

Science and Cloning

Topic: Science vocabulary

Aims:

- To improve oral communication
- To link the student's knowledge and interest in science with their English class
- To act as an introduction to the relationship between science and studying English

Level: Intermediate and above

Introduction

This lesson is aimed at secondary school children between the ages of 12-18 years. The focus of the lesson is on oral communication and the content and theme of the class, science and cloning, attempts to link the student's knowledge and interest in science with their English class and to act as an introduction to the relationship between science and studying English.

The lesson consists of different activities which explore the role of Science in Modern Life.

- Multiple-choice quiz which provides a general introduction to the topic of Science and Science in the UK.
- Ranking activity which discusses the importance of scientific achievements in modern life.
- Jumbled text and discussion activity which discuss cloning and its ethical implications.
- Vocabulary building exercise which highlights the importance of English as a global language of science.
- Controversial science-related topics for debate.
- Oral presentation and report writing follow-up activities

Procedure

Introduction to topic: Worksheet A Science Quiz

- To introduce the topic ask students if they are studying science at school and whether they like it or not, why/why not, and what kinds of things do they do in their science classes. Then give the students the short general knowledge quiz to complete in groups or pairs.

Science Quiz

Read the following questions and circle the correct answer

1. What percentage of the world's inventions in the past 100 years have been British?

A. 44% B. 54% C. 34% **B. 54%**

2. How many Nobel Prizes have UK scientists received in the last 50 years?

A. 36 B. 26. C. 46 **C. 46**

3. How many out of Europe's top 50 technology companies are in the UK?

A. 15 B. 21. C. 25 **B. 21**

4. Marie Curie was

A. a Chemist B. a Biologist C. a Physicist **C. a Physicist**

(The world's most famous female physicist, she discovered radium with her husband Pierre and coined the term radioactivity)

5. Alexander Graham Bell invented the

A. Radio B. Telephone C. Door Bell **B. Telephone**

6 Alexander Fleming discovered Penicillin in

A. 1898 B.1908 C.1928 **C.1928**

Now get the student's to discuss the following points with their partner(s)

- Do you think studying science is important? Why or Why not?
- Who do you think are the world's most famous scientists? What did they discover or invent?
- Can you name any famous scientists from your country or from the UK?
- Do you think girls and boys have equal opportunities to study science at school and at University?

Science and Modern Life

- First of all write the words **Science and Modern Life** on the board and then ask students to brainstorm as a class what scientific achievements or discoveries have been most important for modern life and write all their ideas on the board or get some of the students to write them on the board as the other students shout them out. You may need to give the students one or two examples to start them off.
- Next give the students the **Worksheet B** and get them to do the ranking task individually. Then re-group the students in small groups and get them to compare and discuss the differences in their answers, and to decide upon the top 5 most important discoveries as a group. Once all the groups have decided, you can then get each group to report their top five back to the class.

Science and Modern Life

Which of the following scientific discoveries do you think have been the most important for modern life?

Individually rank the following scientific achievements from 1 to 10 in order of importance.

Number one being the most important, number 10 being the least important:

- Atomic Bomb
- Wireless technology
- Computers
- Cloning
- Penicillin/Antibiotics
- Solar Power
- Air Travel
- Plastic
- Electricity
- Robots

Worksheet C Dolly the Sheep

- Before class you will need to prepare by cutting up the sentences of the text. One text will need to be cut up for each group.
- First of all write the word **cloning** on the board and ask the students if they understand what it means. Then ask the students to tell you anything they know about cloning.
- Now draw a little sheep on the board and write **Dolly** under it. Ask if any of the students know about Dolly the sheep and let them tell you whatever they know. Now tell them that they are going to read a text about Dolly the sheep.

- Put the students in to small groups and divide the cut up sentences between all the members in the group. The students then have to piece the text together and find the answers to the questions. **(Answers given in bold)**

Dolly the Sheep

- Where was Dolly the Sheep cloned? **Roslin Institute, near Edinburgh**
- When was she born? **In 1996**
- How old was Dolly when she died? **Six years old**
- Why do researchers think she may have died so young? **Because she was cloned from a sheep who was already six years old**

Cut up sentences

Dolly the Sheep, the first animal cloned from an adult cell, died in 2003. It had taken hundreds of attempts to produce Dolly and since many people believed that it was impossible to clone something as complex as a sheep, Dolly was a real scientific breakthrough.

However, Dolly who was born in the Roslin Institute near Edinburgh, Scotland in 1996 died at only six years old.

Sheep normally live between 10 to 16 years so Dolly was quite young when she died.

Since Dolly was cloned from an adult sheep that was also six years old, investigators are researching into whether this may have had something to do with her early death.

They believe that there is a strong possibility that the fact that Dolly's genetic material came from a six-year-old sheep may have caused her to age faster than normal.

Dolly's death has sparked off further debate into the safety of cloning, and the ethics of cloning humans.

Follow-up

- Follow-up questions for the student's to discuss.

- Do you think humans should be allowed to be cloned?
- What benefits do you think cloning can have?
- What negative aspects do you think that cloning can have?
- Do you know what your countries policy on cloning is?
- Would you like to clone yourself or anyone else?
- If you could clone someone famous, who would it be and why?

To Clone or not to Clone?

- This discussion activity on cloning can be done in pairs or small groups. Give each pair or group the discussion cards and ask them to discuss the different scenarios about cloning on them one by one in their group. Once the students have finished discussing the cards in pairs or groups, you may want to close the activity by asking different pairs or groups their opinions on some of the scenarios and ask them if their opinions on cloning have changed. You will need to cut up the cards before class and give each group one set of cards.

Worksheet D To Clone or not to clone?

Card 1

Jane is blind and has a guide dog called Bobby.
Bobby has been her guide dog for 10 years but is getting old. Bobby is Jayne's best friend and she feels that without him she couldn't live.

Should Jayne be allowed to clone Bobby before he dies?
Should people be allowed to clone their pets?

Card 2

There is only one Giant Panda left on earth. It does not have a partner to breed with so once it dies the species will be extinct.

Should scientists be allowed to clone another Giant Panda to keep the species alive?
Should scientists be allowed to clone endangered species?

Card 3

Scientists believe that *stem cells* found in human embryos could be used to cure a range of diseases.

Should scientists be allowed to clone human embryos to create stems cells for medical purposes?

Card 4

Mrs. Jones eldest son Mark is 10 years old and is dying with cancer. Should Mrs. Jones be allowed to clone Mark before he dies?

Should people be allowed to clone other humans or clone themselves?

Card 5

John Green is a farmer in Texas and he wants to clone his prize bull to sell it and make money.

Should farmers be allowed to clone their best animals to make money?

Card 6

A developing country with food shortages want to clone their best food producing animals, cows, chickens, pigs etc. to try and produce more food per animal to solve their food shortages.

Should countries be allowed to clone animals to increase food production?

Science and English

This activity raises awareness about the important role that the English language plays in science.

- To introduce the topic write the following scientific acronyms on the board and ask if any of the students know what they stand for. Ask if they use the same acronyms in their own language?

AI (Artificial Intelligence)
 DNA (Deoxyribonucleic Acid)
 HIV (Human Immunodeficiency Virus)
 H₂O (Dihydrogen Monoxide = Water)
 CO₂ (Carbon Dioxide)

- Ask if the students can think of any more common acronyms.
- The rest of the activity can be done in pairs or small groups. The students put the words into the correct category and then discuss the following bullet points.

Worksheet E Science and English

Put the words in the box below into the most suitable category. Some words may fit into more than one category. **(Answers given in bold)**

Addition	Plant	Liquid	Chemicals	Leaf	Program	Root	Earth
Equation	Input	Hard Drive	Subtraction	Solution	Acid	Network	
Division	Mouse		Test Tube	Habitat		Experiment	
			Virus				
<i>Words used in Biology</i>	<i>Words used in Chemistry</i>	<i>Words used in Computer Science</i>	<i>Words used in Maths</i>				
Plant Leaf Root Earth Mouse Habitat Virus Experiment	Liquid Chemicals Solution Acid Test Tube Experiment Virus	Liquid Chemicals Solution Acid Test Tube Experiment Virus	Addition Equation Subtraction Division Solution Root				

Follow-up Discussion Questions

- What language are most scientific documents in your country written in?
- Do you think it is important for scientists to be able to read and write English?
- Can you describe in English a recent science experiment you have done in your science class at school to your partner or group?

Hot Topics for Debate

- The following topics can be used for debating or for discussion either as a class or in groups. First of all check that students understand what a debate is and how it works. If they do not understand then explain what a debate is and how the activity will work. For example:
 - A debate is a contest, similar to a game, where two or more speakers present their arguments intent on persuading one another over to their viewpoint, Example of real-life debate, parliament, law courts, academic debate.
- Then explain that the students will be divided into two groups, 'for' and 'against' the argument that they chose to debate. In turn each group will present their point of view.
After which each side can ask the other side questions if they want to. At the end of the debate each side can make a summary of their arguments and the class/group then take a vote.
- Let students chose the topic(s) they would like to debate and let them divide themselves into 'for' and 'against' groups. It is important you give students enough thinking and preparation time to be able to think of enough suitable arguments for their case before you start the debate. Access to the library, resource books or the Internet would be helpful at this stage of preparation. You may even want to give the students their debate topics as homework to research in the library or Internet and get them to prepare their arguments for debating in the next class. Depending on the level of your students you may also want to pre-teach some useful phrases to help them with their debating skills.

Worksheet F Hot Topics for debate

- A debate is a contest, similar to a game, where two or more speakers present their arguments intent on persuading one another over to their viewpoint.
- You will be divided into two groups, 'for' and 'against' the argument you chose to debate.
In turn each group will present their point of view. After which each side can ask the other side questions if they want to. At the end of the debate each side can make a summary of their arguments and the class/group then take a vote.
- Make sure you prepare your arguments well before the debate starts!

Topic 1

Scientific experiments on animals are cruel and should be banned.

Topic 2

Young Children and Teens spend too much time using computers and playing video games. Children and Teens should be restricted to using computers for a maximum of 2 hours per day.

Topic 3

Nuclear energy is better than solar or wind energy.

Topic 4

Mobile Phones and hand-held electronic games are noisy and disruptive and should be banned in public places.

Topic 5

Less government money should be spent on defence and more money should be spent on protecting the environment.

Topic 6

Science should be a compulsory subject at school for all students at all levels.

Topic 7

Global warming is not a serious threat to human survival.

Follow-up Activities:

- Get students to orally present a recent science experiment they have done in class, or get them to do a short exposition relating to science on a topic that interests them.
- Get student to write a short scientific report in English about one of the science experiments that they have done in their science class at school.