

Fogged In

Experiment Express

STEM Field of Study

Science

Specific STEM Area

Meteorology

Age Group

All

Cost

\$0 - \$5

Time

Ongoing Activity (more than one day)

Materials

Cool evening or morning, outdoor thermometer, Warm clothes / jacket, Pen or Pencil, Lab Notebook
* Please note that this is an early morning or early evening activity.

Safety

It's a good idea to have an adult nearby

IEP Goals

Academic

Behavioral

Motor

Question:


Can you predict when, why and what type of fog may form in your area?

Hypothesis:

Before you do this experiment; try to predict the answer to the question above. Write down your Hypothesis in your logbook

Instructions:



1. Gather all your materials together.
2.  Review all Safety Precautions.
3. Make sure to put on warm clothes.
4. Grab your Pen / Pencil and your lab book.
5. Record the month/day and time of day.
6. Record the temperatures at the times of observations.
7. Draw or take a picture of the fog.

Observe the fog and indicate your observations. How thick is the fog? What temperature does the fog seem to appear / disappear?

Record your observations in your lab notebook.

There are 8 Types of Fog:

Advection – Windy, warm, and moist air meets cool moisture on the ground. The warm air is cooled by the ground and when the dew point rises it creates high humidity and fog is formed.

Freezing Fog – occurs when temps fall below 32°F. Fog creates a drizzle & water drops freeze when they meet an object. At the same time sublimation occurs – that is when water immediately turns into a gas.

Ice Fog- This is only seen in the arctic regions and when temperatures are around 14°F. The air is too cold for the air to hold the water drops so they form tiny ice crystals.

Precipitation Fog - Occurs when there is cold, dry air at the surface and rain falls through it, evaporates and cause dew points to rise and creates fog.

Radiation Fog – is common and occurs mainly in the fall and winter and at the bookends of the day – morning and evening. The ground absorbs heat throughout the day and radiates it back into the air. When the warm ground air contacts cool evening air points rise creating a low blanket of fog.

Steam Fog – Common near the Great Lakes but can be seen over any lake. Forms mainly during the fall when water temperatures do not cool as quickly as the air temperature. Cold dry air moves over the lake which conducts warm, moisture into the air and the two conditions try to even out. This is the second law of thermodynamics states that heat transfer occurs spontaneously only from higher to lower temperature bodies.

Upslope Fog – forms adiabatically. This is a fancy thermodynamic way of saying no heat is gained or lost. It is a process that forces warm air to sink and cool air to rise. Moist air blows up a mountain causing the air to rise and cool. When the cool air meets the dew point – fog forms at the top of the mountains.

Valley Fog – forms in a valley when the ground is wet from a rainfall, as skies begin to clear and solar energy leaves the earth, the temperatures cool near a dew point. This forms a very thick / dense fog called tule fog.

Think about it!

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Post Experiment Questions for Adults to ask:

1. What type of fog is most common in your area? Why?
2. Did you notice any common elements that contributed to the formation of fog?
3. What led to the dissipation of fog?
4. Where can fog form?
5. Was your hypothesis correct?

Let's talk!

Discussion of Results / Post Experiment Answers:

1. Answers will vary, however, when the student answers why – their response should match the description of the variety of fog and the conditions that contribute to the existence of fog in their area.
2. The answer to this question is location dependent; however, the student should be capable of articulating the observations they made that seemed to contribute to the existence of fog in their area.
3. Radiation fog usually dissipates from daytime heating and surface air warming through conduction. Conduction is the transfer of heat through a substance – and in this case, the ground. Conduction is the same reason why the handle on a pot of boiling water becomes hot.
4. Fog can occur anywhere – however, it occurs most often over creeks, waterways, and river valleys.
5. If your hypothesis was correct, congratulations! If not, do not worry and keep trying!



Draw your own conclusion:

Lighthouses have been around since 247 BC! In fact, the oldest lighthouse, The Pharos of Alexandria, is still standing today in Egypt. These towers stand to serve two purposes: 1. Serve as a navigational aid and 2. To denote and warn boats of dangerous areas. The lighthouse typically has a very bright and rotating light at the top. Our question to you is: why would the lighthouse also require a Foghorn? What purpose do you feel it serves?

Fog can be an extremely dangerous condition to drive in. One driving skill that is taught to new drivers is to NOT turn on your bright driving lights in fog. Our question to you is: Why?

Let us know your answers to these questions at: www.stemwithsaints.org

Expansion Experiments:

Can you recreate fog? Is it possible for you to recreate the conditions that allow fog to form? Try it and let us know the experiment that you created to form this Meteorological event. You never know – we may use your experiment on our website to help teach others about fog! Send your experiment to www.stemwithsaints.org

Log your work:

Go for it!



This is a perfect time to keep a record of your observation.

Real World Application:



Driving / Operating equipment and machinery

Weather planning

Thermodynamics

Navigation

Additional Resources:



<https://weather.com/science/news/how-does-fog-form-20131010>

<https://scijinks.gov/fog/>

The Magic School Bus Wet All Over: A Book About The Water Cycle by [Pat Relf](#) (Author), [Carolyn Bracken](#) (Illustrator)

<https://www.nationalgeographic.org/encyclopedia/fog/>

Cloud or Fog? (This or That? Weather by [Kelly Doudna](#) (Author)

