

Air, Wind and Sun

Unit 4

Lesson 1; Moving Air = Wind

Book(s):

Time Frame: 1 session of 30 minutes

Learning Standards:

Earth Science

Earth's Materials	1. Understand that air is a mixture of gases that is all around us and that wind is moving air.
The Sun as a Source of Light and Heat	7. Recognize that the sun supplies heat and light to the earth and is necessary for life.

Physical Science

States of Matter	3. Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container.
Position and Motion of Objects	4. Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.
	5. Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.

1. Materials and Tools

Broad Concept: Materials both natural and human-made have specific characteristics that determine how they will be used.

1.3 Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.

2. Engineering Design

Broad Concept: Engineering design requires creative thinking and consideration of a variety of ideas to solve practical problems.

2.1 Identify tools and simple machines used for a specific purpose, e.g., ramp, wheel, pulley, lever.

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why* and *what would happen if?*
- Make predictions based on observed patterns.
- Discuss observations with others.

Student will be able to:

- 1) Explain the movement of hot and cold air.
- 2) Explain how the movement of warm air creates wind currents.

Background Information:

Anticipatory Set: Tell me about air!

Activity:

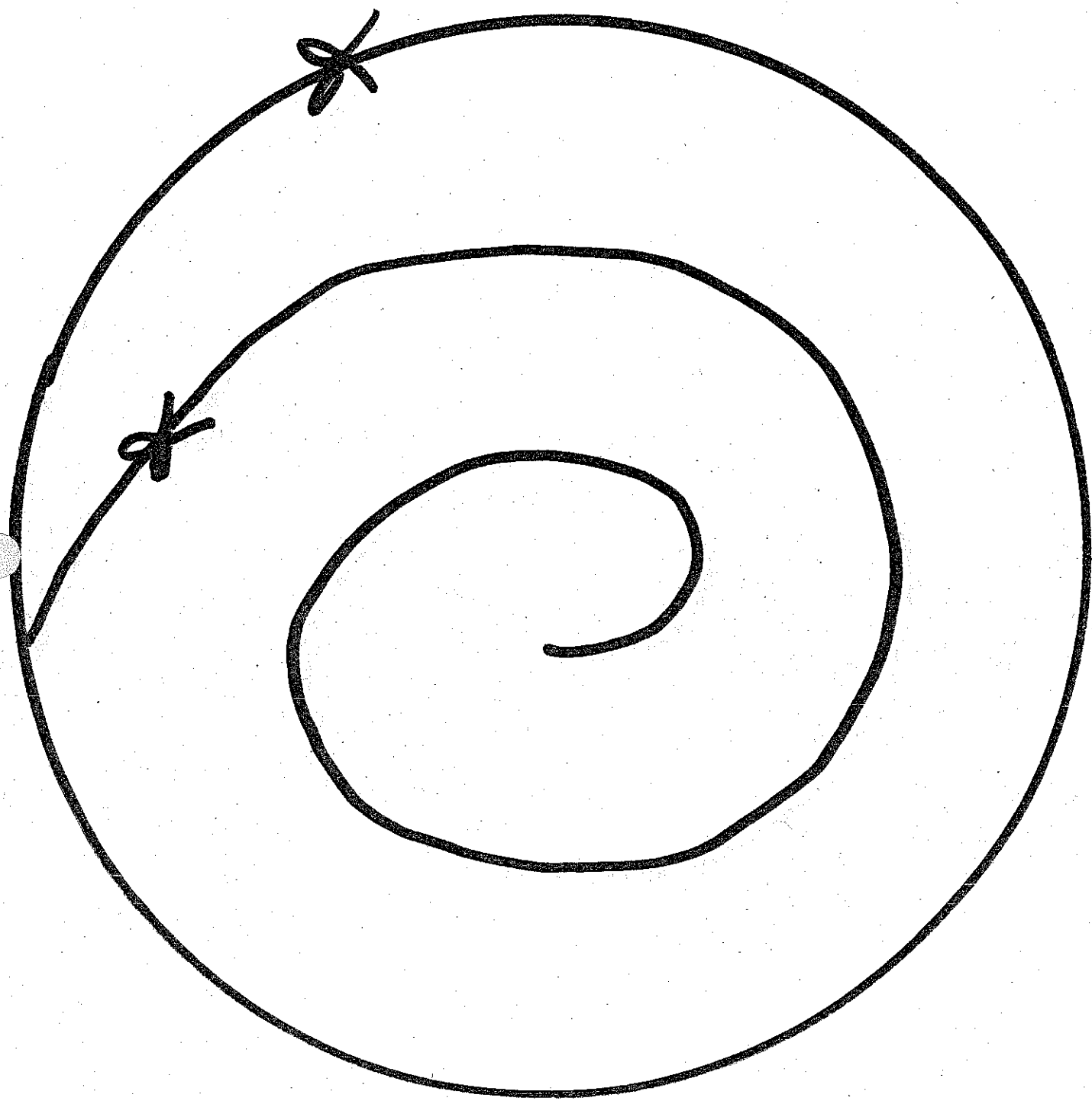
- 1) What do we call moving air?
- 2) Use a spiral from the template to demonstrate moving air.
- 3) Introduce a lamp and ask what the lamp produces. Ask the children what they think will happen to the spiral if you put it over a lamp.
- 4) Demonstrate what happens.
- 5) Discuss how the rising warm air creates wind currents and that wind causes the spiral to move.
- 6) If the warm air rises, what takes the place of the warm air in the current?

Closure: Children make their own spirals and decorate them.

Assessment: Children will be able to explain why the spiral moves in warm air.

Resources and Materials: Spiral template, markers, scissors, light card stock, a lamp without shade

Paper Spiral Template



Air, Wind and Sun

Unit 4

Lesson #2; Wind and Weather

Book(s): Wind Says Good Night; Katy Rydell

Time Frame: 1 session of 30 minutes

Learning Standards:

Earth Science

Earth's Materials	2. Understand that air is a mixture of gases that is all around us and that wind is moving air.
Weather	3. Describe the weather changes from day to day and over the seasons.
Periodic Phenomena	5. Identify some events around us that have repeating patterns, the year, day and night.

Physical Science

Position and Motion of Objects	3. Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, and slow.
	4. Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.

1. Materials and Tools

Broad Concept: Materials both natural and human-made have specific characteristics that determine how they will be used.

1.4 Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.

Skills of Inquiry

- Ask questions about objects, organisms, and events in the environment.
- Make predictions based on observed patterns.
- Discuss observations with others.

Student will be able to:

- 1) Discuss personification of animals in science as unreal.
- 2) Explain how our weather is brought to us.

Background Information: The wind brings us our weather. We can see this by observing the clouds. The clouds are made of water vapor. With the clouds comes the possibility of changes of weather. With observation of clouds, we can see from what direction our weather is coming. That can determine the type of weather we have.

Anticipatory Set:

- 1) What do we know about the wind? (disperses seeds) Now we are going to find out that the wind brings us something else.
- 2) Read, Wind Says Good Night; David Jorgensen

Activity:

- 1) Discuss how sometimes stories make animals have human characteristics. Are these characteristics true of the animals when we are studying science? Does anyone know what was true in the story?
- 2) Discuss what makes the weather in the story.
- 3) Observe the clouds in the sky. What are clouds? What is moving those clouds?
- 4) Wind brings us our weather
- 5) Can we see the wind? We can see what it does, even if we cannot see it.
- 6) Throw a paper plate and discuss what happens.
- 7) Create a "Wind Spinner".

"Cut the paper plate to make eight equal, triangular flaps as shown. Fold the flaps alternating from one side to the other." What do the children think will happen to the spinner? The air pushes on the flaps and causes it to spin. Throw the paper plate and discuss what happens. The air, wind, pushes on the flaps and causes it to spin.

Closure: Go outside or use a fan and create wind. Show children how to test for wind direction. What is the process of water turning into vapor? This process cools. The cool side of your finger is the side of the direction that the wind is coming from. Let children use the wind to sail their spinners.

Assessment: Children will be able to explain how our weather is brought to us b the wind.

Resources and Materials: paper plates, scissors, Wind Says Good Night; David Jorgensen,

Air, Wind, and Sun

Lesson #3: Air and Wind – Wind Direction

Time Frame: 1 session of 30 minutes (or more)

Learning Standards:

Science

Earth and Space Science: Earth's Materials

- 1) Understand that air is a mixture of gases that is all around us and that wind is moving air.

Skills of Inquiry

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why* and *what would happen if?*
- Make predictions based on observed patterns.
- Discuss observations with others.

Technology/Engineering Learning Standards

Materials and Tools

1.3 Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.

Student will be able to:

- 1) Explain that wind is moving air.
- 2) Make a device that can show wind direction.

Anticipatory Set: Place an oscillating fan (or turn the fan manually) in the front of the room and allow it to blow on all of the students. Ask them to describe what they feel. Ask them what is blowing over them. Is it a solid, liquid, or gas? (gas) What is this gas? (air) What is air made of? (different gases)

Activity:

- 1) Place the fan in the front of the room again and discuss wind. Explain that wind is moving air. Ask the students to think about why wind is important to observe. Discuss the damage that can occur with strong wind and discuss how much colder it feels outside on a windy day in the winter (wind chill).
- 2) Hold a piece of paper up near the fan and demonstrate what happens to the piece of paper in the wind (created by the fan). How does the paper move when it is blown on by the fan? Hold the paper in different positions and discuss the results.
- 3) Explain that today in class students will make a simple device that can show if there is wind or not (and the direction it is blowing). Discuss the materials with the students (popsicle sticks, paper, pieces of lightweight fabric (nylon), yarn, scissors, rulers, straws, toothpicks, tape, glue).

- 4) Assign the students to work in pairs or small groups (or students can work individually) and assist them as necessary as they experiment with a device to detect wind. Ask questions and discuss possible design ideas with groups as they work.
- 5) Once the wind devices are completed students may test them in front of the fan or outside (if time permits). Also, if time permits, students may model their devices in front of the class.

Closure: Discuss the following ideas and questions with the students. What is wind? What did your devices do in the wind? Which designs worked best? Why?

Assessment: Participation in class discussions and activities

Resources and Materials: Fan, strip of paper, popsicle sticks, paper, pieces of lightweight fabric (nylon), yarn, scissors, rulers, straws, toothpicks, tape, glue

Air, Wind, and Sun

Lesson #4: Paper Airplanes

Time Frame: 2 sessions of 30 minutes

Learning Standards:

Science

Earth and Space Science: Earth's Materials

- 1) Understand that air is a mixture of gases that is all around us and that wind is moving air.

Skills of Inquiry

- Ask questions about objects, organisms, and events in the environment.
- Tell about *why* and *what would happen if?*
- Make predictions based on observed patterns.
- Name and use simple equipment and tools (e.g., rulers, meter sticks, thermometers, hand lenses, and balances) to gather data and extend the senses.
- Record observations and data with pictures, numbers, or written statements.
- Discuss observations with others.

Technology/Engineering Learning Standards

Materials and Tools

1.3 Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.

Student will be able to:

- 1) Build and fly paper airplanes and measure, record, and discuss the results.

Anticipatory Set: Ask the students to brainstorm what can fly or float in the air. Write a list on the board (including airplanes, gliders, birds, parachutes, etc.). Discuss that the properties of air as a gas allow certain types of objects to fly and/or glide through the air.

Activity:

- 1) Tell the students that today they will make paper airplanes. Before class, set up each table as a different airplane-making station. The instructions for the 4 different types of airplanes are included after this lesson (including tips for flying paper airplanes). To speed this process along, it may be helpful to pre-fold the paper in half (if necessary). There should be an adult at each table to assist with making each type of airplane.
- 2) Allow the students to work in small groups (by table) to construct the airplanes. Explain the directions to the entire table and assist students individually as necessary.

- 3) Direct the students to switch to another table and make another type of airplane. Repeat this process as long as time permits.
- 4) Ask the students to put their names on the paper airplanes and take them down to the classroom. Over the next week, students can decorate their airplanes as a follow-up activity. Note: Keep the airplanes carefully stored in a large bin (not folded) so that they maintain their shape.
- 5) Before the 2nd session (in the classroom with the classroom teacher) pass out the paper airplane student record sheet. Ask the students to predict which type of airplane will fly the farthest (you can also discuss which type of airplane will fly the highest or the fastest). Hold up examples of each type of paper airplane. Explain how to fill in the student record sheet.
- 6) Before the students come for the 2nd session, reserve a large space (the gym or the auditorium). Before class, mark off a specific area to indicate where the students will stand to throw their airplanes and lay out a large tape measure to aid in measuring the distances traveled by the paper airplanes.
- 7) For the 2nd session, make sure that the students bring their paper airplanes to the science lab. Proceed, with the entire class, to the large space and test out the airplanes (students may fly the airplanes in small groups or the whole class can throw their airplanes at once). Use the tips provided to ensure that students throw their airplanes effectively.
- 8) Get student help to make measurements about how far the airplanes travel (in cm). Conduct multiple trials of this test. Students will record their measurements. If time permits, you can also test which airplane can go the highest and which airplane goes the fastest.
- 9) Either at the end of the class or as an additional activity in the classroom lead a discussion of the results of the paper airplane activity with the students. Ask the students to share their results and discuss which type of paper airplanes went the farthest. Ask the students to think about what made the paper airplanes travel through the air differently. Students can take their paper airplanes home.

Closure: Discuss the following ideas and questions with the students. Why do paper airplanes stay up? Why don't they stay up in the air longer (like real airplanes)? What would happen if the paper airplanes were flown outside on a windy day? Which designs worked best? Why?

Assessment: Participation in class discussions and activities (student worksheet)

Resources and Materials: Making paper airplane directions (in the binder), white paper, rulers, large tape measure, paper airplane student record sheet

Name: _____

Date: _____

Paper Airplanes

Paper Airplane Guess:

Which paper airplane will fly the farthest? (circle)

Nakamura Lock

The Professional

The Swashbuckler

The Spy Plane

Paper Airplane Observations:

Paper Airplane	Distance Flown (in centimeters)
Nakamura Lock	cm
The Professional	cm
The Swashbuckler	cm
The Spy Plane	cm
Nakamura Lock	cm
The Professional	cm
The Swashbuckler	cm
The Spy Plane	cm