



Smithsonian

Staying Dry



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Rainy Days

Imagine that you are about to leave on a trip. The weather **forecast** says it will rain. Luckily, you have a lot of rain gear. It will help keep you dry. It is all waterproof, so the rain will not get on your skin.

Why do we need to stay dry? How is rain gear made? And how is it **inspired** by nature? It all starts with wet weather.





Wet Weather

The water cycle starts when heat from the sun warms water. When water gets very hot, it turns into a gas. This is called evaporation. The gas it becomes is called water vapor (VAY-puhr).

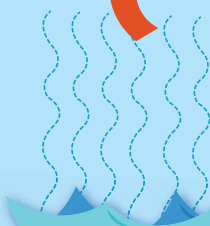
Water vapor rises into the air. It cools as it rises. Once it is cool enough, it makes clouds. This is called condensation.

Clouds cool too. Once clouds get very cold, liquid water forms once more. Water falls from the clouds as freezing rain, sleet, hail, or snow. Those are all types of precipitation. Then, the water cycle starts all over!

Water vapor rises from a hot spring in Yellowstone National Park.



The Water Cycle



A red squirrel shakes off water to stay dry.

Playing in water can be fun. It feels great when the weather is hot. So, what is the big deal about staying dry?

Humans need to stay dry most of the time. Staying dry means staying warm. People lose **body heat** in water. Also, human skin is not designed to stay wet for days at a time.



This bumblebee got wet in the rain.

Science

Being a Bee

Rain can keep animals from doing what they do best. For example, bees cannot fly in heavy rain. The rain pushes them off course. Rain clouds can also block the sun, which bees use to find their way.

A brother and sister play in the sprinklers on a hot day.



People lose body heat up to 25 times faster in cold water than they do in cold air.



STEAM CHALLENGE

Define the Problem

It is supposed to be a very rainy winter this year. A store has hired you to make a piece of winter clothing to sell. Your clothing should be waterproof and strong.



Constraints: You may use no more than five items.



Criteria: Your clothing must fit a friend. Your friend must stay dry when 250 milliliters (1 cup) of water is poured onto the clothing.





Research and Brainstorm

Why is it important for humans to stay dry? What are some ways that plants and animals are “waterproof”?



Design and Build

Sketch a plan of your clothing. What purpose will each part serve? What materials will work best? Build the model.



Test and Improve

Have a friend wear your clothing outside. Pour 250 mL (1 c.) of water onto the clothing. Did your friend stay dry? How can you improve your clothing? Improve your design and try again.



Reflect and Share

In what other ways can you test your design? Will your design work in the snow? Are there any other materials you can use to make your design more successful?