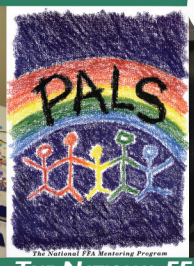
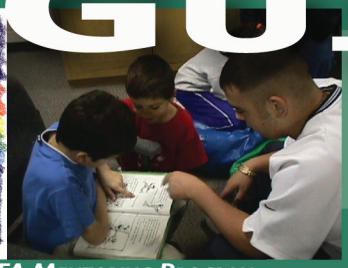
Grow Your PALS Program Guide





The National FFA Mentoring Program

Sponsored by Campbell's

Lesson 1.35

Catching the Wind – Using a Weather Vane

Unit: Mathematical Applications

Precepts

J. Mental Growth
J1. Think critically

F. Continuous Improvement
F5. Acquire new knowledge

Lesson Type:
One on One

National Standards

ESS.03.01.01.b. Differentiate the types of weather systems and weather patterns.
NL.ENG.K-12.12 – Applying Language Skills
NS.K-4.4 Earth and Space Science

Student Learning Objectives

As a result of this lesson, the student will …

- Explain ***wind.***
- Explain what causes ***wind*** to blow.
- Determine the direction of the ***wind*** using a weather vane.
- Describe three things agriculturists can learn by monitoring the ***wind***.

Time

Instruction time for this lesson: **50 minutes.**

Resources

http://www.weatherwizkids.com/weather-wind.htm

www.weather.com

Robertson, R. (2005) Stop Faking It! – Air, Water, and Weather. NSTA Press: Arlington, VA.

National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.

Tools, Equipment and Supplies

- **PALS1.35.ONE.TM.A**
- **PALS1.35.ONE.ASSESS.A**
- **Globe**
- **Scissors**
- **Three pieces of cardboard**
- **Pencil**
- **Two paper clips**
- **Modeling clay**
- **Two heavy rocks**
- **Tape**
- **Compass**
- **Computer with Internet access**

Key Terms

The following terms are presented in this lesson and appear in ***bold italics***:

Wind
Wind vane
Jet stream
Cold front
Warm front

Content Outline

I. ***Winds*** and the Weather
- A. ***Wind***
  1. Air in motion
  2. Two important factors: direction and speed
- B. ***Jet stream***
  1. A stream of fast flowing air found in the atmosphere
  2. 12 kilometers above the earth

C. ***Cold front***

1. A mass of cold air displaces warmer air
2. Usually causes more intense thunder and snowstorms

D. ***Warm front***

1. A mass of warm air displaces colder air
2. Usually results in a longer, more gradual weather pattern

II. ***Wind vane***

A. Tool used to measure ***wind*** speed and direction

Interest Approach

Begin this lesson inside. Have a globe ready as a prop.

What is this thing?

Hold up the globe.

Right, this is a globe representing the earth. What are some things you know about the earth?

Allow the student to share. Things may include that it is round, it has water and land, it is really big, etc. Join in the discussion about the earth.

You know a lot about the earth. What about the weather? How do clouds move around the earth?

Let the student explore different ideas.

Do the ***wind****s* always move the same way?

Discuss the student's ideas.

Wind and weather are very important parts of the weather on the earth. Did you know that the sun warms parts of the earth in different ways? Let's turn out the lights and you hold the flashlight. The flashlight represents the sun. Turn on the sun.

Have the student stand and hold the flashlight.

OK, you are the sun and I am the earth. When the sun hits the earth, it heats up certain areas more than others. Which areas right now would be really warm?

Student should point at areas of direct light.

What about areas that are really cold?

Point at dark areas.

This is what causes winter and summer. Also, areas of different temperatures cause ***wind*** and storms to form.

Many times we see the weather right outside our window, but we never think about what is going on in terms of the earth. If we know how weather works, we can predict what the weather will do just by looking at the ***wind***. Agriculturists do this all the time. By paying attention to which way the ***wind*** blows, and how fast it blows, they can prepare for storms, rain, snow or even dangerous weather like tornadoes, lightning or flooding.

Today, we are going to learn about what causes ***wind*** to blow and storms to develop. We're also going to build our own ***wind vane***, and then monitor the ***wind*** to predict the weather. Let's start by learning about ***wind*** and weather.

Summary of Content and Teaching Strategies

Objective 1. | Explain what *wind* is and what causes it to blow.

We feel and see the ***wind*** every day. What do you think the ***wind*** is?

Let the student respond.

The ***wind*** is simply air in motion – air that is moving. Like we said earlier, different parts of the earth get more heat from the sun causing ***winds*** to blow. Two factors are very important: speed and direction.

Warm air weighs less than cool air, so warm air rises. The cool air moves down and makes the ***wind*** blow. That is why sometimes when you feel a cool breeze coming in you know a storm could be coming.

Use the globe again.

There are also "rivers" of ***wind*** that flow in opposite directions over the earth. These are called ***jet streams.*** For example, ***wind*** here in the United States always flows from west to east across the globe. The ***jet stream*** pushes cold and warm air around the globe causing storms and dry spells. Let's look at an example of a ***jet stream***.

*Look at PALS1.35.ONE.TM.A or find a weather map showing the **jet stream** from a local weather website.*

As you can see, the ***wind*** is shown like a river and you can tell if it is hot or cold air. You can see in this example that when cold air meets warm air, it rains.

When warm air moves into an area of cold air it is called a ***warm front***. When cold air moves into an area of warmer air, it is called a ***cold front***. Usually a ***cold front*** pushes hot air up fast causing big snowstorms or thunderstorms. A ***warm front*** pushes in warm air that slowly moves up and causes a slow steady rain.

Wind is a very important part of the weather. Let's start measuring **wind** right here where we are located.

OBJECTIVE 2. | Determine the direction of the *wind* using a weather vane.

Have all of the materials listed above on a table. It is best if you have enough for you and your PALS so that you can model the steps.

Right here we have everything we need to create our own ***wind vane***. We will take it step-by-step.

First, use the scissors to cut out three pieces of cardboard, each 4" by 12."

Help your student with the scissors if they struggle.

Next, use the tip of the scissors to score across the piece of cardboard. Make a hole in the middle of this cardboard piece and push a pencil through it until the hole is slightly larger than the diameter of the pencil. This is the stand for the weather vane.

Complete this step and make sure the PALS has their base complete.

OK, now we will use tape to attach the stand to a second piece of cardboard.

Demonstrate.

Straighten out two paper clips. Wrap one loosely around the top of the pencil and the other one loosely around the sharpened end. Remove the paper clips from the pencil.

Demonstrate.

Use the clay to attach the pencil to the center of the arrow.

Make sure there is an equal amount of clay on both sides of the pencil or the arrow won't balance properly.

Use the tape to attach the paper clip over the hole in the stand. Attach the other to the base underneath. Now stand the pencil in the hole.

Demonstrate.

Mark the points of the compass on the base. Then take it outside and use a compass to line it up.

*Move to a place outside that is suitable to monitor the **wind**. Set up the **wind vane**. You may need to place two rocks on each end of the **wind vane** to hold it in place.*

You can see that your ***wind vane*** is already moving because of the ***wind***. Which way is the ***wind*** blowing?

*Help the student use the compass bearings to determine the **wind** direction.*

Exactly. Your new tool allows you to monitor what the ***wind*** is doing right here in our own town. Agriculturists do this same thing to guess what the weather is going to do.

Now that we have the tools, we can make guesses about the weather. Let's make some predictions!

OBJECTIVE 3. | Describe three things agriculturists can learn by monitoring the *wind*.

Let's start with the ***wind*** direction. Which way is it blowing?

*Work with the student to determine the **wind** direction.*

Great!

Now what about the speed of the ***wind***? Do you think the ***wind*** is blowing really fast, moderate or hardly at all?

*Work with the student to record their **wind** speed.*

Finally, do you feel like the temperature is getting hotter or colder?

Discuss the temperature with the student.

Great. So we know that there is either hot or cold air coming. If it is cold air we know a big storm might be coming in. If it is warm air, we might be in store for some gradual storms.

If you were a farmer or a rancher today, what would you think about the weather?

Allow the student to respond.

Good ideas! I wonder if our predictions were correct. Let's go inside and look at the actual weather report and see if it matches our weather data.

REVIEW/SUMMARY

Bring the student back into the classroom and pull up a weather report in your specific area by using www.weather.com.

Here is the actual weather radar showing what is going on right now. Where is the ***jet stream***?

Have the student show you where the **jet stream** *is.*

Does that match your predictions in terms of cold or ***warm fronts***?

*Show the student various cold and **warm fronts** moving across the country.*

What about ***wind*** direction and speed? Does it match our calculations?

Discuss the similarities and differences.

What would you be thinking if you were a farmer and you saw this weather map?

*Look at the weather report and allow the student to navigate around the weather information. Support through a discussion of the five-day forecast. Focus on the cold and **warm fronts** moving in or out.*

Now you, just like farmers and ranchers, can predict what is going to happen as the ***winds*** and weather change. The ***wind*** plays a major role in our weather each and every day.

Grab the globe again.

Can you find where we are at on the globe?

Have the student find their state on the globe.

That is right. Many times when we are in our city, we don't realize how the air is moving all over the globe and affecting our weather.

Application

Small Group Idea
*Complete this lesson and then take the small group to meet a farmer or rancher and discuss how weather affects his or her everyday decisions. Allow students to work with the professional to use their **wind vanes** and make predictions.*

Large Group Idea
*For this activity, it would be essential to have more mentors available to complete the **wind vanes**. Build student teams and ask each team to use their weather vane and their senses to predict the weather. Then follow the weather to see who was the closest to what actually happened.*

PALS1.35.ONE.ASSESS.A | Evaluation Answer Key

1. A
2. B
3. C
4. B

PALS1.35.ONE.ASSESS.A

Name:_____

With the help of your mentor, answer the following questions:

1. This type of front usually causes severe thunderstorms and lots of rain over a short time.
    a. Cold front
    b. Warm front

2. This type of front usually causes longer, more steady storms.
    a. Cold front
    b. Warm front

3. What do we call a river of air?
    a. Windy river
    b. Flowing wind
    c. Jet stream

4. What tool do we use to find the wind direction?
    a. Compass
    b. Wind vane
    c. Thermometer

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