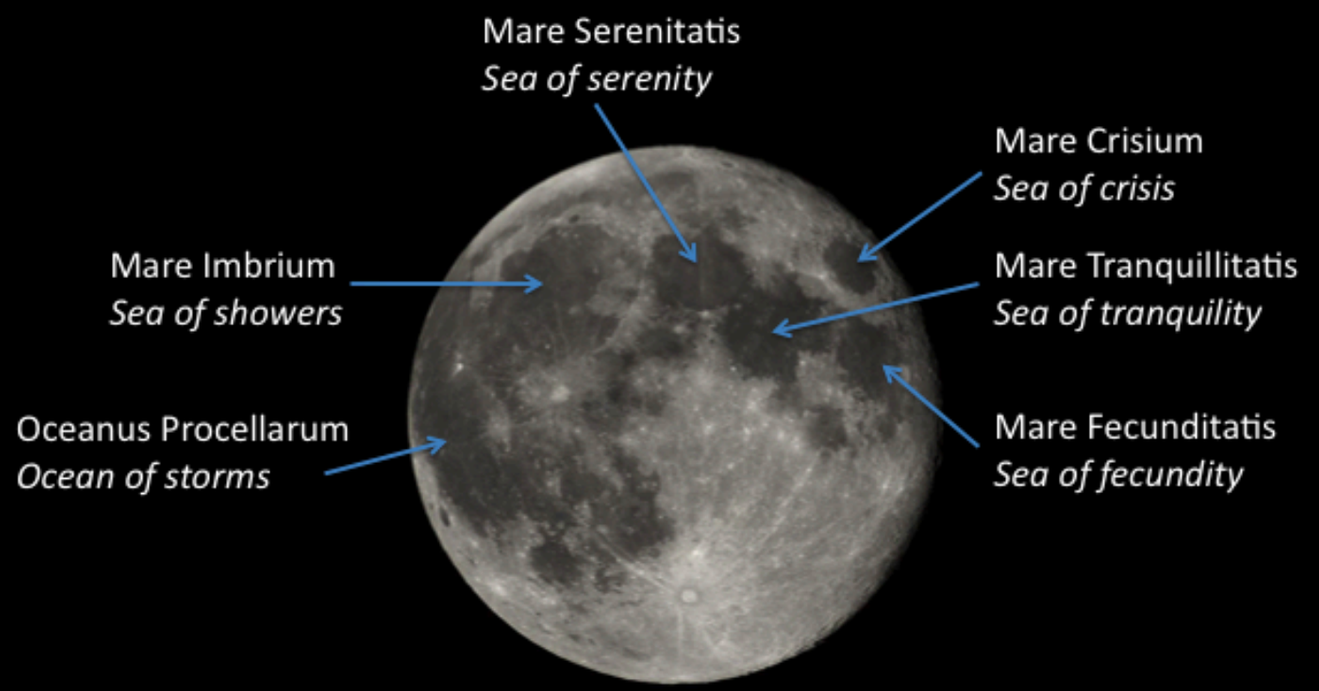


MOON FEATURES

- Maria: Latin for “seas”. Remnants of lava flows from volcanic activity. 3.5 billion years old.

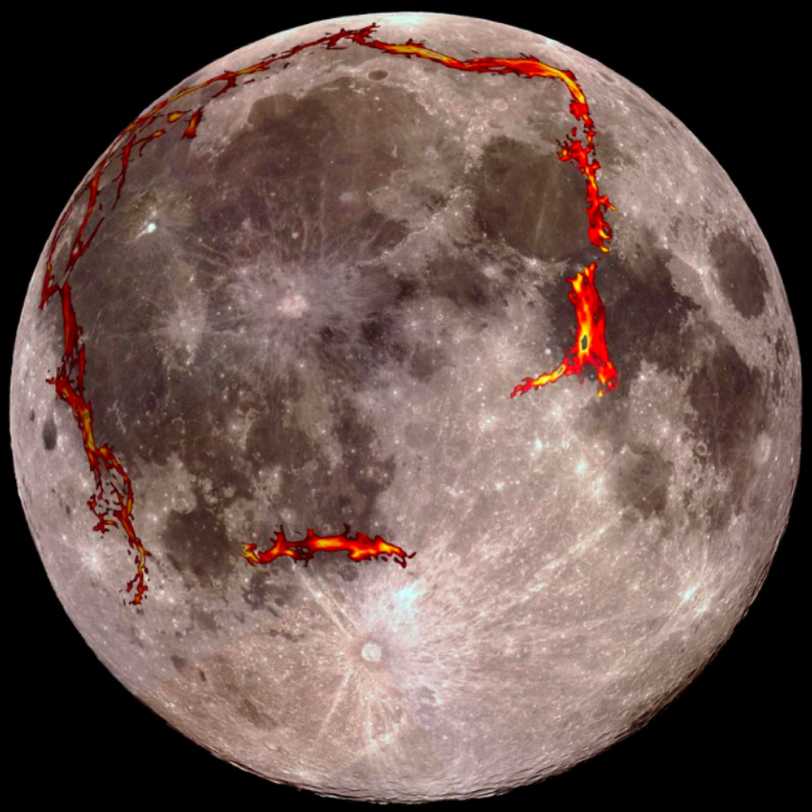
- Craters: Created by impacts from objects such as asteroids. May be surrounded by streaks of material that was ejected during impact

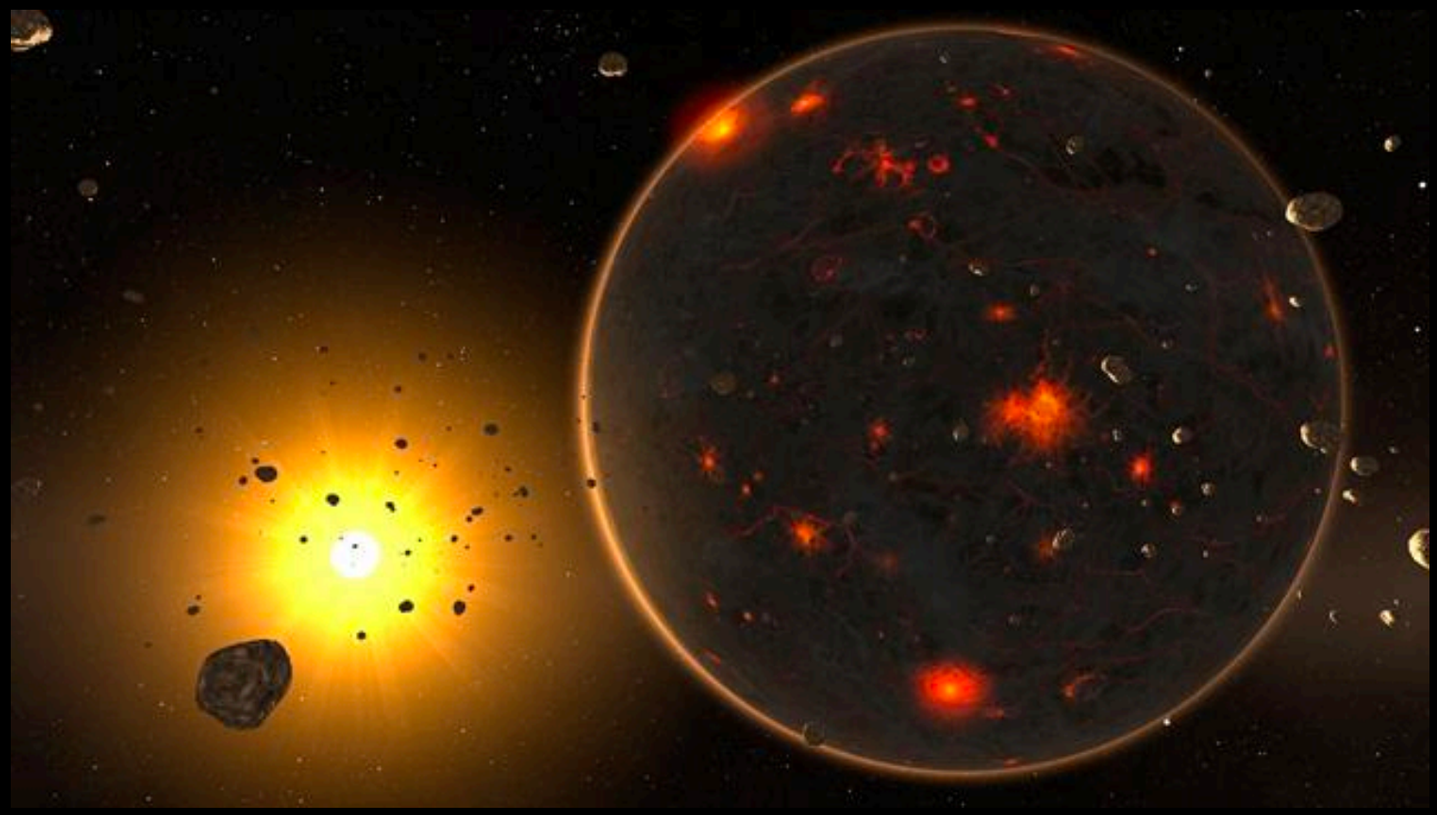
- Highlands: Old mountainous regions. Typically a lighter colour than the Maria.



WHAT DO THESE FEATURES TELL US?

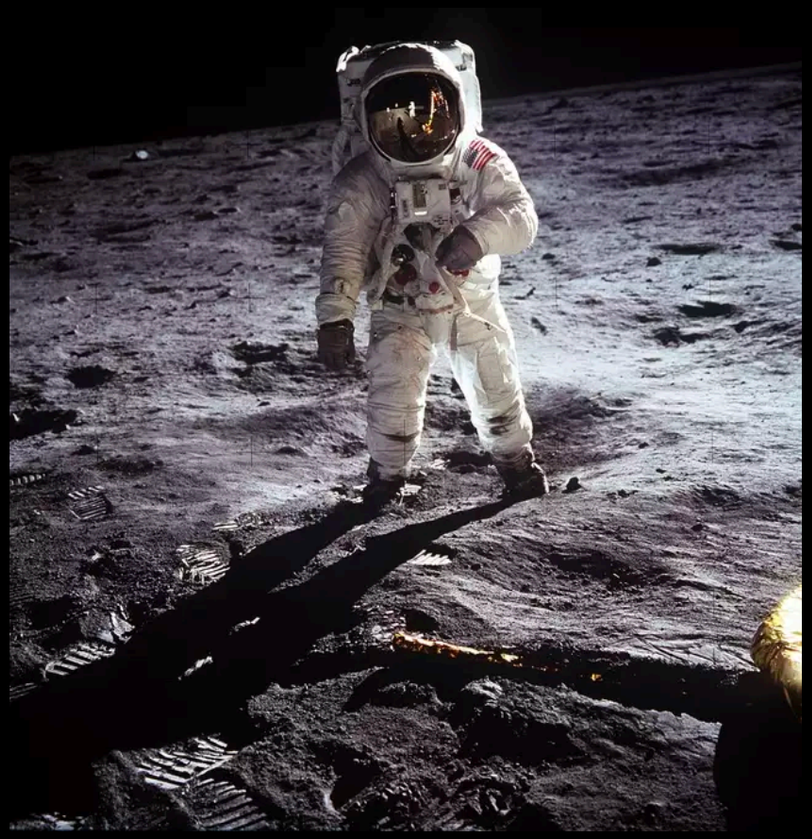
- Maria: The moon used to be volcanically active.
- # of craters on maria compared to highlands indicate a violent early solar system (the Late Heavy Bombardment).

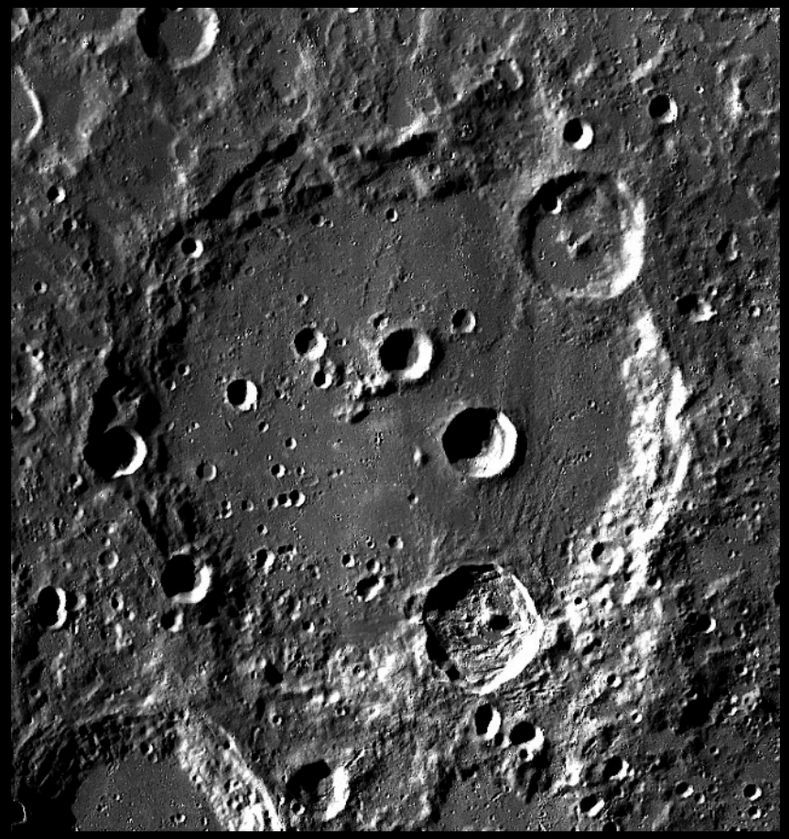




PART 1

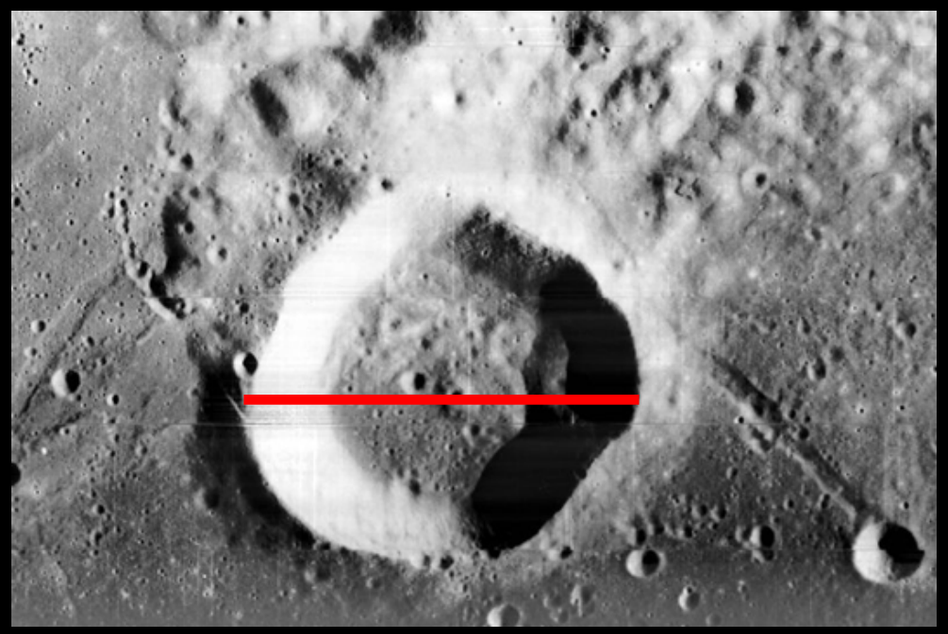
- Use posters to answer questions 1 through 4.
- Label your answers on your high-res image.





PART 2

- Use gimp look at high resolution image of moon and answer questions 5-8.
- Q5: Scale = D(moon_km)/d(moon_pixels) (Use the measure tool)
- Q6: D(crater_km) = Scale x d(crater_pixels)
- Q7: Rule of thumb-Diameter of crater is ~10 to 50 times diameter of meteorite.
- Q8: d(crater_pixels)= D(crater_km)/Scale



PART 3

- Use an impact calculator to answer questions 9-13.
- Both diameter and speed are given in both cases, the other parameters chosen need to be justified (Q10).
- Q13: Obtain the crater size given by a 1km diameter asteroid. (Best to make the largest crater you can.)

PART 4

- Use the crater size you found to count the # of craters on the Maria (Use the ellipse tool). Answer questions 14-20.

- Q15: Total Craters = #Counted x (A_moon/A_maria) = #Counted/.16

- Q17: Crater Rate= Total Craters/3.5 billion years

- Q18: Earth Crater Rate = Crater Rate x (A_Earth/A_moon)