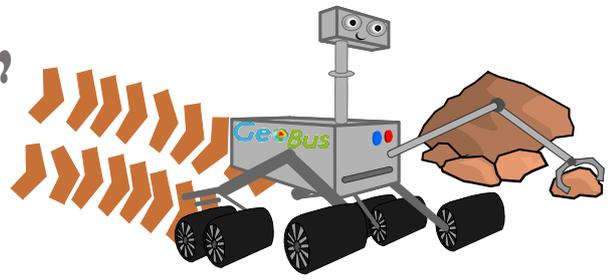


Science Fact or Fiction?

Salty Soil Instructions



Materials:

Ice

Ice frozen with salt (sprinkle ~2tsp coarse salt per glass of water)
[large pieces of ice work best – try freezing in take-away dishes]

Large dishes/trays with sides

Liquid watercolours or food colouring

Dropper/spoon for colouring (plastic pipettes are great)

Coarse salt

Activity:

Place the pieces of ice in to the dishes/trays to contain the melting, and dot the surface of each piece with the colouring. The colouring won't colour the already frozen ice, but it should follow the melting pattern.

Keep an eye on what happens, and you should notice a difference between the salt water ice and the fresh water ice.

You can sprinkle more salt on top of the ice and/or add more food colouring to see what happens after some time has passed.

Discussion:

The salty water has a lower freezing point than the fresh water so it will start to melt sooner, forming channels in the ice. If you add more salt, it dissolves in the melted water, adding ions that decrease the temperature at which the water could re-freeze. As more ice melts, energy is drawn from the water, making it colder. Salt is used in ice cream makers for this reason - it makes the ice cream cold enough to freeze.

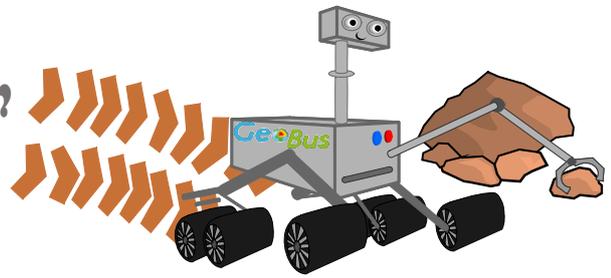
On Mars, temperatures are too low for liquid water to exist – is it possible that liquid salty water could exist?

There is evidence that Martian soils contain salts called perchlorates, which would lower the freezing point in the same way as in this experiment – based on estimated temperature and pressure conditions for the surface of Mars, it is possible that a perchlorate salt solution could be stable in liquid form for a few hours each day during the summer.

This could be good news for the possibility of life on Mars but is bad news for human exploration as perchlorates are toxic in high enough conditions.

Science Fact or Fiction?

Salty Soil



This activity considers the different states of water and what influence salts present in the soil on Mars might have on the search for life.

What is the name of the salts found within soil on Mars?

Melting ice experiment:

You have several frozen dishes, some containing fresh frozen water and the others containing salty frozen water. Drop some food colouring on each bowl so that you can see the melting pattern, and describe what happens in each.

Can you tell contains salty water?

Liquid water is thought to be an essential ingredient for life as we know it, and there is life virtually wherever there is liquid water on Earth. As such, when researchers search for life elsewhere in the universe, they often look for places that could harbour liquid water.

Following the evidence from the experiment above, water could possibly have flowed on the surface of Mars with the help of salts in the soil that can melt ice, just as salts on Earth can be used to melt ice on slippery winter roads and pavements. Some researchers have suggested that this means *"the shallow subsurface of Mars could be habitable"*.