

STEM Learning Module Template

PISA Team:

Name	Grade	School
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Brian Calligy	3 to 6	

Strand(s):

5.3.D Data Analyses and Probability

1. Uses tables and graphs to represent and interpret data.

5.4.C Technological Design

2. Choose materials most suitable to make simple mechanical construction.

5.8.B Atmosphere & Water

3. Observe weather changes and patterns by measurable quantities such as temperature, wind direction and speed and amount of precipitation.
5. Observe that rain, snow and other forms of precipitation come from clouds, but not all clouds produce precipitation.
6. Recognize that clouds and fog are made of tiny droplets of water and possible tiny particles of ice.

6.1 Social Studies Skills

- 6.1.A.3 Locate sources for the same information (e.g.; weather forecast on TV, the internet, or in a newspaper).

6.6 C Physical Systems

1. Describe the basic components of the Earth's physical systems including landforms, water, erosion, weather and climate and discuss their impact on human development (**partially covered**).

8.2 Technology Education

All students will develop an understanding of the nature and impact of technology, engineering, technological design, and the designed world as they relate to the individual, society, and the environment.

Grade(s): **3**

Key Science Terms:

Weather, atmosphere, anemometer, barometer, blizzard, cloud, cirrus cloud, cumulonimbus, cumulus, cyclone, drought, earthquake, evaporation, condensation, hurricane, water cycle, meteorologist, precipitation, storm, stratus cloud, temperature, tornado, water vapor, rain gauge, thermometer, thunder, lightning, meteorology, meteorologist, rain, snow, hail, sleet, fog, dense fog, rainbow, sunlight, water filter, purification, erosion, weathering, wind vane, acid rain, forecasting, freezing, melting, thawing.

Key Science Concepts:

- Weather is something that happens in our atmosphere at any given time.
- There are different types of weather.
- Environment can be quickly changed by natural disasters.
- Environment can slowly change through weathering and erosion.
- The types of clouds formed during the water cycle determine weather.
- Instruments measure weather.
- There are many types of weather.

NJCCC Standards:

3.1 (Reading) All students will understand and apply the knowledge of sounds, letters, and words in written English to become independent and fluent readers, and will read a variety of materials and texts with fluency and comprehension.

3.2 (Writing) All students will write in clear, concise, organized language that varies in content and form for different audiences and purposes.

4.4 (Data analysis) All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.

5.1 (Scientific processes) All students will develop problem-solving, decision-making and inquiry skills, reflected by formulating usable questions and hypotheses, planning experiments, conducting systematic observations, interpreting and analyzing data, drawing conclusions, and communicating results.

6.1 (Social Studies) All students will use maps, globes, and charts / locate longitude and latitude /time zones.

5E's	Procedure	Assessment	Materials/Handouts
<p data-bbox="289 344 415 376">Engage</p> <p data-bbox="310 415 394 448">Days</p> <p data-bbox="302 451 403 483">2 days</p>	<p data-bbox="485 344 737 376">Key Questions:</p> <ul data-bbox="533 380 1146 483" style="list-style-type: none"> • What is weather? • What are some types of weather? • What are the components of weather? <p data-bbox="485 487 720 519">Key Concepts:</p> <ul data-bbox="533 522 1201 695" style="list-style-type: none"> • Weather is something that happens in our atmosphere everyday. • There are different types of weather • Weather consists of precipitation, temperature and air pressure <p data-bbox="485 698 667 730">Procedure:</p> <ul data-bbox="533 734 1243 1299" style="list-style-type: none"> • Show video of "Tornado" http://www.youtube.com/watch?v=xCI1u05KD_s • Make a KWL chart on weather • Read "Wild Weather" • Discuss effects wild weather has on our community. • Discuss why forecasting is important (Break into small group then each group presents their ideas to the class). • Watch a weather report on TV or internet http://www.weather.com • Students will keep a weekly log of the weather in their community, describing what the day looks like, feel like and making predictions for the next day. 	<p data-bbox="1318 344 1440 376">Pre-test</p>	<p data-bbox="1514 805 1839 870">Chart Paper, markers Book: "Wild Weather"</p> <p data-bbox="1514 1052 1839 1227">Daily Weather Journal http://www.education-world.com/a-lesson/tm/ws_fall99_temperature.shtml</p>

<p>Explore</p> <p>Days 3 to 5</p>	<p>Key Questions:</p> <ul style="list-style-type: none"> • Why does it rain? • Are all clouds the same? • What are some different types of storms? • What causes lightning? <p>Key Concepts:</p> <ul style="list-style-type: none"> • Types of clouds formed during the water cycle determine weather. • Types of clouds • Positive and negative charges produce electricity <p>Procedure:</p> <ul style="list-style-type: none"> • Introduce Water Cycle. (How old is the water in your glass?) http://www.units.muohio.edu/dragonfly/water/watercycle.shtml • Group students: put up unlabeled water cycle diagram and have students discuss what is happening in the diagram. • Experiment: Making a mini Water Cycle http://www.units.muohio.edu/dragonfly/water/experiment.shtml • Have students look outside and draw what they see in the sky. • Show pictures of different clouds • PISA Tape Activity (Science Inquiry) Students will cut about 2 strips of tape about 3 inches long and label it 1 and 2 accordingly. Place strips 1 and 2 on the table with the sticky side down, then pull tape 1 and 2 out and have the non-sticky part face each other. Write your observation then place tapes back on to the table. Now cut another 2 strips of tape, 	<p>Make a cloud book.</p> <p>Water Cycle Diagram</p> <p>Tape Activity</p>	<p>Construction paper Cotton balls</p> <p>Instructions: Place 1 type of cloud on each page; label the different types of cloud, then staple the booklet together.</p> <p>Glass of Water</p> <p>Book: "Droplet and Water Cycle"</p> <p>A large clear bowl, a weight, plastic wrap, a smaller container (a cut-down yogurt works well), a rubber band or piece of string</p> <p>Tape, scissors</p>
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each 2 inches long, and label them 3 and 4. Place 3 on top of 1 and 4 on top of 2. Now take 1 and 3 and have the non-sticky part face each other then write observation. Repeat the process for 2 and 4 and write observation.

- **Making Lightning (Science Inquiry)**

Purpose of making lightning is to observe lightning formation

<http://www.eo.ucar.edu/webweather/lightningact.html>

Making
Lightning

Styrofoam plate,
thumbtack, pencil with
new eraser, aluminum
pie pan, small piece of
wool fabric

Explain

Days
4 to 6

Key Questions:

- How do storms form?
- How do storms affect different communities?

Key Concepts:

- Different storms include and are not limited to thunderstorms, tornadoes, hurricanes, blizzards, tsunami, hailstorm, dust storm, water spouts, typhoon
- Most storms form when water droplet in clouds become to heavy and wind speed increases
- Flooding and high wind speeds can damage property affects lives and life style.
- Instruments that assist in measuring and determining weather are wind vane, rain gauge, thermometer, anemometer and barometer

Procedure:

- Read cloudy with a Chance of Meatballs and Tornado Alert
- Work in groups creating a storm poster
- A whole group discussion on how storms are

Pre-test
[http://www.t
eachnet-
lab.org/miami
/2004/sardina](http://www.eachnet-lab.org/miami/2004/sardina)

U.S. Map
[http://www.infoplease
.com/atlas/unitedstate
s.html](http://www.infoplease.com/atlas/unitedstates.html)

Google Earth
[http://www.googleear
th.com](http://www.googleearth.com)

Book: "Cloudy with a
chance of Meatballs"

Book: "Tornado Alert"

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- formed
- Identify where in U.S. certain storms occur
 - Brainstorm affects of storms on communities in small groups on the Web
 - Discuss how meteorologist tell weather for the day
 - Build a weather instrument
<http://www.dcrafts.com/weatherinstruments.htm>
<http://www.weatherwizkids.com/wxexperiments.htm>
 - Tracking Hurricanes
<http://www.weatherwizkids.com>
<http://www.nhc.noaa.gov/2005atlan.shtml>
 - **EDP- Whichever Way the Wind Blows**
How can we tell which way the wind is blowing? Have students generate a list of things that will move in the wind.
Introduce the problem: Wind socks are used at airports so pilots can easily see the strength and direction of the wind because wind direction affects weather. How can we find out the direction of the wind in our schoolyard?

http://www.ciese.org/curriculum/weatherproj/engineering_windsock.html
- [s/Pre-Test%201.htm](#)

Wind Sock:

String, ribbon, or yarn, paper clips, tape, stapler, fabric scraps, tissue paper, construction paper, scissors, glue, paper puncher, dowel/meter stick, compass

Elaborate

Days
8 to 9

Key Questions:

- Why are beaches getting smaller?
 - Why are there so many potholes in the winter?
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- What happens when wind and rain move pollution?
- How can pollutants be removed from water?

Key Concepts:

- Erosion is caused by wind and water.
- Weathering is caused by freeze/thaw.
- Runoff occurs when extra water flows to a body of water. Pollution is sometimes transported with the running water.
- Tools can be used to purify water.

Procedure:

- Two groups model erosion using sand and water and wind (using blow dryer or paper fan) **(Science Inquiry)**
- Two groups will model erosion using soil, water and wind. **(Science Inquiry)**
- Students will break into 3 groups. Each group will put a different material into a sieve; one group will add soil, another group will add tiles, the next group will add gravel. Students will add food coloring to the water. They will spray then pour the water over their materials. They will then measure the amount of water that made it through the sieve, this water is runoff.
- **EiE Lesson: Water, Water Everywhere**
Follow all lesson procedures

Sand, soil, water, pan, blow dryer or paper fan, spray bottle

3 sieves, soil, tiles, gravel, food coloring, measuring cup

Screens, coffee filters, sand gravel, cotton balls, cheese cloth, mystery water

Evaluate

Days:
1 to 2

Procedure:

Students will explore the weather firsthand by explaining their weather instrument and assuming the role of meteorologist. They will implement and analyze weather investigation by keeping a weather log, recording data and writing a report on

Post-test

Project:
Making a Weather Instrument

their findings.

<http://www.dcrafts.com/weatherinstruments.htm>

<http://www.weatherwizkids.com/wxexperiments.htm>

Weather Word Search Puzzle

<http://www.thepotters.com/puzzles/weather.html>

Additional Collaborative Project (Optional):

CIESE Real Time Data Project: Wonderful World of Weather

http://www.ciese.org/curriculum/weatherproj/project_information.html

Timeline: Create a timeline for this project.

Engage:

1 and 2 Days

Show Tornado Video
Make KWL chart
Read "Wild Weather"
Begin Weather Journal
Take Pre-Test

Explore:

3 to 5 Days

Introduce Water Cycle
Identify Clouds
Tape and Lightning Activity

Explain

4 to 6 Days

Read "Cloudy with a Chance of Meatballs" and "Tornado Alert"
Create Storm Posters
Build a weather instrument
Track Hurricane on Google Earth

Elaborate
8 to 9 days

Project: Make a Wind Sock

Complete Runoff Activity
Complete Weathering and Erosion Activity
EiE Lesson: Water, Water Everywhere

Evaluation
1 to 2 days

Graph results from weather journal
Complete Research Report on weather instrument
Take Post-Test
