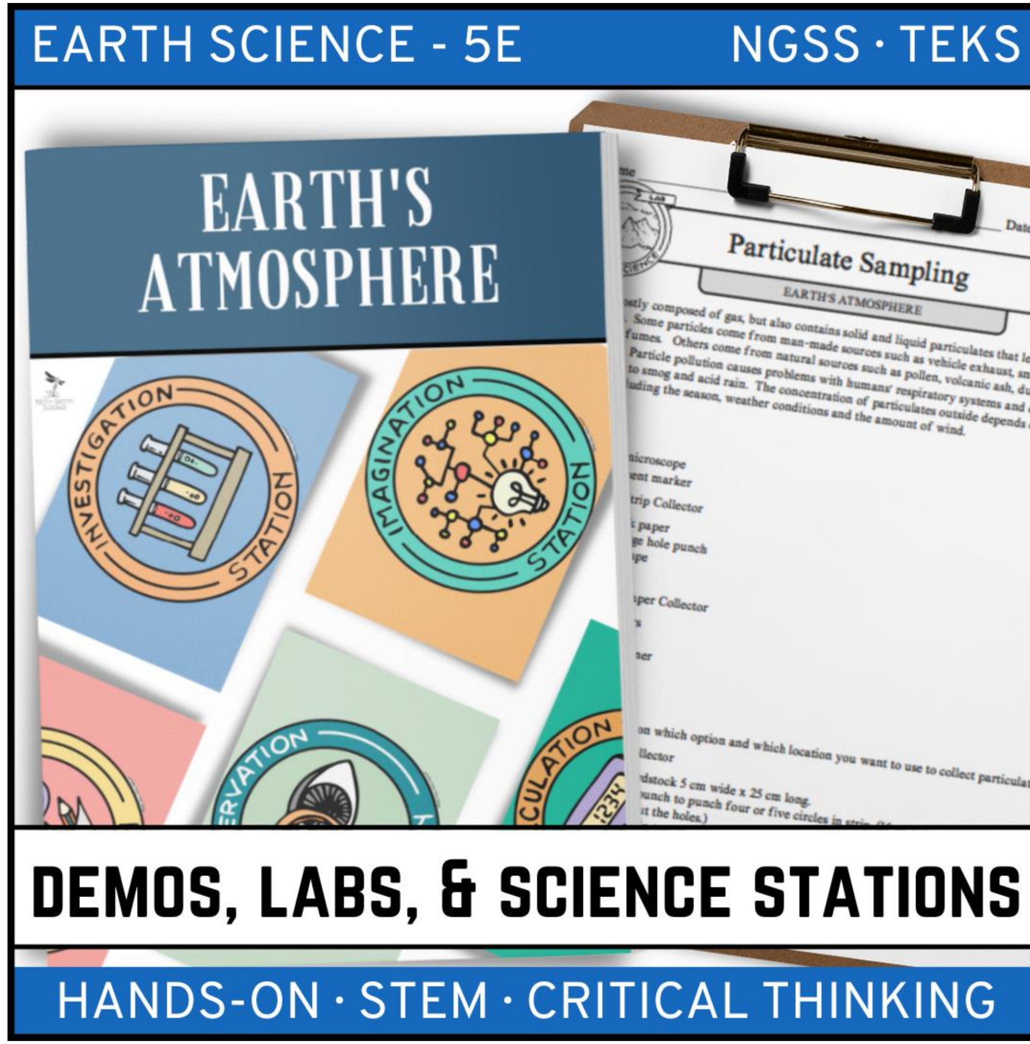
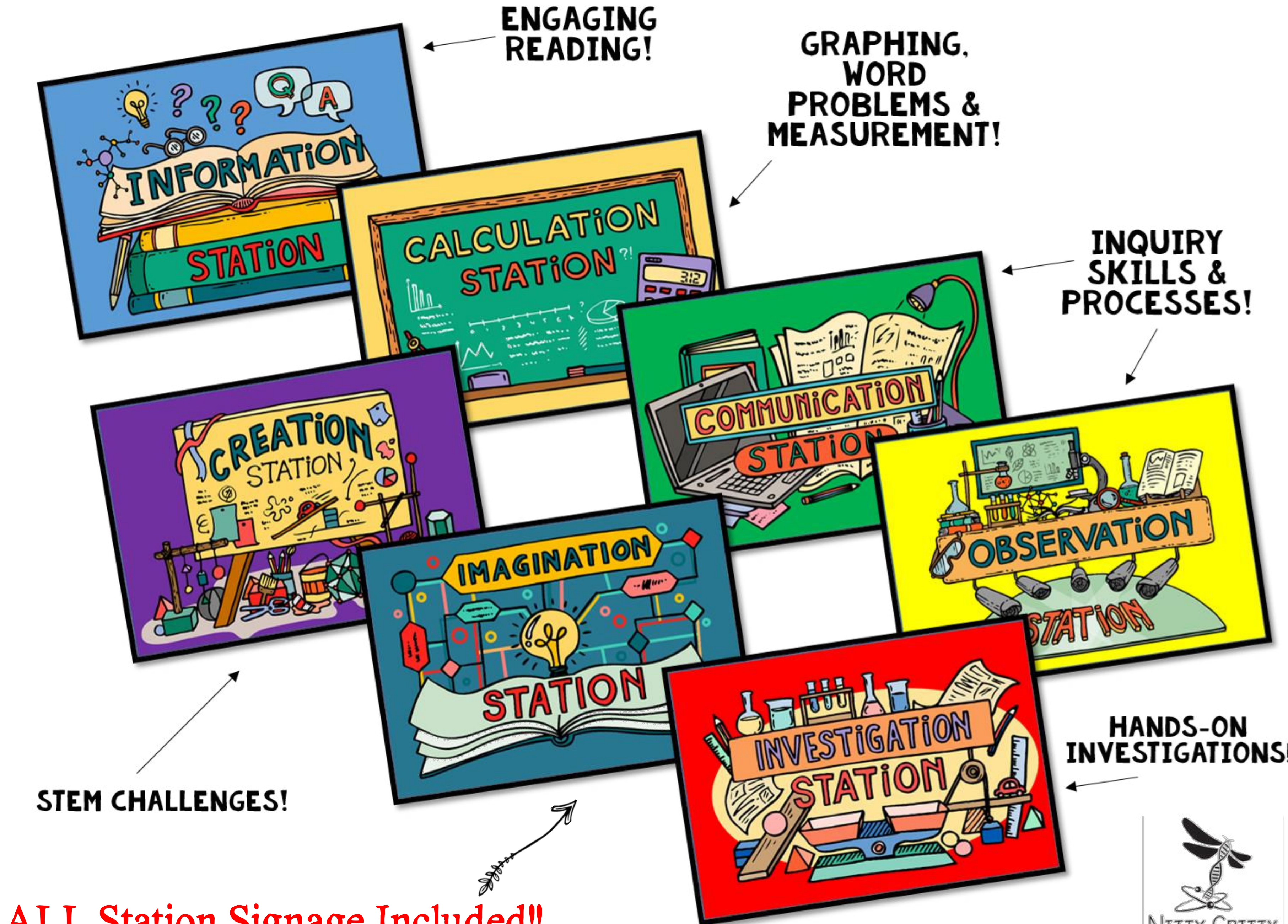
Demos, Labs, & Science Stations Feature:

- Hands-on Investigations
- STEM Challenge
- Scientific Literacy
- Inquiry Process Skills





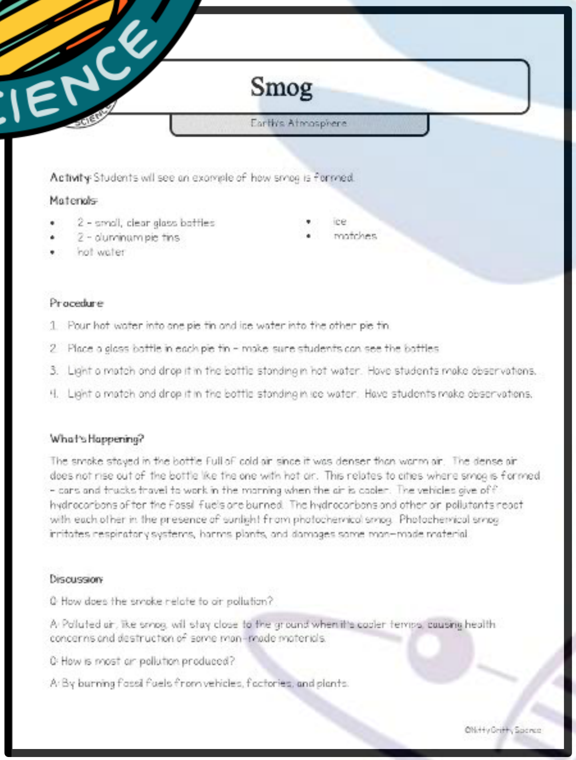
ALL Station Signage Included!!

Color & Black and White

NITTY GRITTY SCIENCE

Teacher guide and answer key offered for every lab!

Easy-to-get materials!



Smog

Earth's Atmosphere

Activity: Students will see an example of how smog is formed.

Materials:

- 2 - small, clear glass bottles
- 2 - aluminum pie tins
- hot water
- ice
- matches

Procedure

1. Pour hot water into one pie tin and ice water into the other pie tin.
2. Place a glass bottle in each pie tin – make sure students can see the bottles.
3. Light a match and drop it in the bottle standing in hot water. Have students make observations.
4. Light a match and drop it in the bottle standing in ice water. Have students make observations.

What's Happening?

The smoke stayed in the bottle full of cold air since it was denser than warm air. The dense air does not rise out of the bottle like the one with hot air. This relates to cities where smog is formed – cars and trucks travel to work in the morning when the air is cooler. The vehicles give off hydrocarbons after the fossil fuels are burned. The hydrocarbons and other air pollutants react with each other in the presence of sunlight from photochemical smog. Photochemical smog irritates respiratory systems, harms plants, and damages some man-made material.

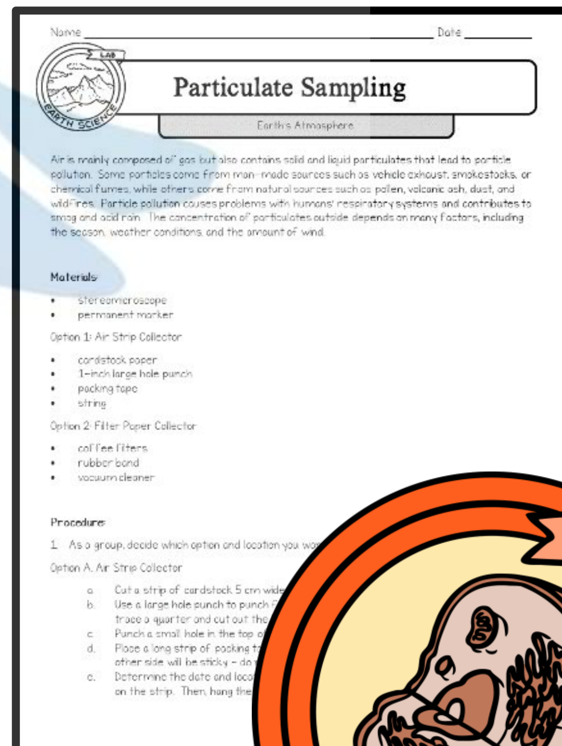
Discussion:

Q: How does the smoke relate to air pollution?

A: Polluted air, like smog, will stay close to the ground when it's cooler temps, causing health concerns and destruction of some man-made materials.

Q: How is most air pollution produced?

A: By burning fossil fuels from vehicles, factories, and plants.



Name ______________________ Date __________

Particulate Sampling

Earth's Atmosphere

Air is mainly composed of gas but also contains solid and liquid particulates that lead to particle pollution. Some particles come from man-made sources such as vehicle exhaust, smokestacks, or chemical fumes, while others come from natural sources such as pollen, volcanic ash, dust, and wildfires. Particle pollution causes problems with humans' respiratory systems and contributes to smog and acid rain. The concentration of particulates outside depends on many factors, including the season, weather conditions, and the amount of wind.

Materials:

- stereomicroscope
- permanent marker

Option 1: Air Strip Collector

- cardstock paper
- 1-inch large hole punch
- packing tape
- string

Option 2: Filter Paper Collector

- coffee filters
- rubber band
- vacuum cleaner

Procedure:

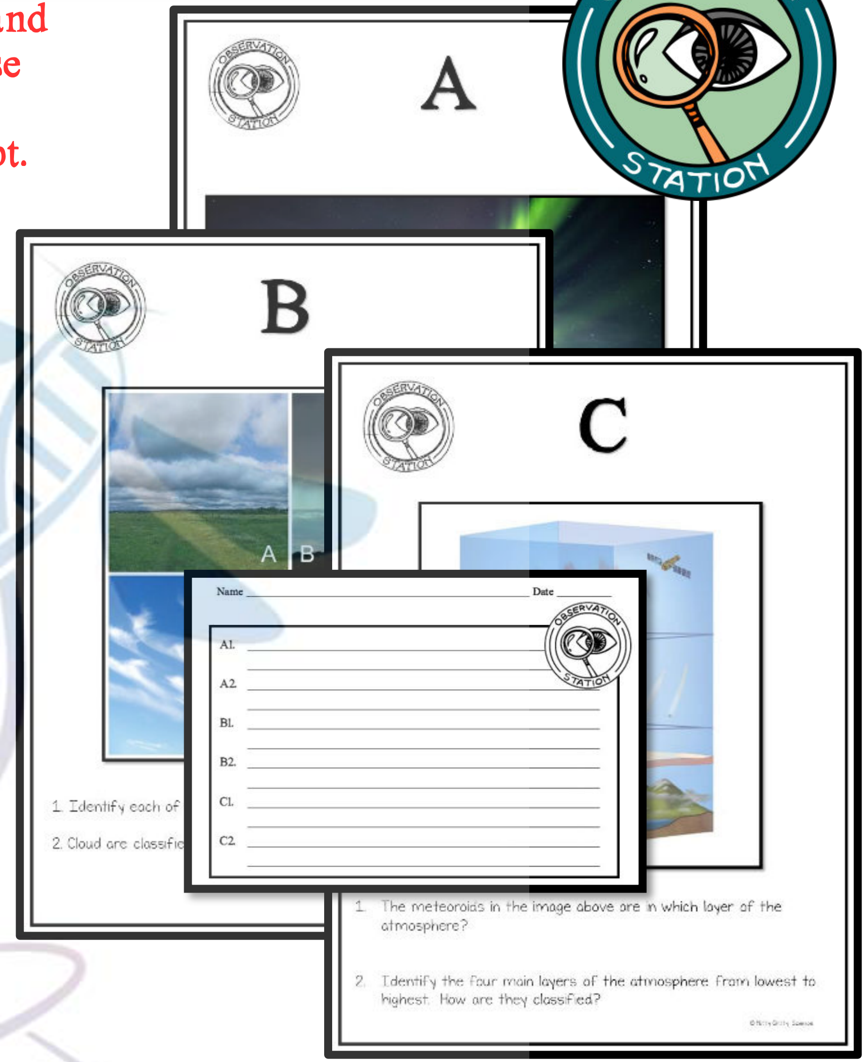
1. As a group, decide which option and location you wo

Option A. Air Strip Collector

a. Cut a strip of cardstock 5 cm wide
b. Use a large hole punch to punch
trace a quarter and cut out the
c. Punch a small hole in the top o
d. Place a long strip of packing t
other side will be sticky – do
e. Determine the date and loca
on the strip. Then, hang the

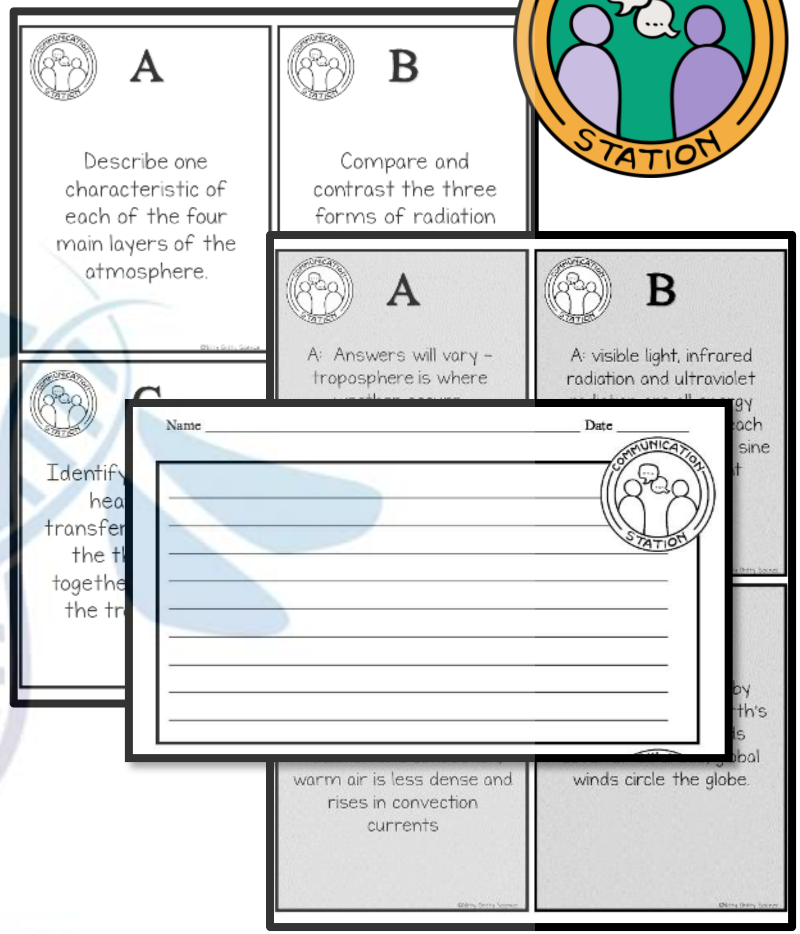
Discussion questions and teacher set-up included!

Group members will read a passage and then complete a task to help increase science literacy and deepen their understanding of the science concept.



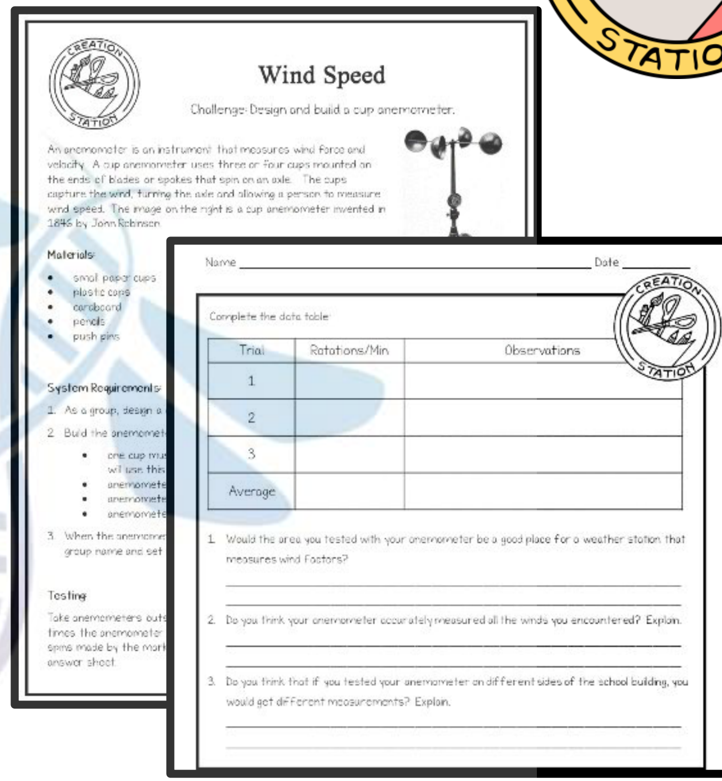
Group members will have images, illustrations, or actual samples at this station that show applications or processes of the science topic.

Group members will work with one another to explore the concept through hands-on activities, so they may practice specific inquiry process skills as they learn.



There are three different options for this station: interviews, videos, or group essay. Depending on the option you choose, group members will communicate what they know by answering questions in creative ways.

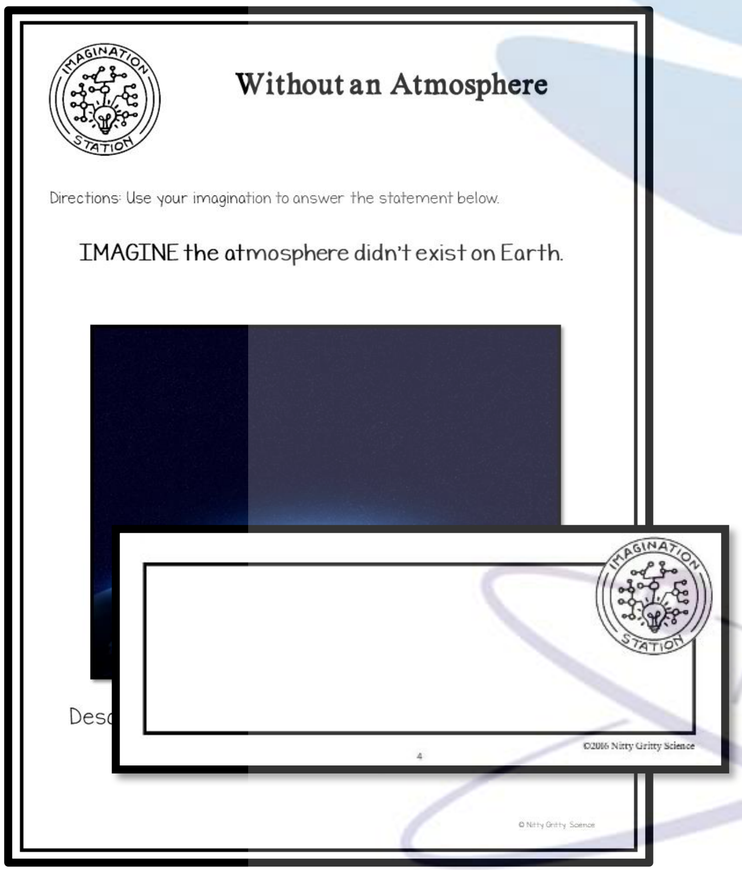
Group members use their math skills to complete the station challenge. Skills may include graphing, analyzing data, using models, measurement, and calculating formulas or word problems.



Group members will work together to solve a STEM (Science, Technology, Engineering, Math) challenge by creating models or designs that demonstrate their understanding of the science topic being taught.

This station makes science concepts relevant for students by asking them to imagine scenarios that will bring about discussion and critical thinking.

USER-FRIENDLY PAGES: Students easily recognize which answer sheet to use at each station by matching station icons located on each page!



Without an Atmosphere

Directions: Use your imagination to answer the statement below.

IMAGINE the atmosphere didn't exist on Earth.

Desc

4

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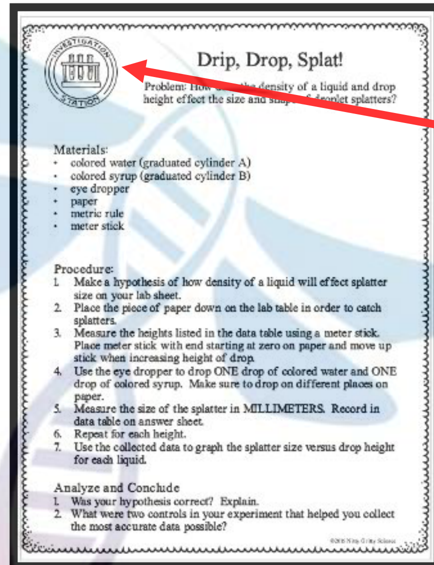

Drip, Drop, Splat!

Problem: How [illegible] the density of a liquid and drop height effect the size and [illegible] droplet splatters?

Materials:
- colored water (graduated cylinder A)
- colored syrup (graduated cylinder B)
- eye dropper
- paper
- metric rule
- meter stick

Procedure:
1. Make a hypothesis of how density of a liquid will effect splatter size on your lab sheet.
2. Place the piece of paper down on the lab table in order to catch splatters.
3. Measure the heights listed in the data table using a meter stick. Place meter stick with end starting at zero on paper and move up stick when increasing height of drop.
4. Use the eye dropper to drop ONE drop of colored water and ONE drop of colored syrup. Make sure to drop on different places on paper.
5. Measure the size of the splatter in MILLIMETERS. Record in data table on answer sheet.
6. Repeat for each height.
7. Use the collected data to graph the splatter size versus drop height for each liquid.

Analyze and Conclude
1. Was your hypothesis correct? Explain.
2. What were two controls in your experiment that helped you collect the most accurate data possible?

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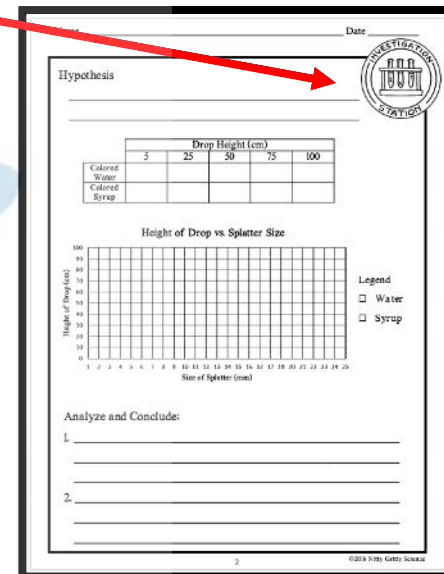

Date

Hypothesis

	Drop Height (cm)				
	5	25	50	75	100
Colored Water					
Colored Syrup					

Height of Drop vs. Splatter Size

Legend
- Water
- Syrup

Analyze and Conclude:

1.

2.

2

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TEACHERS SAVE TIME: Laminate station pages and reuse for each class and for years to follow!

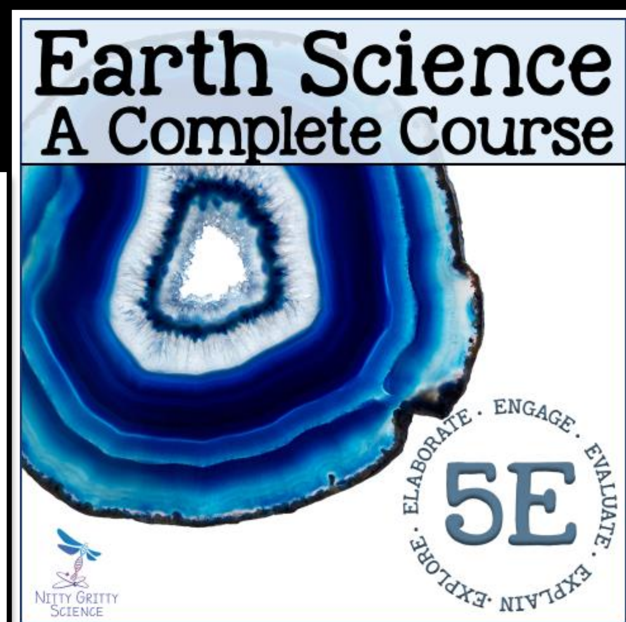
Inquiry and Process Skills

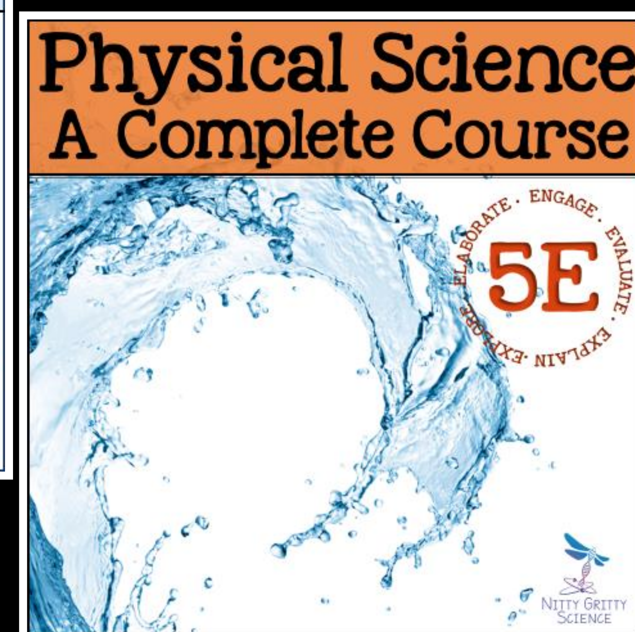
Demo | Guided Inquiry Lab | Science Stations

Inquiry-Based Science Unit: Earth's Atmosphere	Classifying	Communicating	Compare & Contrast	Creating Models	Gather/Organize Data	Generalizing	Identifying Variables	Inferring	Interpreting Data and Graphs	Making Decisions	Manipulating Materials	Measuring / Calculating	Observing	Predicting
Smog	X	X	X			X		X		X			X	
Particulate Sampling		X	X	X	X		X		X		X	X		X
Information Station: It's a Bird, It's a Plane					X	X		X						
Observation Station: Images & Questions	X		X		X	X		X					X	
Investigation Station: Properties of Air	X		X		X		X		X		X		X	
Calculation Station: Absorbing Solar Energy					X		X			X		X		
Communication Station: Questions	X	X				X				X				
Creation Station: Wind Speed		X		X	X				X	X	X	X	X	X
Imagination Station: Without an Atmosphere		X		X						X				X

NGS promotes scientific inquiry throughout the curriculum. Students become more confident and effective learners while developing problem-solving and critical thinking skills. Process skills, such as planning, organizing and evaluating, help students to complete projects and assignments. These skills allow students to independently gather information, analyze it, and draw their own conclusions.

This download is part of the Nitty Gritty Science Complete Course Collection. Click below to learn more.





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