ESU TEACHING RESOURCE

LESSON PLAN: DEBATING SCIENCE

Debating is a great way to engage students with science and help them to get to grips with the big issues. It can also help them to understand why studying science is relevant to their everyday lives, and inspire them to do their own research about a topic that they find interesting. Plus, a bit of friendly class competition never hurts! Besides being fun, debating science also helps to meet targets set by the National Curriculum for Science.

This resource contains **two speech and debate games** that use critical thinking, argumentation and public speaking as a means to engage with scientific topics.

This resource also includes **8 topics suitable for KS1-4** that can be used for each exercise, each topic is linked to the National Curriculum. You may also like to pick a topic that is relevant to your current teaching scheme, or that your pupils may recently have read about.

NATIONAL CURRICULUM LINKS

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely.

Debating Science also enables pupils to grasp the social and economic implications of science, for which there is no specific provision within the curriculum, but which the curriculum itself deems important.

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GAME 1: POINTS OF VIEW

	Group size: 5-30
	Classroom set up: no specific set up required
	Time: 25-45 mins (dependent on group size)

Select one of the topics below and ask the class to come up with a list of interest groups that would be affected by the topic and write it up onto a whiteboard. Divide the class into the different interest groups. Tell the students to discuss the topic from the point of view of their interest group for 10 minutes and then come up with 2 major concerns that they would have about the topic.

Each group should nominate a spokesperson who will have 2 minutes to present their group's point of view in front of the whole class. After each group has shared their ideas, a classroom discussion can take place with all pupils still representing their interest group. This should culminate in a whole class vote to either support or oppose the topic.

GAME 2: SCIENTIFIC PEER REVIEW

	Group size: 6-30
	Classroom set up: no specific set up required
	Time: 45 mins

Select a topic from the list below. Instruct your pupils to take on the role of a scientist and decide whether they would like to support or oppose the topic. Give them 10 minutes to think of one or two reasons why they support that side.

After working alone for 10 minutes, ask pupils to form small groups with other pupils that have picked the same side of the topic and get them to share their ideas for 5-10 minutes.

Each group should then nominate one person to present their main reasons to the class. Each presentation should last for up to 3 minutes. After the presentation, members from the other groups should be invited to 'peer review' the group's ideas by asking questions or making short comments about the presentation. Each individual review should take no more than 15 seconds, and each member of the group should be able to answer the question. First collect all reviews from the room, and then give the presenting group an opportunity to respond and answer. The response should be limited to 2 minutes. Repeat this with all the groups and then vote on which group presented the best ideas.

TOP TIPS

Encourage pupils to use a clear structure for their presentation. This includes an introduction, a conclusion (that links to the topic) and clearly number reasons organised in the Point - Explanation - Evidence structure.

To encourage participation avoid having the most confident students self--select and present and answer questions. Instead make it a rule that every member of the group has to both ask as well as answer at least one question. Students can share tips on which answers and questions to ask, but each student must have spoken to the other side at least once.

Game 2: Instead of giving pupils 10 minutes to come up with their initial arguments you can let them research the topic at home beforehand to make it easier for them to use more scientific terminology in their presentations.

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SELECTED TOPICS BY KEY STAGE

Junk food should be banned in schools

KS1
Pupils should be taught to describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

LKS2
Pupils should be taught to identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.

Smoking should be illegal

UKS2
Pupils should be taught to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

Governments should not fund research projects that have no distinct goal (e.g. CERN, the European Organization for Nuclear Research)

KS4
Working Scientifically: Students should develop understanding and first-hand experience of: appreciating the power and limitations of science and considering ethical issues which may arise; explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications and making decisions based on the evaluation of evidence and arguments; recognising the importance of peer review of results and of communication of results to a range of audiences.

Technologies that allow parents to influence the genetic composition of the foetus should be banned

KS3
Biology: Pupils should be taught about heredity as the process by which genetic information is transmitted from one generation to the next; the variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection.

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Working Scientifically: Students should develop understanding and first-hand experience of: appreciating the power and limitations of science and considering ethical issues which may arise; explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications and making decisions based on the evaluation of evidence and arguments; recognising the importance of peer review of results and of communication of results to a range of audiences.

Countries should focus on adapting to climate change instead of mitigating it

KS3
Chemistry: Pupils should be taught about: the Earth as a source of limited resources and the efficacy of recycling; the production of carbon dioxide by human activity and the impact on climate.

KS4
Chemistry: Students should be taught about: evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change; potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate.

KS4
Working Scientifically: Students should develop understanding and first-hand experience of: appreciating the power and limitations of science and considering ethical issues which may arise; explaining everyday and technological applications of science; evaluating associated personal, social, economic and environmental implications and making decisions based on the evaluation of evidence and arguments; recognising the importance of peer review of results and of communication of results to a range of audiences.

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SELECTED TOPICS BY KEY STAGE

Missions to explore our solar system should be led by government agencies and not private companies

KS4
Working Scientifically: Students should develop understanding and first-hand experience of: appreciating the power and limitations of science and considering ethical issues which may arise; explaining every day and technological applications of science; evaluating associated personal, social, economic and environmental implications and making decisions based on the evaluation of evidence and arguments; recognising the importance of peer review of results and of communication of results to a range of audiences.

All legal barriers to the genetic enhancement of humans should be removed

KS3
Biology: Pupils should be taught about heredity as the process by which genetic information is transmitted from one generation to the next; the variation between species and between individuals of the same species meaning some organisms compete more successfully, which can drive natural selection.

We should legalise marijuana

KS2
Pupils should be taught to recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

KS3
Biology: Pupils should be taught about the effects of recreational drugs (including substance misuse) on behaviour, health and life processes).