LESSON PLAN

15 MORE METEORITE SCIENTISTS

11-14

OVERVIEW

In this lesson, students will investigate some of the loan box's meteorites and associated rocks.

They will test them for magnetism and perform a visual analysis of the samples. In addition, they will make a to scale model of the samples out of plasticine and perform a displacement test to allow them to determine the density of the samples when combining this information with the mass.

They will then use the meteorite identification cards to help them select which object is which.

CURRICULUM LINKS

Making measurements and examining objects.

Calculating density.

Displacement of water to find volume.

Replicating shape and space.

WHAT YOU NEED

- **A15 PowerPoint**
- **4 trays containing:** a **magnaprobe**, **2 hand lenses,** the relevant **tray labels (15.4)** and a copy of the **15.1 Identify the samples** task sheet. In addition, the trays require the following from the loan box:
  Tray 1: Large iron meteorite and basalt rock
  Tray 2: Chondrite cut through meteorite and anorthosite rock
  Tray 3: Etched iron cut through meteorite and Lybian glass impactite
  Tray 4: Whole chondrite and tektite
- **A class set of 15.2 worksheet**
- **15.3 Space rocks identification hint sheets** (2 per group)
- **One set of scales per group** (or easy access to a set of scales)
- **One or two USB microscopes** set up at the front of the room connected to a computer running VLC media player (optional)
- **Clamp and stands for usb microscopes** (optional)
- **Selection of measuring cylinders including 1 large measuring cylinder*** (big enough to fit a to scale model of the largest sample in)
- **Enough plasticine per group for each student to make a to scale model of their rock samples.**
- **Paper towels**

**If you do not have a sufficiently large measuring cylinder available, you can make your own using an empty 2 litre bottle of pop. Please see additional sheet in the resources folder for instructions on how to do this.*

MORE METEORITE SCIENTISTS

Before the lesson begins, set up a 'volume measuring station' near a sink with a variety of different sized measuring cylinders. Students should bring their models over to here to establish the volume of their models, rather than having water near the actual meteorites which can rust if they come into contact with water. Alternatively, if you have large enough Eureka cans, you can use these to identify the volume of the models.

IMPORTANT! The reason we are asking students to make a model of their rock samples for this activity is because the meteorites contain iron, and if they are exposed to water they will start to rust! You could make a big point of this, asking students why they think they are not allowed to drop the rocks in the water. Please also make sure students do not handle any of the samples with wet hands.

STARTER

Using the powerpoint to help you, briefly explain what a meteorite is, and what we look for when trying to identify them.

Ask the class what is meant by density. Hand around two objects of similar size but very different masses (for example, a foam ball and a cricket ball) and explain that dense items are ones that are very heavy for their size. This will be important information to help them with identifying the objects that they have.

Go through the Archimedes slide and get the class to explain how you would work out the density of an object by using mass and displacement of water. You may wish to demonstrate this method to the class.

MAIN ACTIVITY

Split the class into 4 groups, and hand each group a tray with the relevant worksheet, space rocks identification hint sheet, magnaprobe, hand lenses and the samples listed above.

Explain that each group will have to investigate their two samples and try to identify whether they think it is a meteorite, or another type of rock. The tray sheets will tell the students which object they need to calculate the density of. To do this, they will need to make a to scale model of the sample out of plasticine. Get each student to perform this task so that they can then obtain an average of their results.

Once they have made their model meteorite, they will perform a water displacement test by noting the initial volume of water, dropping their model into the measuring cylinder, and recording the final volume. They will then calculate the change in volume and from this determine the volume of their model, and an average volume for the group.

PLENARY

Each group now feeds back to the rest of the class, explaining their findings and what they believe each sample to be and allowing the rest of the class to see their items. You may wish to supplement what they say with some additional information from the meteorites guide in the teacher handbook. You can then hand round the pallasite, moldavite and lunar/martian meteorite samples for students to observe.