

Turn in the unit 5 pages from your lab notebook AND pages 2-3 of this lab handout.

## Discovering Jupiter's Moons

**Purpose:** In today's lab, we will use explore how Galileo discovered Jupiter's moons!

**Lab notebook set-up:** Write the standard heading. Label each section and number the questions.

### Materials

- Blue, yellow, red, and black pens/pencils/crayons

### Background

Galileo was an important Italian scientist. You will learn more about his role in science in Introductory Physics. For now, we will consider his discovery of Jupiter's moons. When Galileo was alive, most scientists thought that the Earth was at the center of the universe. It was orbited by the sun, the moon, and the other planets. The stars were located in a layer outside of the planets.

In 1610, Galileo used his newly improved telescope to observe Jupiter. During his observations, Galileo noticed four other specks of light near Jupiter. At first, he thought that they were stars. However, their movement was not normal! Rather than move with the other background stars, they moved in the opposite direction. Further, they always stayed close to Jupiter. After nine days of observation, Galileo realized that the specks of light were not stars at all; rather, they were moons. This was the first time that scientists discovered that planets other than Earth had moons. By following his investigation, we will have a chance to practice the process of scientific enterprise.

### Procedure

1. Read the background!
2. When Galileo first saw the specks of light, he thought that they were stars. Explain how this hypothesis was based on the current scientific theory and common sense.
3. Look at the "Night 1" Image. It shows Jupiter and the four objects that Galileo saw. Describe the objects.
4. Why might Galileo have thought that these objects were stars?
5. On the diagrams on the next pages, label the Nights as 1-9. (Example: "Night 1") The red dot is Jupiter. It is at position 0. The -2 to 2 scale is to provide a reference to help you properly chart the moons.
6. Look at the images for nights 1-9. For each image, chart the location of the objects on the diagrams below.
7. Color code the objects. Use a black pen/pencil for the white object, a yellow one for the yellow object, etc.

Night: \_\_\_\_\_



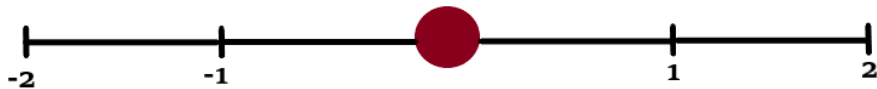
Night: \_\_\_\_\_



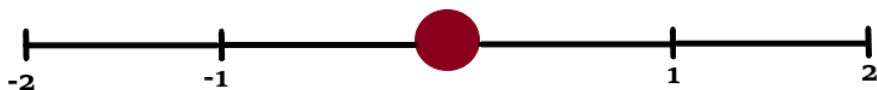
Night: \_\_\_\_\_



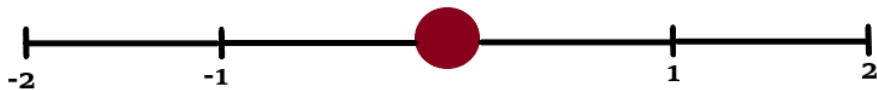
Night: \_\_\_\_\_



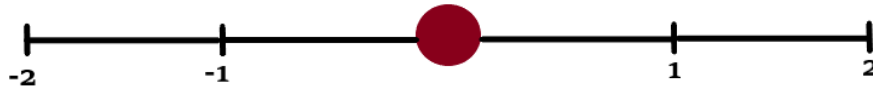
Night: \_\_\_\_\_



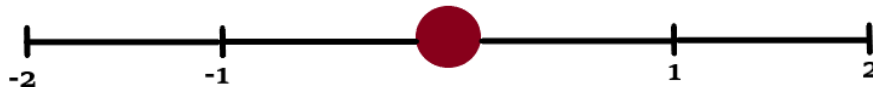
Night: \_\_\_\_\_



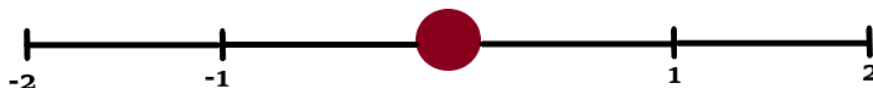
Night: \_\_\_\_\_



Night: \_\_\_\_\_



Night: \_\_\_\_\_



8. Describe the motion of these objects. Explain how they move relative to Jupiter and how they move relative to each other.
9. How does this motion disprove the hypothesis that these objects are stars?
10. How does this motion support the theory that these objects are moons?

## Conclusions

1. Explain how Galileo followed the cycle of scientific enterprise during his research.
2. Three months after discovering the moons, Galileo published his discovery in *The Starry Messenger*. Other scientists were then able to verify his results. Based on Galileo's discovery, what further questions might scientists have? Come up with at least three questions.
3. Make a hypothesis for each of your questions.
4. Pick one of your hypotheses and briefly describe an experiment/observation that could be used to study it.

## References

Lawrence Hall of Science. *In the Footsteps of Galileo: Observing the Moons of Jupiter*. 2008. Astronomical Society of the Pacific accessed 8 August 2021. [https://astro.society.org/file\\_download/inline/1689e781-3f4a-4178-8f7a-7bc581986242](https://astro.society.org/file_download/inline/1689e781-3f4a-4178-8f7a-7bc581986242).