

The Moons of Jupiter

Middle/high school grades

Lesson Summary

Students investigate how the density of Jupiter's moons is related to their diameter and their distance from Jupiter.

Prior Knowledge & Skills

- Plotting data
- Interpreting data

AAAS Science Benchmarks

The Physical Setting

Structure of matter

NSES Science Standards

- **Physical science:** Properties and changes of properties in matter (5-8), Structure and properties of matter (9-12)
- **Science as inquiry:** Abilities necessary to do scientific inquiry

NCTM Mathematics Standards

- **Data analysis and probability:** Develop and evaluate inferences and predictions that are based on data, Formulate questions that can be addressed with data and collect, organize and display relevant data to answer them

Teaching Time: One 45-minute period

Materials

Each student needs:

- Copy of "The Moons of Jupiter" worksheet
- Density and diameter data for Mercury, Mars, and Earth's moon

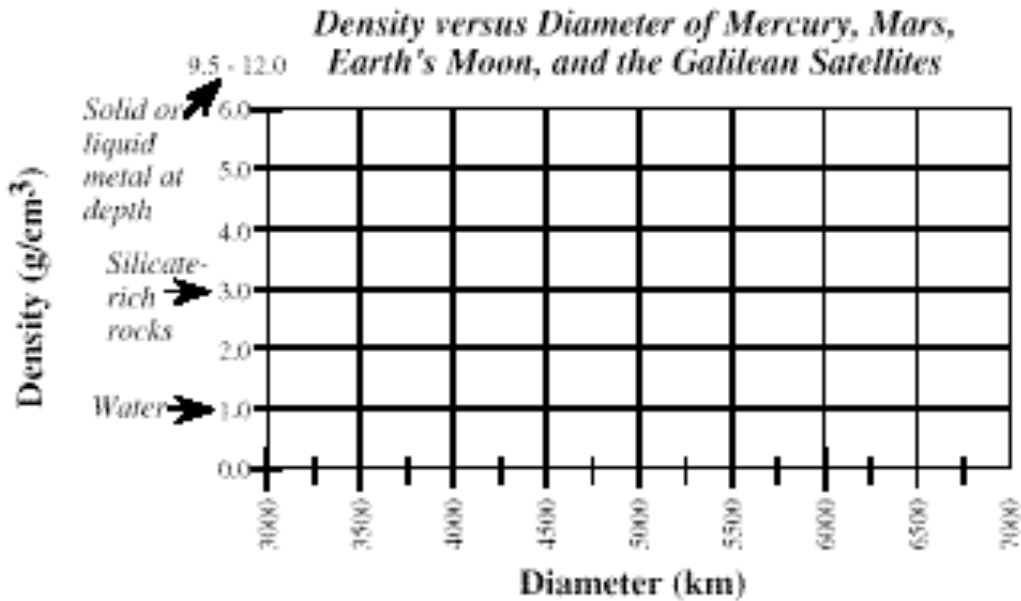
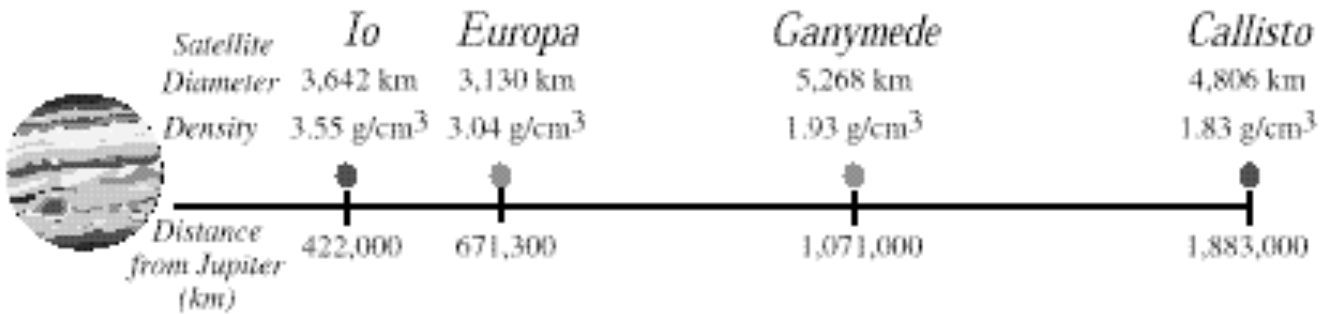
Advanced Planning Preparation Time: 30 minutes

1. Prepare handouts
2. Gather density and diameter data for Mercury, Mars, and Earth's moon
3. Review lesson plans

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The Moons of Jupiter

More than 60 moons have been found at Jupiter. The four largest were discovered by Galileo himself in the year 1610! That's why they're called "The Galilean Satellites." There are four smaller satellites in near-circular orbits that are closer to Jupiter than the innermost Galilean Satellite (Io, see below): Amalthea (discovered in 1892) and 3 others (discovered in 1979). The remaining satellites have elliptical orbits and are found far beyond Callisto. And, if that isn't enough, the Voyager mission also discovered a RING around Jupiter!!



Using the data below and the information on the worksheet, plot the density versus diameter of Mercury, Mars, Earth's moon and the Galilean satellites on the chart provided.

Planet	Diameter	Density
Mercury	4,879 km	5.42 g/cm ³
Mars	6,794 km	3.94 g/cm ³
Earth's Moon	3,475 km	5.52 g/cm ³

How do the Galilean satellites compare to these bodies in terms of size?

Based on density, can you guess anything about the composition of Jupiter's moons?

Based on density, can you guess anything about the other bodies? For example, why is Mercury so much denser than Mars?

Do you see any trends that correspond to distance from Jupiter?

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