

An invitation to pupils to measure magnetic particles in soil

Your most important tool will be a strong magnet. Use a ring-magnet of neodymium-iron-boron. Place the magnet in a drilled hole in a piece of wood. Cover the magnet with aluminium which must be thinner than 0,5 mm. Let there be no space between the magnet and the aluminium. There may be magnetic particles hanging on to the magnet. But because of the cover, it will be easy to wipe them off again. Now you can see the magnetic dust hanging on to the small ring-magnet. 500 ring-magnets are sponsored by Siemens Flow Instruments.



When I put sand on the magnets, the magnetic parts of the sand will hang on to the magnet. Look! These are particles of magnetite. They were washed out of rocks in Sweden and brought to Denmark by the ice thousands of years ago. In Denmark we find a lot of the black magnetite in our soil. To day magnetite is made by extremophile life near vulcanoes deep down in the north-eastern Pacific Ocean. Was Magnetite also made on Mars in the in an ocean, that once was there? Scientists want to answer that question.



This is ochre. This is produced, when iron dissolved in water meets oxygen. Ochre is red and very weakly magnetic – if magnetic at all. But when you put ochre in an oven at 480 degrees Celcius for 26 hours, it changes into a mixture containing particles of maghemite, which is **very** magnetic and has turned into a darker red colour. We find maghemite some places with red soil. Is there also maghemite on Mars? How was it made?

Next January, in 2004, there are going to be magnets from Denmark in an experiment on this Rover.

Strong magnets will be catching some magnetic particles that are suspended in the thin atmosphere on Mars.



In this vivarium we will show how. We have constructed a mill to make a storm. At the other end of the vivarium we have put a magnet. Now I will slowly pour some of the material from the oven into the vivarium.

Look – some of the dust is now sticking on to the magnet!
The same thing will probably be happening on Mars. There will be cameras taking pictures, which will be received on Earth for the scientists to analyze.



Here are some experiments we have made with some samples of soil from different places.

To the left you see some red soil from Grib Skov in Denmark. You can see that a part of it is magnetic.

To the right you see small pebbles from the Spanish island of Lanzarote. These are very magnetic!



Maybe we can also get some of the interesting red soil from Rio Tinto in the southern part of Spain? Any pupil all over Europe can measure and collect magnetic soil, where they live.

We would like to invite you to make your own experiments. Take a strong magnet and measure the magnetism of the soil from places where you live. Take a picture and mail the result to Denmark. We would like to create a map with pictures showing the positions of the magnetic soils in Europe. Send us some of the soil as well for possible testing at the University of Copenhagen. Let pupils of Europe measure the soils on Earth in nearly the same way as the scientist will do it on Mars.

7.class at Bellahøj Skole, Svenskelejren 18, Dk-2700 Brønshøj, Denmark

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Read more: http://www.bellahoj.dk/klasser/astronomi/in_english_magnetism.htm



Here we show you how much of each type of soil that hang on to the magnet.