Activity Title: Tracking Weather Using NOAA Website

Subject (Focus/Topic): Using NOAA data to track weather movement

Grade Level: Grades 6th – 8th

Average Learning Time: This lesson is designed for students to complete outside of the regular classroom time. Introducing the lesson, web site, and data tables requires approximately 30 minutes.

Lesson Summary (Overview/Purpose): Students will visit the NOAA weather web site over the course of several days (length determined by the instructor) to record and analyze weather movement and patterns across the United States.

Overall Concept (Big Idea/Essential Question): Students will gain understand that weather moves from west to east across the United States, and the difference between weather and climate. Students will use critical thinking and analytical skills to summarize recorded data. Additionally, students will gain experience in using large online data bases and understanding of various methods of displaying data.

Specific Concepts (Key Concepts): The key concept in this lesson is tracking weather patterns across the United States, differentiating between weather and climate. Students will complete the following prompt: Analyze the data collected for each of the three geographical locations

Focus Questions (Specific Questions): The following prompts are provided to guide students through the analyzing process.

1. For each geographical location what weather patterns or trends have been recorded?
2. At different times of day, what changes occurred? What do you think influenced these changes?
3. Is there a correlation between, time, temp., wind, humidity and cloud cover? Does one time of day seem to have more severe or calm weather conditions?
4. Is there a sequence of events between the different geographical locations? Does the weather tend to move along a particular path or direction?
5. Based on your analysis, what distinctions can you make between weather and the local climate?

Objectives/Learning Goals: Students will complete the data collection with 95% accuracy and complete the analysis and review sections with 90% accuracy.

Background Information: This lesson is intended to advance students awareness and use of large interactive data bases, provided by NOAA. The lesson challenges students to use higher level thinking skills when analyzing and summarizing the data collected. The lesson is designed to be used in any geographical area and can be modified to accommodate a wide range of learning abilities. This lesson can be completed in or outside of class time.

Common Misconceptions/Preconceptions: Students may think of weather and climate as the same event. Students may think that weather moves the opposite direction from Earth's rotation.

Materials: Student need to have access to the Internet, have a working knowledge of web browsers and interactive web sites, and have access to Google Drive® or Word® (depending upon how the instructor is going to collect the completed assignment).

Technical Requirements: An electronic device with internet capabilities.

Teacher Preparation: Be familiar with the interactive properties of the www.weather.gov web site. Review the student data tables to be sure the documents meet the needs of individual students.

Keywords: Data base, Active Alerts, Warnings or Advisories, Universal Time (UTC), Climate

Pre-assessment Strategy/Anticipatory Set (Optional): Students will log on to www.weather.gov web page and freely explore aspects of the interactive site. While the students are exploring the teacher will use formative assessments and provide individual instruction, as needed, to be sure all students are capable of navigating the various web pages.

Lesson Procedure:

1. Whole Class with Student Participation: log onto www.weather.gov
2. Provide 5 – 10 minutes to allow students to individually explore the web site.
3. Small Group: have students share two (2) interesting applications available on the web site or available links.
4. Whole Class: have students retrieve electronically, or use paper copy, of data collection documents. Review document.
5. Whole Class with Student Participation: return to homepage www.weather.gov
6. Click on the geographically area in which your school is located.
7. On the smaller map that appears click on your geographical location.
8. Review and record the current weather conditions provided.
9. Repeat steps 4 – 6 for two other geographical locations of the students choosing. Instruct students to choose locations that are in different regions (west, midwest, east) and are at different latitudes.

Assessment and Evaluation: Activity can be assessed in the follow ways depending upon available class time.

1. Little to no class time required. Students submit completed data collection documents. (electronically or paper copy)
2. One Class Period required. In small groups have students share both the information collected and data analysis.
    a. Based on group information re-evaluate individual analysis and reviews.
    b. After review have each group share their overall analysis and review.
    c. Students submit completed data collection documents.

Follow up instruction, supporting student analysis

- Interaction of oceanic and atmospheric processes controls weather and climate by dominating the Earth's energy, water & carbon systems.
- Oceans moderate global weather and climate by absorbing most of the solar radiation reaching Earth – driving the water cycle, regional weather phenomena.
- Oceans supply freshwater (rain) and nearly all Earth's oxygen.

Standards:

- **National Science Education Standard(s) Addressed:**
  Level 5-8 Structure of the Earth System
  Level 5-8 Understanding about science and technology
  Level 5-8 Science in Personal and Social Perspectives – Natural hazards
  Level 5-8 History and nature of Science – Human endeavor
- **Ocean Literacy Principles Addressed:**
  3. The ocean is a major influence on weather and climate.
  6. The ocean hand humans are inextricably interconnected.
- **Next Generation Science Standards**
    - Interdependence of Science, Engineering, and Technology
      1. Science and technology drive each other forward
      2.The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the finds of scientific research; and by differences in such factors as climate, natural resources and economic conditions.

- MS. Weather and climate
  1. MS-ESS2-5 Collect data to provide evidence for how the motion and complex interactions of air masses results in changes in weather conditions.

- ELA/Literacy: RST. 6-8 Cite specific textual evidence to support analysis of science and technical texts. (MS – ESS2-5 & MS. ESS3-5)

- WHST 6-8.8 Gather relevant information from multiple print and digital sources;

- MP .2 Reasons abstractly and quantitatively

- **State Science Standard(s) Addressed:**

  EALR1: Systems: Inputs, Outputs. Boundaries, and Flow
  EALR 4: Earth Systems Structures and Processes – Core Content: cycles in Earth's systems

- **Other National or State Standards Addressed (Optional)**

Additional Resources: N/A

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Tracking the Weather

In this lesson you will be using several NOAA web sites to explore different aspects of weather. Go to: www.weather.gov You will be using this map over the course of several days. Study the weather map and answer the following questions for your home state and two other states in different geographical areas of the country. Pick one location in the Midwest and one on the east coast. You will be using these same locations throughout this activity.

Your home state:	**Weather Conditions**						
1st Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
2nd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
3rd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
Analyze the data you collected. Look at all the data you collected. Do you see a weather pattern? Describe the pattern you have identified.							
Define weather:							
Define climate:							

2nd Geographical area:	**Weather Conditions**						
1st Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
2nd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
3rd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
Analyze the data you collected. Look at all the data you collected. Do you see a weather pattern? Describe the pattern you have identified.							

Explore other areas of the NOAA weather site. Provide three (3) additional pieces of information you discovered.

1.

2.

3.

3rd Geographical area:	**Weather Conditions**						
1st Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
2nd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
3rd Date Stamps:	Time	Temp.	Wind	Humidity	Cloud Cover	Warnings or Advisories	Tomorrow's Forecast
What are the current weather conditions in **your area** of the state?							
Are **other areas** of your state experiencing different weather conditions? If so, what are those conditions?							
	Area: Condition(s):						
Analyze the data you collected. Look at all the data you collected. Do you see a weather pattern? Describe the pattern you have identified.							
Review the analysis of each of the geographical areas you have been monitoring. Discuss the weather patterns you have observed. Include the movement of weather conditions from one area to another.							

When analyzing your data consider the following questions:

1. For each geographical location what weather patterns or trends have been recorded?

2. At different times of day, what changes occurred? What do you think influenced these changes?

3. Is there a correlation between, time, temp., wind, humidity and cloud cover? Does one time of day seem to have more severe or calm weather conditions?

4. Is there a sequence of events between the different geographical locations? Does the weather tend to move along a particular path or direction?

5. Based on your analysis, what distinctions can you make between weather and the local climate?