The Science Zone
111 W. Midwest Ave.
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TheScienceZone.org

Daily Dose of Science Challenge: Dry Ice & Pressure

When watching the video, make observations about how dry ice behaves.
Parents: Notice that vapor comes off the dry ice in the video. Point out that this is 'sublimation'.

Question:
What is sublimation and how does it explain why frozen CO2 is called "dry ice"?

(You may already know this but we encourage NOT to provide an explanation for your kids just yet. Let them observe, think and hypothesize for themselves right now.)

Go further:
Dry ice is a great way to make observations about states of matter. We see dry ice change from a solid to a gas. But does that mean that dry ice is never a liquid?
In fact, **under certain conditions CO2 can exist in a liquid form. AND, under certain conditions, water will sublimate! What are those conditions?**
Here is a quick video: **https://astrocampschool.org/dryice/**

The important concept today is to use this opportunity to talk about the role of air pressure.

Activity:
This is a great activity if you are looking for an excuse to get outside and drive to different places. This is only recommended IF you stay safe and IF you have a camp stove and a thermometer (make sure it is a thermometer that is safe to use at boiling temperatures!).
Go outside and boil water on your campstove. Measure the temperature when the water begins to boil.
Measure the elevation and the boiling point. (Generally within Casper you are at about 5000 ft., at Rotary Park you are at about 6000 ft., at the overlook on Casper Mtn. Road you are at about 7000 feet and if you can get to the towers on East End Road you are at about 8000 feet.) If you have a way to measure your own elevation, you should use that.
(*If you can't go outside or don't have the equipment, that's OK - you can look up this information easily*.)
Gather this data:

Elevation	Boiling point

What happens to the boiling point on Mt. Everest? Why is it so different?

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Graph your results:

You should notice that as elevation increases (i.e. air pressure decreases) the boiling point is lower. This is a way to help your children understand that air pressure matters! The boiling point changes under different amounts of pressure. This may be as far as you want to go with this activity - the most important thing is to help your kids understand that pressure matters!

For older students you can continue to explore the concept of triple point and phase diagrams. Keep the concept simple for now. Under enough pressure, dry ice WILL turn to a liquid and if there is very little air pressure, ice WILL sublimate. This video may be helpful for older students:
https://www.youtube.com/watch?v=QrHlwgmMTq4

If you need help explaining why air pressure is lower at higher elevations, here is a link to a video:
https://www.youtube.com/watch?v=jmQ8FWnM0fA

KEEP SCIENCING!