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Weather – Wicked Winds!
Episode 107

Investigations To Explore Forecasting

Mari and Lindsey wondered how people used to predict the weather before there were satellites, radar and computers. They knew of several folktales about the weather, and were curious if they were true.

Question

Can you use folklore to predict the weather?

Investigation

Mari and Lindsey explored several folktales about weather. They were: Clouds at night predict tomorrow's weather; hair won't hold its curl if rain is coming; bees stay near the hive when storms approach; cows lie down when it's going to rain; Grandma's toe hurts when bad weather is coming. They also built a homemade barometer to see if they could detect weather changes that way.

Results

The girls counted the number of times each predictor was correct about the next day's weather, out of nine days.

Clouds at night	7	**Bees**	6
Grandma's toe	3	**Hair**	4
Barometer	5	**Cows**	3

Conclusion

Mari and Lindsey found that over nine days, only two of their folktales were reliable more than half the time. They wondered if their results would come out differently if they observed the weather for several weeks.

Tornado Model

Fascinated by tornadoes, Sullivan and Alexa wanted to learn how tornadoes form in nature.

Question

Is a side wind or an updraft wind more important in forming a tornado?

Investigation

Sullivan and Alexa built their own tornado model from a large cardboard box, two household fans and a humidifier. They tried all combinations of settings to see how to make the strongest tornado vortex.

Conclusion

They found that a high side wind is important in making a destructive tornado, but it is not enough all by itself. The side wind becomes a destructive tornado only when there is also a strong updraft.

Find out more: pbskids.org/dragonflytv.

Scientist: Dr. Howie Bluestein

Howie is a stormchaser in Oklahoma who specializes in tornadoes. He has also studied other kinds of violent storms, and has flown into the eye of a hurricane six times!

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Classroom Inquiry

1) Getting Started

- Ask your students to discuss extreme weather events they remember. Do bad storms keep them up at night? Do they worry about tornadoes or hurricanes?
- How do meteorologists predict the weather?
- Meteorologists talk a lot about barometric pressure. What is that?
- Do any students have devices in their homes that measure temperature, humidity, or pressure? Do any students use them? Could they be used for investigations?
- Show students a copy of The Old Farmer's Almanac. List different methods for weather prediction described in the book.

2) Going Deeper

- There are hundreds of weather myths, legends, and folktales. Name as many as you can. What would you need to find out if these legends are true?
- Create plans for a class weather station. What would you include? Ask teams to design a homemade anemometer to measure wind speed, a barometer to measure air pressure, a wind vane, a thermometer, or other instruments. Could you use these to predict the weather?

3) Investigate With DragonflyTV

- Watch the video and see how Mari and Lindsey tested some weather folktales – OR – give your students data from the video (see opposite page) and have them draw their own conclusions.
- Mari and Lindsey found that some folktales described current weather, but not future weather. What's the difference between describing and predicting?
- The girls said the weather didn't change dramatically during the nine days they did their test. Should they have conducted their test during changing weather?
- Try making your own weather predictions for a week, using observations of natures clues. How successful can you be?

4) Investigate On Your Own

- Using the Forecasting or Tornado Model segments to get students thinking, ask your students to design their own investigations. Give these challenge cards to student teams to get things rolling.

Challenge Cards

1) Bowling in Tornado Alley

Has there ever been a tornado in your state? Are there places in the United States that get more tornadoes than other places? Where? Look at tornado maps. (Hint: try a tornado website, like the one at http://www.spc.noaa.gov/faq/tornado/f5torns.html) Do you see a pattern? Why do you think tornadoes occur in some places more than others? Do they occur near oceans? Near mountains? In deserts? Investigate your ideas. Based on what you've learned about U.S. tornadoes, predict other tornado-prone areas around the world.

2) Winds of Change

Winds often signal a new weather front moving in. See if you can tell what kind of weather is coming by the strength and direction of the wind. To measure the wind, you might try using a feather, or invent a wind flag. Keep a wind diary. Is it windy on a day when the weather map shows a new high or low pressure system approaching? Create an investigation to see whether cold weather actually comes from the north. Investigate where changing weather comes from where you live.

3) Weather City

Investigate three real cities from around the world that have very different types of weather. You might try a town in a desert, in a rainforest, even your own town. How does weather shape each place? Are the buildings different? How about the vehicles, food, drink, clothes, or holidays? Sketch six key differences.

Based on what you discovered, imagine building a city on Mars. Investigate the local weather and draw an imaginary town designed to match it.

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Inquiry Tips

The Art and Science of Investigation: On Questioning

It is true that there is no such thing as a bad question, but experienced investigators develop a knack for sifting through many questions to find just the right ones to suit their purpose. This process, which is both an art and a science, is a fundamental part of an investigation. Discuss the questions below with your students to start them thinking about the nature of inquiry and to help track down questions that will most likely lead to great discoveries.

Why should I care about this question?

If your class worked together to generate the question, chances are you have already solved the problem of relevance. Students know what they find interesting, but they may still benefit by discussing reasons why a question is significant. Such a discussion becomes more important if the students did not generate the question themselves.

Is the question too easy or too hard?

Often questions that seem easy at first lead to other questions worth investigating. Ask your students to keep probing. When faced with a question that seems too hard, ask your students to break the question into interesting pieces.

What's my best approach?

Challenge students to devise alternative strategies for addressing a question. A question about lions may best be answered by library research. Other questions may require interviews, computer research, thought experiments, direct observation, or field experiments. The best questions often challenge students to adopt multiple approaches. You might try giving students a list of questions and then have them determine the best ways to address each one.

Will this question lead anywhere?

Point out the difference between a descriptive question and a comparative question. Imagine a student who asks the descriptive question, "How many animals are under that rock?" Let's imagine she picks up the rock and finds three pillbugs and a spider. So what? It seems a dead end. But, if she asks the alternative, comparative question, "Are there more animals under big rocks than small rocks?" she opens up other questions. Does she think more animals live under big rocks just because of their size? Or is there more moisture under big rocks? Is there more protection? Do spiders fall into the same pattern as pillbugs? How could she find out? Review the questions in the DragonflyTV investigations. Are they comparative questions?

A wonderful unit could be born with just one simple comparative question. To help your students with comparative questions, have them practice moving from description to comparison.

Do we have the resources?

Some excellent questions may require more resources than students have available. Yet, constraints in time and equipment can be used to inspire students to create ingenious solutions. Often, the best investigations are completed with rulers, string, paper plates, and other simple tools. While recognizing that not everything is possible, help your students realize that more is possible than they might first think.

It would be convenient, but not very interesting, if inquiry could be defined in a simple way. It cannot because the process of investigation relates to your life inside and outside the classroom.

If your students have great investigations, visit our Web site at pbskids.org/dragonflytv and tell us about them. Your students could be on DFTV!

For graduate-credit teacher workshops, visit www.DragonflyWorkshops.org

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