



**2024–2025 ACADEMIC YEAR**  
**GRADE 9 PHYSICS PROJECT**

**NAME OF THE PROJECT: DESIGN A WIND TURBINE**

Grade	Content	Acquisition	Duration	Assessment
9	Applying Scientific method to a daily life observation; “ <b>Wind Turbine</b> ”	Develop skills for making scientific inquiries.	Academic year	Research & Experiment Rubric

Dear Student;

In this project, you will explore the principles of energy conversion by designing and constructing a simple wind turbine. The objective is to understand how kinetic energy from the wind can be converted into mechanical energy and subsequently into electrical energy.

You need Craft materials (e.g., plastic or cardboard for blades), Small motor or generator (optional for electrical conversion), Support structure (e.g., wooden dowels or plastic tubing), Tools for assembly (e.g., glue, scissors, tape), Measuring instruments (e.g., anemometer, voltmeter).

Test the wind turbine in various wind conditions to evaluate its performance. You will measure how effectively the turbine converts wind energy into mechanical energy and, if applicable, into electrical energy using a simple generator setup.

Determine in which way its efficiency gets maximum.

**You should follow the following steps.**

- A. Research**
- B. Experimentation**
- C. Experiment report**

**A. Research:**

**Determine the subtitles;** Wind energy, Development of Wind Turbines, Current Applications and Innovations etc.

**Determine the relevant parameters:** What could be the relevant parameters; blade design (shape, size, angle), wind speed, turbine placement etc.

**B. Experimentation:**

After determining the relevant parameters, form a testable hypothesis for one of the parameters such as “changing the blade shapes will affect the efficiency.” (Do not use this hypothesis, this is only an example.)

Determine the independent, dependent and the controlled variables. You should choose it according to your own hypothesis.



Design a method to test your hypothesis, determine the apparatus to be used, draw the details of the mechanism.

Collect data, form a data table accordingly.

Evaluate the validity of the hypothesis based on your data.

Suggest improvements to further inquiry.

### **C. Experiment Report:**

**Title:** \* a brief, concise, yet descriptive title.

#### **Statement of the Problem:**

\* What question(s) are you trying to answer?

\* Include any preliminary observations or background information about the subject.

#### **Hypothesis:**

\* Write a possible solution for the problem.

\* Make sure this possible solution is a complete sentence.

\* Make sure the statement is testable, an if-then statement is recommended to illustrate what criteria will support your hypothesis (and what data would not support the hypothesis).

#### **Materials:**

\* Make a list of all items used in the lab. Alternatively, materials can be included as part of the procedure.

#### **Procedure:**

\* Write a paragraph (complete sentences) which explains what you did in the lab as a short summary.

\* Add details (step-by-step) of your procedure in such a way that anyone else could repeat the experiment.

#### **Results (Data):**

\* This section should include any data tables, observations, or additional notes you make during the lab.

\* You may attach a separate sheet(s) if necessary.

\* All tables, graphs and charts should be labeled appropriately.

#### **Conclusions:**

\* Accept or reject your hypothesis.

\* EXPLAIN why you accepted or rejected your hypothesis using data from the lab.



\* Include a summary of the data - averages, highest, lowest, etc. to help the reader understand your results. Try not to copy your data here, you should summarize and reference KEY information.

\* List one thing you learned and describe how it applies to a real-life situation.

\* Discuss possible errors that could have occurred in the collection of the data (experimental errors)

**You should present your teacher the following at the end of your entire work;**

- 1) Research paper containing a cover paper, research of the subtitles, introduction, body, conclusion, quotation, footnote, references.
- 2) Experiment report.

**FIRST CHECK: (Planning)**

Do your research and determine relevant parameters.

**SECOND CHECK: (Draft)**

Do your experiment, write down a draft report.

**SUGGESTIONS:**

Be careful about keeping all other variables constant when testing the dependent variable.



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**ACADEMIC YEAR 2024- 2025**

**SCIENCE DEPARTMENT**

**RESEARCH & EXPERIMENT RUBRIC**

	<b>CRITERIA</b>	<b>EXCELLENT (5 POINTS )</b>	<b>GOOD ( 3-4 POINTS)</b>	<b>FAIR ( 2-3 POINTS )</b>	<b>POOR ( 1-2 POINTS )</b>	<b>NOT EXIST AT ALL 0</b>	<b>POINTS EARNED</b>
<b>Content of the research paper</b>	Determination of the subtitles.						
	Research of the subtitles.						
	Accuracy of the content.						
	Relevancy of the content to grade level.						
	Originality. (Turnitin)						
<b>Neatness of paper</b>	Cover paper.						



	Content, design of the title and foreword.						
	Page design. (Fonts, style)						
	Plan, introduction, body, conclusion.						
	Quotation, footnote, references.						
	Grammar, Labeling, Spelling.						.
<b>Quality of the experimentation (45 points)</b>	Relevancy of the experiment to grade level.						
	Formulate a testable hypothesis and explain it using scientific reasoning.						
	Design and carry out scientific investigations that include dependent and independent and controlled variables.						
	Design and carry out a method to be followed.						
	Draw the details of the mechanisms.						
	Outcome of the investigations- data collection, graphs, and tables.						



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	Reliability of the data.						
	Evaluate the validity of the hypothesis based on the data.						
	Suggest improvements to the method or further inquiry.						
<b>TIMING</b>	<b>FIRST CHECK (IF NOT; - 5 POINTS) FIRST DRAFT:</b>	<b>SECOND CHECK (IF NOT; - 5 POINTS) SECOND DRAFT:</b>			<b>SUBMISSION ( IF LATE FOR 2 DAYS; - 10 POINTS ) SUBMISSION:</b>		
	<b>DATE:</b>	<b>DATE:</b>			<b>DATE:</b>		