TARWATER ELEMENTARY SCHOOL STEM LAB

Activity ID: H-2

Activity Name: Leif Catches the Wind

MATERIALS:

Materials Provided in Bin:

Item:	Quantity:	Notes:
Lesson Plan		
Leif catches the wind book	1 per student/team	Can read book prior to experiment
Leif catches the wind binder	1 for teacher	Provides additional insight to experiment
Thin Dowels	1 per windmill	
String	15 inches per windmill	
Paper Cup	1 per windmill	
3 inch foam ball	1 per windmill	
Craft Sticks	8 per windmill	May not use them all
Index cards	8 per windmill	May not use them all
Paper	**2** sheets per windmill	
Washers	50 per windmill	To be used as small weights
Rulers	1 per windmill	
Pencils	1 per windmill	
Tape (duct)	1 piece per windmill	
Tape (masking)	1 per windmill	

Materials In STEM Lab or Classroom (Common Items):

Item:	Quantity:	Notes:
Fan		
Crayons/markers		Kids can color their blades

Materials Teacher/Parents Need to Provide:

Item:	Quantity:	Notes:
Cardboard milk/juice carton	1 per windmill	

WHAT ARE WE DOING?

Designing and constructing a windmill. Testing and improving their windmill blade designs. Understanding how the energy of wind can be harnessed to do work and how wind pushes on objects and interacts with them.

VIDEOS / LINKS:

Refer to binder in bin (section Lesson 4 provides detail about how to help students think through the experiment and different worksheets that could be provided for them to document their plan and outcomes)

SAFETY NOTES:

Beware of little fingers touching the fan, if a fan is used.

SCIENCE TERMS:

Energy: The ability to do work.
Wind: Air that is moving and has energy.
Windmill: A machine that harnesses the energy of the wind to do useful work.

Wind turbine: A kind of windmill that changes the energy of air (wind) into electrical energy (electricity).

STEPS (Pages 38/39 in book or p90-92 in binder):

1. Make holes in front and back of milk carton (can use pen or nail and hole must be slightly bigger than dowel). Use ruler to make sure hole is centered on carton. Hole should be towards the top, approximately 2 inches from top (It needs to be high enough so blades do not hit the ground). *It must be in the same location* on *carton* of *both the front and back* or *the dowel will* not *spin correctly.*

2. Put some weights in the bottom of the milk carton in order to help it not tip over.

3. Put dowel through hole.

4. Place washer on dowel and then push foam ball onto one end of the dowel. Then secure foam ball to dowel using tape, otherwise it will spin freely without rotating the dowel.

5. Attach the small cup to the string. Attach the string to the dowel using small piece of duct tape (so weights can be added during testing process). The cup should hang ~12 inches down. The carton can be placed at the edge of

the table to allow cup to hang freely/low enough.

6. Create blades. Attach index card to craft stick with tape. Depending on graqe, les$ dir ction can be provided. Allow students to try different shapes, different materials, different quantity for the blades.

7. Start adding blades to foam ball. Try different numbers to find optimal number of blades.

8. Place windmill outside (if windy) or in front of a fan.

9. For additional exploration, refer to binder pages 98-106. Some additional materials provided in bin to support.

QUESTIONS TO ASK STUDENTS:

What angle for the blades worked best to cause the windmill to spin?
What is the optimal number of blades to cause the windmill to spin?

What could you do to improve the windmill design?

CLEAN-UP:

Into the Bin = Lesson plan, dowel, craft sticks, washers, rulers, foam balls, cups, books, binder

Back to Lab/Classroom= Fan

Trash/Recycle = cartons, index cards, paper

IF RUNNING OUT OF A SUPPLY IN THE BIN, PLEASE CONTACT LAURIE JONES IN THE OFFICE (X4307)
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