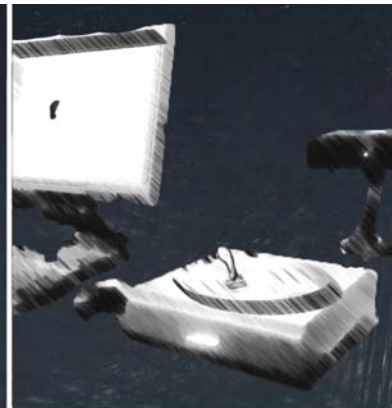
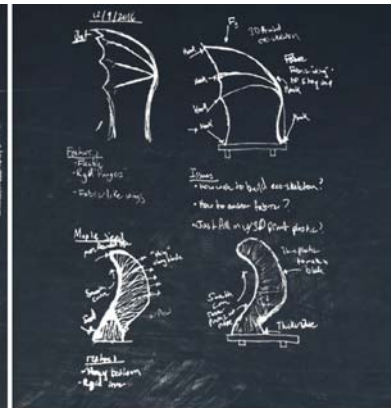
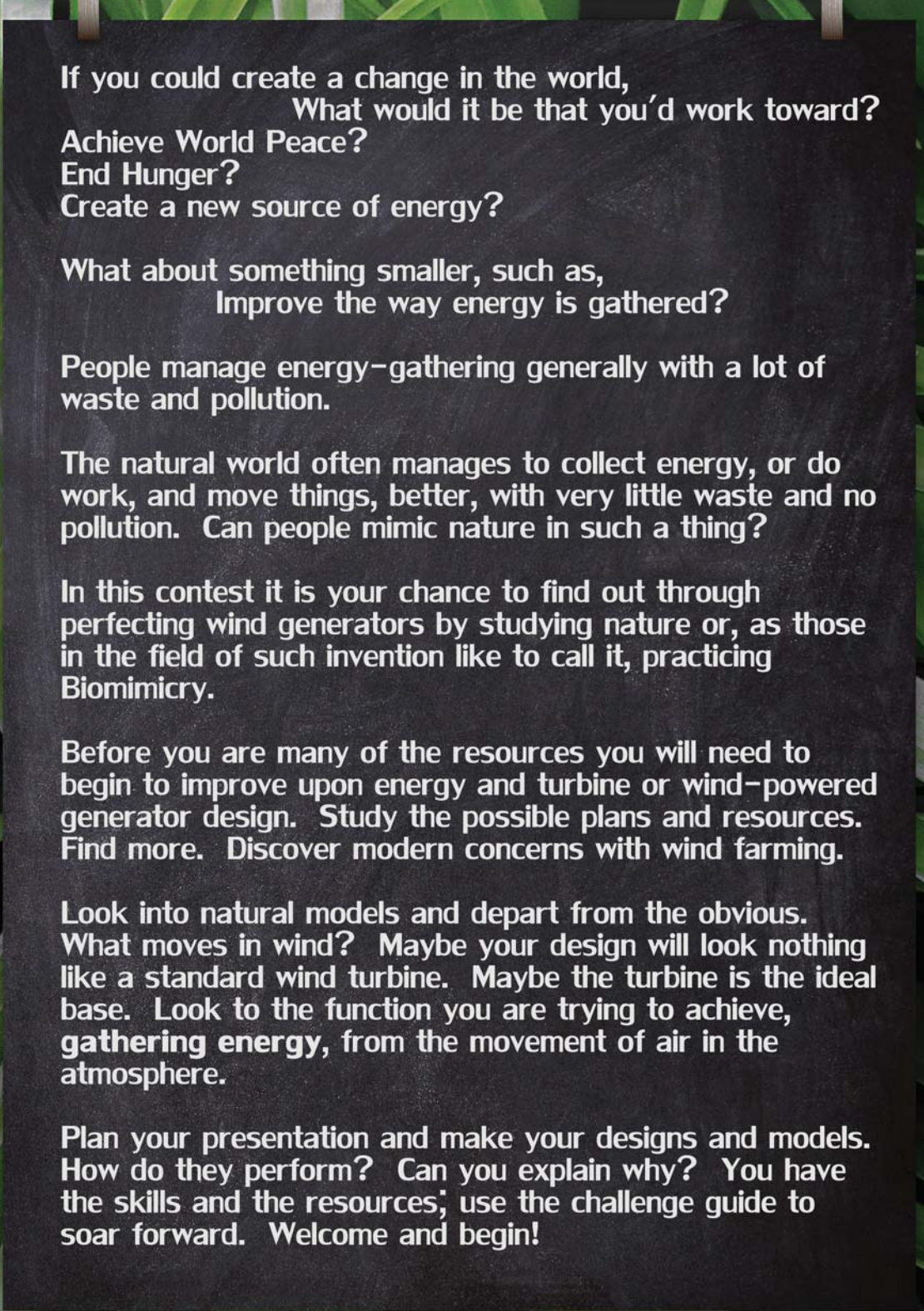




The Wind Generator Challenge







If you could create a change in the world,
What would it be that you'd work toward?
Achieve World Peace?
End Hunger?
Create a new source of energy?

What about something smaller, such as,
Improve the way energy is gathered?

People manage energy-gathering generally with a lot of
waste and pollution.

The natural world often manages to collect energy, or do
work, and move things, better, with very little waste and no
pollution. Can people mimic nature in such a thing?

In this contest it is your chance to find out through
perfecting wind generators by studying nature or, as those
in the field of such invention like to call it, practicing
Biomimicry.

Before you are many of the resources you will need to
begin to improve upon energy and turbine or wind-powered
generator design. Study the possible plans and resources.
Find more. Discover modern concerns with wind farming.

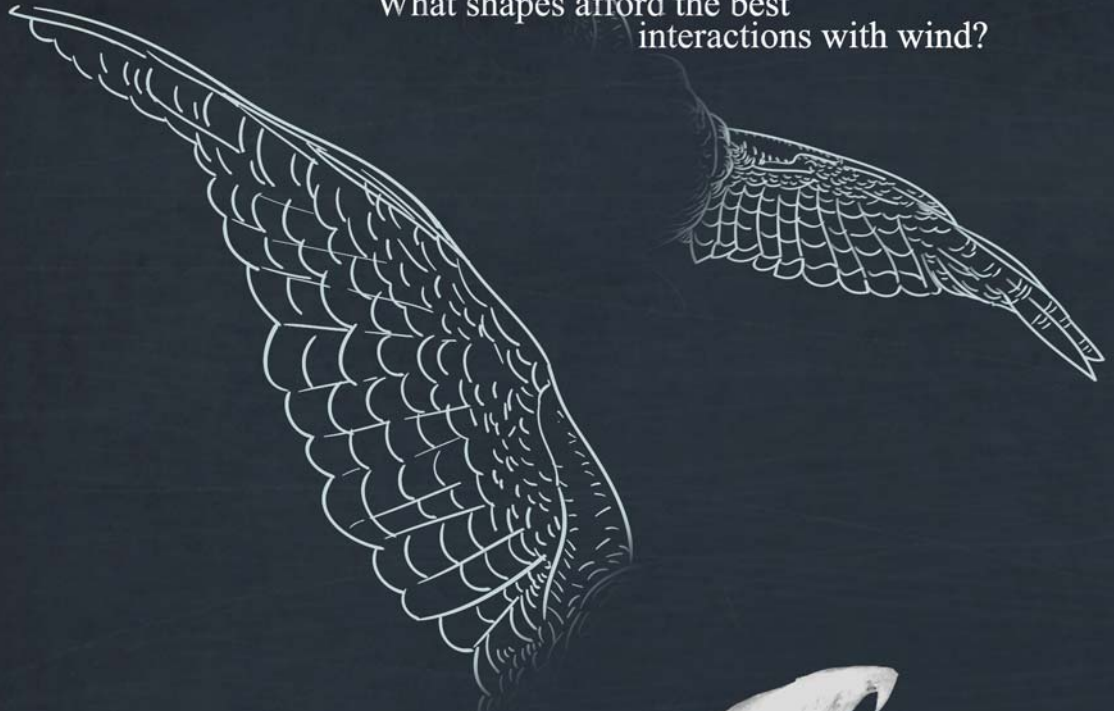
Look into natural models and depart from the obvious.
What moves in wind? Maybe your design will look nothing
like a standard wind turbine. Maybe the turbine is the ideal
base. Look to the function you are trying to achieve,
gathering energy, from the movement of air in the
atmosphere.

Plan your presentation and make your designs and models.
How do they perform? Can you explain why? You have
the skills and the resources; use the challenge guide to
soar forward. Welcome and begin!



Think about the different senses of the words 'wind powered'.
What interacts with wind?

What shapes afford the best
interactions with wind?



In borrowing insight from nature
double-check that you follow-through with
any critical elements of design that play a functional
role in your invention.

Is there an ARC or a CURVE or an ANGLE or a LIP to the wing,
seed, or whisker you are mimicking?
Think in 3 dimensions, and maybe consider too, asymmetries,
movement, responsiveness, and material.





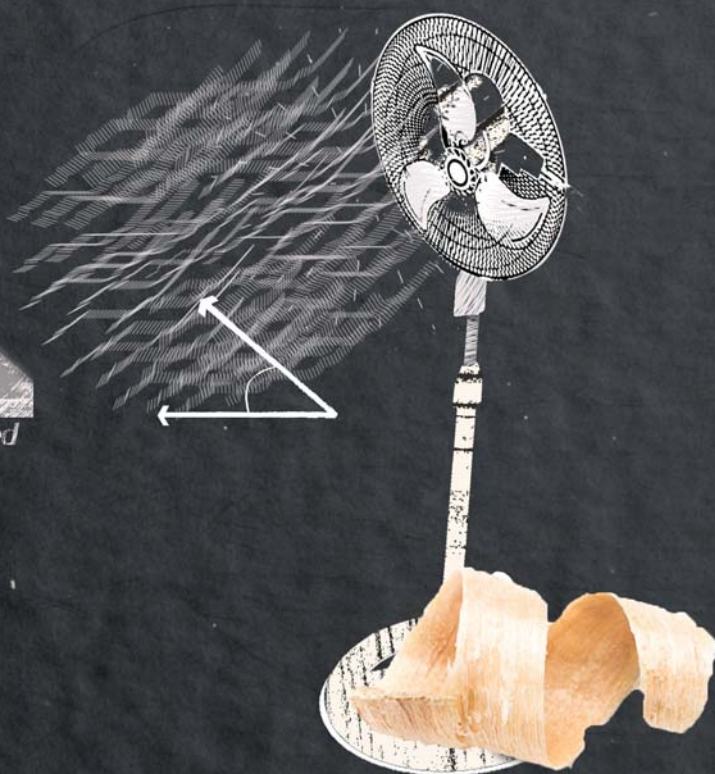
Challenge Scenarios

Efficiency in oblique wind.

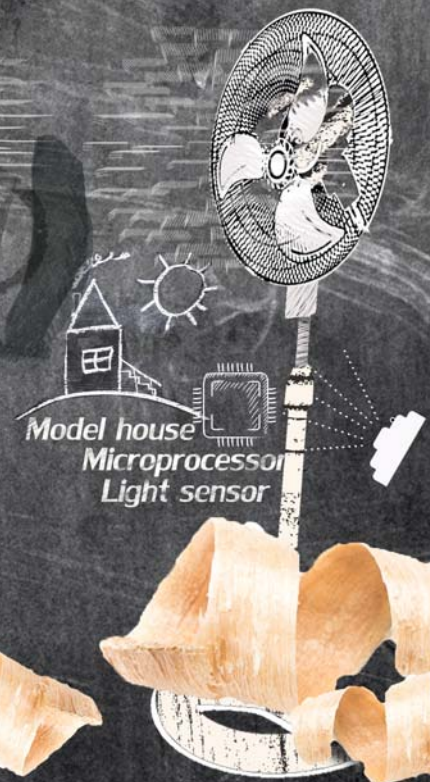
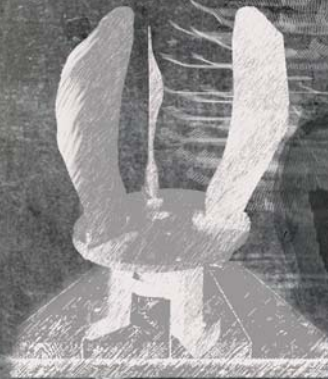


energy obtained

Voltmeter



Preventing the shadow-flicker effect.



Use a Tiny Circuit, Arduino, Raspberry Pi, or other microprocessor to help determine whether the design would render the houses near it subject to noticeable fluctuations of light and shadow.

Inventor's Name : _____

Place one of these numbers in each box below, then total carefully.

- 5 – Outstanding in nearly every detail.
 4 – Overall impressive.
 3 – Criteria met in some areas.

- 2 – Effort was made to meet criteria.
 1 – Improvement needed.

<u>JUDGING CRITERIA</u>		<u>COMMENTS</u>
Biomimetic Design Consider: Does the design synthesize inspiration from identified living organisms?		
Direct Wind Flow Energy Generated Consider: Does the design produce significant energy in head-on wind?		How much: _____
Low Level Wind Flow Energy Generated ...Significant energy in low wind?		How much: _____
Indirect Wind Flow Energy Generated Consider: Does the design produce significant energy in oblique wind?		How much from the top: _____ How much from the bottom: _____
Innovation and Imagination Consider: Does the design show innovative thinking to address specific problems?		
Degree of Difficulty Consider: Does the design display artisanship; does its quality catch the eye?		
Life-Conductive Design 1 Consider: Does the innovation demonstrate healthy, life-supporting design elements?		
Life-Conductive Design 2 3 additional points if the invention meaningfully demonstrates use of the Biomimetic Life's Principles of Design.		
SCORE TOTAL		
Total From Other Card _____		
<u>Final Score</u>		

Place one of these numbers in each box below, then total carefully.

5 – Outstanding in nearly every detail.
4 – Overall impressive.
3 – Criteria met in some areas.

2 – Effort was made to meet criteria.
1 – Improvement needed.

JUDGING CRITERIA

Originality of Design

Consider: How well does the uniqueness of the design stand out?

Critical Thinking

Consider: Was an attempt made to address more than just the basic problem of designing a windmill?

Problem Solving

Consider: Was an effort made to address other problems? One additional point for every design element identified which meaningfully addresses one of the following: Further Pollution Reduction, Flicker Effect, Bird Strikes, Low-Frequency Vibrations, Life-Cycle Of Materials (i.e., cradle to cradle vs cradle to grave), Maintenance and Monitoring, Resilience in Natural Disaster, Equity and Property Values, Power Distribution

Product Awareness

Consider: Were the benefits/deficits of wind power vs “other power generation” explored?

Global Awareness

Consider: Does the inventor demonstrate an understanding of the global issues of pollution, renewable energy, and wind energy?

Civic Awareness

Consider: Does the inventor demonstrate an understanding of the community health, equity, and class power issues of pollution, renewable energy, and wind energy?

Creativity

Consider: In addition to a unique design, is the thinking that went into the design a step beyond the linear?

Human-centered design process

Consider: How well were the steps in a design process from engineering, art, human-centered design, and/or biomimicry communicated?

Communication

Consider: How well were ideas behind the design communicated?

SCORE TOTAL

Final Score



Extension Ideas

Environmental Science is one natural seat for this toolkit, especially in conjunction with the Animal Info Cards Mini-Kit, the Self-Guided Wind Turbine Challenge, and the seed dispersal activities in Form, Float, and Function. An Art or Engineering classroom also makes a strong space for this performance-based assessment challenge.

English and Social Studies

Launch a Debate

Whenever there is a concern about the use of the 'commons', the effects of various forms of pollution, or the pros and cons of alternative energy, social considerations are paramount.

Human-centered design and the life-conductive biomimetic approach to invention may help to alleviate some tensions, but these may not hit them all. Regardless, tensions need to be uncovered before they can be addressed. Identifying which communities may find themselves voiceless in the shadow of the flicker-effect or the area of impact of low frequency vibration may help meaningful equity-based dialogue to arise in the classroom. Ideally learners will come to recognize the actual challenges of various forms of alternative, renewable energy. If learners can also identify the threats and weaknesses of traditional energy tracts, and come to understand the degree to which their own life may be effected by the sphere of energy, they may be more prepared to take informed action as global citizens. Collaborate with the Social Studies or Humanities educators to convene a debate or recommend a *parallel position-paper*.