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Description automatically generatedKOLBE CATHOLIC COLLEGE

Year 8

Investigation

Renewable energy

2021

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The College Board has approached you to ask you to investigate a viable renewable energy source that could be used within the College to supplement some of the current energy needs across the school. You will have access to the STELR solar panel and wind turbine.

There are some suggestions below, but you could also think of your own ideas. Of course, you’ll have to agree on your investigation as a group and then get your topic approved by your teacher.

You must design and conduct an investigation which explores the use of one of these renewable energy sources. You will then present your findings (in whatever way you see fit!) to Mr. Alweyn and the College Board, explaining the importance of using renewable energy sources and how the College might make use of them. You should be able to support your argument by referring to the findings of your investigation.

Some of the directions for your investigation might include:

**Solar panel**

* What is the effect of clouds (or dust or leaves) on the energy delivered?
* Does temperature have any effect on energy output? If so, how?
* Does the colour of the light have an impact on the output of the panels?

**Wind turbine**

* Will combinations of different blade lengths and/or angles generate more electricity?
* How does blade surface area relate to energy output?
* How do gears and gear ratios affect the output of a wind turbine?

Or something else that you can think of…be sure to get it checked off by your teacher first!

**Step 1**: Plan your experiment. You will need to include enough information in your plan to convince your teacher that you are ready to go ahead. Use the investigation planner that follows. The more information you can present to your teacher, the more likely it is that they will give you the OK.

Checklist:

 We have identified the question  Done some research  Written a hypothesis

 Identified variables  List of materials you require  Safety concerns  Method

 Data collection?

**Step 2**: When you have permission, carry out the experiment. It may not work properly straight away – you may need to change materials and/or procedure before you take your data readings. If you do, make a record of this. Take photos – you will need these to support your claims and explain your findings to your audience. Finally, record your data and present it in a meaningful way. Then discuss what it shows. How does this relate to your hypothesis?

Checklist:

 Changes to method recorded  Data collected  Made sure it was accurate

 Photographs  Data presented  Describes what the data shows

 How does this reflect on your hypothesis?

**Step 3**: Finally, you will need to present your findings in a manner that you could present at a College Board Meeting, pleading the case for the use of renewables.

Checklist:

 Grammar  Spelling  Neatness  References  Evidence to support

You can work on this within your group. You will have 2 weeks of class time to plan, run, collate and present your findings.

## **Investigation Planner**

|  |  |
| --- | --- |
| **What you are investigating** | |
| What is your hypothesis? | What do you think will happen? Explain why. What do you already know about the use of this type of renewable? |
| **Designing your experiment** | |
| What variables might affect the outcome of your investigation? | Which variable(s) will you test? |
| How will you make your tests fair? | What observations and measurements will you need to take? |
| How will you ensure that your measurements are reliable? | What calculations (if any) will you need to perform? |
| What risks might be involved in conducting your investigation? Hence, what safety precautions do you plan to take? | What materials, including equipment will you need? |

|  |  |
| --- | --- |
| **Your results** | |
| How will you record your observations and measurements?  Design any suitable tables and draw them up ready in your journal.  Can you use symbols and a key to avoid repeated writing of your observations? If so, have these ready under the appropriate tables. | What graphs can you draw and what spreadsheets can you design to display your results and to enable you to identify any patterns and relationships? |
| **Conducting your investigation** | |
| Once your teacher has approved your plans and supplied the materials, conduct your investigation.  Record how you performed the investigation. Be sure to include any modifications you made to your plans and the reasons for them. | |
| **Analysing your results: your conclusions** | |
| Examine your results. What do they show? How would you best display these findings for your audience? | From your conclusions, was your hypothesis correct? Does your hypothesis need to be modified? Discuss. |
| What are the implications of your findings to the College | |

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| --- | --- | --- | --- |
| **Experimental design process** | Above standard(3) | At standard(2) | Below standard(1) |
| 1. Presented a question that could be answered through experiment. |  |  |  |
| 1. Accessed a minimum of three, age-appropriate sources for background research, addressing all key scientific concepts of the project. Provided appropriate references. |  |  |  |
| 1. Developed a hypothesis based on background reading. |  |  |  |
| 1. Correctly identifies variables (I, D, C). |  |  |  |
| 1. Demonstrated the ability to carry out the experimental procedure at an age-appropriate level. |  |  |  |
| 1. Solved problems that arose with the experimental procedure. If necessary re-designed the procedure and tried experiment again. |  |  |  |
| Opportunities for improvement: | | | |
| **Data collection and conclusion** | Above standard(3) | At standard(2) | Below standard(1) |
| 1. Ran sufficient trials (minimum 3). |  |  |  |
| 1. Derived conclusions from appropriately organised and summarised data. |  |  |  |
| 1. Clearly related conclusions back to the hypothesis, key scientific concepts, and background research. |  |  |  |
| Opportunities for improvement: | | | |
| **Presentation** | Above standard(3) | At standard(2) | Below standard(1) |
| 1. To what extent does the student’s presentation provide a thorough picture of the investigation? |  |  |  |
| 1. To what extent can the student communicate effectively about the project? |  |  |  |
| 1. Does the student’s presentation provide ample evidence of how the student thought through the experimental process and collected data? |  |  |  |
| Opportunities for improvement: | | | |
| Comments: | | TOTAL:  /36 | |