

# Weather Tools of the Trade

## Standard II:

Students will understand that the elements of weather can be observed, measured, and recorded to make predictions and determine and determine simple weather patterns.

## Objective 3:

Evaluate weather predictions based upon observational data.

## Intended Learning Outcomes:

3. Understand Science Concepts and Principles.

## Content Connections:

Language Arts VII-2; Comprehension to Understand Text.

Science  
Standard  
II

Objective  
3

Connections

## Background Information

For students to predict the weather they need to know the simple weather patterns. To know the simple weather patterns they need to know the simple instruments used by meteorologists that measure the elements of weather. These simple instruments that 4<sup>th</sup> graders need to know are the thermometer, barometer, weather vane, anemometer, and rain gauge. When the students have learned the identity of these instruments, they need to know how they work and how to interpret the information they have gathered. In this lesson you will learn how to teach what these instruments are, how they are used, data that can be collected from the use of these instruments, and why we keep records of the data. Later in another lesson we will interpret the data.

## Research Basis

Myhill, D. (2006). Talk, talk, talk: teaching and learning in whole class discourse. *Research Papers in Education*, Vol. 21, No. 1, pp. 19-41

It is important that teachers don't take up too much of student learning time by talking that limits opportunities for pupil learning. Teachers are encouraged to only take up about 15 minutes of whole class time. Teachers are encouraged to use questions for student interaction with each other for discussion and discovery. The teacher only acts as a facilitator during the student learning time. Teachers are also encouraged to have students work in groups to learn from each other.

Enfield, M. (2007). Discussion maps make sense. *Science and Children*, Vol. 44, No. 5, pp. 46-49.

Discussions can be useful for teachers in evaluating students' ideas. They offer windows for teachers to help understand student thinking.

Through discussions, students can express their ideas. Some students feel more comfortable during a discussion than during any other school task. The "discussion map" lets a teacher gain insight into the students' level of participation and helps the teacher get an idea if the student understands the concept taught.

## Invitation to Learn

Make about six groups with four students in each group. Pass out pictures of the rain gauge, barometer, thermometer, anemometer, weather vane, and ruler (or the real articles if you have enough) to each group. These pictures shouldn't have the name of the instruments on them. (If possible, have a real sample of each of the weather instruments by you that the students have pictures of.) Tell the students that these are some of the weather instruments meteorologists use to find out what the current weather conditions are.

Without telling the name of the instruments show the real instruments to them one by one. Pass out cards that that tells the names of each weather instrument. Give the groups time to put the name of the weather instruments with the pictures of the weather instruments. When they are done see if they have correctly matched the names with the instruments.

At this time you can see if any of the students know how these instruments measure the weather elements. As they tell about each one, pass out the card that tells about that particular weather instrument and its use. Elaborate on what the student has stated about the instrument. Do this until all the instruments have been talked about. Tell the class that these are the basic instruments that meteorologists use to tell us what the past weather was and what the current weather is now.

## Instructional Procedures

Tell the students that today they are going to learn more about these weather instruments and how meteorologists use them by watching a weather newscast from a local TV station.

1. Have the students get out their journals and tell them they are going to take notes of what they see in the local weather broadcast. Tell them to look for the instruments they use, the order they present the information, and what is the final idea they want to present to us. Right now, we are not interested in the numbers they show, just the type of information they are giving us.

### Materials

- Pictures, word Cards, and samples of:
  - Barometer
  - Thermometer
  - Rain gauge
  - Ruler
  - Anemometer
  - Weather vane
- Weather instruments description cards
- Local weather forecast video
- What Did The Meteorologist Say To Us?*
- Journals



2. Show a clip of a 10:00 p.m. weather broadcast from a local news station.
3. Have the class members write down what the meteorologist showed as part of his/her weather presentation.
4. They may write:
  - The current day's past statistics (kind of precipitation, amount of precipitation, air temperature—highs and lows, and wind speed).
  - The present conditions (kind of precipitation, air temperature, wind direction, wind speed, cloud cover, and air pressure—rising, dropping, or stable).
  - What tomorrow's weather is going to be (kind of precipitation, amount of precipitation, air temperature—highs and lows, wind speed, wind direction, and cloud cover).
5. Discuss what they observed about the weather broadcast.
6. Pass out the worksheet *What Did The Meteorologist Say To Us?*
7. Ask the students, "How did the meteorologist know what the past weather conditions were? (They used the weather instruments we talked about.)"
8. Ask the students, "How did the meteorologist know what the present weather conditions were? (They used the weather instruments we talked about.)"
9. Ask the students, "What are the instruments he used to tell us about the weather of the day?" (The rain gauge or ruler, thermometer, anemometer, and others they may name.)
10. Ask the students, "Why are these weather instruments important?" (They tell us what the past weather was and what the present weather is.)
11. Ask the students, "Why is it important to us to know what the present weather is?" (We know what we need to wear to be comfortable out in the weather.)
12. Ask the students, "Why do you think it is important that we keep track of the weather and record it day by day?" (Some will give guesses to this question, but the students may not directly know this answer. You may want to help them along with more questioning to get to the right answer.)
13. When they can't answer it totally correct, tell the students that meteorologists use the past weather data to watch for patterns. They watch the patterns of the temperature, wind direction, wind speed, the kind of precipitation, the amount of

precipitation, and the barometric pressure and make weather predictions.

14. Ask the students, "Are there other instruments the meteorologist used for presenting the weather to us?" (Yes, he used satellite pictures.)
15. Tell the students they are going to learn about weather patterns by keeping a record of the basic elements of weather by using these tools we have talked about.

## Assessment Suggestions

- Look in their journals to see if they took good notes on the weather forecast segment that they viewed. They needed to have written the three parts that a meteorologist presents—present day's past statistics, the current conditions, and the forecast. They should have written down the instruments they used during the weather broadcast.
- Look at the worksheet the students answered during the discussion.
- Test the students if they know the weather instruments by using the pictures and the words of the pictures to match them up.
- Have the students write what the uses of the instruments are.
- Have the students tell why the information that is recorded by these instruments is helpful.

### Curriculum Extensions/Adaptations/Integration

- Advanced learners can do some research on these instruments.
- Advanced learners can do some presentations on these instruments in depth during the presentation or after the presentation.
- Learners of special needs should be able to physically touch the weather instruments and match them to the pictures. They will need special help in the group to match the names with the instruments.
- Have the students make the weather instruments in class.
- Have the students read more about the instruments they have learned about.

## Family Connections

- Send the pictures of the weather instruments home with the students to explain to their families what each of the instruments are and how they are used to find out what the current weather is.
- If the students made some of the instruments in school, send them home to show and explain their families about the weather instruments. Have them use them at home.
- Give an assignment to the students to watch a weather report on any of the channels to reinforce what they learned in school. Have them take notes on what the weather is going to be the next day and see if it is correct the following day.

## Additional Resources

### Books

*Weather*, Science Alive; ISBN 0-7787-0611-7

### Media

*Forecasting and Weather Instruments DVD*, UNITED LEARNING, 2001

### Web sites

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

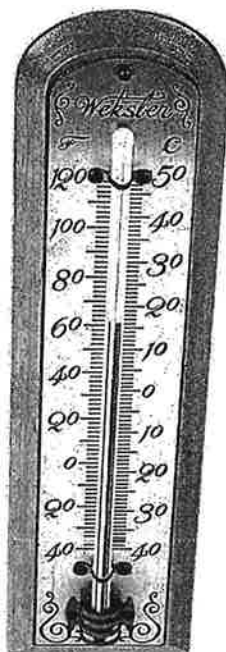
<http://schoolscience.rice.edu/duker/winstruments.html>

<http://www.fi.edu/weather/todo/todo.html>

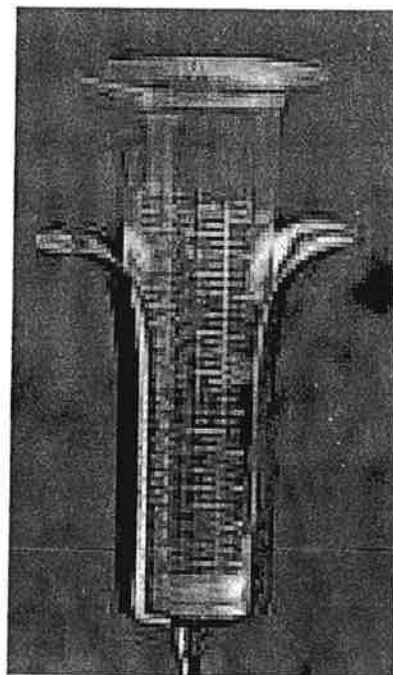
# Weather Instruments



**Barometer**



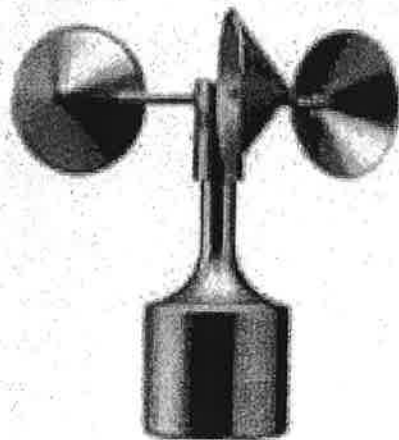
**Thermometer**



**Rain Gauge**



**Weather Vane**



**Anemometer**



**Ruler**

# Names of the Weather Instruments

<b>Barometer</b>	<b>Thermometer</b>
<b>Rain Gauge</b>	<b>Anemometer</b>
<b>Weather Vane</b>	<b>Ruler</b>

# Weather Instrument Descriptions

## Barometer

There is air pressure around us all the time. The barometer measures the air pressure around us. Sometimes this air pressure changes because of changes in the atmosphere. When the air pressure changes there is usually a change in the weather. When there is a big change in the air pressure a storm is coming.

## Thermometer

The thermometer measures the temperature of the air around us. The air temperature outside changes constantly. It changes because the sun changes its position in the sky, when the sun goes down at night, when the sun goes behind a cloud, or when warm or cold air moves into our area.

## Anemometer

The anemometer measures how fast the air is moving around us. It may be blowing softly telling us that we will enjoy fair weather for a while, or it may be blowing hard telling us that a low pressure is near and a storm may be coming our way. The wind can be very pleasant or it can do a lot of damage.

## Weather Vane

The weather vane tells us from which direction the wind is coming from. It is set up so the arrow points in that direction. The wind hits the back tail and turns it so the arrow will point in the direction the wind is coming from. Sometimes we can tell if a storm is coming by knowing which direction the wind is coming from.

## Rain Gauge

The rain gauge measures how much rain we got during a rainstorm. After the rainfall is measured, meteorologists will look at the other weather instruments to see what the conditions were like right before it rained. They will record this data. When they see the other instruments all measuring the same again before another rainstorm, they can predict how much rain we will get with the storm coming in.

## Ruler

The ruler measures the depth of the snow after a snowstorm. After the snow depth is measured, meteorologists will look at the other weather instruments to see what the conditions were like right before it snowed. They will record this data. When they see the other instruments all measuring the same again before another snowstorm, they can predict how much snow we will get with the storm coming in.



# What Did The Meteorologist Say To Us?

1. How did the meteorologist know what the past weather conditions were?

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2. How did the meteorologist know what the present weather conditions were?

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3. What are the instruments he used to tell us about the weather of the day?

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4. Why are these weather instruments important?

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5. Why is it important to us to know what the present weather is?

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6. Why do you think it is important that we keep track of the weather and record it day by day?

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