Lab 11
The Surface of the Moon

Names: _____

Station #1

Question #1: Approximately how many craters can you see inside the dark circular region that defines Mare Imbrium? Compare the number of craters in Mare Imbrium to the brighter regions to the North (above) of Mare Imbrium. (**3 points**)

Question #2: Using the diameters for the large craters noted above, and a ruler, what is the approximate diameter of the smallest crater you can make out in images #4 and #5? If the NMSU campus is about 1 km in diameter, compare the smallest crater you can see (and can still measure) to the size of our campus. (**3 points**)

Question #3: Estimate the coverage of the Organ Mountains that are located to the east of Las Cruces. Estimate a width and a length, and assuming a rectangle, what is the approximate area of the Organs? (**2 Points**)

Question #4: Roughly how much area (in km^2) does Mons Piton cover? Compare it to the Organ Mountains. How do you think such an isolated mountain came to exist? [Hint: In the introduction to the lab exercises, the process of maria formation was described. Using this idea, how might Mons Piton become so isolated from the mountain range to the northeast?] (**2 Points**)

Station #2

Question #5: Compare the region around Clavius to Mare Imbrium. Scientists now know that the lunar highlands are older than the maria. What evidence do you have (using these photographs) that supports this idea? [Hint: review "Relative Ages of the Moon" in the introduction.] (**5 Points**)

Station #3

Question #6: Describe the logic that NASA used in choosing the two landing sites – why did they choose the Tranquillitatis site for the first lunar landing? What do you think led them to choose the Apollo 17 site? (**5 Points**)

Question #7: Do the photographs from the actual landing sites back-up your answer to why NASA chose these two sites? How? Explain your reasoning. (**5 Points**)

Station #4

On the northern-most edge of Mare Imbrium sits the crater Plato (labeled in images #2 and #6). Image #20 is a close-up of Plato.

Question #8: Do you agree with the theory that the crater floor has been recently flooded? Is the mare that forms the floor of this crater younger, older, or approximately the same age as the nearby region of Mare Imbrium located just to the South of (below) Plato? Explain your reasoning. (**4 points**)

Station #5

Question #9: Is Plato located in a high region, or a low region? Is Plato lower than Mare Imbrium (centered at 32° N, 344°)? [Remember that Plato is on the Northern edge of Mare Imbrium.] (**4 points**)

Question #10: Compare the average elevation of the near-side of the Moon to that of the far-side. Are they different? Explain. Can you make-out the Maria? Compare the number of Maria on the far side to the number on the near side. (**4 points**)

Station #6

With the surface of the Moon now familiar to you, and your perception of the surface of the Earth in mind, compare the Earth's surface to the surface of the Moon. Does the Earth's surface have more craters or fewer craters than the surface of the Moon? Discuss two differences between the Earth and the Moon that could explain this. (**5 points**)

Station #7

Question #11: Compare the distribution of iron and titanium to the surface features of the Moon (using images #1, #2 or #6, or the topographical map in image #23). Where are the highest concentrations of iron and titanium found? (**5 points**)

Question #12: If the heavy elements like iron and titanium sank towards the center of the Moon soon after it formed, what does the presence of large amounts of iron and titanium in the maria suggest? [Hint: do you remember how maria are formed?] (**5 points**)

Question #13: Is the Moon composed of the same mixture of elements as the Earth? What are the biggest differences? Does this support a model where the Moon formed out of the same material as the Earth? [Hint: review Trevor's intro lecture for this lab!] (**5 points**)

Question #14: Given this information, do you think it is likely that the Moon formed out near Mars? Why or why not? (**5 points**)

Question #15: Given the data in Table 11.2, present an argument for why the giant impact theory probably is now the favorite theory for the formation of the Moon. Can you think of a reason why the compositions might not be *exactly* the same? (**3 points**)