

## Features of Quality - EEI

Key Features of Quality in support of student and teacher judgement for the Extended Experimental Investigation are described here. The Features of Quality are the criteria used to assess the student work as best fitting one of the four Descriptors.

	Exceptional	Above Expectations	In Line with Expectations	Yet to Meet Expectations
Investigating	<ul style="list-style-type: none"> <li>Forms a testable hypothesis or prediction with justification</li> <li>Describes considerations related to reliability and fairness</li> <li>Outlines appropriate safety considerations, and describes the method used to accurately collect and record good quality, reliable data in a manner that could be easily repeated.</li> <li>Uses an innovative approach that truly enhances the work</li> <li>Records a sufficient amount of good quality data</li> </ul>	<ul style="list-style-type: none"> <li>Forms a testable hypothesis or prediction with justification</li> <li>Identifies the variable to be measured and the variable to be changed</li> <li>Outlines appropriate safety considerations, and describes the method and equipment used to collect and record data</li> <li>Records a sufficient amount of good quality data</li> </ul>	<ul style="list-style-type: none"> <li>With limited guidance, forms a testable hypothesis/prediction</li> <li>Describes a safe method used to collect data – some of the steps are understandable but lack some detail</li> <li>Records raw/primary data</li> </ul>	<ul style="list-style-type: none"> <li>Uses a given investigation question</li> <li>Is directed in using equipment to collect and record data</li> <li>Data collection method described is not repeatable</li> </ul>
Communicating	<ul style="list-style-type: none"> <li>Presents data in the most appropriate way using relevant scientific terminology and informative representations; calculations, if any, are performed to a high degree of accuracy</li> <li>Describes the relationships between the variables</li> </ul>	<ul style="list-style-type: none"> <li>Displays data neatly and accurately, using relevant scientific terminology and informative representations; calculations, if any, are performed to a high degree of accuracy</li> <li>Describes the relationships between the variables</li> </ul>	<ul style="list-style-type: none"> <li>Displays data on simple tables, charts or graphs, allowing for some errors in scaling or plotting</li> <li>States a relationship between the variables</li> </ul>	<ul style="list-style-type: none"> <li>Displays data on incomplete tables, charts or graphs, allowing for significant errors in scaling or plotting</li> </ul>
Knowledge & Understanding	<ul style="list-style-type: none"> <li>Provides a justified conclusion supported by the data; identifies and explains any anomalous data</li> <li>Uses relevant science knowledge to assess and describe whether the hypothesis has/has not been supported</li> <li>Describes in detail the strengths and weaknesses of their own investigations, including appropriate improvements and or refinements, or explains fully why no further improvements could reasonably be achieved</li> </ul>	<ul style="list-style-type: none"> <li>Draws a conclusion consistent with the data and comments on whether the conclusion supports the hypothesis</li> <li>Identifies the strengths and weaknesses of the investigation and suggests appropriate improvements, or explains why the procedures were of sufficient quality</li> </ul>	<ul style="list-style-type: none"> <li>Draws a conclusion based on data collected, identifies some features of the investigation that could be improved and suggests improvements</li> </ul>	<ul style="list-style-type: none"> <li>Comments on the investigation without making a conclusion/refinement to the investigation.</li> </ul>



## Completing the Extended Experimental Investigation

Over the course of three weeks, students will engage in four activities which contribute to the generation of their evidence of learning and achievement in the EEI

- A. Questioning and predicting
- B. Planning and conducting
- C. Processing and analysing
- D. Reflecting and reporting

It is not intended to present the activities as a rigid and linear process. Each activity may be revisited at different times as students complete the investigation.

### A. Questioning and Predicting

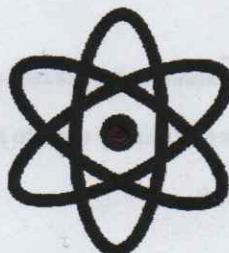
For this part of the investigation students may work individually or in small groups. Each student must contribute to the work of the group.

- Choose the topic
- Decide the research question
- Collect information on the background theory related to the research question
- Refine the question to help with the justification of their hypothesis/prediction
- Record the sources of information
- Write the hypothesis/prediction

### B. Planning and Conducting

For this part of the investigation students may work individually or in groups. Each student must contribute to the collection of data.

- Hands-on experience in the laboratory to plan and refine experimental design
- Decide what equipment and materials will be necessary
- Assess any possible risks
- Write individual Investigation Plans
- Submit individually for investigation approval
- Conduct the investigation
- Record all data as well as problems and changes to method used during any preliminary trials and during final experiments





## Investigating and analysing data and patterns

### C. Processing and Analysing

For this part of the investigation students must work individually

- Analyse their own data
- Perform any necessary calculations
- Consider how to best represent and analyse their data
- Identify patterns and relationships in the data
- Explain any anomalous data
- Describe the relationships between the variables
- Draw conclusions
- Consider if their hypothesis or prediction has or has not been supported

### D. Reflecting and Reporting

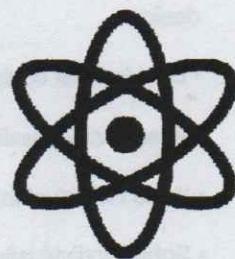
Students may work individually or in groups to reflect on their work. They should be encouraged to critically discuss various aspects of their investigation, such as:

- the design of the experiment and possible improvements
- the limitations of their data
- any possible theoretical or practical implications of their findings
- further related investigations that they might conduct and why

Students must work individually to compile the report of their investigation, using the information/data they have recorded in their research throughout the investigation. Students will report their research and findings in a format of their choice. If a typed or hand-written report is the format of their choice, the total length of the report would typically be in the 400 - 600 words range (excluding tables, graphs, reference list and research records), but this should not be regarded as a rigid requirement.

When planning the content of their report, students should be familiar with the

Features of Quality used to judge the level of achievement which will be awarded to their work.



Adapted from Junior Cycle Science Guidelines for the Classroom-Based Assessments and Assessment Task: For use with CBAs from October 2018

## Completing the CBA EEI report

### **Section A: Questioning and Predicting**

The following should be included in this section:

- The **topic** your investigation is related to: Chemical Reactions, Food, Forces, Energy Conservation, Plant responses and Growth, Earth – Sun – Moon System, Water, Plastics
- Your research **Question**
- Your **hypothesis** – prediction with a clear explanation as to why this is your prediction
- **Background research** - just a sentence or two

### **Section B: Planning and Conducting**

- **Equipment** and chemicals used
- **Safety precautions** that you needed to consider
- A **variables table**, example below

Independent Variable (The variable I changed is)	
Dependent Variable (The variable I measured is)	
Controlled Variables (The variables I kept the same are)	

- A clear, detailed **procedure**.... numbered points
- Clearly **labelled diagram** (page 4)
- A neat, clear **results table**
- **At least one graph** (pages 6 and 7) .....remember SALT (scale, axis, labels, title)

### **Section C: Processing and Analysing**

- Carry out any **calculations** that are necessary
- **Analyse your results**.... explain in detail what your results mean
- Clearly explain the relationship between your **independent variable** and your **dependent variable**

- Explain any **trends** in your results
- Explain any anomalous data
- Form a **conclusion**

#### Section D: Reflecting and Reporting

- Did your investigation turn out as you expected - Do your results agree with your original hypothesis
- What were the **strengths** (good points) of your investigation?
- What were the **weaknesses** (bad points) of your investigation?
- What **improvements** could you make to your investigation?
- How could your investigation help in the real world?

periodic table  
Rain