

# Life on Mars

## Activity

Get ready for a scientific investigation on Mars! In this activity you'll create your very own Martian surface and uncover the secrets of life and geology on the red planet. Put on your scientist hat as you search for intriguing signs of life, unravel the mysteries of different rock types, and explore potential energy sources. Don't forget to watch the video instructions for helpful tips to conduct this activity.

## The Science

Have you ever wondered if there could be life on Mars? Scientists are asking the same question, and they're working hard with rovers to find the answer. Mars, which is now a cold desert, may have been a lot more like Earth billions of years ago. There may have been life living on Mars back then as it was on Earth. One way Scientists search for life is by exploring the Martian surface. They look for signs like ancient riverbeds or minerals that could have been made by living organisms. Scientists also examine rocks to understand Mars' geology and find clues about its past. By studying the rocks, they can learn about the planet's history and whether it was ever suitable for life.

Another exciting aspect is investigating potential energy sources on Mars. Just like we need energy to survive, scientists believe that life on Mars would need energy too. They study different sources, such as sunlight or chemicals, to understand how life could sustain itself on the red planet. In this experiment we look at iron, an important energy source for many lifeforms on Earth, but also a substance that creates all sorts of interesting chemistry that we like to study on Mars.

Carbonate rocks are a type of rock that contain calcium carbonate. When a geologist is in the field and they want to know whether a rock is a carbonate rock, they drop hydrochloric acid on it and watch for a fizzing reaction. We can re-create this experiment using bicarbonate of soda (instead of a carbonate rock) and lime juice (instead of hydrochloric acid). Bicarbonate of soda is a base, and lime juice contains citric acid. When these two substances combine, they react to produce carbon dioxide gas, water, and a compound called sodium citrate. This reaction is known as a neutralization reaction. The release of carbon dioxide gas creates bubbles and a fizzy sensation, just like what would happen on a carbonate rock, but in this case the hydrochloric acid is the acid and the rock is the base.

## Materials

- Sand or dirt
- Glitter
- Iron filings
- Bicarbonate of soda
- Lime or lemon juice
- A dish or box
- A slightly smaller dish or box
- Magnifying glass
- Tablespoon
- Teaspoon

## Activity instructions

Regolith is how scientists refer to the dirt on Mars. In this activity we will make our own Mars regolith by using a container and tablespoon to mix together:

- A cup of sand or dirt
- A pinch of green glitter
- 1 teaspoon of bicarbonate of soda
- 1 teaspoon of iron filings

For an extra challenge, ask an adult to prepare the Martian regolith for you to test. They can do this as three separate samples instead of one so you can determine which sample contains which of the different elements you are investigating.

### **Part One: Searching for Life**

For this part of the activity you will need your Mars regolith and a magnifying glass.

Use your magnifying glass to find microorganisms (glitter) living in your Martian regolith. This should be quite challenging but imagine how hard it is to find microorganisms on Mars. Microbes are about 100 to 5000 times smaller than a piece of glitter.

### **Part Two: Iron**

For this part of the activity you will need your Mars regolith and a magnet

Slowly move the magnet over the regolith and see if you can find any iron in the regolith. On Mars, iron is an important substance that could affect the chemistry and potential life on the planet.

### **Part Three: Bicarbonate**

For this part of the activity, you will need your Mars regolith, another small container, a tablespoon, and lime juice.

Use the tablespoon to scoop some of the regolith out of the main container and transfer it into the smaller container.

Now squirt some lime juice onto the regolith. If there is bicarbonate in the regolith then it should bubble. In the real world, bubbles from acid reveal carbonate rocks.

## Further investigation

Ask an adult to add another mysterious substance to the Martian regolith and see if you can figure out a way to detect it! They could try:

- Another type of magnetic substance like nickel
- Something larger that could be sieved out of the regolith, like small rock particles
- Multiple different coloured glitters to represent different species. Can you work out the species richness (which there is the most of)?
- If water had been added to a part of the regolith, which was then allowed to dry up, would you be able to see it?
- Drop a round object onto the Martian regolith to generate a crater. Would you be able to tell how big the meteorite was and what angle it came from? Check out [Mark's](#) STEM in Action profile to learn more about this and try his [Meteorite - activity](#)