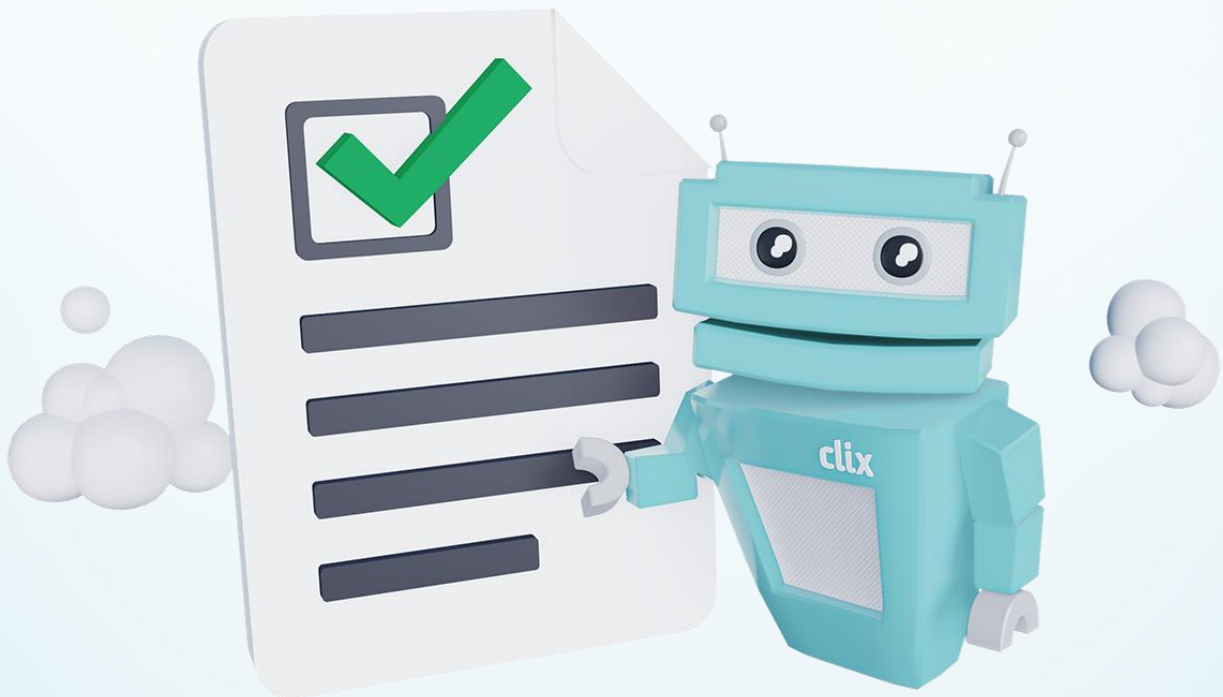


# Science

How to Succeed in Junior Cycle

Science CBA 2



**by Conor Eivers**

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## Introduction

Classroom-Based Assessment 2 (C.B.A.) for Junior Cycle Science is named the **Science in Society Investigation (S.S.I.)**. Over a three-week period, you will research a **socio-scientific issue**, analyse the information/secondary data collected, evaluate the claims and opinions studied, and draw evidence-based conclusions about the issues involved, with support from your teacher.

### **The S.S.I. has three sections:**

1. Initiating research,
2. **C**ommunicating findings and
3. **E**valuating the information to respond to the chosen research question.

You must work individually to conduct this investigation, but you will be encouraged to discuss different aspects of your investigation with your classmates. Your report can be completed in various ways. For example, you could complete a written report (by hand or typed), submit a PowerPoint, produce a poster (remembering that this will need to include significant detail) or you could make a podcast or video.

When completing your report, you will need to make sure you have covered all features of quality for the level of achievement you are aiming to receive for your S.I.I. There are four different levels of achievement; **Exceptional, Above expectations, In line with expectations, and Yet to meet expectations**. The report you submit will be judged to fit one of these four levels of achievement. Your teacher will use a document entitled '**Features of Quality**' to decide the level of achievement your report receives.

An explanation of the levels of achievement are as follows:

- **Exceptional** describes a piece of work that discusses all of the Features of Quality for the C.B.A. to a very high standard. Your C.B.A. does not need to be perfect, but the strengths of the work far outstrip its weaknesses, which are minor. You suggest improvements clearly.
- **Above expectations** describes a piece of work that discusses the Features of Quality for the C.B.A. very well. You would have shown a clear understanding of how to complete each area of the investigation, and your work would contain a lot of detail. Feedback from your teacher would include comments on small sections of your report that need further attention or polishing, but, on the whole your work is of a high standard.
- **In line with expectations** describes a piece of work that reflects most of the Features of Quality for the C.B.A. well. You would have shown a good understanding of the task and your report would have been free from significant error. Feedback from your teacher would include comments on sections of your report that need further attention or correction, but your work is generally competent and accurate.
- **Yet to meet expectations** describes a piece of work that falls short of the demands of the C.B.A. and its Features of Quality. You would have made a good attempt, but you might not have grasped the task clearly or have left out large sections of the report. Feedback from your teacher would include comments on the fundamental errors that need to be addressed.

## Project Sections

This investigation requires you to research a scientific topic or issue and its impact (positive or negative) on society and/or the environment. Your chosen topic may be related to something you have studied in class, but you can choose to complete it on any issue you are interested in, provided it is related to the areas outlined below. It is important that the topic chosen can be researched, has a sound base of scientific understanding, and can be turned into a question. As there may be multiple opinions on the topic or issue you have chosen, you should consider more than one point of view, even if you do not agree with them all. Your topic must be related to any of the following areas;

1. A technological application of science,
2. An application of science that has an effect on human health,
3. An application of science that has an effect on the environment or
4. An application of science that has an effect on society.

## Task 1: Topic

You must choose a topic and research question. The best way to do this is to research different scientific articles on the websites provided in the 'Finding Sources' section of this guide and come up with a question related to one of the articles. **Remember that your topic must have an impact on society and/or the environment.** Use our 'Sample Research Questions' to give you some inspiration on the types of questions that are suitable. If you answer yes to ALL of the questions below when deciding on your research question, it is suitable:

1. Is it the question related to something you have studied in science or is it related to human health, the environment or society?
2. Is it possible to complete research on the question?
3. Is there a sound base of scientific understanding and ideas needed to complete the research question?
4. Could you debate the question with your classmates (i.e., is there two sides to the research question)?

When you have decided on a research question, you should be able to pick the topic that the research question falls under.

## Task 2: Research

When you have chosen your topic and research question, you must find out and reference information from multiple balanced sources including reports, articles, etc. You can do this by researching the question online, making sure to use the 'Evaluating Sources' section of this guide to assess if the webpage you are getting information from is reliable. This is the most important aspect of the investigation. **You MUST consider the quality of ALL information you collect from sources.**

### Tip

Look at the feedback you received on your C.B.A. 1 presentation when making your presentation for C.B.A. 2 to make sure you do not make the same mistakes when presenting your findings.



### Task 3: Communicating

When you have collected information on your question, you can present your project in the following order:

**Section 1:** Explain the sides of your topic in a structured way using the scientific terminology you have learned since studying Junior Cycle Science. Refer to where you obtained different pieces of information. Do not include your opinion on the topic or research question in this section.

**Section 2:** Clearly explain the impact of your topic on society and/or the environment.

**Section 3:** Review the information you have collected using scientific explanations and give a justified opinion, based on your findings, on your research question and topic.

### Finding Sources

1. Science News for Students (<https://www.sciencenewsforstudents.org/>)
2. Science Journal for Kids (<https://www.sciencejournalforkids.org/>)
3. Frontiers for Young Minds (<https://kids.frontiersin.org/>)
4. Kids Ahead (<http://kidsahead.com/>)
5. Science Blog (<https://scienceblog.com/>)
6. Teaching Kids News (<http://teachingkidsnews.com/category/science/>)



## Evaluating Sources

A skill required for completing the Science in Society Investigation (S.S.I.) is being able to **evaluate the evidence behind a scientific claim**. When reading different articles, you should make sure to keep the following points in mind to help you spot misinformation:

1. Headlines are commonly designed to entice viewers into reading different sources of information and some can **over-simplify or sensationalise the findings of research**.
2. Different sources of information can **distort or misinterpret the findings of research** for the sake of a good story. If possible, read the original research, rather than relying on an article based on the research.
3. Many companies will employ scientists to carry out and publish research which can cause a **conflict of interest**. Whilst this doesn't necessarily invalidate any research completed, but they should be analysed with this in mind.
4. **Speculation** can often help to drive science forward. However, articles should be clear on the facts their study proves, and which conclusions are unsupported.
5. In trials, **the smaller a sample size, the lower the confidence** in the results from that sample. Conclusions drawn can still be valid, and in some cases small samples are unavoidable, but larger samples often give more representative results.

## Sample Research Questions

1. Should we use wind energy as our main source of energy in Ireland?
2. Should we ban the use of plastic in Ireland?
3. Is using nuclear energy better for the environment than using fossil fuels?
4. Do the benefits of X-rays outweigh the drawbacks?
5. Are electric cars the only option for the future?
6. Are electric cars good for the environment?
7. What are the advantages and disadvantages of genetically modified food?
8. Is stem cell treatment really promising?
9. Will researchers really be able to use genetics to help us live both longer and healthier?
10. Should the United States return to the moon and try to go to other planets?
11. Should humans really make the effort to find a way to live in space or on other planets?
12. Is it a good idea that the U.S. has approved the release of "killer" mosquitoes to fight disease?
13. Is recycling metal really important??
14. Is hydraulic fracking going to destroy important ecosystems?
15. Is the world too dependent on just a few crops?
16. Is stem cell research ethical?
17. Is it possible to predict the next pandemic?
18. Is it beneficial or harmful for wild animals to have interactions with people?
19. Should sugar be regulated like a drug?
20. Which diet choice is better: low fat, low sugar, or low carbs?
21. Do cell phones or microwaves cause cancer?
22. Is global warming real?
23. Should vaccines be made mandatory?
24. Should we rely on pesticides for agriculture?

## Report Checklist

Have I ...	Tick when complete
Chosen an interesting topic?	
Chosen an interesting research question?	
Used at least six sources of information in my report?	
Ensured that my sources are relevant to my research question?	
Checked my sources to ensure they are accurate?	
Acknowledged if any of my sources are biased?	
Shown that my research topic has an impact on society or the environment?	
Ensured that my report is clear and easy to read?	
Used diagrams and graphs where appropriate?	
Used correct scientific terms in my report?	
Presented my work in an innovative or creative way?	
Considered the different sides of the argument and included them in my report?	
Backed up my research with scientific explanations?	
Explained the science behind the information I have researched?	
Given a personal opinion and backed it up with reference to all of the information I have research?	
Linked the information to the topic under investigation?	

## Features of Quality

<b>Exceptional</b>	
<b>Investigating</b>	<ul style="list-style-type: none"> <li>• Your topic and research question are interesting and original.</li> <li>• You find information using a large number of sources.</li> <li>• Your sources are balanced and varied.</li> <li>• You provide a complete reference list.</li> <li>• You evaluate the relevance of your sources.</li> <li>• You evaluate the accuracy of your sources.</li> <li>• You evaluate the bias of your sources.</li> </ul>
<b>Communicating</b>	<ul style="list-style-type: none"> <li>• You clearly explain how your topic and research question is relevant to science, and how it has an impact on society and/or the environment.</li> <li>• Your report on the investigation is very well-structured (clear and easy to read).</li> <li>• Your report on the investigation uses scientific terminology, when appropriate.</li> <li>• Your report on the investigation is written in an interesting and original way.</li> <li>• Your report on the investigation explains, in detail, the different sides of the argument for your chosen topic and research question.</li> </ul>
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• You discuss, in detail, the different views on your chosen topic and research question.</li> <li>• You discuss, in detail, your views on your chosen topic and research question.</li> <li>• You base your views on information gathered throughout your research, using scientific explanation when required.</li> </ul>

<b>Above Expectations</b>	
<b>Investigating</b>	<ul style="list-style-type: none"> <li>• Your topic and research question are interesting and original.</li> <li>• You find information using a number of sources.</li> <li>• Your sources are balanced.</li> <li>• You provide a complete reference list.</li> <li>• You consider the relevance of your sources.</li> <li>• You consider the accuracy of your sources.</li> <li>• You consider the bias of your sources.</li> </ul>
<b>Communicating</b>	<ul style="list-style-type: none"> <li>• You explain how your topic and research question is relevant to science.</li> <li>• You explain how your topic and research question has an impact on society and/or the environment.</li> <li>• Your report on the investigation is well-structured (clear and easy to read).</li> <li>• Your report on the investigation uses scientific terminology, when appropriate.</li> <li>• Your report on the investigation considers different sides of the argument for your chosen topic and research question.</li> </ul>
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• You discuss, in detail, your views on your chosen topic and research question.</li> <li>• You base your views on information gathered throughout your research, using scientific explanation when required.</li> </ul>

<b>In Line with Expectations</b>	
<b>Investigating</b>	<ul style="list-style-type: none"> <li>• You decide on a topic and research question to investigate with help from your teacher.</li> <li>• You find some useful sources of information on your topic and research question.</li> <li>• You provide some references.</li> <li>• You consider the relevance of some of your sources.</li> <li>• You consider the accuracy of some of your sources.</li> <li>• You consider the bias of some of your sources.</li> </ul>
<b>Communicating</b>	<ul style="list-style-type: none"> <li>• You briefly mention the relevance of your topic and research question to science.</li> <li>• You briefly mention the impact of your topic and research question on society and/or the environment.</li> <li>• Your report on the investigation is presented in a structured way.</li> <li>• Your report on the investigation uses scientific terminology, when appropriate.</li> <li>• Your report on the investigation provides information on the different sides of the argument for your chosen topic and research question.</li> </ul>
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"> <li>• You discuss your views on your chosen topic and research question with some explanation.</li> </ul>

<b>Yet to Meet Expectations</b>	
<b>Investigating</b>	<ul style="list-style-type: none"><li>• You decide on your topic, but you are given a research question from your teacher.</li><li>• Your teacher gives you sources of information on your research question and topic.</li><li>• You use few sources and do not provide references.</li></ul>
<b>Communicating</b>	<ul style="list-style-type: none"><li>• You present your investigation using some scientific terminology.</li><li>• You present your investigation in a way that is somewhat structured.</li></ul>
<b>Knowledge and Understanding</b>	<ul style="list-style-type: none"><li>• You give a personal opinion without explanation or linkage to the original question.</li></ul>



Best of luck in the exam!  
You will be great! 😊