1.1 STEM Investigations
Inquiry Based Learning Activity: E-Poster Activity

Summary:
In this activity students utilise the deep knowledge and understanding they have gained from the STEM Investigations unit to utilise the scientific method, collect and analyse data and communicate the results of their findings. The activity involves students utilising inquiry based learning strategies to apply appropriate design, production and evaluation skills to a contemporary problem based on energy.

Activity Description:
Students are to form teams from 2 to 5 members per project, 3 is recommended in order to produce research on an energy based problem. Students are to present their findings on the form of a poster and a verbal presentation. See details below;

Posters Dimension and Content:
1. Posters must be two-dimensional (one single sheet) and one-sided.

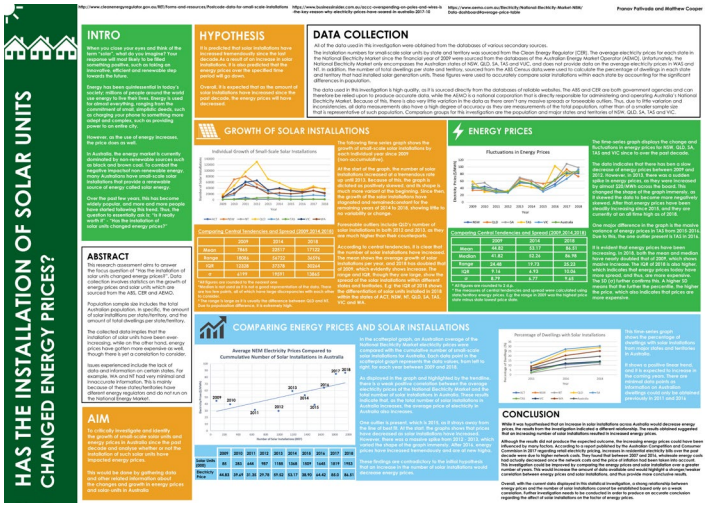
2. Topic of investigation must relate to energy or electricity.

3. Investigation must reflect or illustrate clear aims, methods, analysis, interpretation and communication of collected data or statistical information and findings.

4. Data used can be collected by students or previously published by someone else (if the data is published, the source must be cited in the poster).

5. Posters must be presented in English.

6. Posters must be the original design and creation of students and must cite any content obtained from existing sources using appropriate footnotes and references.



Syllabus Outcomes:
5.2.1 A student describes how scientific and mechanical concepts relate to technological and engineering practice
5.2.2 A student applies cognitive processes to address real world STEM based problems in a variety of contexts
5.3.1 A student applies knowledge and understanding of STEM principals and processes
5.4.1 A student develops skills in using mathematical, scientific and graphical methods whilst working as a team
5.5.1 A student applies a range of communication techniques in the presentation of research and design solutions
5.8.1 A student understands the importance of working collaboratively, cooperatively and respectfully in the completion of STEM activities

Tips and Hints:
Plan the work and work the plan. A well considered plan will improve the likely value and success of your project. Consider the following:

1. What areas of studies in energy or electricity may be of interest to you and your team, as well as to others viewing the poster.

2. What is/are the key question/s you wish to address, or hypotheses to test?

3. Can quantitative data (numbers) be obtained, within your personal constraints and those of the project, that will help you to answer such questions or hypotheses?

4. Should, or could, you involve comparisons (e.g. solar versus wind; type of solar cells; etc.) and in what ways may they be compared?

5. If someone else repeated your project would they obtain the same or similar results? Are you attempting to make some generalisations based on a sample?

- How have you considered variation?
- How generalisable are your results?
- Are you measuring what you intended to measure and need to measure?

6. Has everyone involved in collecting data used the same method of measurement and is it the best measure?

- Why did you measure in a particular way?

7. Are you best to report something graphically, via text or verbally?

- Does your graph provide a clear message or is it hard to interpret?

8. How strong are your conclusions and have you noted limitations and why you were unable to overcome them?

9. Is your poster presentation adequately simple and informative?

10. Have you used clear headings?

Marking Guidelines:
Based on the National Secondary Schools Poster Competition

Poster and Presentation	Grade
• ***Clarity:*** The e-poster and presentation clearly articulate the objectives, research questions or hypothesis. It is easily understood without any superfluous information. Results and conclusions are professionally communicated. The poster layout is logically ordered and easily understood by a range of audiences. • ***Data:*** Data collected is appropriate for answering the research question stated. Excellent data collection methods have been utilised and referenced in the presentation (e.g., primary data collection by print, internet, survey). All secondary data sources (published reports, databased, web addresses, etc.) are professionally cited. Data collected is of a very high quality (i.e. accurate, reliable, using a reasonable sample size, using appropriate methodologies, etc.) Use of controls or comparison groups have been considered. • ***Analysis:*** Data has been analysed in terms of research question or hypotheses. Analysis is of a high quality and is appropriate to the type of data collected. Research questions or hypotheses have been answered to a high standard. Highly developed conclusions have been written and articulated which are supported by the data. Limitations of the research findings have been clearly articulated. • ***Graphs & Tables:*** The poster utilises high quality graphs/tables/statistics appropriate for displaying and summarising data. Graphs and tables are correctly titled and explained. • ***Presentation:*** All team member involved in the verbal presentation. Verbal presentation is clear, and concise. The e-poster has a good balance of graphs and text and is presented to a very high standard. • ***Creativity/Importance:*** The research undertaken is highly creative or original in nature. The poster design displays creativity and originality. An interesting question has been answered with an eye catching e-poster design.	**A**

• ***Clarity:*** The e-poster and presentation articulates the objectives, research questions or hypothesis. It is easily understood without a great deal of superfluous information. Results and conclusions are well communicated. The poster layout is logically ordered and easily understood by audiences with a high level of technical knowledge. • ***Data:*** Data collected is appropriate for answering the research question stated. Very good data collection methods have been utilised and referenced in the presentation (e.g. primary data collection by print, internet, survey). Most secondary data sources (published reports, databased, web addresses, etc.) are cited. Data collected is of high quality (i.e. accurate, reliable, using a reasonable sample size, using appropriate methodologies, etc.) Consideration of controls or comparison groups is evident. • ***Analysis:*** Data has been analysed in terms of research question or hypotheses. Analysis is of a good quality and is appropriate to the type of data collected. Research questions or hypotheses have been answered to a good standard. Well developed conclusions have been written which are supported by the data. Limitations of the research findings have been included. • ***Graphs & Tables:*** The poster utilises quality graphs/tables/statistics appropriate for displaying and summarising data. Graphs and tables have titles and are briefly explained. • ***Creativity/Importance:*** The research undertaken is creative or original in nature. The poster design displays some level of creativity and originality. An interesting question has been answered with a quality poster design.	**B**
• ***Clarity:*** The e-poster and presentation includes the objectives, research questions or hypothesis. It is easily understood but has some superfluous information. Results and conclusions are evident. The poster layout is logically ordered. • ***Data:*** Data has been collected in order to answer the research question stated. Some data collection methods have been utilised in the presentation (e.g., primary data collection by print, telephone, internet, survey). Some secondary data sources (published reports, databased, web addresses, etc.) are included. Data collected is of a satisfactory quality (i.e. accurate, reliable, using a reasonable sample size, using appropriate methodologies, etc.) • ***Analysis:*** Some data analysis related to the research question or hypotheses is presented. Analysis is satisfactory and is appropriate to the type of data collected. Research questions or hypotheses have been addressed. A basic conclusion has been written. • ***Graphs & Tables:*** The poster utilises some graphs/tables/statistics. Graphs and tables are labelled. • ***Creativity/Importance:*** The research undertaken demonstrates some originality.	**C**

• ***Clarity:*** The e-poster andpresntation is not easily understood and has a great deal of superfluous information. Results and conclusions are not evident. The poster layout is not logically ordered. • ***Data:*** Little to no data has been collected in order to answer the research question stated. Data collection methods are not evident. At least 1 secondary data source (published reports, databased, web addresses, etc.) has been included. • ***Graphs & Tables:*** The poster uses some graphs which are labelled. • ***Creativity/Importance:*** The research undertaken is not original work.	**D**
• ***Clarity:*** The e-poster and presentation is not easily understood and has a great deal of information not relevant to the area of study. No results or conclusions completed. Poor layout evident. • ***Data:*** No primary data use to answer research question. • ***Graphs & Tables:*** The poster has no graphs or tables • ***Presentation:*** The poster is hard to read and follow. • ***Creativity/Importance:*** The research undertaken is not original work.	**E**