Journey to The Moon

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Introduction

There are many researches that have been conducted about the moon by now. Twelve people had stepped on the moon's surface. Some spacecrafts were launched there to investigate about topography, atmosphere and more. Some of them accomplished the mission but a few of them couldn't complete the mission mostly because of the technical problems. The U.S.A., Russia, India, Japan and the European Space agencies are still going on their observations about the moon. These all researches had been conducted up to now were published on academic journals, books and other resources.

Pupils have knowledge about the moon researches from science lessons and media tools. But basically, they do not know about how scientists get these scientific knowledges about the moon and how these researches are going on. On this study, pupils as lunar scientists are researching about the moon to send a rover there.

Objective

The objective of this study is to make pupils as lunar scientists by investigating the moon by the digital map which take the images from the Lunar Reconnaissance Orbiter Camera (LROC)[1]. It is a system of three cameras mounted on the Lunar Reconnaissance Orbiter (LRO) launched by NASA in 2009. By the help of this map, pupils research the moon like real lunar scientists. So that way, they use both ICT skills and scientific process skills during the project. Based on project based learning, they have a problem which is to land a rover on the moon for investigating. But how they manage the scientific process before sending a rover? They firstly observe the moon rigorously and make a research about it by the digital map. They research craters' estimated age, diameter, latitude, longitude, topography, chemical structure and after, they define an exact location where they will land the rover. According to data they get, they decide a plain area by taking into consideration the size of the rover. After all, pupils prepare a paper about their research and publish their study on school's science fair.

Materials and Methods

Pupils explore some craters' which are named Edison, Maxwell, Einstein, Nobel, Copernicus. They look over their diameters, latitudes, longitudes and generate graphics and tables for comparing them.

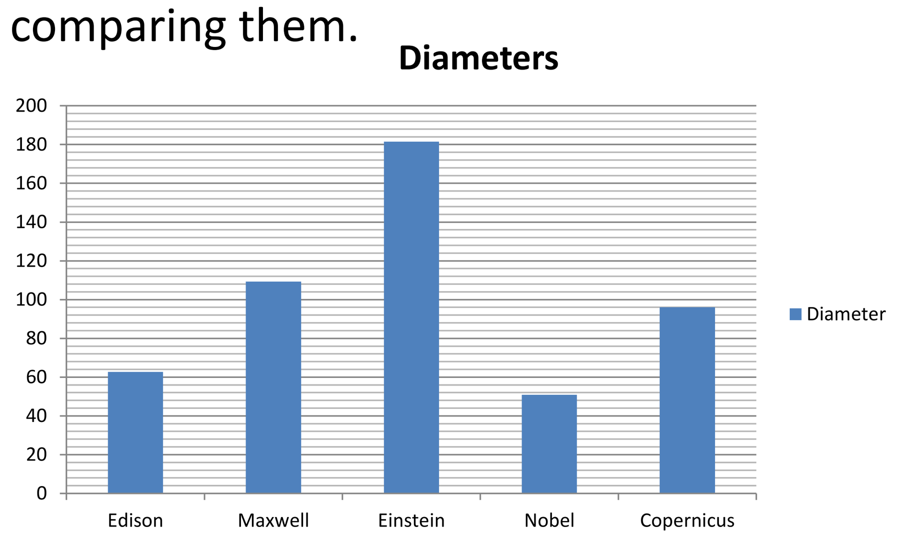

Figure 1. Diameters of Lunar Craters

Table 1
Central Latitude and Longitude of Lunar Craters

Nomenclature's of Crater's	Central Latitude	Central Longitude
Edison	24,8805	99,268
Maxwell	29,9048	98,5256
Einstein	16,603	271,3455
Nobel	14,733	258,6105
Copernicus	9,6209	339,9214

Pupils observe younger craters which play important role to understand meteor flux and lunar interior structure. They learn the ways to find out craters estimated age (younger or older) by looking the rays reflected from their surface.

For example, one of them is named as Copernicus is one of the biggest one with its diameter about 96 km. On the Figure 2, it is seen Copernicus crater and its neighbor Eratosthenes. The two neighboring craters look very similar in terms of the morphologic features (rim, walls, central peak), however Eratosthenes has no rays. The fact that Eratosthenes has no rays shows it is older than Copernicus.

On the younger crater (Copernicus) they define, they look into the elements which constitute the moon and have knowledge about craters' structure.

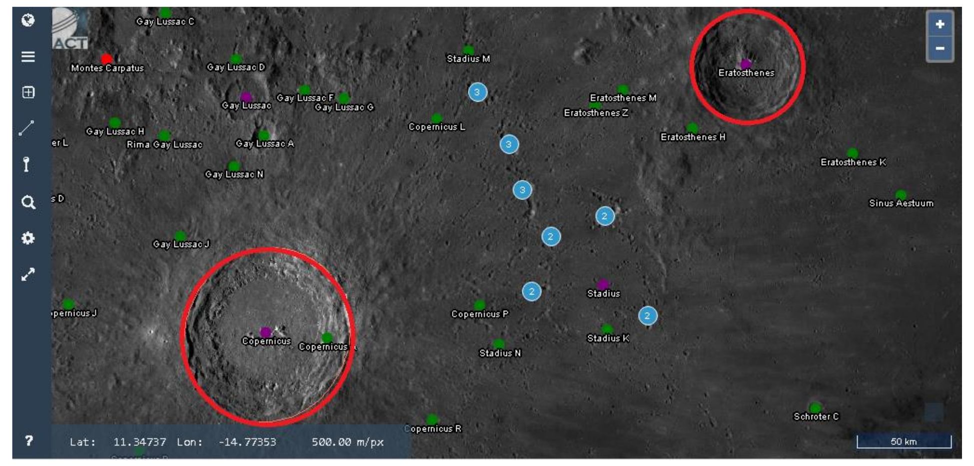

Figure 2. Copernicus and Eratosthenes

After that researching , they observe Copernicus which is younger and bigger crater between them. Younger craters are important to understand meteor flux and lunar interior for lunar scientists. Pupils search distribution of elements on Copernicus crater according to the brightness of light reflected from surface. Yellow-orange color shows it is rich of iron, less of titanium. Blue rays show that it is rich of titanium, less of iron on Figure 3.

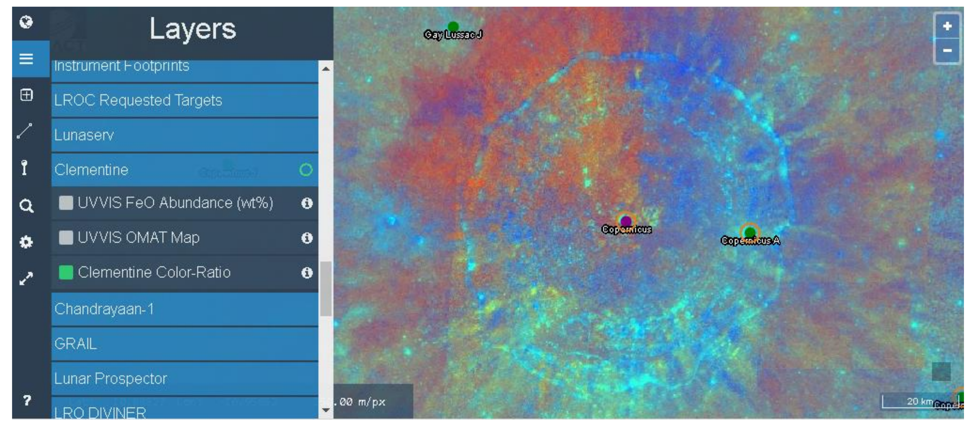

Figure 3. Iron-Titanium distribution on Copernicus

Results

Finally, according to data they collect, pupils discuss if they want to investigate the moon surface by sending a rover, which plain area on the crater they would choose for landing. They measure the crater's length vertically and horizontally and search elevation on the way they mark up. They draw a polygon on the plain area according to the size of rover (about 300 meters). Finally, as it is shown on Figure 4, pupils define the exact location on Copernicus for rover landing. After the research completed, they prepare a paper and publish it on school's science fair.

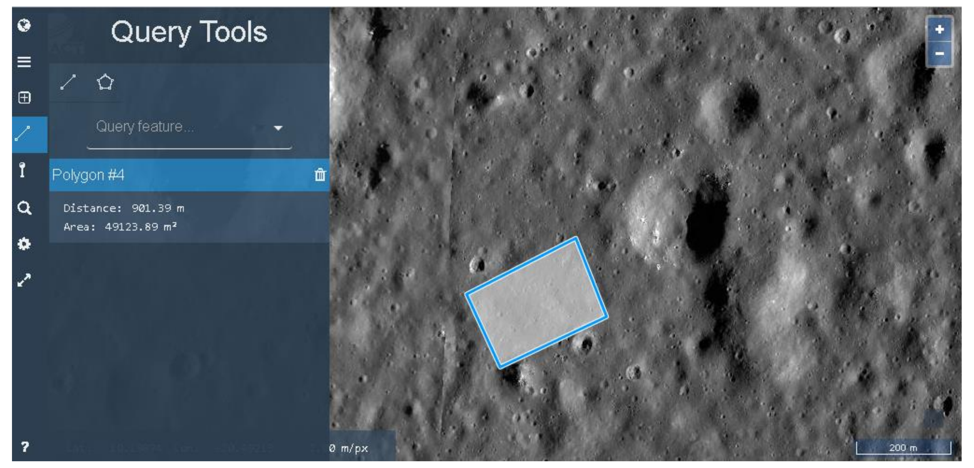

Figure 4. Polygon drawing for rover landing

Conclusion

As a conclusion of this poster, pupils observe the moon, collect data, generate graphics and tables about them and interpret data to solve the rover landing problem. By this way, the pupils have experience to improve their ICT and scientific process skills. They have deep and sound knowledge about the moon and have experience about how it is like to be a lunar scientist.

References

1. Retrieved from http://quickmap.lroc.asu.edu