

Science Performance

Grade – Upper Elementary (3 grade+)

Title

Topic – Energy

Wind Can Do Work for You!

Next Generation Science Standards (NGSS):

4-PS3-1: Use evidence to construct an explanation relating the speed of an object to the energy of that object.
3-5 ETS1-2: generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Performance Expectation (Learning Targets):

I can build a wind turbine that can lift a load.
 I can trouble shoot the problems of energy flow of the turbine as the weight of the load increases.

Background Information:

After watching video on wind turbine at <https://www.youtube.com/watch?v=yeKjipwadg> encourage the students to research the history of windmills and turbines.

Student Performance

Gathering Information: They will come up with a list of other purposes for windmills and turbines. They can follow the directions below to build one.

Materials for Project: 1-5” tall plastic cup, 2 straws; 1 full size, 1 cut to 3 1/2”, a straight pin, 1 sm. Binder clip, 30cm thread, paper clips, masking tape, scissors, hole punch, ruler, marker fan and 1 pattern per child for turbine (next page)

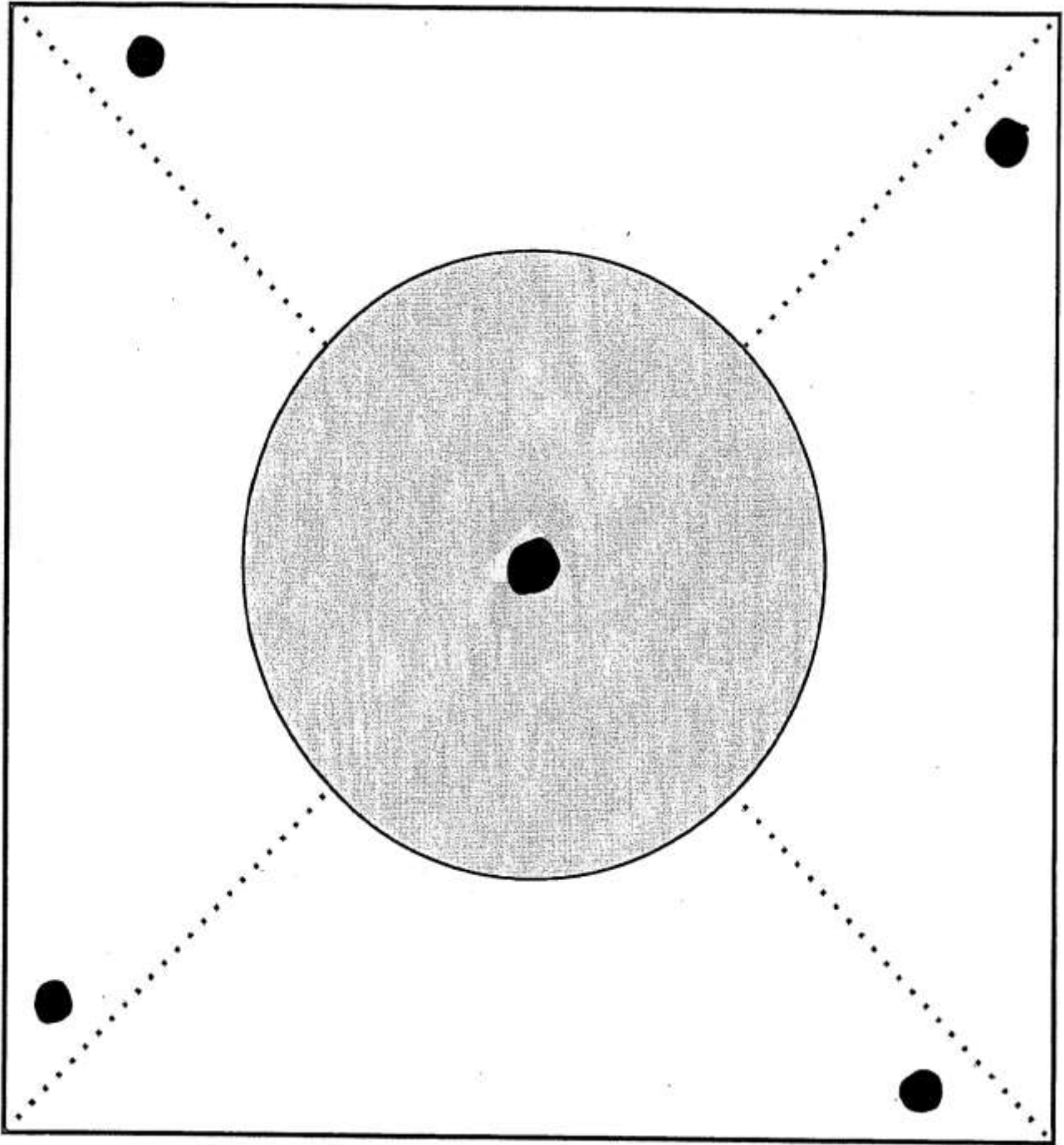
Students assemble turbine and test to see how many paperclips they can successfully lift using the fan as the wind source. (Use same settings for each test...challenge students to see if changing the number of blades; triangle, pentagon, hexagon, or the shape of the blades increases the load they can lift.)

Communicating: Students can work in pairs to make turbines and take data of load it will lift. Write a summary of your findings.



Science Essentials

Science Practices	Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
Crosscutting Concepts	Most scientists and engineers work in teams.
Disciplinary Core Ideas	Possible solutions to a problem are limited to available materials and resources.
Connections	
Common Core State Standards	Writing – Conduct a short research project and write a summary. Math – gather data



Cut out square and then cut on dotted lines. Use a hole- punch to carefully punch the circles out. This will become the blades of your turbine.