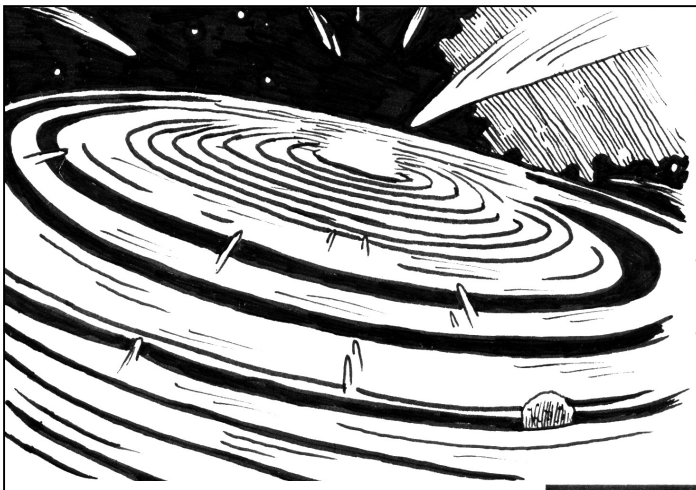
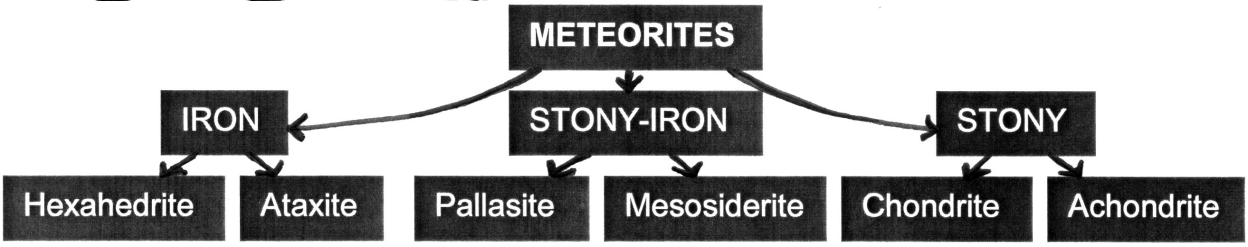
**Geology fact sheet:**

# METEORITES

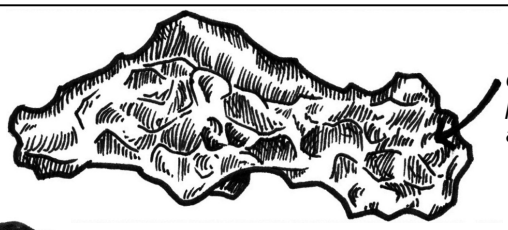


Meteorites are either lumps of rock left over from the formation of the Solar System, or small pieces of planet launched into space during major impacts.

There are three basic types of meteorite: **Iron**, **Stony-iron**, and **Stony**. These types are then split up into several more groups according to their composition:




**Iron meteorites** also contain a percentage of nickel. Iron meteorites with less than 6% nickel are known as **Hexahedrites**, and between 6% and 17% are called **Ataxites**.

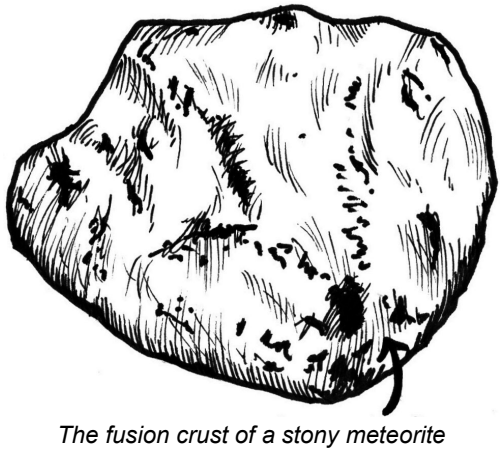


*The characteristic pitted surface of an iron meteorite*

*A stony-iron meteorite which has been cut and polished*

**Stony-iron meteorites** make up only 2% of meteorites found on Earth. They contain iron and nickel, but may also contain silica and other compounds. This class of meteorite is split up into **Pallasites** (olivine/peridot in a nickel-iron matrix) and **Mesosiderites** (nickel-iron and broken stony components, such as silicate minerals, rich in magnesium).

**Stony meteorites** are the largest group of meteorites. They used to be part of the crust of a planet or asteroid. Fresh stony meteorites have a black 'fusion crust'. Most stony meteorites still contain enough iron for them to stick to a powerful magnet.
The stony meteorites that contain colourful, grain-like inclusions known as 'chondrules', are called **Chondrites**. Meteorites without chondrules are called **Achondrites**.



*The fusion crust of a stony meteorite*



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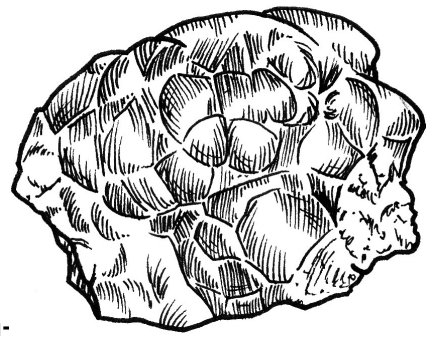
Meteorites are among the most rare of materials that exist on our planet. They are far less common than gold, diamonds, and emeralds. The chances of discovering a new meteorite are extremely slim, even for scientists who hunt for and study meteorites.

Meteorites can easily be confused with a number of more common materials. Earth is rich in iron oxides such as magnetite and hematite – many of which will stick to a magnet. In addition to this, there are different types of man-made metallic by-products such as slag and corroded iron tools, which can also be confused with meteorites.

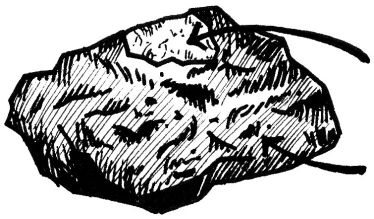


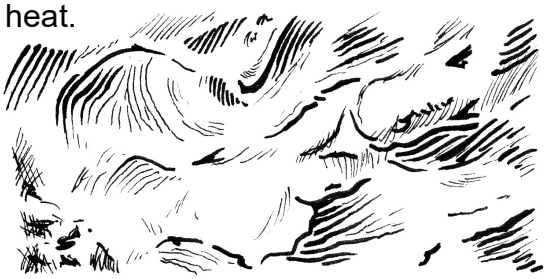
*A meteor-wrong: the terrestrial mineral hematite*

It can be very difficult to identify a genuine meteorite, but there are a number of simple tests that can help determine a space rock from a common terrestrial stone.

Meteorites tend to look very different from the rocks around them. They don't contain the common earth mineral quartz, and in general don't contain vesicles (small cavities found in our volcanic rock).

When meteorites enter our atmosphere, tremendous heat is generated by atmospheric pressure, and the surface of the rock melts. A thin, dark layer called a 'fusion crust' is formed on the surface as a result of this brief, intense heat.

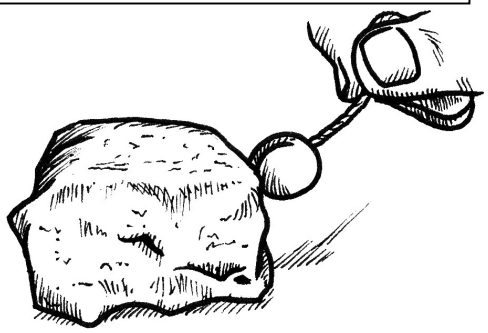


*Close-up of regmaglypts and flow lines on the surface of a meteorite*

In addition to the dark fusion crust, pits the size and shape of fingerprints known as 'regmaglypts' also form on the surface during entry into the Earth's atmosphere. Tiny rivulets of molten rock flow along the surface of a meteorite as it melts. These features (often thinner than a human hair) are known as 'flow lines'.

Iron and stony-iron meteorites are so rich in iron that they will stick to a powerful magnet so strongly that it can be difficult to separate them. Most stony meteorites (apart from Achonrdites, Lunar and Martian meteorites) have a high iron content, so a strong magnet should also stick to them. However, magnets will also stick to many iron-rich earth rocks too – so using a magnet is only the start of meteorite identification.



*The magnet test – magnets are often strongly attracted to meteorites*


*The polished face of a chondrite meteorite*

Chondrite stony meteorites are the most common type of meteorite. They contain tiny, colourful, spherical 'chondrules'. Iron-nickel flakes are often visible as small, shiny blobs on the surface of these meteorites.



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