


BE A STEM GIANT



A STEM Alliance Program

SCIENCE: BELOW ZERO SUPERHERO

Description:

Let's explore chemical reactions by looking at a real world problem: Why do we use salt when roads are icy? Why don't we use hot water or baking soda? Why is sand sometimes used? Does that melt the snow? Let's experiment and find out!

Materials:

- Freezable container such as a recycled milk carton
- Action figure or small waterproof toy
- Large mixing bowl
- Hot water
- Sand
- Baking Soda
- Different types of salt (table salt, sea salt, rock salt, etc.)

The STEM Alliance
is dedicated to growing the next
generation of STEM GIANTS.

Learn more:

www.theSTEMalliance.org



Creating a network of STEM learning opportunities!

DIRECTIONS:

1. Place your action figure into an empty container and fill it with water
2. Freeze the container overnight
3. Remove the block of ice from the container and place it in a large bowl so that as the ice melts, it won't make a mess!
4. Try to "save" your action figure from the ice by experimenting with the hot water, sand, baking soda and salt to see if you can melt the ice.
5. Follow the steps of the Scientific Method and ask yourself these questions:
 - a. What happens to the hot water when you pour it on the ice? Is it still hot? Why would this not work on the roads?
 - b. Does salt really work to melt the ice? Is there a difference between various types of salt?
 - c. What about baking soda -- does that work?
 - d. Why do they put sand on the road if that doesn't melt the snow?



THE SCIENCE BEHIND IT:



- Salt helps in lowering the freezing point and, consequently, the melting point of water (the main component of snow and ice). In its pure state, water freezes at 32°F. By using salt, that freezing point can be lowered which forces the ice to melt and prevents the water from freezing or re-freezing.
- While workers use salt to melt ice, they rely on sand for improved traction. Sand crystals increase friction and help prevent vehicle tires from slipping on slick roads. This makes travel easier for drivers, but it does not actually melt the ice.
- The hot water loses heat, while the cold water from the melted ice gains heat. Note that the results depend on how much ice and hot water you have at the start. If you add a ton of ice to 4 cups of water, the hot water won't have enough heat to melt all the ice.

Congratulations, you are now a scientist!

You have been using the scientific method to answer our questions. Learn more about all the steps in the scientific method [HERE](#).