



## LESSON PLAN STANDARDS SAMPLE LESSON

**LESSON TITLE:** “Gluscabi and the Wind Eagle”

**GRADE LEVEL:** Lower or upper grade level students.

### **OVERVIEW:**

The importance of wind and weather is emphasized throughout this lesson. Topics include: the causes of wind, local and regional influences upon wind patterns and the relationship between the wind and air pollution. Wind is moving air. It comes from the uneven heating of the earth’s surface by the sun. Wind speed and direction can be measured. Wind speed and direction vary by location and time of day. Wind can do work. A wind turbine changes wind energy into electricity.

There are several activities in this lesson. They can be adapted to include more lower-level, “cognitive” activities, or more “complex” thinking levels for upper middle school students.

Select from the “standards” below that match your state and grade level requirements.

### **STANDARDS:**

- Develop and test strategies to solve practical, everyday problems which may have single or multiple answers.
- Use oral, written, concrete, pictorial, graphical, and/or algebraic methods to model mathematical situations.
- Objects, organisms, and events are classified based on similarities, differences, and interrelationships.
- Use appropriate tools to measure objects, organisms, and/or events.
- Follow a multi-step procedure when carrying out experiments, taking measurements, or performing technical tasks.
- Observe to acquire new information about an object, organism, or event.
- Report and record both quantitative/qualitative data in an appropriate method when given data.
- Communicating is the process of describing, recording, and reporting experimental procedures and results to others.
- Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations.
- Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions.
- The biosphere is made up of all that is living on the Earth. It is a life-supporting global ecosystem, where living things depend on other organisms and the environment.
- The motion of an object can be described by its position, direction of motion, and speed as described by Newton’s Laws of Motion.

## **OBJECTIVES:**

1. Students will observe how air moves from a high-pressure system (inside an inflated balloon) to an area of lower pressure.
2. Students will learn that warm air is lighter than cold air so it rises.
3. Students will use local newspaper weather information and Internet sites to track weather systems.
4. Students will identify, then compare and contrast wind patterns.

## **ACTIVITY #1** *“Introductory Lesson”*

### **MATERIALS:**

- Excerpt from “Gluscabi and the Wind Eagle”
- Copy of discussion questions.

### **PROCEDURES:**

1. Read excerpt provided from the Abenaki-Northwest Woodlands Native American legend, “Gluscabi and the Wind Eagle” (see story at end of lesson). Students will use computers (if accessible) or journals to record answers to discussion questions as future resources.
2. Classroom group discussion of questions.

### **\*Questions**

1. Why does Gluscabi travel to visit the Wind Eagle? What happens to him along the way?
2. Is it a good idea for Gluscabi to tie up the Wind Eagle? Why or why not?
3. Gluscabi plays a trick to get his way and he stops the wind so he can paddle his canoe. What else could Gluscabi have done instead of tying up the Wing Eagle?
4. Once Grandmother Woodchuck tells Gluscabi what has happened because the wind is no longer blowing, Gluscabi feels foolish and he listens to Grandmother Woodchuck. What lessons does Gluscabi learn?
5. What is the scientific explanation for what causes the wind to blow?
6. How does the wind benefit people and other living things?

\*See “Additional Information”

## **ACTIVITY #2** *“Blast Off: Air-Pressure Rocket Ships”*

### **MATERIALS:**

- Balloon
- Cotton thread
- Straw
- Sticky tape
- Tape measure
- Stop watch

## **PROCEDURES:**

1. Push the cotton through the straw.
2. Stretch the thread across a room. (The thread needs to be taut, so it is best to secure the ends to fixed objects.)
3. Blow up the balloon without tying up the end of it and tape the balloon to the straw horizontally.
4. Once the balloon is secured to the straw, release the end of the balloon. (It will go flying along the cotton thread across the room.)

Link to activity and lesson extensions:

<http://www.green-planet-solar-energy.com/balloon-rocket-experiment.html>

## **ACTIVITY #3:** “Sail Away”

### **MATERIALS:**

- 9” x 9” square sheet of paper for each student or group
- Tray or tub of water to sail boats (3’ by 3’ or larger)
- Measuring tape
- Stop watch

### **PROCEDURES:**

Wind blows across lakes and ponds to free them of floating debris and it mixes vital oxygen into the water. This is a fun demonstration to demonstrate how the wind clears the surface of water.

1. Get a piece of square paper color side up in a diamond shape.
2. Fold the bottom corner up to the top corner and crease.
3. Fold left and right corners up to the top corner and crease, which should create a small diamond shape.
4. Pull the left and right corners back down to return to the triangle shape.
5. Fold the first layer of paper from the top corner down to the bottom.
6. Fold the left and the right corners back to the top corner along the same fold.
7. Flip paper over to the other side.
8. Pull the single layer of paper from the top.
9. Flip paper over.
10. Fold bottom corner up to middle and flatten. Add a sail.
11. Place the folded paper boats into the water. (Blow on the sail or use a fan as your power source.)

12. Conduct several trials to determine which boats sail the greatest distance, and which ones sail the fastest. Students may then make changes and conduct additional trials.

#### **ACTIVITY #4:** “Weather Wise”

#### **MATERIALS:**

- Copies of local newspapers
- United States blank outline map
- Colored pencils
- Computer (if accessible)

#### **PROCEDURES:**

1. Discuss how air masses meet along *fronts*-places marking the leading edges of air masses where storms often occur. A warm air mass pushing against a heavier cold air mass rides over the cold air (*warm front*), while a cold air mass pushing against a warm air mass forces the lighter warm air upward (*cold front*). Use the information from discussion about fronts to explore the effects on wind and weather patterns caused by local and regional influences such as mountains, lake and oceans.
2. Access local weather websites or use copies of local newspapers to generate a discussion that will describe warm fronts, cold fronts and general and local weather patterns. Monitor the weather in your area and forecast the weather. Discuss and list examples of the forms of air pollution caused by burning fossil fuels.
3. Research and identify the sources of pollution blowing into your area from communities upwind, and the destination of your pollution blowing downwind. Understand the general wind and weather patterns with local variations in wind and weather patterns due to the affects of mountain ranges, oceans and other regional influences. Understand that the forthcoming weather conditions and air quality can often be estimated accurately by looking to the west.
4. Using U.S. outline maps, locate and monitor the weather patterns to the west of your home, or in the direction of the prevailing winds in your area.

#### **ADAPTATIONS:**

##### Elementary:

1. Make windsocks to hang outside. (The closed tip of the sock will point in the direction the wind is blowing “*toward*”.)
2. Make pinwheels.
3. Design, construct, and fly kites.
4. Blow soap bubbles in the wind.

##### Upper middle school:

1. (Use powerpoint to introduce lesson.)  
<http://www.liberty.k12.mo.us/-sheeke/units/weather/Winds.PDF>

“There are other forces that affect the wind. The Earth’s spinning motion creates the *Coriolis effect*, which causes winds to be deflected to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. This creates the *westerlies*, the general wind pattern blowing from west to east in the middle latitudes of the northern and southern hemispheres.

This pattern is familiar to most people because we generally look to the west to see what kind of weather lies ahead. Wind direction is described as “where the wind is coming *from*”. An easterly wind blows from east to west.

Besides playing an important role in determining weather patterns, wind also dilutes air pollution that is produced by automobile exhausts, electrical generating plants, industrial emissions and more. Wind blows across lakes and ponds to free them of floating debris and it mixes vital oxygen into the water.”

2. Have the students produce reports on air pollution as a general topic, as local issue and as an issue in their lives that they can do something about. Have them create and include a list of specific ideas for how they can each help to have cleaner air.

3. Use the internet to further research how to describe the difference in characteristics of possible wind formation and damage in tornadoes and hurricanes. Students can use latitude and longitude maps to track the formation and paths of Atlantic Ocean hurricane activity.

### **EVALUATION:**

- a. Student responses to a quiz created from discussion questions.
- b. Students can create PowerPoint presentations showing different aspects of how wind patterns form. This could be followed by oral presentations and graded with a rubric.
- c. Teacher informal assessment of student participation.

### **OTHER RESOURCES:**

<http://science.pppst.com/weather/wind.html>

<http://www.activitytv.com>

<http://www.touchstoneenergykids.com/.../lessons/RenewableEnergyLessonPlan.pdf>

“[Where Does the Wind Blow?](#)” written by Cynthia A. Rink

“[Gusts and Gales: A Book About Wind](#)”- (*Amazing Science: Weather*), written by Henry Sherman and Josepha Sherman

“[Little Cloud and Lady Wind](#)”, written by Toni Morrison, Slade Morrison, and Sean Qualls

“[The Wind Blew](#)”, written by Pat Hutchins

“[At the Back of the North Wind](#)” and “[Mother West Wind Stories](#)”, written by Thornton Burgess

“[Iva Dunit and the Big Wind](#)”, written by Carol Purdy

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### **ADDITIONAL INFORMATION:**

“Wind is created when air moves from places of higher air pressure to places of lower air pressure. These differences in pressure are caused by the uneven heating and cooling of air. Warm air is lighter than cold air so it rises. For instance, during the day along the coastline, the land heats up faster than the water and this warmer air rises. The heavier cool air from the sea rushes in beneath the rising warm air on land and a *sea breeze* or *lake breeze* forms. At night the land cools faster than the water and the warmer air over the water rises and is replaced by cooler air blowing in from the land, forming a *land breeze*. In mountainous and hilly areas, air in the valley warms during the day and rises, causing an up-slope *valley breeze*. As the air cools and sinks at night, a *mountain wind* blows down-slope.

Clouds form when a rising warm air mass meets a cold air mass at a temperature at which water vapor condenses into liquid and forms visible droplets. The warm air cools and can no longer hold as much moisture. Clouds are constantly both forming and being evaporated by the sun’s heat.”

*Gluscabi cannot paddle as strong as the wind can blow so he decides to do something about it. When he learns from Grandmother Woodchuck where the Wind Eagle, Wuchowsen, lives, Gluscabi schemes to stop the wind. He tricks the Wind Eagle, but once the wind stops Gluscabi learns that he wind also brings some good things with it that he had not thought about before. Grandmother Woodchuck tells him of the many ways that life would not be good without wind. Gluscabi listens and goes to free the Wind Eagle. He pretends to be someone else. The Wind Eagle recognizes him but still he listens to Gluscabi’s advice. Today the wind blows sometimes and doesn’t blow at other times.*

(Gluscabi also appears in Chapter 3, “The Coming of Gluscabi,” Chapter 20, “Gluscabi and the Game Animals,” and as Koluscap in Chapter 10, “Koluscap and the Water Monster.” Grandmother Woodchuck also appears in Chapter 20, “Gluscabi and the Game Animals.”)

## **LESSON SUPPLEMENT**

### **“Gluscabi and the Wind Eagle” (Abenaki –Northwest Woodlands)**

Long ago, Gluscabi lived with his grandmother, Woodchuck, in a small lodge beside the big water. One day Gluscabi was walking around when he looked out and saw some ducks in the bay.

“I think it is time to go hunt some ducks”, he said. So he took his bow and arrows and got into his canoe. He began to paddle out into the bay and as he paddled he sang:

“Ki yo wah ji neh  
yo hey ho hey  
Ki yo wah ji neh  
Ki yo wah ji neh.”

But a wind came up and it turned his canoe and blew him back to shore.

Once again Gluscabi began to paddle out and this time he sang his song a little harder:

“KI YO WAH JI NEH  
YO HEY HO HEY  
KI YO WAH JI NEH  
KI YO WAH JI NEH.”

But again the wind came and blew him back to shore. Four times he tried to paddle out into the bay and four times he failed. He was not happy. He went back to the lodge of his grandmother and walked right in, even though there was a stick leaning across the door. That meant that the person inside was doing some work and did not want to be disturbed.

“Grandmother”, Gluscabi said, “What makes the wind blow?”

Grandmother Woodchuck looked up from her work.

“Gluscabi,” she said, “Why do you want to know?”

Then Gluscabi answered her just as every child in the world does when they are asked such a question.

“Because,” he said.

Grandmother Woodchuck looked at him. “Ah, Gluscabi,” she said. “Whenever you ask such questions I feel there is going to be trouble. And perhaps I should not tell you. But I know that you are so stubborn you will never stop asking until I answer you. So I shall tell you. Far from here, on top of the tallest mountain, a great bird stands. This bird is named Wuchowsen, and when the flaps his wings he makes the wind blow.”

“Eh-hey, Grandmother”, said Gluscabi, “I see. Now how would one find that place where the Wind Eagle stands?”

Again Grandmother Woodchuck looked at Gluscabi. “Ah, Gluscabi”, she said, “Once again I feel that perhaps I should not tell you. But I know that you are very stubborn and would never stop asking. So, I shall tell you. If you walk always facing the wind you will come to the place where Wuchowsen stands.”

“Thank you, Grandmother,” said Gluscabi. He stepped out of the lodge and faced into the wind and began to walk.

He walked across the fields and through the woods and the wind blew hard. He walked through the valleys and into the hills and the wind blew harder still. He came to the foothills and began to climb and the wind still blew harder. Now the foothills were becoming mountains and the wind was very strong. Soon there were no longer any trees and the wind was very, very strong. The wind was so strong that it blew off Gluscabi’s moccasins. But he was very stubborn and he kept on walking, leaning into the wind. Now the wind was so strong that it blew off his shirt, but he kept on walking. Now the wind was so strong that it blew off his hair, but Gluscabi still kept walking, facing into the wind. The wind was so strong that it blew off his eyebrows, but still he continued to walk. Now the wind was so strong that he could hardly stand. He had to pull himself along by grabbing hold of the boulders. But there, on the peak ahead of him, he could see a great bird slowly flapping its wings. It was Wuchowsen, the Wind Eagle.

Gluscabi took a deep breath. “GRANDFATHER!” he shouted.

The Wind Eagle stopped flapping his wings and looked around. "Who calls me Grandfather?" he said.

Gluscabi stood up. "It's me, Grandfather. I just came up here to tell you that you do a very good job making the wind blow."

The Wind Eagle puffed out his chest with pride. "You mean like this?" he said, and flapped his wings even harder. The wind which he made was so strong that it lifted Gluscabi right off his feet, and he would have been blown right off the mountain had he not reached out and grabbed a boulder again.

"GRANDFATHER!!!" Gluscabi shouted again.

The Wind Eagle stopped flapping his wings. "Yes?" he asked.

Gluscabi stood up and came closer to Wuchowsen. "You do a very good job of making the wind blow, Grandfather. This is so. But it seems to me that you could do an even better job if you were on that peak over there."

The Wind Eagle looked toward the other peak. "That may be so," he said, "but how would I get from here to there?"

Gluscabi smiled. "Grandfather," he said. "I will carry you. Wait here." Then Gluscabi ran back down the mountain until he came to a big basswood tree. He stripped off the outer bark and from the inner bark he braided a strong carrying strap which he took back up the mountain to the Wind Eagle. "Here, Grandfather," he said. "let me wrap this around you so I can lift you more easily." Then he wrapped the carrying strap so tightly around Wuchowsen that his wings were pulled in to his sides and he could hardly breathe. "Now, Grandfather," Gluscabi said, picking the Wind Eagle up, "I will take you to a better place." He began to walk toward the other peak, but as he walked he came to a place where there was a large crevice, and as he stepped over it he let go of the carrying strap and the wind Eagle slid down into the crevice, upside down, and was stuck.

"Now," Gluscabi said, "It is time to hunt some ducks."

He walked back down the mountain and there was no wind at all. He waited till he came to the tree line and still no wind blew. He walked down to the foothills and down to the hills and the valleys and still there was no wind.

He walked through the forest and through the fields, and the wind did not blow at all. He walked and walked until he came back to the lodge by the water, and by now all his hair had grown back. He put on some fine new clothing and a new pair of moccasins and took his bow and arrows and went down to the bay and climbed into his boat to hunt ducks. He paddled out into the water and sang his canoeing song:

"Ki yo wah ji neh  
yo hey ho hey  
Ki yo wah ji neh  
Ki yo wah ji neh."

But the air was very hot and still he began to sweat. The air was so still and hot that it was hard to breathe. Soon the water began to grow dirty and smell bad and there was so much foam on the water he could hardly paddle. He was not pleased at all and he returned to the shore and went straight to his grandmother's lodge and walked in.



“Grandmother,” he said, “What is wrong? The air is hot and still and it is making me sweat and it is hard to breathe. The water is dirty and covered with foam. I cannot hunt ducks at all like this.”

Grandmother Woodchuck looked up at Gluscabi. “Gluscabi,” she said, “what have you done now?”

Gluscabi answered just as every child in the world answers when asked that question, “Oh nothing,” he said.

“*Gluscabi*,” said Grandmother Woodchuck again, “Tell me what you have done.

Then Gluscabi told her about going to visit the Wind Eagle and what he had done to stop the wind.

“Oh, Gluscabi,” said Grandmother Woodchuck, “will you never learn? Tabaldak, The Owner, set the Wind Eagle on that mountain to make the wind because we need the wind. The wind keeps the air cool and clean. The wind brings the clouds which gives us rain to wash the Earth. The wind moves the waters and keeps them fresh and sweet. Without the wind, life will not be good for us, for our children or our children’s children. “

Gluscabi nodded his head. “Kaamoji, Grandmother,” he said. “I understand.”

Then he went outside. He faced in the direction from which the wind had once come and began to walk. He walked through the fields and through the forests and the wind did not blow and he felt very hot. He walked through the valleys and up the hills and there was no wind and it was hard for him to breathe. He came to the foothills and began to climb and he was very hot and sweaty indeed. At last he came to the mountain where the Wind Eagle once stood and he went and looked down into the crevice. There was Wuchowsen, The Wind Eagle, wedged upside down.

“Uncle?” Gluscabi called.

The Wind Eagle looked up as best he could. “Who calls me Uncle?” he said.

“It is Gluscabi, Uncle. I’m up here. But what are you doing down there?”

“Oh, Gluscabi,” said the Wind Eagle, “a very ugly naked man with no hair told me that he would take me to the other peak so that I could do a better job of making the wind blow. He tied my wings and picked me up, but as he stepped over this crevice he dropped me in and I am stuck. And I am not comfortable here at all.”

“Ah, Grandfath...er, Uncle, I will get you out.”

Then Gluscabi climbed down into the crevice. He pulled the Wind Eagle free and placed him back on his mountain and untied he wings.

“Uncle,” Gluscabi said, “It is good that the wind should blow sometimes and other times it is good that it should be still.”

The Wind Eagle looked at Gluscabi and then nodded his head. “Grandson,” he said, “I hear what you say.” So it is sometimes there is wind and sometimes it is still to this very day. And so, the story goes.