

Lesson 16 - Pinwheel

Colorado Academic Standards:

Standard 1: Physical Science

Kindergarten:

Concepts and skills students master:

1. Objects can move in a variety of ways that can be described by speed and direction
2. Objects can be sorted by physical properties, which can be observed and measured

2nd grade:

Concepts and skills students master:

3. 1. Changes in speed or direction of motion are caused by forces such as pushes and pulls

Standard 3: Earth Systems Science

Kindergarten:

Concepts and skills students master:

1. The Sun provides heat and light to Earth

1st grade:

Concepts and skills students master:

1. Earth's materials can be compared and classified based on their properties

2nd grade:

Concepts and skills students master:

1. Weather and the changing seasons impact the environment and organisms such as humans, plants, and other animals

Learning Targets:

SC.00.01.02.01 Identifies, predicts, and extends patterns based on observations and representations of objects in the sky, daily weather, and seasonal changes.

SC.00.02.01.01 Makes simple observations, explanations, and generalizations about earth materials.

SC.00.08.01.01 Makes simple observations, predictions, explanations, and generalizations based on real-life experiences.

SC.00.10.01.01 Investigates and participates in cause and effect activities.

SC.00.11.01.01 Uses senses and tools to make and record information through discussions, drawings, and charts scientific

SC.01.21.01.02 Changes in speed and direction of motion are caused by forces such as pushes and pull.

SC.01.13.01.03 Earth's materials can be compared and classified based on their properties.

SC.01.23.01.02 Weather and the changing seasons impact the environment and organisms such as humans, plant and other animals.

Lesson Objective: Develop conceptual understanding of wind energy and renewable energy. Students will learn about wind energy, what devices use wind energy, how energy in the wind creates movement.

Time: 60 minutes

Materials:



Pinwheel pattern
Scissors
Straight pin
Pencil w/eraser
2 Sequins
Earring back
Crayons
Energy Science Journal (made in lesson 1)
Books:
Wind Power (Energy for Today) by Tea Benduhn
Generating Wind Power (Energy Revolution) by Niki Walker

Vocabulary: energy, wind energy, renewable, turbines, movement

Teacher Background: Wind is a “renewable” resource, which means that it will never run out and can be used over and over. Wind turbines capture the wind's energy with two or three propeller-like blades, which are mounted on a rotor, to generate electricity. The turbines sit high atop towers, taking advantage of the stronger and less turbulent wind at 100 feet (30 meters) or more above ground.

Purpose Setting Question(s):

- What is wind energy?
- What things use wind energy?
- What does renewable mean?
- How do you know when wind is blowing?
- Where does the pinwheel get its energy from?
- What happens to the pinwheel when it's in the wind?
- How can you make the pinwheel spin when there's no wind?
- How do you know when wind is blowing?

Procedure:

- Read Aloud: Wind Power (Energy for Today) by Tea Benduhn OR Generating Wind Power (Energy Revolution) by Niki Walker
- Class Discussion about **wind energy** (refer to teacher background).
- Teach wind chants to be used in future lessons:
 - **“Wind is moving air, energy is there!”** Throughout this chant, spin one arm like a windmill.
 - **“Energy is flowin’ in the wind.”** Make big arm circles, mimicking a windmill, as you say this chant.
- Explain experiment to students and have them make predictions based on their experiences.
- Draw and color designs on the pinwheel.
- Cut out the pinwheel. Cut towards the center of the pinwheel on the dashed lines.
- Use scotch tape rolled up for your center connection for the ends of the pinwheel. Take the corners marked with an X and fold them up to the center of the pinwheel. Push the corners firmly on the tape to secure the ends.
- Take the straight pin and insert a sequin on the pin. Push the pin through the center of the pinwheel to the other side.



- Push the pin through the pencil eraser. Put the remaining sequin on the pin and secure the pinwheel by attaching the earring back.
 - Students can experiment with motion by drawing large (1-inch squares around the pinwheel) and see what shapes they get when the wheel turns. Students can also experiment with color. Have them draw red stars alternating with blue stars in a line all the way around the wheel. See what colors they get when the wheel turns.
 - Set up a fan and put it on the lowest setting. Have the students hold their pinwheels in front of it and observe. Turn up the fan and ask the students to observe. Did the pin wheels blow faster? Slower? What can you conclude from this? You can also blow on the pinwheels or take them outside to test the wind.
- Students may discuss in small groups how wind energy is transformed, some may share out in a whole group discussion.
- Students then record how wind energy is used; they may write and/or draw pictures in their science journal.

Results/Observations/Conclusions:

Students should be recording results and observations in their science journals. How has their thought process changed throughout this unit?

Analysis: Ask Students

- What can you learn from this?
- What further questions do you have?
- What connection does this have to my life?

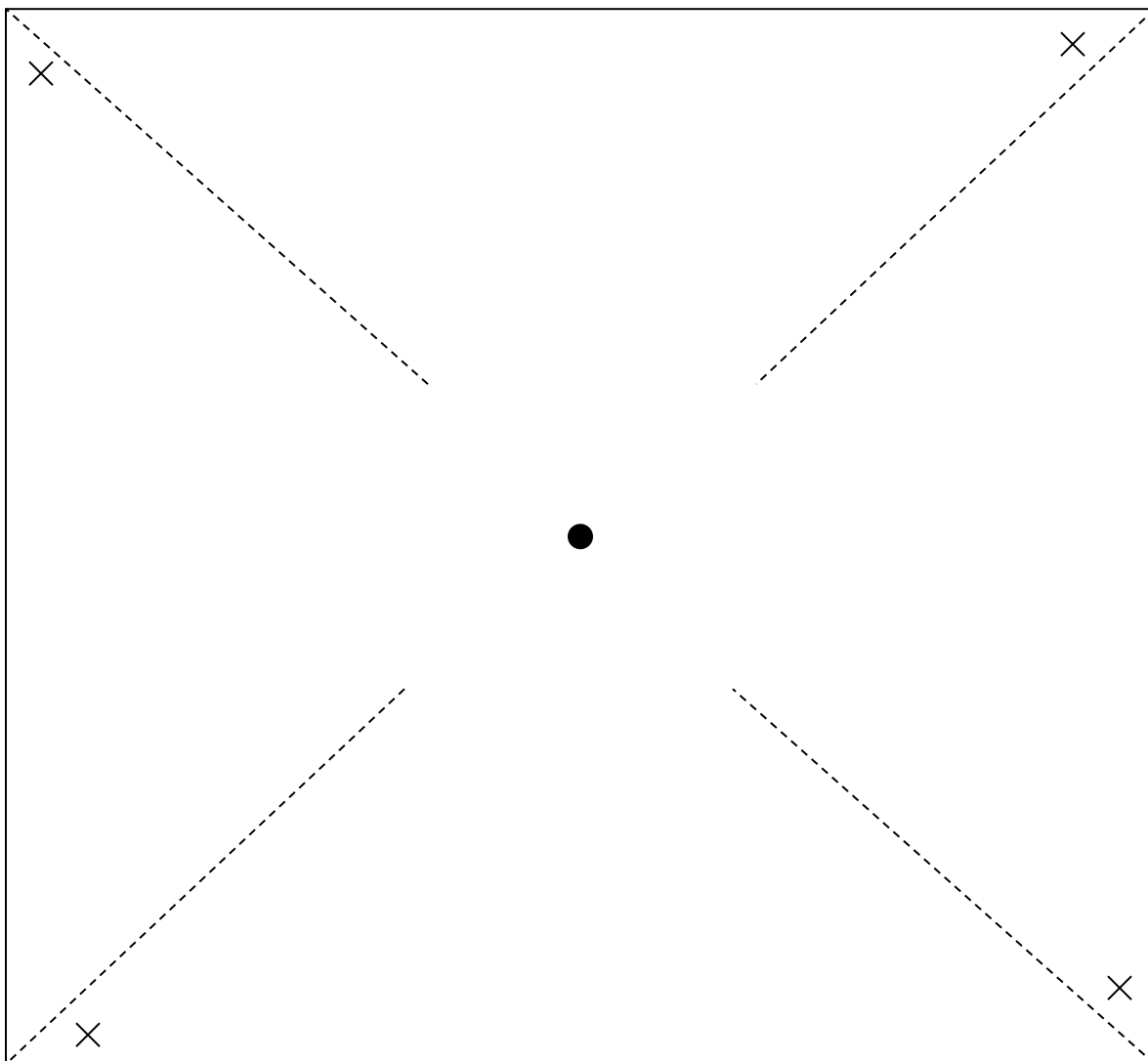
Evaluation:

- Teacher observations of student ability to record information, engage in scientific experiments, predict and explain patterns, develop problem-solving and critical thinking skills.



NAME _____

MAKE A PINWHEEL



Materials: scissors, pins, pencils or straws

1. Cut in at each corner.
2. Take the corners marked X and fold up to center.
3. Pin all corners to the center.
4. Pin on eraser of pencil or plastic straw.

Your wind wheel
should look like
this:



Teacher: Run this on heavy paper such as oak tag.



Name: _____ Date: _____

Lesson 16 – Pinwheel

What do you think will happen to pinwheel?



What can you do with your pinwheel? How do you make it change speeds?



Draw a picture of the results.



