

*Engaging
Students, Teachers and Parents
in Debates*

**Resources for Continuing
Professional Development**

Regina Kelly, Sibel Erduran, Gráinne Walshe, & Liam Guilfoyle

2016



National Centre for STEM Education



UNIVERSITY of LIMERICK
OILSCOIL LUIMNIGH



AntSraith Shóisearach
do Mhúinteoirí
**Junior
CYCLE**
for teachers



Introduction

A distinct feature of science is its reliance on evidence to justify claims. Take, for instance, the claim that the earth rotates around its axis. What is the evidence for this claim? How do we know? Consider also how science impacts society and how everyday citizens in democratic countries have to make informed decisions about a range of topics such as nuclear energy, genetically modified foods and mobile phones. The process of formulating evidence-based claims is often referred to as '*argumentation*'. In traditional school science, argumentation is not common place. There's often an emphasis on 'what' we know at the expense of 'how' we know. As a result, pupils develop limited understanding of the nature of science including how scientific knowledge is produced.

In Ireland, a new development in the Junior Science Specification fortunately brings to the foreground the need to equip pupils with argumentation skills. In particular, the component called "Nature of Science" highlights the significance of construction and communication of evidence and justification in science. How can the skills of evidence-based reasoning and communication be promoted in science lessons? What teaching strategies can be used?

In this booklet, we present some example science activities designed for post primary teachers and students to help implement Nature of Science related learning outcomes. The activities have been produced as part of a project entitled "*STeP into Science: Engaging Students, Teachers and Parents in Debates*" funded by the Discover Programme of Science Foundation Ireland, and led by EPI-STEM, The National Centre for STEM Education at University of Limerick with partnership of JCT.

The project aimed to provide some example strategies for continuing professional development on teaching Nature of Science in general and argumentation in particular. The programme is intended to impact eventually not only pupils but also parents through engagement in school-based debates that will be the culmination of the argumentation lessons.

*Professor Sibel Erduran, STeP into Science Project Leader
Director of EPI*STEM, University of Limerick, Ireland*



Table of Contents

Key Aspects of the Teacher Workshop	2
Teacher Workshop Slides	3
Overview of the Activities	11
Teacher Outline: Card Game Activity	12
Student Exercise: Card Game Activity	16
Teacher Outline: Badger Culling Activity	17
Student Exercise: Badger Culling Activity	19
Teacher Outline: Genetically Modified Foods	22
Student Exercise: Genetically Modified Foods	23
Teacher Outline: Tile and Mat Activity	25
Student Exercise: Tile and Mat Activity	26
Junior Cycle Outcomes and Sample Debates	27
Homework Overview	31
Sample Student Homework Task 1	32
Sample Student Homework Task 2	34
Sample Homework Task 1	35
Sample Homework Task 2	36
Debate Planner Worksheet	37

Teacher Workshop



Key Aspects of the Teacher Workshop

Teacher workshops were run in four locations across Ireland in May 2016. The resources for these workshops were developed by EPI*STEM in consultation with JCT and the workshops were facilitated by JCT. The workshop slides are included to provide a brief overview of the key aspects involved in engaging students, teachers and guardians in debates. All of these aspects are explained in greater detail in the subsequent sections, including worksheet resources.

Overview of the Content of the Slides

Firstly, socio-scientific issues are defined as in this project debates titles are intended to be relevant to current societal issues.

Specific “*Learning Outcomes*” and “*Key Skills*” are identified from the Junior Cycle Science Specification to highlight the relevance of implementing argumentation strategies into the teaching and learning of post primary science.

The fundamental principles of constructing arguments and rebuttals are outlined to provide a simple method for teachers and students to use to form scientific arguments.

Teaching strategies that promote students developing argumentation skills in the classroom are identified so that teachers can design argumentation activities suitable for their own classrooms.

A typical debate structure, suggested lesson sequence, and a checklist for organising debates are included to assist teachers in running a debate event in school.

Ideas for homework tasks are described to show teachers how guardians can be involved in students’ homework activities.

Finally, transferable skills are noted to emphasise that the skills adopted by teachers and students during this project can be transferred to other classroom situations in science. Some examples of how argumentation can be incorporated into science content are listed (IDEAS Resources)

Teacher Workshop Slides

Socio-scientific Debates for Junior Cycle



Socio-scientific issues are societal problems that are informed by science and may involve an ethical aspect
(Sadler, Barab, & Scott, 2007)

For example, global warming, animal testing, genetically modified foods etc.

"The construction of an argument and its critical evaluation, and the interrogation of data are central to science and to the learning of science"

(NCCA, 2014, p. 9)



Argumentation at Junior Cycle



Strand One: Nature of Science Learning Outcomes (NCCA, 2016)

NOS6. *"conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias"*

NOS7. *"organise and communicate their research and investigative findings in a variety of ways fit for purpose and audience, using relevant scientific terminology and representations"*

NOS8. *"evaluate media-based arguments concerning science and technology"*

NOS10. *"appreciate the role of science in society; and its personal, social and global importance; and how society influences scientific research"*



Argumentation and key Skills in Junior Science

JUNIOR CYCLE SCIENCE AND KEY SKILLS

Key skill	Key skill element	Student learning activity
Being creative	Exploring options and alternatives	As students engage in scientific inquiry, they generate and seek to answer their own questions. They try out different approaches when working on a task and evaluate what works best.
Being literate	Expressing ideas clearly and accurately	Students will plan, draft and present scientific arguments, express opinions supported by evidence, and explain and describe scientific phenomena and relationships.
Being numerate	Developing a positive disposition towards investigating, reasoning and problem-solving	As students engage with science, they will come to appreciate the fun of exploring mathematical problems in the context of a scientific idea and the satisfaction of arriving at a solution.
Communicating	Using numbers and data	Students will interpret, compare, and present information and data using a variety of charts/diagrams fit for purpose and audience, using relevant scientific terminology.
Managing information and thinking	Being curious	As students research socio-scientific issues, they will ask questions to probe the problem more deeply and to challenge how they think about the issue.
Managing myself	Making considered decisions	Students enjoy a wide range of collaborative discussions, providing them with opportunities to listen to different perspectives when considering their options.
Staying well	Being safe	Students will engage frequently with planning and conducting practical activities: they will learn to recognise when their personal safety is threatened and respond appropriately.
Working with others	Contributing to making the world a better place	Students enjoy frequent opportunities to discuss and debate issues relating to sustainability. They will learn to think critically about the world and its problems and propose solutions.

Card Game Activity

EPI-STEM

Divide into groups of three.

1. Pick a card that contains a statement (All capitals), then identify a piece of evidence that backs it up, identify a rebuttal to refute statement.
2. Discuss whether you believe the evidence to be credible for that statement.



UNIVERSITY of LIMERICK
RESEARCH. LEARNING.



AN TSIOTH OLLSCOIL LUMNIGH
Junior
CYCLE
for teachers



Constructing an Argument



Argument = Claim + Evidence

A claim is a statement of a belief

Evidence is the data that supports the claim

- *Honey bee populations are diminishing in Ireland (claim)*
- *Biodiversity Ireland report that this is largely due to the varroa mite, which were first reported in Ireland in 1998 (Evidence)*

Source of Evidence

Must be from a credible source, must be relevant to the claim

Consuming large amounts of salt is bad for your health (Claim).

- *Kim Kardashian eats a lot of salt and she has high blood pressure (Evidence 1).*
- *According to the Food Safety Authority there is a relationship between the high levels of salt consumption and high blood pressure (Evidence 2).*
- *Jamie Oliver states that salt removes the water in the cells of a lemon so it can be preserved for 2 years (Evidence 3).*



UNIVERSITY of LIMERICK
OILScoil LUIMNIGH

Constructing a Rebuttal



Rebuttal

Challenges the opposing argument

For example,

- suggesting evidence that challenges oppositions claim,
- questioning the relevance of the evidence to the argument,
- questioning the source of the evidence (bias, credibility),

Organic farming is cost effective (claim)

Teagasc state that organic farming is more profitable as costly artificial fertilisers are omitted from the farming process (evidence)

The UN Environmental Programme report that organic farming is not cost effective as it produces smaller yields than non organic farming methods (Rebuttal)



UNIVERSITY of LIMERICK
OILScoil LUIMNIGH

Designing Argumentation Activities

EPI-STEM

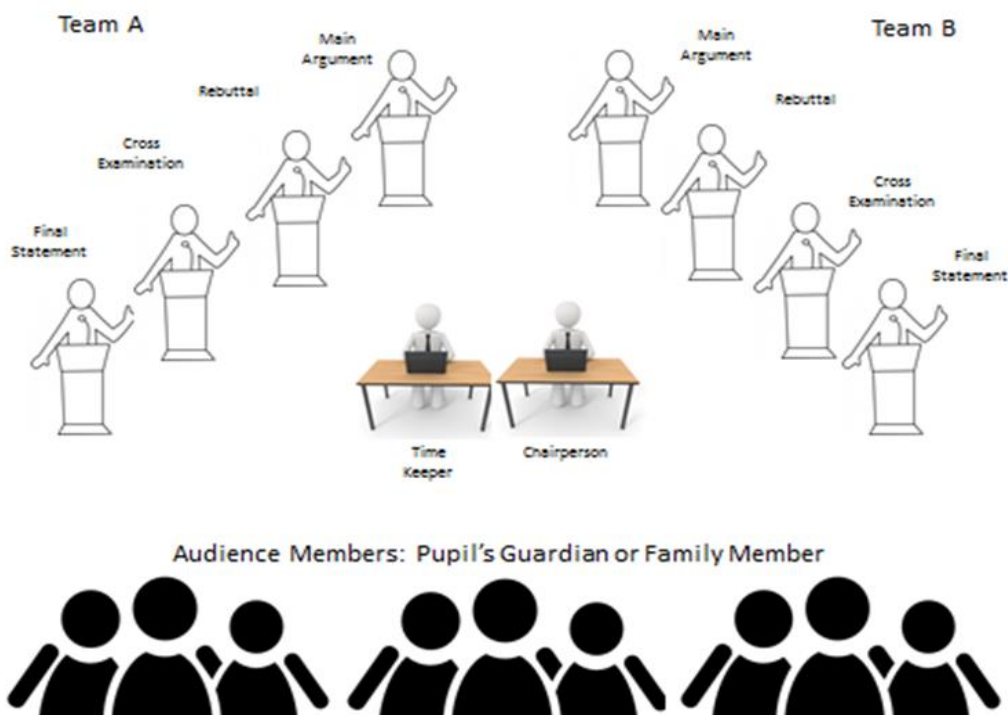
The teaching approaches used in the activities were:

Predict, observe, explain
Group discussions
Concept cartoons

In your group, select **one** of these approaches.
 Design a science activity that is relevant to the JC Learning Outcomes on a poster



Refer to LO Poster
 Which LO links with your activity?



Typical Debate Structure

EPI-STEM

Team A presents their **main arguments** (3 min)
Team B presents their **main arguments** (3 min)

Team A presents their **rebuttal** (2 min)
Team B presents their **rebuttal** (2 min)

Team A **cross examination** of Team B (3 min)
Team B **cross examination** of Team A (3 min)

Final Statement Team A (2 min)
Final Statement Team B (2 min)

Questions from the audience who can ask either team (3 min)



UNIVERSITY of LIMERICK
Ollscoil Lúimnigh

Ideas for Homework Activities

EPI-STEM

Homework Activity 1:

- Student is given a link to article to read relevant to their debate title.
- Student must identify claims, evidence and if the claim is for or against their motion.
- Arguments for their motion may be used in their debate. Arguments against their motion may be used as potential rebuttals. Discuss article with guardian outlining main arguments. (See attached worksheet)



Homework Activity 2:

Complete debate section and present verbally to parent. Get feedback from guardian about what is good regarding (i) debate content, (ii) presentation skills. Discuss potential improvements in (i) debate content and (ii) presentation skills. (See attached worksheet)



UNIVERSITY of LIMERICK
Ollscoil Lúimnigh



Suggested Sequence of Lessons



Lesson 1 (Double class)

- Introduce argument construction, claim, evidence, and rebuttal.
- Student perform in class activity
- Teacher introduces structure of debate
- Teacher assign groups, debate titles and motions.

Homework Activity 1: Research Debate title (Link to article supplied), discuss potential argument with parent.

Lesson 2 (Single class/Double class)

- In groups, student complete their debate sections using debate planner.
- In groups, run through the debate, each person presenting their part.
- Student/teacher suggest amendments

Homework Activity 2: Discuss improvements in debate written content and presentation.



UNIVERSITY of LIMERICK
OILScoil LUIMNIGH



An tSraith Shóisearach
do Mhúinteoirí
Junior
CYCLE
for teachers



Checklist for Organising Debate



- Book a room that will facilitate the number of students and parents.
- Contact parents regarding the date and time of the event
- Assign a chairperson
- Assign a time keeper
- No adjudicator, at the end of each debate the audience will vote which team presented the most convincing arguments. Votes will be counted and revealed at the end of all debates.

Role of chairperson:

- To introduce the title of the debate and the team members names.
- To ensure no student is interrupted during their presentation.
- To facilitate questions from the audience at the end of the debate.

Role of the time keeper:

- Signal to students when they have reached the time limit.



UNIVERSITY of LIMERICK
OILScoil LUIMNIGH



An tSraith Shóisearach
do Mhúinteoirí
Junior
CYCLE
for teachers



After the debate: Transferable Skills

EPI-STEM

Try incorporating activities that will further develop students' science argumentation skills using scientific content.

For example, IDEAS Activity Resources

- Why does the moon have phases?
- Mixtures, elements and compounds.
- Heating Ice to Steam
- Generating Energy

IDEAS Activity Resources available at:

<https://www.stem.org.uk/elibrary/resource/28125>



UNIVERSITY of LIMERICK
OILScoil Luimnigh

Lesson Activities



Overview of the Activities

This section provides worksheets for four activities which are designed to support students to use argumentation in science. These were tried out by teachers during the workshop. Each activity begins with a teacher outline of the activity, followed by a student exercise sheet.

Card Game Activity

The Card Game Activity was designed to help the pupils distinguish between claims (statements), evidence that supports a claim, and evidence that refutes a claim. This activity can be adapted by a teacher by using different statements and pieces of evidence. The game could also be adjusted so that the content of the statements and evidence are related to school science topics (Junior or Senior Cycle) rather than socio-scientific issues.

Badger Culling Activity

The Badger Culling Activity requires students to evaluate different pieces of evidence and to form arguments for or against badger culling in their local area. This activity uses a concept cartoon teaching strategy and can be adapted by selecting any socio-scientific issue that has two conflicting views, and choosing pieces of evidence to match the arguments, for example, pre-natal genetic screening.

Genetically Modified Foods Activity

The Genetically Modified Foods Activity requires students to consider two scenarios where genetically modified organisms (GMOs) might be used to solve a problem, and to argue if they should be promoted or prohibited. This activity uses group discussion to develop students' argumentation skills. This activity can be adapted by writing any scenarios relating to a socio-scientific issue, for example, one scenario relating to the hazards of space travel and another outlining the benefits of space exploration.

Tile and Mat Activity

The Tile and Mat Activity requires students to make a prediction about a scientific phenomenon, observe what happens, and then explain this in the light of experimental evidence. It provides students with the opportunity to consider and evaluate the arguments of others. This activity is not related to a socio-scientific issue but has been included to show how argumentation teaching strategies can be used to teach science topics.

Teacher Outline: Card Game Activity

This activity aims to help pupils distinguish between claims (statements), evidence that supports a claim, and evidence that refutes a claim.

Teaching points

- Argument = Claim + Evidence
- A rebuttal challenges the opposing argument
- Sources of evidence must be from a credible source and must be relevant to the claim

Teaching Sequence

1. Students select a card that contains a statement (bold text), then identify a piece of evidence that backs it up, and also identify a rebuttal to refute the statement.
2. Students then discuss as to whether they believe the evidence/rebuttal to be credible for that statement.

Teacher Preparation

1. Print and cut the statements and accompanying evidence/rebuttals.
2. Print student sheet (1 page)

Resources Required

1. Cards containing statements
2. Cards containing evidence and rebuttals

Statements Cards (Teachers can cut and supply to students)

Human manned missions to mars are too dangerous

Animal Cloning benefits our society

Eating large amounts of salt is bad for your health

Wind Energy should be promoted in Ireland

Humans are responsible for reduced numbers of honeybees in Ireland.

Organic farming is cost effective

Evidence and Rebuttal (Teachers can cut and supply to students)

The Space Radiation Analysis Group, NASA state that being exposed to space radiation can result in mild health risks (vomiting) to more severe risks like cancer.

According to the American Wind Energy Association, the noise made by wind turbines may be annoying to nearby occupants.

Robots (robonauts) could be used instead of human manned spacecraft. In 2011, NASA sent a robot to live in the International Space Station.

The Centre for Research of Endangered Species in New Orleans says that animal cloning will provide a means of saving endangered animals.

Sustainable Energy Ireland state wind energy does not add to environmental problems to the same extent as other forms of energy. Some pollutants are created in the making and installation of wind turbines.

Donald Trump says that animal cloning goes against the order of nature.

Biodiversity Ireland report that the varroa mites, which were first reported in Ireland in 1998 are responsible for the decline of bees in Ireland.

A study conducted in Britain found that pesticides used by farmers cause a decline in bee populations.

I eat a lot of salt and I don't have high blood pressure.

The Food Safety Authority says there is a link between high levels of salt consumption and high blood pressure.

Teagasc state that organic farming is more profitable as it does not use expensive artificial fertilisers.

The UN Environmental Programme report that organic farming is not cost effective as it produces smaller yields than non-organic farming methods.

Student Exercise: Card Game Activity

Resources Required

1. Cards containing statements (Big Bold Text)
2. Cards containing evidence and rebuttals

Activity Instructions

1. Each member of the groups selects a card that contains a **statement** (big bold text). After reading through all the evidence cards, individually select a piece of **evidence that supports** your statement, and identify **evidence that refutes** your statement.
2. **Share** your statement, evidence to support and evidence to refute with your group members.
3. **Discuss** as to whether you believe the evidence that is matched to your statement is **trustworthy**.

Evidence

What makes a good piece of evidence? Summarise your main points.

Argument

Having completed the activity, what do you think an argument is?

Teacher Outline: Badger Culling Activity

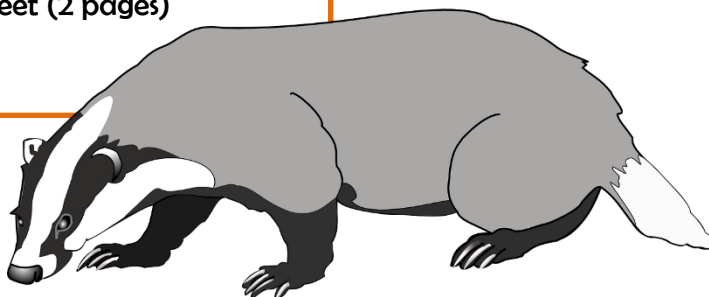
This activity requires students to evaluate evidence to form arguments for and against badger culling in their local area. The pupils are asked to work in groups and sort the evidence into a table

Teaching Sequence

1. Students discuss the two claims illustrated in the carton. Claim 1: Badger culling should be banned. Claim 2: Badger culling should be promoted
2. Students work in their group and select pieces of evidence to match each claim.
3. Individually, students must decide whether they agree with claim 1 or claim 2, justifying using piece/s of evidence.
4. Finally, as a group the students must decide if their group is for or against badger culling. Students will be given 5 minutes to engage in a discussion so that they come to a majority consensus.

Teacher Preparation

1. Print and cut the evidence statements
2. Print student sheet (2 pages)



Evidence Statements (Teachers can cut and supply to students)

The Department of Agriculture reports that badgers cause a threat to cattle. They say this is due to the spread of bovine tuberculosis.

In the past ten years, bovine tuberculosis cost Britain 500 million pounds. This is due to the cost of controlling the disease.

A study in Britain recorded the impact of culling 11,000 badgers. They concluded it had no major impact on the control of bovine tuberculosis in cattle.

In 2012, the control of bovine tuberculosis cost the Irish government 3.4 million euros.

It is difficult to correctly measure the extent at which badgers add to bovine tuberculosis.

The Four Areas Project was conducted in Ireland, it states that reducing the badger population by 80% in an area for several years reduced the number of cattle contracting bovine tuberculosis.

Badgers are protected in Ireland under the Wildlife Acts 1976.

Badger vaccination against tuberculosis is another option to badger culling.

Humans can be infected by the bacteria that cause bovine tuberculosis. According to the World Organisation for Animal Health, humans can be infected by drinking unpasteurised milk from an infected cow.

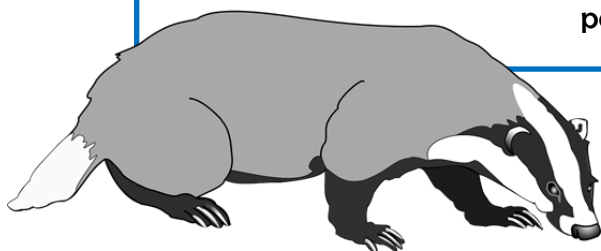
Animal Rights Action Network claim that capturing badgers in snares and shooting them is cruel.

Vaccinating cows for tuberculosis is not a choice for farmers. Cows that have received a vaccine would show false positive readings to tuberculosis testing after the vaccination.

Food Safety Authority Ireland requires that all milk sold must be pasteurised. This means that humans have low risks of being infected with bovine tuberculosis.

Student Exercise: Badger Culling Activity

Badger culling involved the slaughter of badgers to decrease the population



Activity

1. In groups discuss the two claims illustrated in the cartoon. Claim 1: Badger culling should be banned. Claim 2: Badger culling should be promoted
2. Your teacher will give you pieces of evidence. Some support Claim 1, some support Claim 2. In your groups discuss what pieces of evidence should be placed on the table on the next page.
3. Individually, decide whether you agree with claim 1 or claim 2, justifying using piece/s of evidence. Prioritise any piece of evidence you feel are the most important.
4. Finally, as a group decide if your group is for or against badger culling. You will be given 5 minutes to engage in a discussion so that you come to a majority consensus. Complete the statement at the bottom of the table.



Evidence that suggests badger culling should be promoted	Evidence that suggests badger culling should be banned
Place Priority 1 evidence here	Place Priority 1 evidence here
Place Priority 2 evidence here	Place Priority 2 evidence here
Place Priority 3 evidence here	Place Priority 3 evidence here
Place Priority 4 evidence here	Place Priority 4 evidence here
Place Priority 5 evidence here	Place Priority 5 evidence here
Place Priority 6 evidence here	Place Priority 6 evidence here

Teacher Outline: Genetically Modified Foods

This activity requires students to consider two scenarios where genetically modified organisms (GMOs) might be used to solve a problem, and to argue if genetically modified foods should be promoted or prohibited. The pupils are asked to work in groups and discuss the evidence. Pupil discussions are scaffolded by the use of prompts.

Teaching Sequence

Step 1: Pupils read the scenarios and using the evidence presented in the text discuss the pros and cons of using genetically modified foods.

Step 2: Pupils read the additional evidence included and further develop their arguments.

Teacher Preparation

1. Print student sheets (2 pages)
2. Remember, only distribute one sheet initially.



Student Exercise: Genetically Modified Foods

STEP 1: An organism is classified as genetically modified when its genetic material has been changed by scientists. In small groups pick one of the following scenarios and discuss what you would do. Ensure each member has an opportunity to contribute to the discussion. Use the following prompts to get started.

- Why do you think that?
- What is your reason for that?
- Can you think of another argument for your view?
- Can you think of an argument against your view?
- What is your evidence?

SCENARIO-1



You are a doctor who often treats patients for vitamin deficiencies, such as vitamin A deficiency which can lead to blindness and even death. But many of your patients are very poor and cannot afford the cost of vitamins. Genetically modified rice “Golden Rice” has extra vitamin A. If your patients could buy it, they would be much healthier without extra costs. But genetically modified foods are not available for sale in your country. Should you campaign to have it made available in shops to help improve your patients’ health?

SCENARIO-2

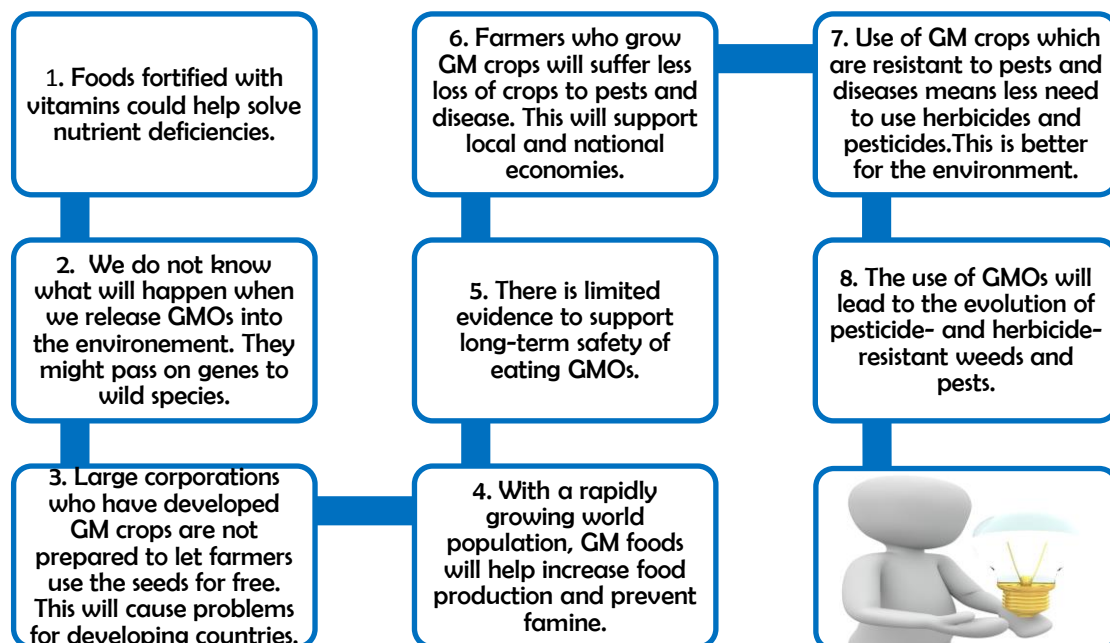
You are the president of a developing country whose people are often on the verge of starvation. The climate of your country is very dry, with desert in most of the country. An agricultural company has produced a genetically modified grain which is suitable for growing in very arid conditions. They have offered to provide your country with 1 million euros worth of this seed for free. They will help farmers to change to growing this crop away from various native crops. But the seed is sterile, so the farmers will have to buy it from the company every year. What will you do?



Student Exercise: Genetically Modified Foods

Read the additional evidence out loud, and then discuss the following questions in your groups.

- Have you changed your position regarding the use of GMO foods?
- What is your reason for changing/ not changing?

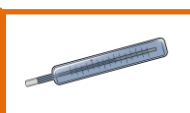


Teacher Outline: Tile and Mat Activity

This activity requires students to make a prediction about a scientific phenomenon, observe what happens using apparatus, and then explain it in light of experimental evidence. It provides students with the opportunity to consider and evaluate the arguments of others.

Apparatus Required

1. Tile
2. Mat
3. Thermometer



Examples of potential student arguments

The tile is a lower temperature; it feels cold. ×
Incorrect

The tile is a lower temperature; it reflects heat from its surface. ×
Incorrect

The tile holds/ absorbs coldness from its surroundings. ×
Incorrect

They are both the same temperature; all objects in a room will be the same temperature as heat is transferred from objects of higher temperature to lower temperature until they reach thermal equilibrium. ✓
Correct

They are both the same temperature; how an objects feels is not a good way to measure its temperature. ✓
Correct

They are both the same temperature; one conducts heat from hand, the other is an insulator therefore it is a poor conductor of heat. ✓
Correct

Teaching Sequence

1. Predict (individually) the temperatures of the materials? (Worksheet)
2. Measure the temperature of materials using digital thermometer (Tile, mat, thermometer supplied).
3. Complete worksheet individually, then discuss result and your explanation. Discuss your ideas with your group members.

Student Exercise: Tile and Mat Activity

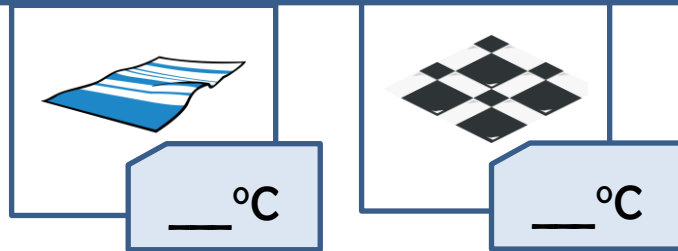


A mat lies on a tiled floor, what temperature do you **predict** the (a) mat and (b) tiles to be?

Why did you select those temperatures?

Observe!! Use the thermometer to measure the temperature of a rug and tile left at the back of the classroom.

What was the measured temperature of ...



Why do you think they are those temperatures?

How do you pick which objects to test? Does it matter if the object is near a window??

Sample Debate Titles



Junior Cycle Outcomes and Sample Debates

It has already been indicated that using argumentation teaching strategies in the classroom can develop several Junior Cycle Outcomes (page 4). These learning outcomes focus on the first strand of the junior cycle specification (Nature of Science). Debate titles may also address any of the contextual learning outcomes.. To demonstrate this, several debate titles are suggested below that align with specific learning outcomes.

Outcome BW6

Students should be able to evaluate how human health is affected by: inherited factors and environmental factors including nutrition; lifestyle choices; examine the role of micro-organisms in human health

Debate 1: Sunscreen, a waste of money?

Debate 2: Superfoods, a super scam?

Outcome BW9

Students should be able to explain human sexual reproduction; discuss medical, ethical, and societal issues

Debate 1: Asexual reproduction, cloning should be accepted in the 21st century

Debate 2: Surrogacy, the modern day answer to infertility

Debate 3: Prenatal genetic screening, too much information is available to expectant mothers.

Outcome
PW8

Students should be able to research and discuss the ethical and sustainability issues that arise from our generation and consumption of electricity

Debate: Ethical and sustainability issues of wind farms in Ireland

Outcome
CW10

Students should be able to evaluate how humans contribute to sustainability through the extraction, use, disposal, and recycling of materials

Debate: Exaction of gas from Corrib, a cleaner way to supply energy in Ireland

Outcome
ES7

Students should be able to illustrate how earth processes and human factors influence the Earth's climate, evaluate effects of climate change and initiatives that attempt to address those effects

Debate: Humans are detrimental to the Earth's Climate

Outcome
PW8

Students should be able to examine some of the current hazards and benefits of space exploration and discuss the future role and implications of space exploration in society

Debate: Human space exploration, unnecessary danger

Homework Overview



Homework Overview

This project aims to involve guardians in two ways. Firstly, guardians will assist their child in completing homework tasks. Secondly, guardians will attend a debate event in school. This section describes two sample homework tasks.

The first task involves the child reading an article (or listening to a podcast) about the scientific issue that they are going to debate and identifying the arguments presented in the article. They also identify whether the arguments support or refute their debate motion. The child is asked to discuss the main arguments they selected from the article with their parent.

The second homework task involves the child verbally presenting their debate section to their guardian. The guardian may suggest feedback about the content of the debate and the presentation of the debate.

It is important to specify in class that any older family member, (sister, grand dad, uncle, etc.) or neighbour can assist the child with these two homework tasks.

Sample Student Homework Task 1

In class today you were assigned a debate title and motion. Please write below.

Please read the article supplied to you by your teacher and identify arguments in the text (Just the student).

Claim 1

For or Against

Evidence to Support

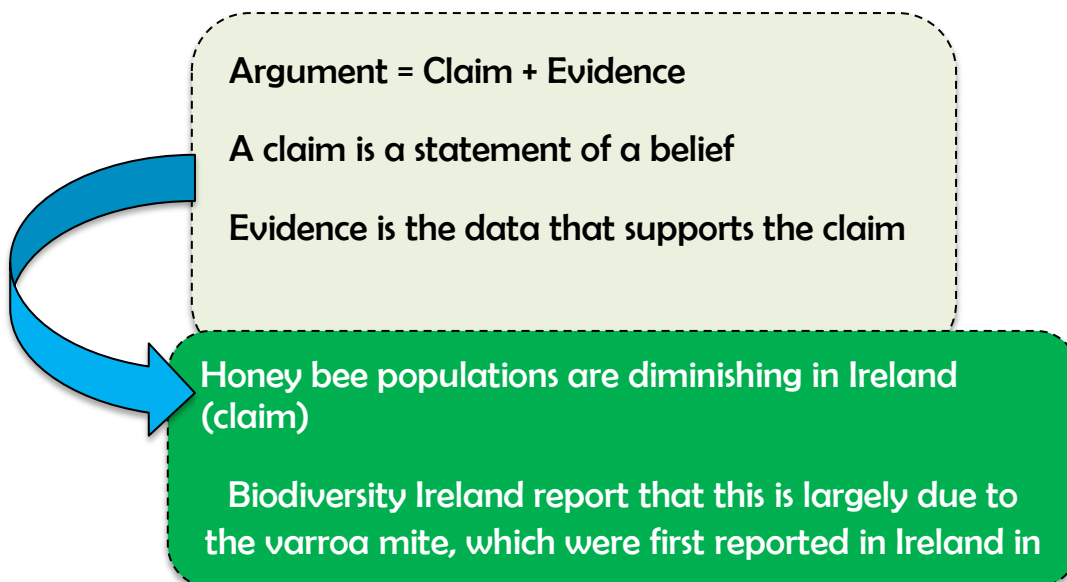
Claim 2

For or Against

Evidence to Support

Sample Homework Task 1 *Information for Family Member*

In school today your child learned how to construct an argument.



At home your child is required to read an article and complete a worksheet. The worksheet asks your child to identify the arguments in the article.

How you can help?

After your child completes the worksheet, please read the article and review his/her worksheet. Discuss the arguments he/she have identified. Is there any additional information you identified from the article or know about the topic?

Sample questions you may consider asking your child

- How did you get that answer?
- What do you think is the strongest piece of evidence in this article, why?
- Do you agree with any of the arguments, why?
- Do you disagree with any of the arguments, why?
- Is there any piece of information you would like to look up after completing this homework?

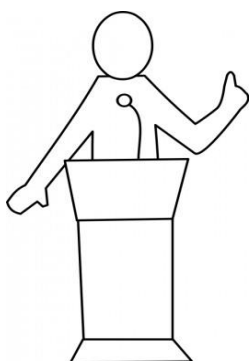


Sample Homework Task 2

Information for Family Member

At school, your child wrote a draft of a debate section using the debate planner worksheet.

At home, your child will review the content of their written debate and practise presenting their debate.



You can help by listening to your child present their debate verbally and discuss strengths and possible improvements. Take this opportunity to improve your child's understanding of science and develop positive attitude towards learning

Good Presentation Skills Tips

Encourage your child to:

- Speak loudly, at a slow pace and clearly.
- Stand tall and not to fidget with hands or sway
- Look up and around the room not on the floor
- Relax. Before starting the debate, they should take a deep breathe. If they lose their train of thought or get confused it is fine to stop, take a breath and start the next part.
- Speak enthusiastically, they may have practised the presentation 5 times but it should not sound repetitive.
- Be persistent. Public speaking is difficult but practice is key. Your child may need to practise several times to be comfortable speaking.

Debate Planner Worksheet

Included below is a suggested outline for a scientific debate. Four/five students can form a team.

The division of tasks would typically be:

Person 1 presents the opening statement (main arguments) for their team

Person 2 presents the rebuttal of the opposing team's argument

Person 3 cross examines the other team

Person 4 presents the closing statement for their team

All team members take notes that can be included in their other team members' segment

In a 5-person team, person 5 will not present a segment of the debate, but will contribute to each of his or her team members' segment.

The chairperson introduces the title of the debate and the team member's names.

- Team A presents their main arguments? (3 minutes)
- Team B presents their main arguments (3 minutes)
- Team A presents their rebuttal (2 minutes)
- Team B presents their rebuttal (2 minutes)
- Team A cross examination of Team B (2/3 minutes)
- Team B cross examination of Team A (2/3 minutes)
- Final Statement Team A (2 minutes)
- Final Statement Team B (2 minutes)
- Questions from the audience (family members, teachers, other students) may be directed at either team (3/4 minutes)

Total time of a debate will be approximately 25 minutes. It is important that there are no interruptions to speakers by opposing team members or audience members. The chair person can monitor this.

Main Argument Planner

The opening statement should contain the following information

- A statement that identifies your position (for or against) in the debate.
- A least three claims to support your position. Each claim must be accompanied by relevant evidence (may include more than 1 piece of evidence per claim).
- Explain the source of your evidence clearly (book, website, newspaper article, study)

Statement that identifies your position

Claim 1

Evidence to Support

Claim 2

Evidence to Support

Claim 3

Evidence to Support

Claim 4

Evidence to Support



Rebuttal

You need to predict the arguments the opposing team will put forward, then put forward counter arguments that will weaken their arguments.

The other team may argue

To weaken this claim we will argue

The other team might argue

To weaken this claim we will argue

The other team might argue

To weaken this claim we will argue

Cross Examination

The aim of the cross examination is to question the other team's arguments

For example in a debate arguing that fast food restaurants should be banned from areas close to schools, a student may pose the question "In your first argument you state that fast food restaurants should be banned due to the high levels of saturated fat and sugar in their meals, as indicated by nutritional values supplied by McDonalds and Burger King websites. How does it make sense to just ban fast-food restaurants, if the deli counters in petrol stations and other restaurants in the areas supply similar food options,

Argument you want to question

Question 1

Argument you want to question

Question 2

Argument you want to question

Question 3



This project was made possible with the support of:

