From Sea to Shining Salt continued...

If you live in a warm area with low humidity, you can place this dish in a sunny spot for several days to allow the remainder of the water to evaporate. Or to speed up the process just apply heat! Place the baking dish in your oven on the lowest possible setting until the remaining water evaporates and you're left with a thick crust of salt.

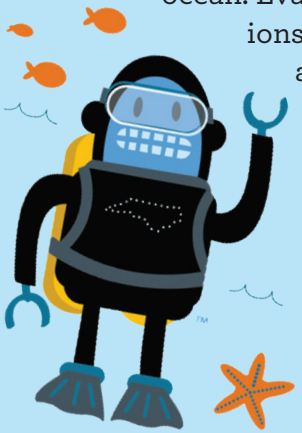
Congratulations! You've harnessed part of the water cycle to create your own sea salt. Break up the larger chunks and enjoy the taste of North Carolina's Atlantic Ocean.

1 gallon of water will yield about 1 cup of sea salt.

WHY IS THIS SCIENCE?

So what makes the ocean so salty? The answer is inside the water cycle. The water cycle is the path water travels as it moves through the earth, oceans, and atmosphere. Some of these steps are easy to observe, such as rain falling during a thunderstorm (precipitation), or steam collecting on a bathroom mirror (condensation). Other steps in this cycle, such as evaporation, are harder to observe. Evaporation is the process by which liquid water transforms into a gas and rises into the atmosphere.

By boiling ocean water you sped up the evaporation process that naturally occurs when the sun's energy heats up the water in the ocean. Evaporation leaves behind sodium and chloride ions in the water. Sodium and chloride both have a salty taste. Runoff (another step in the water cycle) is what carried these ions into the ocean from rocks on land. Just think how far the salt you're tasting travelled to get to you! From rocks on land, through the water cycle, and finally to your tastebuds.



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From Mountains to Sea

SCIENCE FESTIVAL™ Presented by THE BIOGEN FOUNDATION

Science in the Great Outdoors

NORTH CAROLINA STATE PARKS 1916 Naturally Wonderful 100 YEARS 2016

Burst-A-Bag

How can a mountain put your potato chips under pressure?

YOU WILL NEED

- 1 sealed bag of chips, any size or brand (snack size may work best)

GET STARTED

At the base of a mountain observe your bag of chips. How does the bag look and feel? Start ascending the mountain (by foot, bike, or car) occasionally checking your bag of chips for observable changes. What do you notice about the bag as you climb higher and higher through the atmosphere? When you reach the peak of the mountain check the bag again to see how it has changed. Has it burst open?

WHY IS THIS SCIENCE?

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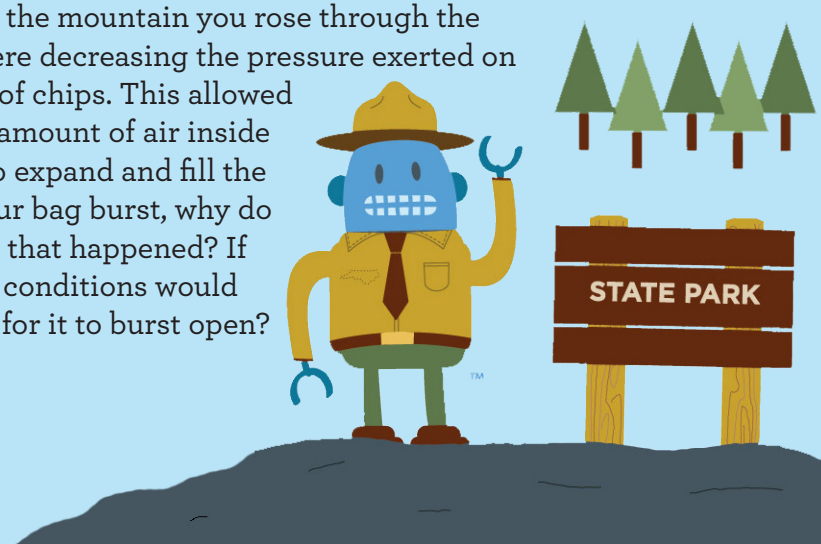

Shake-A-Shrub

Amazing biodiversity is waiting to be discovered in plants along the trail.

YOU WILL NEED

- White pillowcase or sheet
- A stick
- Small jars or cups

GET STARTED

Place your white fabric underneath a shrub or bush. Then shake the bush or hit it with a stick. Interesting insects and spiders will drop onto your white sheet below. This is a great way to see things you don't ordinarily see, like crab spiders and beetles. Pick them up with a small jar to take a closer look before releasing them back into the bush.

- Count their legs.
- How many body parts do they have?
- What color and shape are the insects?
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You can keep track of your observations in a journal or sketchbook.

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From Sea to Shining Salt

Explore the water cycle using the Atlantic Ocean to make your own sea salt.

YOU WILL NEED

- 2 large containers to hold ocean water
- Access to unpolluted ocean water
- 1 large cooking pot
- Cheesecloth
- Large spoon or spatula
- Low shallow glass or ceramic baking dish
- Oven and stovetop

GET STARTED

Collect ocean water from the beach and transport back to your cooking space. Fold the cheesecloth over on itself several times, until there are at least 6 layers of cheesecloth. Secure this over the mouth of your second large container. Slowly pour your ocean water through this filter to remove large impurities. Repeat until the water runs fairly clear.

Transfer the ocean water into a large cooking pot (aluminum not recommended) and bring to a boil. See those clouds of steam rising from the pot? That's water turning into vapor and evaporating, an important step in the water cycle. Reduce heat until simmering. Stir occasionally until water has reduced by half. This will take several hours. The liquid will change from clear, to sludgy white. Be careful at this stage not to allow the salt to burn. Stir regularly and monitor the mixture for changes in consistency.

When your mixture reaches the consistency of wet sand, turn off the heat and transfer into the baking dish, spreading it in an even layer. This increases the surface area of the salt mixture and will speed up the evaporation process.

Marshmallow Combustion

Oxygen, heat, and fuel come together to create a flaming ball of sugar!

YOU WILL NEED

- Marshmallows
- Stick for roasting marshmallows
- A campfire
- A bucket of water

LIGHT IT UP!

Try to set your marshmallows on fire as quickly as possible. Time yourself mentally or with a stopwatch to learn what conditions lead to the fastest ignition! Some variables to try are:

- roasting directly in the flame or over hot coals
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Carefully extinguish your flaming marshmallows in water.

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All fires need the same three things: heat, fuel, and an oxidizer. This is called the Fire Triangle. In this experiment the heat came from your already burning campfire, a marshmallow is the fuel, and the oxidizer is oxygen from the air. When the marshmallow burns it goes through a chemical reaction and creates byproducts like heat and char (the blackened outside of your marshmallow).

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Science in the Great Outdoors

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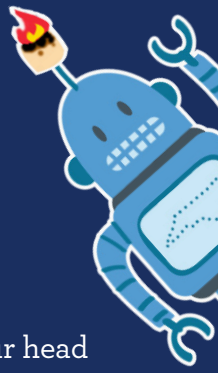
Spider Eyes

Nocturnal predators have unique adaptations for survival.



YOU WILL NEED

- A flashlight or headlamp
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LIGHT IT UP!

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Sunken S'mores

Explore volume, mass, and density with marshmallows.

YOU WILL NEED

- 2 marshmallows
- Water
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Start by pouring water into your container, leaving enough space at the top that you won't spill any liquid when you add the marshmallow. Make a prediction based on what you know about marshmallows: do you think a whole marshmallow will sink or float when you drop it into the cup?

Test your prediction by gently dropping the marshmallow into the water.

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WHY IS THIS SCIENCE?

Objects float when their density is less than the density of the liquid into which they're placed. Density is the ratio between the mass of an object and it's volume. When you compress the marshmallow (forcing all the air out) you increase the density of the marshmallow and it sinks.

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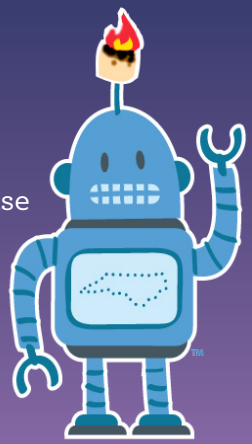

Grow-A-Mallow

Observe the properties of gases while toasting a delicious treat.

YOU WILL NEED

- Marshmallows
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LIGHT IT UP!

Place your marshmallow on the end of a roasting stick. Put the marshmallow near, but not directly in the flames. Gently twirl the marshmallow so it roasts evenly.

Watch the marshmallow carefully, do you notice it expanding? Keep a plain unroasted marshmallow nearby for comparison.

WHY IS THIS SCIENCE?

Pull apart an unroasted marshmallow. See all the tiny holes on the inside? Those holes aren't really empty, they're full of air. The molecules that make up air react when heated. They move faster and faster, pushing exerting pressure on the marshmallow and forcing it to expand. This expansion is aided by the sugars in the marshmallow heating up and getting soft. Eventually you'll notice your marshmallow stops expanding. That happens when all the hot air is eventually able to escape your marshmallow.

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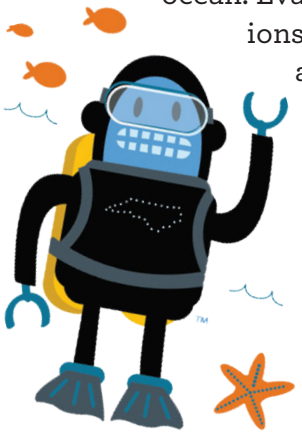

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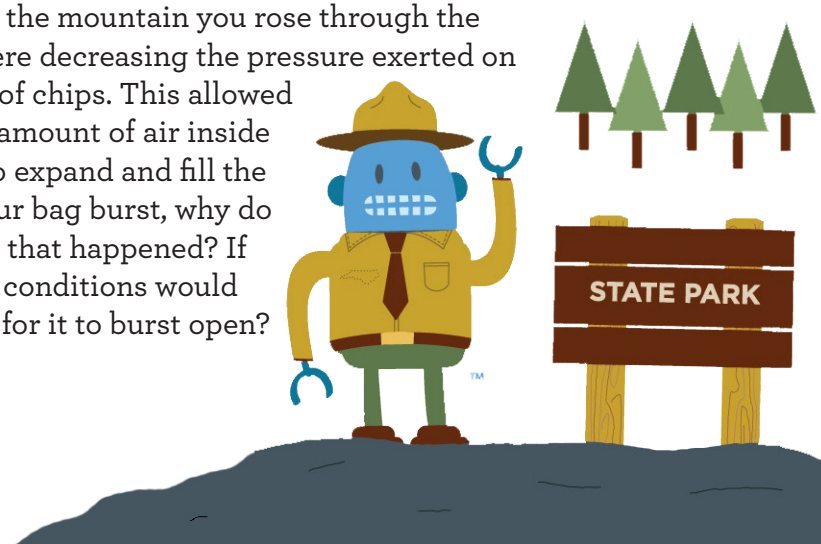

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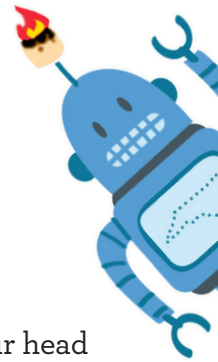

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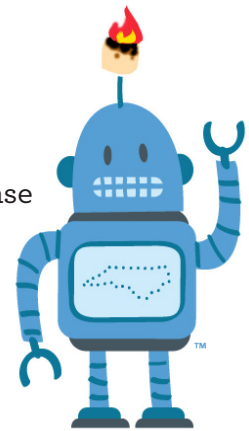

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