Scope Phenomenon

Name: _____ Date: _____

The Making of a Hurricane

1. What are some observations you can make about the video?

2. What happens to the storm over the ocean? What happens to it when it moves onto land?

3. What do you think is causing the storm to get bigger over the ocean?

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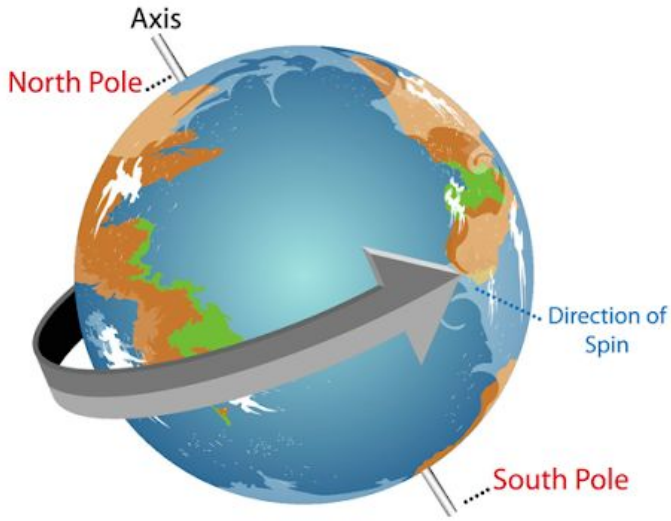
Name: _____ Date: _____

On the Move

Procedure

Part I: Earth's Spin



1. Work in pairs within your group.
2. Inflate and tie off one round balloon. The balloon represents Earth.
3. Hold the tied part of the balloon and the balloon upright.
4. Use a marker to draw an equator line around the middle of the balloon.
5. Using a red marker, draw the predicted path of warm air traveling from the equator to the North Pole and from the equator to the South Pole.
6. Using the blue marker, draw the predicted path of cold air traveling from the North Pole down to the equator and the South Pole to the equator.
7. Record a sketch of this model in Data Table 1.
8. Earth rotates counterclockwise on its axis. One person must hold the balloon and slowly rotate it in a counterclockwise direction. The other person will mark the air movement.
9. Air falls at the North Pole. Place the blue marker at or near the North Pole, and draw a straight line to the equator as the balloon is rotating. This line will represent the air moving down from the North Pole toward the equator.
10. Switch roles.
11. Begin rotating the balloon. This time, draw the line with the blue marker, beginning at the South Pole and ending at the equator, while the balloon is rotating. Do not flip the balloon over. This line will represent air moving from the South Pole toward the equator.
12. Complete the same steps, rotating the balloon counterclockwise using the red marker. Draw a path from the equator to the North Pole and from the equator to the South Pole as the balloon is rotating counterclockwise.

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13. Record a sketch of your model below.

Data Table 1

Model before Spinning	Model while Spinning

Questions

1. How did the arrows differ in the stationary model compared to the spinning model?

2. What type of air is moving from the equator to the poles?

3. What type of air is moving from the poles to the equator?

4. How do you think this movement can affect local weather?

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Part II: Leaving on a Jet Plane

1. Does it take longer to travel in an airplane from east to west or from west to east?
2. Write your prediction in Data Table 2, and explain why you think that.
3. Write “West Coast” on one sticky note and “East Coast” on the other sticky note.
4. Place the West Coast sticky note on the left side of your bucket and the East Coast sticky note on the right side.
5. Fill up your container halfway with room-temperature water.
6. Cut small, identical slits in the bottoms of the bags. Clip the bags to the inside of the container on opposite sides using the binder clips.
7. Fill one cup with ice and water. Add 5–10 drops of blue food coloring to the water. Make sure that it is dark in color. Place the cup on the East Coast side of your container.
8. Fill a second cup with hot water. Add 5–10 drops of red food coloring to the water. Make sure that it is dark in color. Place the cup on the West Coast side of your container.
9. At the same time, pour the blue water into the bag on the “East Coast” and the red water into the bag on the “West Coast.”
10. Wait a moment to allow the convection current to begin.
11. Observe the movement of the colored water, and record your observations in Data Table 2.

Data Table 2

Prediction	Justification
Current Movement Observations	

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Questions

1. Was your prediction correct?

2. Which air current appeared to move the fastest?

3. What do you think caused it to move faster?

4. What does the water represent in this model?

Reflections and Conclusions

1. What do you think the model in Part I represents?

2. What do you think the model in Part II represents?

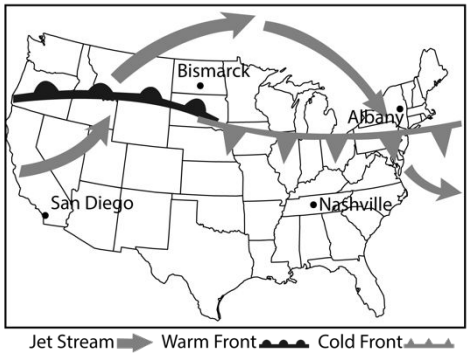
3. How do you think Earth's rotation changes the direction of the wind on Earth?

4. What does this mean for birds flying between coasts? In which layer of air, higher or lower, would they move more easily from west to east? From east to west?

Explore

Claim-Evidence-Reasoning

Using what you have learned from this activity and the weather maps, how does the spinning of Earth affect local weather?



Claim: 1–2 sentences *The claim answers the question, is accurate, and is based on data.*	
Evidence: 2–3 sentences *Evidence cites data directly from the activity or investigation, interprets patterns within the data, and accurately uses labels.*	
Reasoning: 2–4 sentences *Reasoning cites the scientifically accurate reason based on the evidence provided. It uses correct vocabulary and connects it to the claim; reasoning shows an accurate understanding of the concept.*	

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CER Rubric

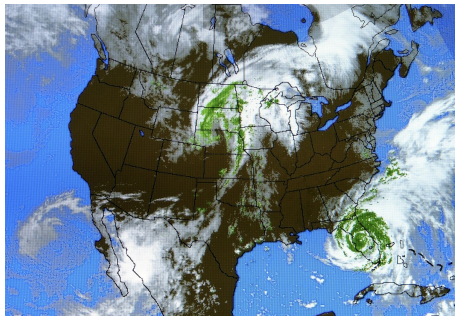
Points Awarded	2	1	0
Claim	The student made an accurate claim.	The student made an inaccurate claim.	The student did not make a claim.
Evidence	The student provided at least **two** accurate pieces of evidence.	The student provided **one** accurate piece of evidence.	The student did not provide evidence or provided only inappropriate or inaccurate evidence.
Reasoning	The student accurately connected the evidence to scientific thinking.	The student accurately explained scientific thinking but did not connect it back to the evidence.	The student did not connect any evidence to the claim or made only inappropriate or inaccurate connections to the evidence.

Explore

Name: _____ Date: _____

Forecast for Omaha

The movements of water and air masses in the atmosphere are caused by thermal energy transferred to Earth's surface from the Sun. This energy, which is driven atmospheric movement, causes the weather we see from day to day. The movements of water and air masses lead to changes in atmospheric conditions, such as wind speed and direction, temperature, humidity, and precipitation, which can be tracked over time. Weather stations exist all over the world and measure these conditions daily, hourly, and even by the minute. By knowing the atmospheric conditions today and for the past week, month, year, or decade, meteorologists can predict what the weather will do tomorrow and next week.



Procedure:

1. Use the chart to record your data.

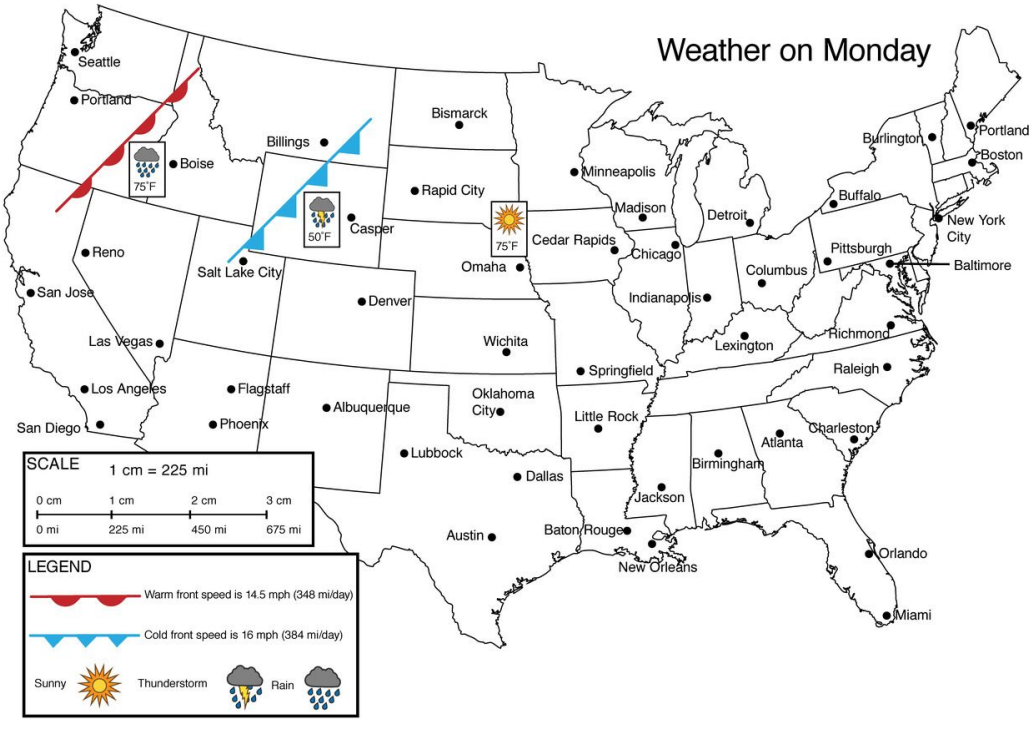
Weather for Omaha					
	Monday	Tuesday	Wednesday	Thursday	Friday
Temperature					
Precipitation symbols					
Probability of rain (high or low)					
Miles traveled by cold front					
Miles traveled by warm front					

2. Using the weather map provided by your teacher, plot the cold and warm fronts for the next week and predict the weather for Omaha, Nebraska. Looking at your weather map, fill in the chart for Monday.
3. Using the information on your weather map, calculate how far the fronts will move each day. To calculate how far they will move, take the speed they are moving and multiply it by the number of hours in a day. Record the distance each front will travel each day in the data table.
4. Using the map scale and the ruler, draw in the new location of each front for the remaining four days of the week.
5. With your fronts now drawn, predict the weather in Omaha for Tuesday through Friday. Write your predictions for daily temperature and probability of rain, and draw the predicted precipitation symbol in the data table.

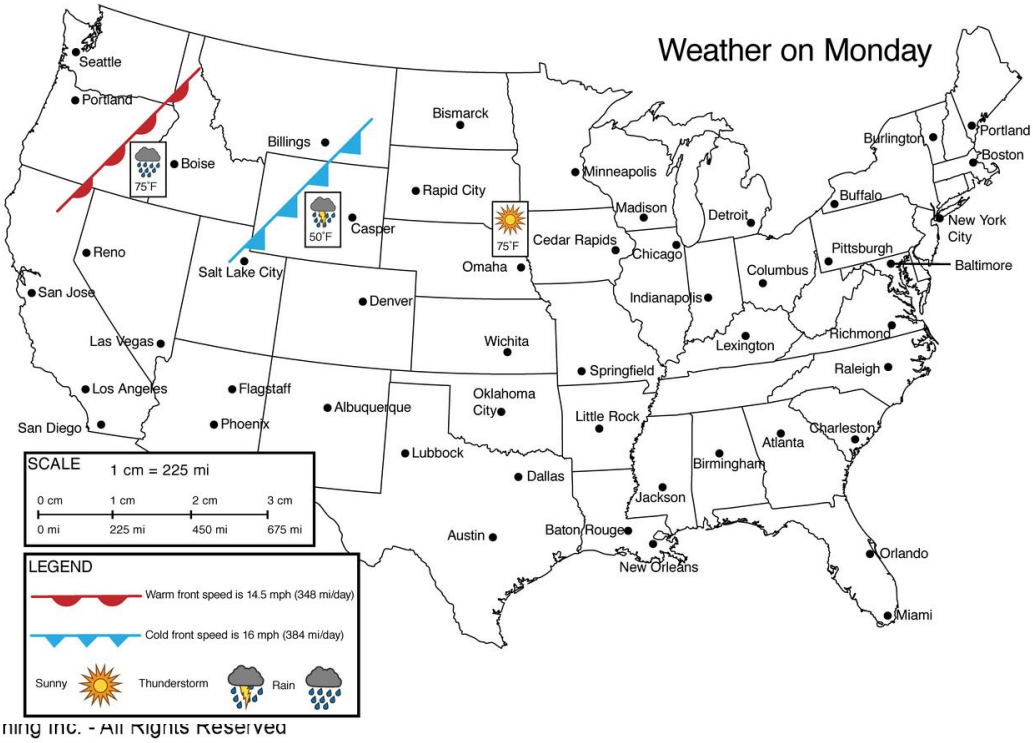
Explore

Weather Map for Omaha

Weather Map for Omaha



Weather Map for Omaha



Linking Literacy

Name: _____ Date: _____

BDA Reader's Questions

Use the table below to record your thoughts and questions before, during, and after reading the text.

Before-Reading Questions	
Based on my preview…	My questions include the following:
During-Reading Questions	
While I am reading, I notice that…	My questions include the following:
After-Reading Questions	
I still wonder about…	My questions include the following: