Down to Earth
KS3

Student worksheet

Meteorite Sleuths

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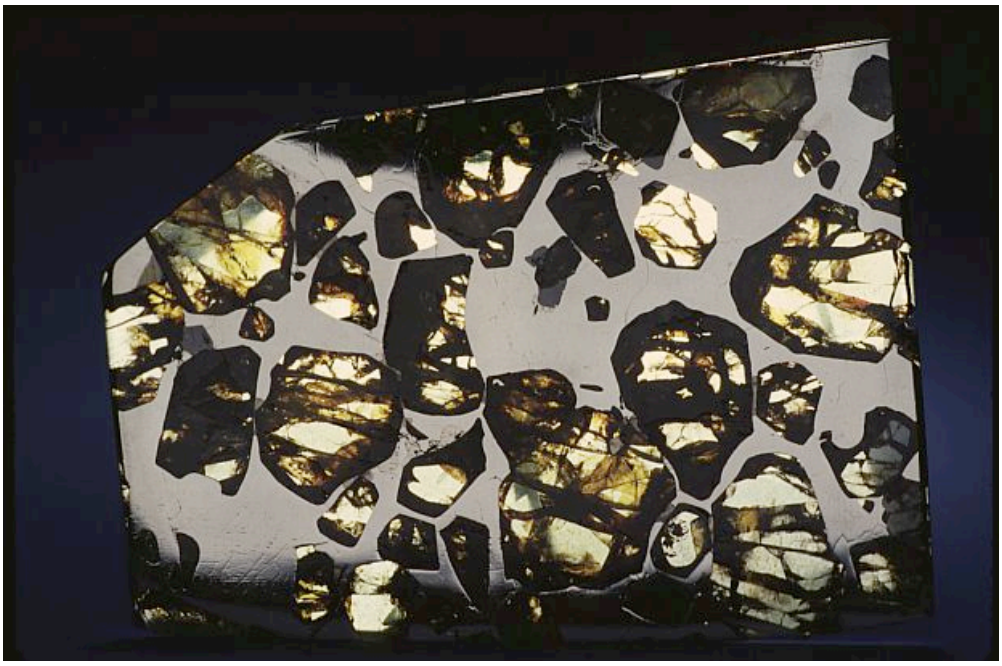
Meteorite Sleuths

Background

Scientists studying meteorites use various types of observations. They make **qualitative** measurements of colour, shape and texture, and **quantitative** measurements of mass and volume observations, recording all the data carefully.



Scientists usually start with general observations about the meteorite, and then move on to more specific observations to identify the meteorite.

They study meteorites in detail under a microscope or magnifying glass, describing what they see.

They slice the meteorites to make even more detailed visual observations. Very thin slices (thinner than a hair) are cut and mounted on microscope slides. High powered microscopes give a clear picture of the minerals and other materials that make up the meteorite.

Meteorites are classified based on the types, amounts and textures of minerals they contain. They are classified as **stony**, **iron** or **stony-iron meteorites**, based on the amount of metal within them.

Stony meteorites are sub-divided into **chondrites**, which contain round blobs called chondrules, and **achondrites**, which do not contain chondrules.

The study of these rocks from Outer Space helps scientists to find out how our solar system, the Earth and other planets formed.

Meteorite Sleuths

1: Inspection

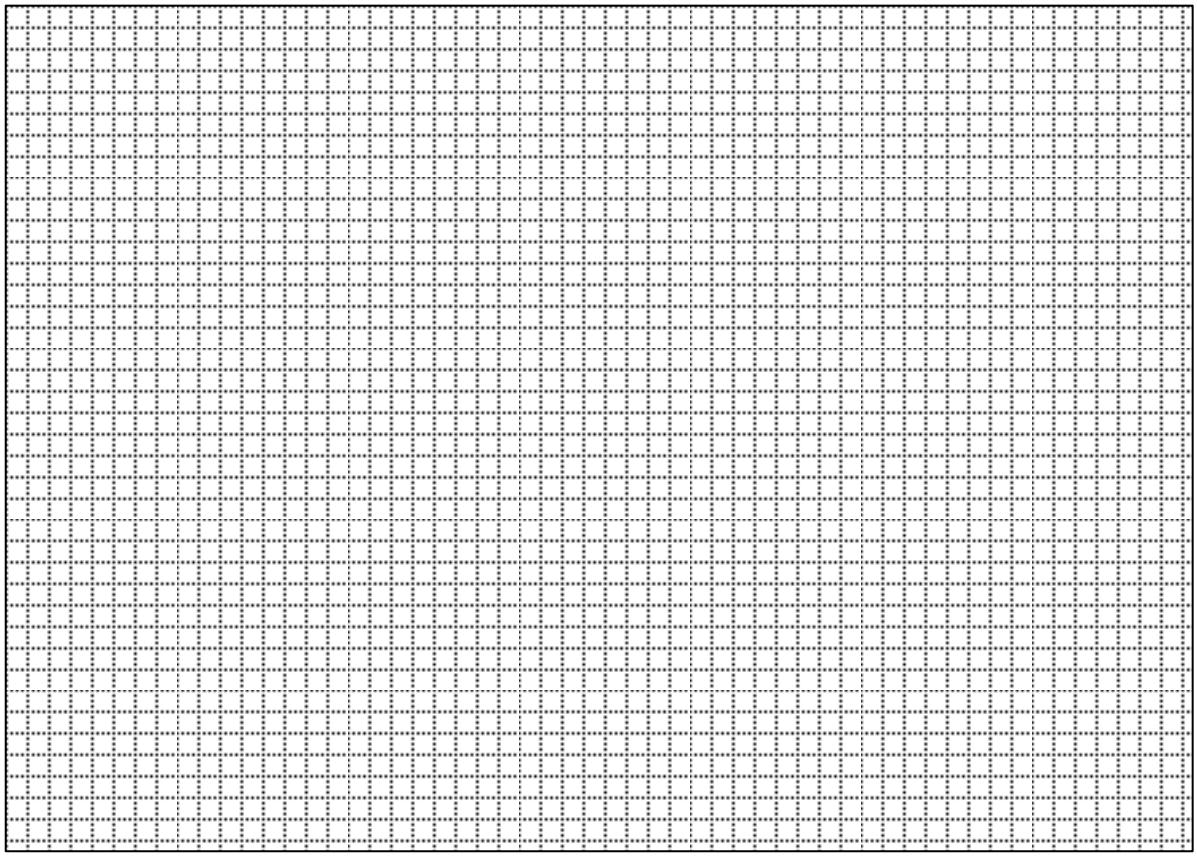
Method

1. Examine the rock.
2. Record its colour and any features you can see.
3. Measure your rock and record its measurements on the grid below.
4. Sketch rock to scale on the grid below (add a scale).
5. Choose a meteorite from the Meteorite Loan Box and record its colour, texture and shape.

Rock Info:

Colour:_____

Description:_____



2: How Dense Is Dense?

Method

1. Measure the mass of each type of marble: Mass of _____ marble: ___ g

Mass of _____ marble: ___ g

2. Write a phrase using the words "mass" and "density" for each type of marble (density = mass/volume).

_____

_____

3. Look at the **iron meteorite** and the **achondrite** in the Meteorite Loan box. Which do you think has greater density?

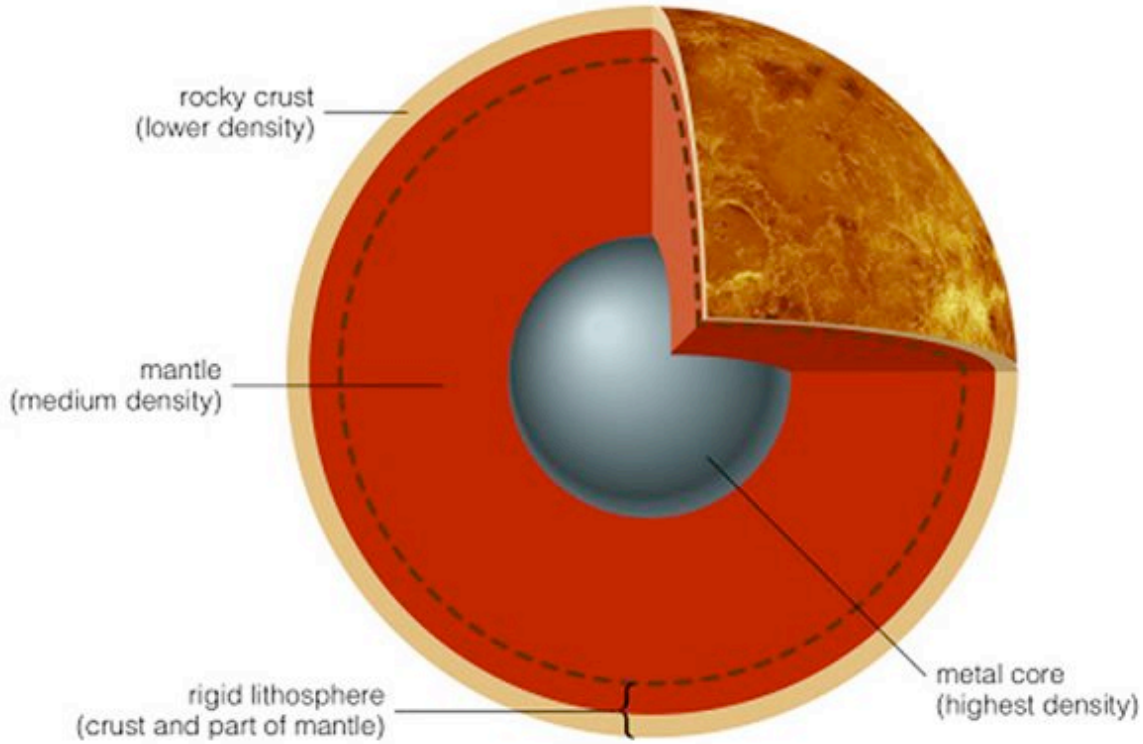
_____

4. How could we measure this?

_____

5. How could density and mass help us to identify different meteorites?

_____



6. Have a look at the picture.

Which of these two meteorites do you think might have come from the crust of a planet and which might have come from the core? Explain your reasons.

_____

_____

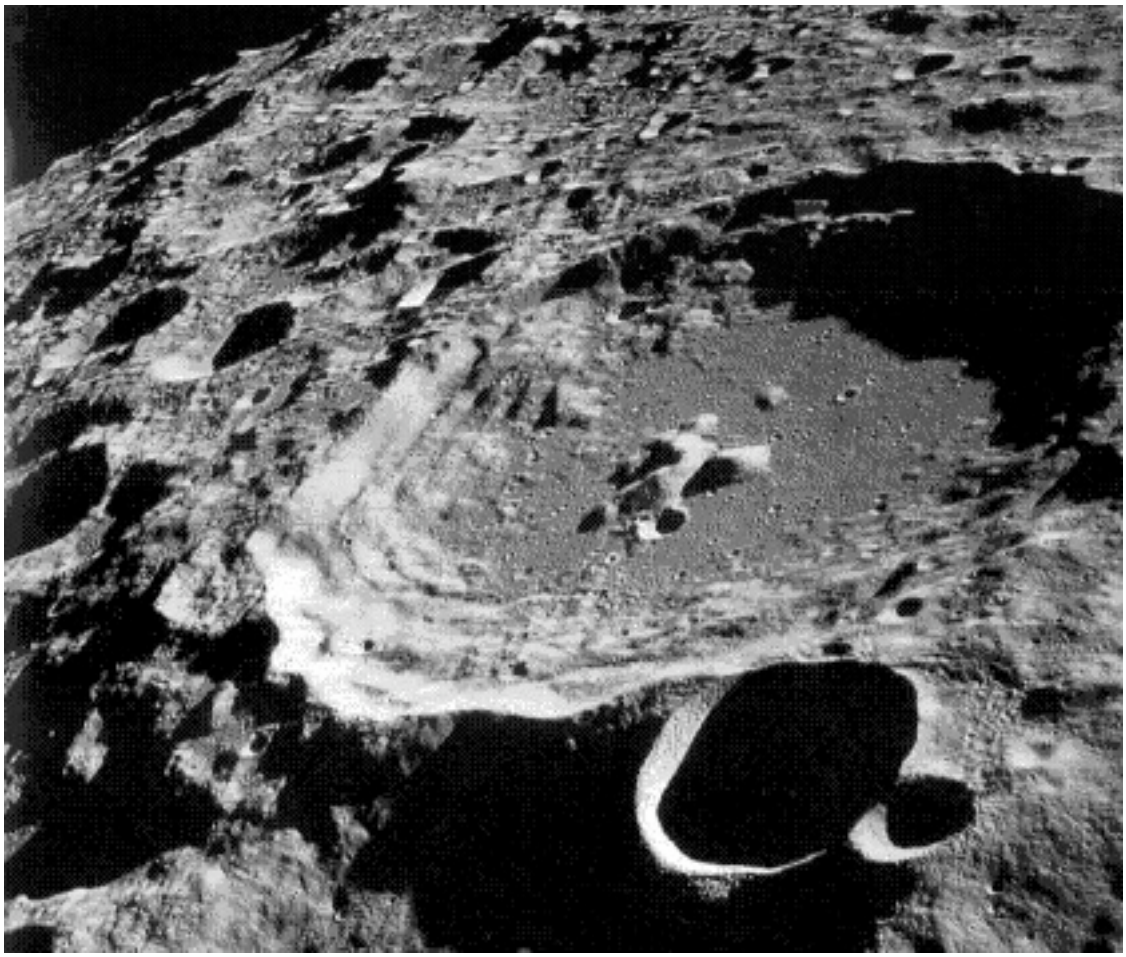
_____

3: Marvellous Magnification

Method

1. Examine the picture below with the unaided eye and then with the magnifying glass.

Write down what you can see with your eyes, what you can see using the magnifying glass and any differences between the two.



Unaided:_____

Magnified:_____

Differences:_____

2. Collect a specimen from the Meteorite Loan box.

Study one of the meteorites using both your unaided eye **and** the magnifying glass, and make a labelled sketch of your observations in the boxes below.

Without Magnification	With Magnification

3. Which type of observation provides more information in meteorite investigations?

_____

4. With which specimens did using the magnifier make the most difference?

Were there any in which the magnifier did not make much difference?

Which ones? Why do you think this is?

_____

_____

_____

4: Meteorite or Meteor-wrong

Method

1. Put specimens on bubble wrap or tissue paper on the table.
2. Please be careful when handling these objects!
3. One of these objects is a real meteorite, the others are things that are often mistaken for meteorites. In your group, try to work out which is the true meteorite.

Some questions which may help you to decide are:

a.Does it have a black or brown crust?

- *Do you think meteorites will gain a crust as they fall through the atmosphere? Why?*

b. Is it solid, without holes or bubbles?

- *Meteorites do not usually contain bubbles. Why do you think this is?*

c. Is the sample heavy for its size? Is the inside of the rock metallic silver?

- *Iron meteorites are very dense compared to most rocks on the Earth, but there are other types of meteorite which are more similar to Earth rocks.*

d. Is the rock magnetic? Does it attract a magnet or deflect a compass needle?

- *Iron meteorites are strongly magnetic. Most meteorites are magnetic.*

e. Does it look like any Earth rocks you have seen?

- *Which ones? How do they form? Do you think this rock could form on another planet?*

4. Why did you choose this object as the meteorite?

Describe the features that helped you to identify it.

_____

_____

_____