

Documentation of Turbine Design & Wind Science

Purpose: Document your design process and knowledge of wind energy science. One project per team, solo students will address their blades and the shared tower. **Six** minutes is the maximum length. When adding research support, clearly state your source for credit: “As cited by ___ + (your talking point/ the research)”

• Video (iMovie) **or** Slide show with embedded narration (Keynote or PowerPoint) Google Slides requires using Quicktime and then iMovie to create.

Explanation of the Design Process

BLADES- show pictures of all prototypes used

- Explain the design progression and iteration of the 4 blade prototypes.
 - o Use details about size, shape, number & pitch to explain.
 - o Use your data documentation (data tables) to support your explanations.
 - o Explain your challenges.

TOWER/ TURBINE- show pictures of plan, tower and power output area

- Explain why you chose your tower design.
 - o Explain your challenges in tower construction.
- Explain why you chose your power output design (direct drive, gear drive or a pulley system).
 - o Explain the challenges.

Knowledge of Wind Energy Subject Matter

The following are some important questions about wind energy. You can research them on your own, or browse the KidWind website for more information.

CHOOSE 2 OF THE FOLLOWING TOPICS TO ADDRESS:

(Include EasyBib citations from any research images and content used)

1. **Environmental Aspects** a.) *What are at least 2 environmental benefits of generating electricity using the wind?* b.) *What are at least 2 negative aspects of wind energy?* c.) *What is your opinion on turbines being more beneficial or more negative and explain why.*

2. **Electricity Sources:** a.) *From what sources do we generate most of our electricity in the US?* b.) *What are the primary sources of electricity used in Maine?* c.) *How has the percent of electricity generated by wind changed over the last ten years in the United States?*

3. **Science of Wind:** a.) *What causes wind?* b.) *Where are most of the wind turbines located in the US?* c.) *What 3 specific town areas in Maine have wind farms (more than 2 wind turbines)?*

4. **Power of Wind:** a.) *What is the equation that defines how much power is in the wind?* b.) *What are the most important variables?* c.) *How does this equation affect turbine design and placement?*

Group Names:

	Exceeds	Meets	Partially Meets	Doesn't Meet
Design Process Explanation	Meets + also... Explanation thoroughly detailed with "external" research, data and scientific principles used for each explanation. Used " <i>As cited by...</i> " statement.	Explanation detailed with personal observations. Data documentation provided.	Missed less than 25% of the 5 questions.	More than 50% of the 5 total questions not addressed.
Wind Energy Knowledge Explanation -2 Topics with each question answered	Meets + also... "External" research, data and scientific principles used. Used " <i>As cited by...</i> " statement.	All questions clearly addressed with explanations for the 2 topics.	Missed less than 25% of the questions for the 2 topics. More "why" or depth needed.	More than 50% of the questions not addressed for the 2 topics.
Visuals personal and online	Meets + also... At least 3 graphs and/or charts used with a narration discussing them. Image slide for each sub-talking point.	Personal images and online images support each talking point.	Personal and online images used, but not for each talking point or slide.	Less than 50% of the slides have supporting personal and online images.
Narration	Meets + also... No mistakes in the narration. Equal narration time for each partner.	Volume is clear. Voice is clearly announced.	Some mistakes in the narration detract from presentation. Voice is not clear more than 50% of time.	Volume either too loud or inaudible. Limited narration.
EasyBib citations	Meets + also... Every image & informational content cited.	Proper EasyBib citations of resources used.	Not properly cited and/or not all content/images cited.	No citations used.