# Educator Guide: Wind-Powered Toys

This guide provides step-by-step instructions for conducting the 'Wind-powered toys' experiment. The goal is to help students to create pinwheels or simple windmills to explore wind energy and discuss how wind can be harnessed for practical uses like grinding grain or generating electricity.

# 1. Course Objectives

By the end of this course, educators will:

- Incorporate STEM concepts (science, technology, engineering, and mathematics) into hands-on learning activities through toy construction.
- Facilitate student-led exploration and experimentation, encouraging curiosity and problem-solving skills.
- Align toy-building projects with curriculum standards to support cross-disciplinary learning objectives.
- Evaluate and adapt wind toy activities to meet the diverse needs and abilities of young learners.

### 2. Learning Outcomes

By the end of the experiment, students should be able to:

- Identify wind as a source of energy and explain how it can be used to make objects move.
- Describe how their toy works and the role of wind in making it function.
- Follow basic instructions to build a simple wind-powered toy using everyday materials.

#### 3. Materials Checklist

- 1 piece of paper (lightweight)
- 1 small stick
- 1 pin (thumbtack or sewing pin)
- 4 small leaves (similar size, soft, and not too dry)

# 4. Icebreaker Preliminary Questions Session

Teachers ask "thought provoking" questions and students are encouraged to ask their "curiosity questions", to make kids excited or expectant about class.

- Have you ever seen something move because of the wind?
- Can wind help us in everyday life?
- Have you ever wanted to make a toy move without touching it?
- What do you think wind is? Can we see it? Can we catch it?

Encourage students to give their perspective on what they know on wind powered toys. Present a "story" that serves as an example of introduction to the topic - a story that merges science and folklore - can be dynamically spread along the experiment.

# Story:

Nia and the Wind Spirit

A long time ago, in a bright little village where the trees danced all day, there lived a curious girl named Nia. She loved to watch things move-flags fluttering, birds soaring, and leaves twirling in the air. One afternoon, Nia heard a soft whisper in the wind. It said, "I am Aneo, the Wind Spirit. I've been around for thousands of years, helping people move things without lifting a finger. But most have forgotten me..." Nia's eyes sparkled. "Can you teach me your secret?" she asked. Aneo replied, "Only if you're ready to build something that dances with me. Something small... but powerful." That night, Nia couldn't sleep. What could she build that moves with the wind? The next morning, Nia ran outside and saw something on her doorstep: four colorful leaves, a smooth stick, and a shiny pin. A note read: "Build your Wind Dancer. Let it spin, and I will meet you again." She gathered the leaves and paper and carefully followed the wind's clues. She folded, cut, and pinned... and when she blew on it-whoosh!---it spun like magic! Nia shouted, "It's working!" and the breeze seemed to laugh with joy. Aneo appeared again, swirling around Nia's pinwheel. "You've unlocked the wind's secret! Long ago, people built giant versions of your toy. They used them to grind grain, pump water, and even make electricity!" Nia smiled. "So wind can do work?" "Yes," said Aneo. "You've made something small—but it's part of something big. Every time your pinwheel spins, you remember: wind is power, and play is learning." From then on, whenever Nia saw her pinwheel spin, she imagined all the windmills dancing across the world.

# 5. Experimental Setup

- Take 4 small leaves and arrange them in a cross shape.
- Glue or tape the base (stem side) of each leaf to the center of the paper square so they point outward like blades.
- Carefully push a pin through the center of the paper where the leaf stems meet.
- Stick the pin into the top end of the twig or stick.
  - Make sure it's not too tight, so the leaves can spin.

- Hold your pinwheel in the wind or blow on it gently.
- Watch the leaves spin!

#### What to Expect - What kids should focus on:

- Energy is the ability to do work. It comes in various forms, such as:wind energy (energy from wind).
- Think about wind as something that can do work—like turning blades, moving air, or spinning your toy.
- Discover the potential of wind energy.

#### Additional References or Material

https://youtube.com/shorts/FqXMk9FUwQM?si=V7gPgliTHiYTcVoW

# 6. Facilitation Tips

- Use phrases like "Let's discover together!" to create excitement and openness to explore.
- Repeat key safety steps, especially when using scissors or pins.
- Remind them: "Scientists test things all the time—that's how they learn!"

# 7. Class Conclusion and Takeaway

As "assessment evaluation" kids can be divided in groups, given time and space and asked to come out with a "skit" summarizing what they learned. Ask kids to come up with a story themselves about the topic of the lesson.

#### 8. Instructor's Theoretical Background

- Wind energy is renewable—it never runs out.
- Wind turbines are modern versions of windmills that turn wind into electricity.
- A pinwheel is a simple model of how wind turns blades to create motion.

#### 9. Illustrations

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