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Odyssey
Oxford Debates for Youths in Science Education

Use of animals

Material for students

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Introduction

Resolution

Scientific community has a moral obligation to ban the use of animals in experiments.

Definitions

Introductory determinations: Research on live animals is assumed to have been conducted for two and a half thousand years. Today, there is almost a consensus in the scientific community that the use of animals in scientific experiments should be limited to certain principles. First of all, the number of animals used in experiments should be reduced by (1) improving experimental techniques, (2) improving data interpretation, and (3) sharing information with other researchers, so that there is no need to repeat experiments with animals. Furthermore, experimental techniques should be improved to take into account animal welfare and reduce the suffering caused by testing, by (1) using less invasive experimenting techniques, (2) providing them with adequate medical care, and (3) providing them with better living conditions. Finally, experiments with animal should be replaced, wherever possible, with different testing methods that would include (1) in vitro experimentation, i.e. experiments with cell cultures instead of live animals, (2) the use of computer models and simulations, and (3) the use of human volunteers instead of animals in certain experiments.

Alternative method - any method that can be used as a substitute for animals in testing, and which minimizes anxiety or decreases the number of animals needed for testing.

Animal model - animal used for studying the human organism or a disease which affects humans.

Biomedical research - experiments designed to understand human biological processes with the aim of improving human health condition or prevention and curing disease in humans.

Computer simulation - computer program designed to simulate the behavior of biological molecules, cells, tissues, organs or other elements of a living system, usually developed to replace animals in experiments.

Anxiety - state of an animal caused by pain, suffering, anxiety, fear or other negative emotions.

Pain - psychophysical reaction of an organism resulting as a consequence of potential or real tissue damage.

Efficiency - successfully achieving the desired result.

In vitro - testing done on cells and tissue cultures in Petri dishes. *In vitro* is Latin for "in glass".

In vivo - testing done on live organisms. *In vivo* is Latin for "in life".

Cell culture - process in which cells or tissues are cultured outside of a living organism (e.g. in a Petri dish).

Introductory questions

1. German philosopher Max Stirner wrote this in the 19th century: the tiger that attacks me has the right, and I, who strike him down, also have the right. I defend not my right against him, but rather myself. Stirner was skeptical about rights in general... But in spite of that and considering the contemporary context, can we say that certain animals have rights similar to those assigned to and guaranteed for humans, such as e.g. the right to life and freedom?
2. Can certain animals think and feel in a similar manner as humans?
3. What is implied from a positive answer and what is implied from a negative answer?
4. Imagine you have three drugs - A, B and C, in the phase of testing on animals, and then applied to humans. Suppose mice, guinea pigs, rabbits, and cats are used for testing. The drug is intended for the treatment of a deadly disease, which takes millions of human lives every year. During testing, drug A killed mice, guinea pigs, rabbits and cats. Drug B killed all mice and guinea pigs, half of the rabbits (it was efficient for the other half) and no cats (it was efficient). Drug C caused no deaths in animals, it only had mild side effects on mice. Drug C cured most of the animals. Which drug will you test on humans? Although the answer appears obvious, it does not follow that drug C will be safe, efficient and non-lethal to humans.

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Worksheet

Topic
Animal neurobiology
Resolution
Scientific community has a moral obligation to ban the use of animals in experiments.

Task 1.

The "Introduction" tab provided by the teacher contains a set of questions to help prepare arguments for the debate. On their basis, prepare a set of arguments and group them into those that are clearly PRO the resolution, AGAINST the resolution and those arguments that can be used by both sides. Enter them in the appropriate places in the table.

PRO	DEBATABLE	CON
1. Animal testing has contributed to the development of numerous treatments and drugs that have saved a significant number of human lives. 2. In a large number of biomedical research, there are no alternative methods that could replace the use of animals. 3. Animals are very similar to humans, which makes them suitable for use in biomedical research. 4. Most scientists do not oppose the use of animals in scientific research. In addition, a small number of animals are used in research.		1. The use of animals in scientific experiments is cruel and inhumane. 2. Nowadays, there are alternative methods that can replace the use of animals in scientific experiments. 3. Despite many similarities, animals differ from humans to an extent that cannot be ignored and are therefore not suitable for use in biomedical research. 4. Scientists and citizens agreeing on the use of animals in research does not imply that such a practice is morally right.

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FACTS FOR PROPER ARGUMENTATION

Below you will find Info cards, Story cards and Question cards. Read them carefully and analyse in order to formulate good arguments for the debate.

Info card 1 Facts and data	Info card 2 Facts and data	Info card 3 Facts and data	Info card 4 Facts and data
Animal testing has contributed to the development of numerous treatments and drugs that have saved a significant number of human lives. The use of primates plays an important role in the study of HIV/AIDS, since primates can be infected with a virus that is very similar to HIV (so-called SIV). In addition, some species of primates can carry HIV, but it does not harm them. In the study of cancer, scientists have succeeded in transmitting malignant cells of humans to immunodeficient mice and are observing the development of the disease without endangering human lives. These studies are also important for the development of tumor gene therapy. Testing on guinea pigs has led to a breakthrough in the medical treatment of asthma. At the start of the 20th century, scientists used an extract from the spinal cord of a boy who died of polio to infect monkeys with it. This experiment led to the fact that the disease can spread from individual to individual, which provided an invaluable model for studying the disease. After years of study on mice, rats and monkeys, a vaccine against this vicious disease was developed in the 1950s.	**In a large number of biomedical research, there are no alternative methods that could replace the use of animals.** From a statement of the Royal Biological Society, we learn that this society "supports the use of animals in research when it is appropriately regulated and when there are no available alternatives." According to members of this society, the use of animals in scientific research has directly contributed to medical advances and advances in veterinary medicine, including the development of vaccines, antibiotics and some advanced medical procedures which have improved the quality of life of humans and animals. Animal testing has been of vital importance for the advancement of medicine in the last century and will remain a necessary tool for studying and searching for successful treatments for deadly diseases and conditions such as malignancies, Alzheimer's disease, Parkinson's disease, AIDS, injuries, and many fatal infectious and hereditary diseases. It is still impossible to completely exclude animals from research, especially when we need to observe the whole body's reaction to a drug or procedure. Cell cultures,	**Animals are very similar to humans, which makes them suitable for use in biomedical research.** Based on the findings from the evolution theory, we know that all animals share a common ancestor and are part of the same evolutionary tree. Although humans seem different from many animals, there is a significant anatomical and physiological match between humans and other animals. This match is caused by the fact that humans, because of a common origin, share a large number of common genes with other animals. For comparison, people who are not related have more than 99.5 percent of common genes, and we have all the differences in morphology, color of eyes, hair, skin and some preferences owing to this small percentage of difference in genes. Humans and our closest evolutionary relatives - chimpanzees have more than 98 percent of the common genetic material, which is a very large percentage, while we share 85 percent of the common genes with mice, one of our favorite laboratory animals. All mammals have organ systems very similar to humans - brain, heart, lungs, liver, digestive organs, etc. - and are susceptible	**Most scientists do not oppose the use of animals in scientific research. In addition, a small number of animals are used in research.** In addition, research uses a small number of animals. Despite a vocal minority advocating for animal rights and their complete exclusion from scientific experiments, most scientists believe that their use, under certain, clearly defined conditions, is necessary. Statistical data obtained from a representative sample of 3,748 scientists affiliated with the American Association for the Advancement of Science (AAAS) show that 89 percent of scientists support the use of animals in biomedical research. The number of citizens supporting animal tests is significantly lower and amounts to 47 percent. When it comes to citizens, the situation in the UK is significantly different. According to a survey from 2012, 80 percent of British citizens are not against the use of animals in biomedical research when other methods are unavailable. In addition, in the second half of the 20th century, there is a tendency to constantly decrease the number of animals used in research. (This trend was present until the

During the 1940s, only eight mice were needed to confirm the efficiency of penicillin in the fight against bacterial infections, which saved many lives. Also, the first kidney transplants were performed on dogs, and when the procedure was perfected, it was applied to humans. Also, a certain number of dogs had to pay the price in order to discover insulin, which saved many lives.	mathematical models and computers which are proposed as adequate substitutes, do not have an immune system that could react to various agents. Also, a computer cannot properly simulate the work of a complex organ such as the brain. For that reason, those who believe that it is necessary to completely abandon the use of animals in scientific research are wrong, because it is impossible in current conditions. Also, there is a consensus in the scientific community that the use of animals in scientific experiments should be limited to reduce the number of animals used in experiments, experimental techniques should be perfected to take into account the welfare of animals and diminish the suffering caused by testing, and to replace animal experiments wherever possible by using different ways of testing. However, this is not always possible. Of the 106 Nobel Prizes awarded for physiology and medicine from the start of the 20th century to this day, 94 studies have depended on animal experiments.	to similar diseases as humans, which makes them suitable experimental subjects. Since most laboratory animals have a faster life cycle than humans, different diseases and disorders can be studied in vivo on these animals. Owing to the fast (and shorter) life cycle and more efficient reproduction of numerous diseases, disorders and hereditary diseases can be traced from generation to generation. This is maybe most important when it comes to studying and searching for effective treatments to fight malignancies - one of the greatest torments of our time.	1990s, when advances in genetic research led to a certain increase in the use of laboratory animals.) For example, the number of cats used in research has decreased by 66 percent since 1967. Nevertheless, the number of animals used in laboratories is incomparably lower than the number of animals used for food worldwide.
Info card 5 **Facts and data**	**Info card 6** **Facts and data**	**Info card 7** **Facts and data**	**Info card 8** **Facts and data**

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The use of animals in scientific experiments is cruel and inhumane. Experiments on animals are very common in the natural sciences and they are mostly used to develop new drugs and medical procedures and treatments, as well as to test cosmetic products. Many of these experiments cause pain, suffering, stress, emotional anxiety, fear, jeoperdize the well-being and endanger the lives of the test animals. If the goal of a society is to reduce pain and suffering, both in humans and animals, then scientific experiments that have animals as subjects and that lead to an increase in pain and suffering are morally problematic. Numerous procedures applied to animals said to contribute to the growth of scientific knowledge, such as surgical techniques, drug testing, the effects of smoking, the effects of cosmetic products or burns treatments, are very painful. Electrodes are often placed in animals' brains, which was the price of one of the most important discoveries of the 20th century - the discovery of mirror neurons. Also, in psychological experiments, animals are given electroshocks, they are deprived of food and water, or kept in total isolation from birth. Primatologist Jane Goodall states that what is done in the name of science is pure torture from an animal's point of view - a view held by all who do not engage in science. She also points out that the progress of science is not as dependant on animal experimentation as is	**Nowadays, there are alternative methods that can replace the use of animals in scientific experiments.** These alternatives are mainly related to and based on biochemical trials, experiments on cell cultures (in vitro), and some are based on computer simulations and algorithms. These techniques can sometimes give more reliable results than experiments on animals. Also, there is a tendency in the scientific community to increasingly use organisms less expensive and more efficient than mammals - fruit flies (one of the favorite animals of geneticists), roundworms and some species of fish. In addition, microdosing in humans can give more reliable results than testing on animals. The use of cell cultures and tissues grown on culture plates reduces the need to use live animals and thus avoids inflicting pain and causing anxiety and suffering. The use of these cultures has contributed to the development of vaccines for polio and rabies. Scientific advances have led to the fact that today we can grow human skin in glass laboratory plates and use it in toxicological analyses by applying chemical agents to their surface and monitoring cell reactions. Lately, mathematical models and computer simulations have been used to understand certain biological processes and perform various tests, by assessing the potential toxicity and biological reaction of an organism on the basis of the characteristics of molecules themselves,	**Despite many similarities, animals differ from humans to an extent that cannot be ignored and are therefore not suitable for use in biomedical research.** Differences between animals and humans - anatomical, cellular and metabolic - and reliance on the use of animals in biomedical research lead to detrimental consequences to both animals and humans. Jane Goodall points out that a large number of research on animals has sidetracked scientists so that certain drugs have not been put into use for many years, although they turned out to be very useful for humans, while others passed the tests on animals but were detrimental for humans. During the late 1950s and early 1960s, after numerous tests on animals, the drug Thalidomide was released as a sedative, as well as a drug that relieves morning sickness in pregnant women. This drug, which seemed safe for animals, caused the birth of around 10,000 babies with severe physical deformities (usually a lack of limbs). Subsequent experiments on rodents and cats showed that Thalidomide causes congenital anomalies in animals, but only if given in extremely high doses. Also, experiments on mice showed that the drug Vioxx, intended to treat issues caused by arthritis, had a beneficial effect on the heart of mice, however, the same drug caused more than 27,000 heart attacks in humans, and was withdrawn from the market.	**Scientists and citizens agreeing on the use of animals in research does not imply that such a practice is morally right.** The fact that a large number of researchers and citizens consider the use of animals in scientific experiments necessary and right does not imply that it is really necessary, right and justified; also, the fact that a relatively small number of animals are used in scientific research does not diminish the fact that those animals still suffer. Interpersonal agreement is a weak criterion for the rightness of procedures, because people can agree on anything in principle. For example, people can agree that the planet Earth is a flat disk that stands at the center of the universe, however their agreement will never make the Earth a flat disk at the center of the universe. In addition, one party - animals - is completely excluded from giving consent for the things being done to them. Animals do not have the ability to give that consent, but consent would not be crucial in this case either. Because even if they could give it, the practice of experimentation would not be morally right. For example, a human newborn cannot give consent, and yet almost no one thinks it is morally right to perform experiments on human babies, just because they are not able to give consent. Imagine an intelligent alien species that differs from humans to the extent of cognitive and emotional capacity as much as humans differ from the most commonly

often pointed out. Since some animals used in experiments are more conscious than the human newborn, ethics professor Peter Singer wonders if scientists would agree to test six-month-old babies, or adults with impaired brain function whose cognitive and emotional capacities are approximately on the same level as with the animals they plan to use in the experiments.	for example. This way, instead of animals, computers are used in experiments.		used laboratory animals (say, mice and rats). Would it be morally correct for this intelligent species to use humans in scientific experiments in the same way humans use other experimental animals.

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Stories	Stories
Progress I have all my life been a strong advocate for humanity to animals, and have done what I could in my writings to enforce this duty... On the other hand, I know that physiology cannot possibly progress except by means of experiments on living animals and I feel the deepest conviction that he who retards the progress of physiology commits a crime against mankind. Charles Darwin **Mechanism** It is also very worthy of remark, that, though there are many animals which manifest more industry than we in certain of their actions, the same animals are yet observed to show none at all in many others: so that the circumstance that they do better than we does not prove that they are endowed with mind, for it would thence follow that they possessed greater reason than any of us, and could surpass us in all things; on the contrary, it rather proves that they are destitute of reason, and that it is nature which acts in them according to the disposition of their organs: thus it is seen, that a clock composed only of wheels and weights can number the hours and measure time more exactly than we with all our skin. Rene Descartes, *A Discourse on Method*	**Pain** I believe I am not interested to know whether Vivisection produces results that are profitable to the human race or doesn't. To know that the results are profitable to the race would not remove my hostility to it. The pains which it inflicts upon unconsenting animals is the basis of my enmity towards it, and it is to me sufficient justification of the enmity without looking further. Mark Twain **Suffering** The day may come when the rest of animal creation may acquire those rights which never could have been withholden from them but by the hand of tyranny. The French have already discovered that the blackness of the skin is no reason why a human being should be abandoned without redress to the caprice of a tormentor. It may one day come to be recognized that the number of legs, the villosity of the skin, or the termination of the os sacrum are reasons equally insufficient for abandoning a sensitive being to the same fate. What else is it that should trace the insuperable line? Is it the faculty of reason, or perhaps the faculty of discourse? But a full-grown horse or dog is beyond comparison a more rational, as well as a more conversable animal, than an infant of a day or a week or even a month old. But suppose they were otherwise, what would it avail? The question is not, *Can they reason*? nor *Can they talk*? but, *Can they suffer*? Jeremy Bentham, *An Introduction to the Principles of Morals and Legislation*

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Issue card 1 Questions	Issue card 2 Questions	Issue card 3 Questions	Issue card 4 Questions
- If an animal could not feel pain, would it be right to use it in scientific research?	- If we could genetically engineer laboratory animals that don't feel pain, would it be right to use them in scientific experiments?	- There are people with innate insensitivity to pain. Is it right to use them in scientific experiments instead of animals?	- If the progress of science depends on inflicting pain and increasing suffering in the world, then is such progress desirable?
Issue card 5 Questions	**Issue card 6 Questions**	**Issue card 7 Questions**	**Issue card 8 Questions**
- If animals are similar to humans, then isn't it justified to treat them in a similar way we treat other people? - If alternative methods do not give the desired results, then would it be justified to use animals in individual cases?	- Imagine there is a consensus that animals should not be used in scientific research, despite the fact that there are no alternatives and that certain medical procedures would not be developed without their use. Should animal models be used in that case or not? - If the restriction on the use of animals in scientific research hinders the progress of science is such a restriction justified?	- Would you agree to perform scientific experiments on a human subject who is in a permanent vegetative state (unconscious of the environment, without the ability to communicate and feel pain)? - Can the tendency to improve human life be a justification for the use of animals in scientific experiments?	- Why are some animals are considered desirable "laboratory animals"? Why is almost no one opposed to their use (e.g. wine fly - *Drosophila melanogaster*), while the use of a dog or monkey is considered highly inappropriate?

Prepare arguments for the discussion. One group of students prepares arguments supporting the resolution, the other one has contradictory arguments. Use the proposed scheme.

ARGUMENT NO. 1.

Argument	Foreseen rebuttals of the other group	Answers to rebuttals

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ARGUMENT 2.

Argument	Foreseen rebuttals of the other group	Answers to rebuttals

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ARGUMENT 3.

Argument	Foreseen rebuttals of the other group	Answers to rebuttals

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Debate

Scientific community has a moral obligation to ban the use of animals in experiments

Topic: Animal neurobiology

Institute of Geophysics
Polish Academy of Sciences

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Basic definitions

- **Alternative method -** any method that can be used as a substitute for animals in testing, and which minimizes anxiety or decreases the number of animals needed for testing.
- **Animal model** - animal used for studying the human organism or a disease which affects humans.
- **Biomedical research** - experiments designed to understand human biological processes with the aim of improving human health condition or prevention and curing disease in humans.
- **Computer simulation** - computer program designed to simulate the behavior of biological molecules, cells, tissues, organs or other elements of a living system, usually developed to replace animals in experiments.
- **Anxiety** - state of an animal caused by pain, suffering, anxiety, fear or other negative emotions.
- **Pain** - psychophysical reaction of an organism resulting as a consequence of potential or real tissue damage.
- **Efficiency** - successfully achieving the desired result.
- ***In vitro*** - testing done on cells and tissue cultures in Petri dishes. *In vitro* is Latin for "in glass".
- ***In vivo*** - testing done on live organisms. *In vivo* is Latin for "in life".
- **Cell culture** - process in which cells or tissues are cultured outside of a living organism (e.g. in a Petri dish).

Introductory questions

- German philosopher Max Stirner wrote this in the 19th century: the tiger that attacks me has the right, and I, who strike him down, also have the right. I defend not my right against him, but rather myself. Stirner was skeptical about rights in general... But in spite of that and considering the contemporary context, can we say that certain animals have rights similar to those assigned to and guaranteed for humans, such as e.g. the right to life and freedom?
- Can certain animals think and feel in a similar manner as humans?
- What is implied from a positive answer and what is implied from a negative answer?

Source: Wikimedia Commons

RESOLUTION: Scientific community has a moral obligation to ban the use of animals in experiments.

Source: Pixabay

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ЗА

1. Animal testing has contributed to the development of numerous treatments and drugs that have saved a significant number of human lives.
2. In a large number of biomedical research, there are no alternative methods that could replace the use of animals.
3. Animals are very similar to humans, which makes them suitable for use in biomedical research.
4. Most scientists do not oppose the use of animals in scientific research. In addition, a small number of animals are used in research.

ПРОТИВ

1. The use of animals in scientific experiments is cruel and inhumane.
2. Nowadays, there are alternative methods that can replace the use of animals in scientific experiments.
3. Despite many similarities, animals differ from humans to an extent that cannot be ignored and are therefore not suitable for use in biomedical research.
4. Scientists and citizens agreeing on the use of animals in research does not imply that such a practice is morally right.

1. Animal testing has contributed to the development of numerous treatments and drugs that have saved a significant number of human lives. (PRO)

Source: Pixabay

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- The use of primates plays an important role in the study of HIV/AIDS, since primates can be infected with a virus that is very similar to HIV (so-called SIV).
- Testing on guinea pigs has led to a breakthrough in the medical treatment of asthma.
- During the 1940s, only eight mice were needed to confirm the efficiency of penicillin in the fight against bacterial infections, which saved many lives.
- Also, the first kidney transplants were performed on dogs, and when the procedure was perfected, it was applied to humans.

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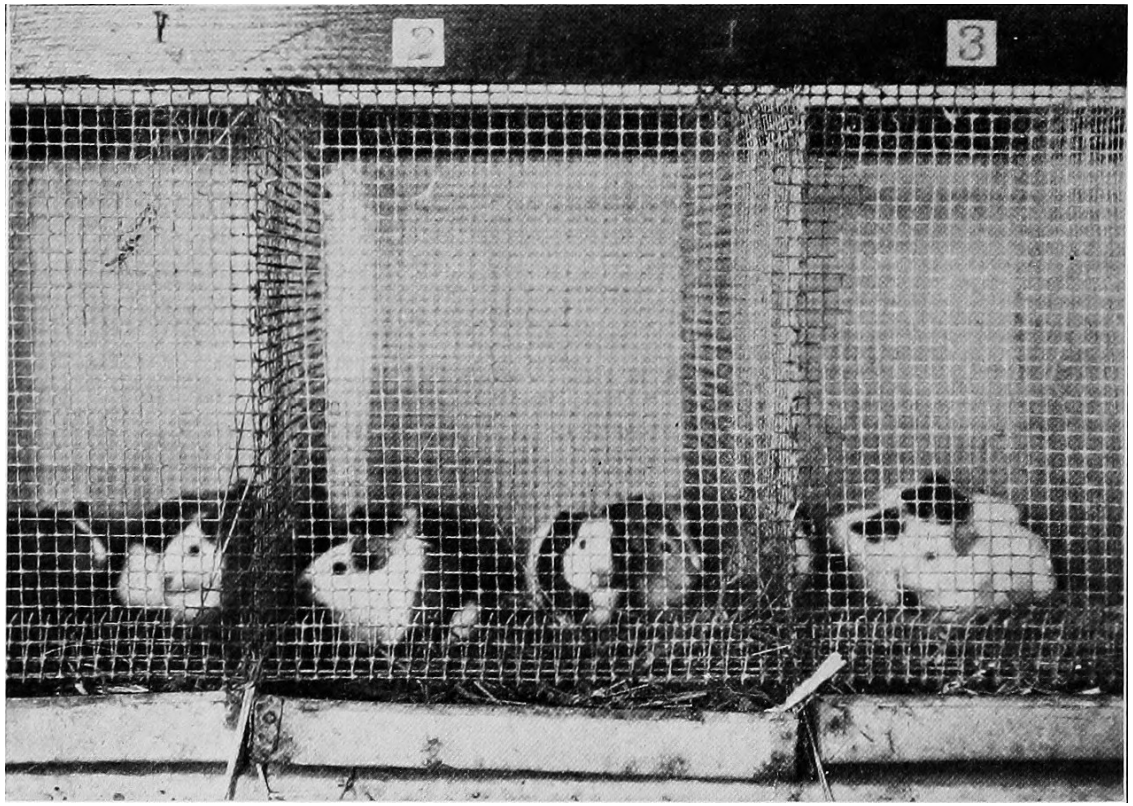
1. The use of animals in scientific experiments is cruel and inhumane. (CON)



Source: Flickr

- If the goal of a society is to reduce pain and suffering, both in humans and animals, then scientific experiments that have animals as subjects and that lead to an increase in pain and suffering are morally problematic.
- Primatologist Jane Goodall states that what is done in the name of science is pure torture from an animal's point of view - a view held by all who do not engage in science.
- Since some animals used in experiments are more conscious than the human newborn, ethics professor Peter Singer wonders if scientists would agree to test six-month-old babies, or adults with impaired brain function whose cognitive and emotional capacities are approximately on the same level as with the animals they plan to use in the experiments.

2. In a large number of biomedical research, there are no alternative methods that could replace the use of animals. (PRO)

Source: Flickr

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- Animal testing has been of vital importance for the advancement of medicine in the last century and will remain a necessary tool for studying and searching for successful treatments for deadly diseases and conditions such as malignancies, Alzheimer's disease, Parkinson's disease, AIDS, injuries, and many fatal infectious and hereditary diseases.
- Cell cultures, mathematical models and computers which are proposed as adequate substitutes, do not have an immune system that could react to various agents.
- Also, a computer cannot properly simulate the work of a complex organ such as the brain.
- Of the 106 Nobel Prizes awarded for physiology and medicine from the start of the 20th century to this day, 94 studies have depended on animal experiments.

2. Nowadays, there are alternative methods that can replace the use of animals in scientific experiments. (CON)

Source: Picpedia

- There is a tendency in the scientific community to increasingly use organisms less expensive and more efficient than mammals - fruit flies (one of the favorite animals of geneticists), roundworms and some species of fish.
- Microdosing in humans can give more reliable results than testing on animals.
- The use of cell cultures and tissues grown on culture plates reduces the need to use live animals and thus avoids inflicting pain and causing anxiety and suffering.
- Lately, mathematical models and computer simulations have been used to understand certain biological processes and perform various tests.

3. Animals are very similar to humans, which makes them suitable for use in biomedical research. (PRO)

Source: Wellcomecollection

- Although humans seem different from many animals, there is a significant anatomical and physiological match between humans and other animals.
- This match is caused by the fact that humans, because of a common origin, share a large number of common genes with other animals.
- Since most laboratory animals have a faster life cycle than humans, different diseases and disorders can be studied in vivo on these animals.
- Owing to the fast (and shorter) life cycle and more efficient reproduction of numerous diseases, disorders and hereditary diseases can be traced from generation to generation.

3. Despite many similarities, animals differ from humans to an extent that cannot be ignored and are therefore not suitable for use in biomedical research. (CON)

Source: Pxfuel

- Jane Goodall points out that a large number of research on animals has sidetracked scientists so that certain drugs have not been put into use for many years, although they turned out to be very useful for humans, while others passed the tests on animals but were detrimental for humans.
- The drug Thalidomide, which seemed safe for animals, caused the birth of around 10,000 babies with severe physical deformities (usually a lack of limbs).
- Also, experiments on mice showed that the drug Vioxx, intended to treat issues caused by arthritis, had a beneficial effect on the heart of mice, however, the same drug caused more than 27,000 heart attacks in humans, and was withdrawn from the market.

4. Most scientists do not oppose the use of animals in scientific research. In addition, a small number of animals are used in research. (PRO)

Source: www.aphis.usda.gov

- Statistical data obtained from a representative sample of 3,748 scientists affiliated with the American Association for the Advancement of Science (AAAS) show that 89 percent of scientists support the use of animals in biomedical research.
- According to a survey from 2012, 80 percent of British citizens are not against the use of animals in biomedical research when other methods are unavailable.
- In the second half of the 20th century, there is a tendency to constantly decrease the number of animals used in research.
- The number of animals used in laboratories is incomparably lower than the number of animals used for food worldwide.

4. Scientists and citizens agreeing on the use of animals in research does not imply that such a practice is morally right. (CON)

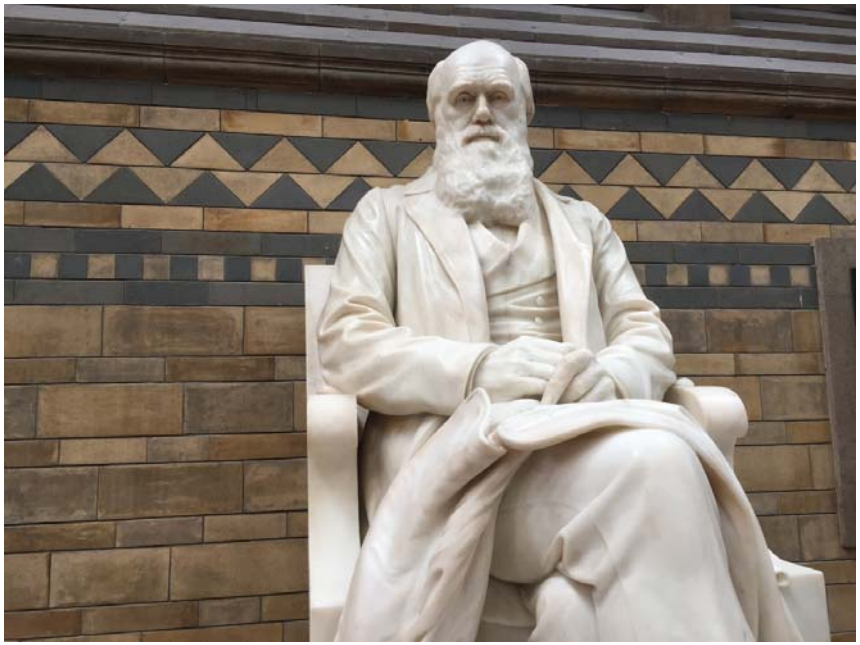
Source: National Gallery, London

- The fact that a relatively small number of animals are used in scientific research does not diminish the fact that those animals still suffer.
- Interpersonal agreement is a weak criterion for the rightness of procedures, because people can agree on anything in principle.
- Animals do not have the ability to give that consent, but consent would not be crucial in this case either.
- A human newborn cannot give consent, and yet almost no one thinks it is morally right to perform experiments on human babies, just because they are not able to give consent.

Progress

I have all my life been a strong advocate for humanity to animals, and have done what I could in my writings to enforce this duty... On the other hand, I know that physiology cannot possibly progress except by means of experiments on living animals and I feel the deepest conviction that he who retards the progress of physiology commits a crime against mankind.

Charles Darwin

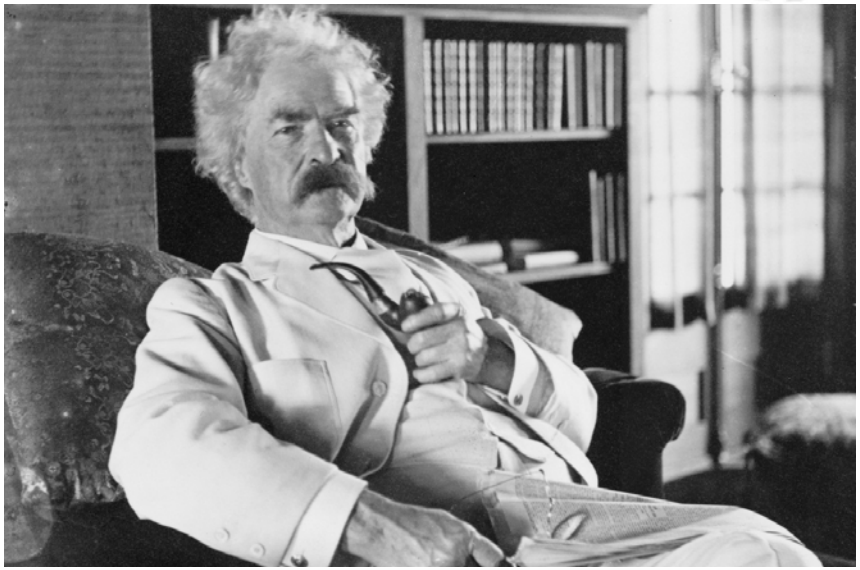


Source: Flickr

Pain

„I believe I am not interested to know whether Vivisection produces results that are profitable to the human race or doesn't. To know that the results are profitable to the race would not remove my hostility to it. The pains which it inflicts upon unconsenting animals is the basis of my enmity towards it, and it is to me sufficient justification of the enmity without looking further.“

Mark Twain



Source: Pixabay

Video material

- Igor Živanović, PhD / ODYSSEY Debate: Scientific community has a moral obligation to ban the use of animals in experiments
- https://youtu.be/MG10Lja6BLc
- VICE News- Experimenting on Animals: Inside The Monkey Lab
- https://www.youtube.com/watch?v=ocsPo53PCls
- WALTHAM Petcare Science Institute - Animal welfare and scientific quality depend on the 3Rs
- https://www.youtube.com/watch?v=yUoFq0Xlpvg
- Cambridge University - Fighting cancer: Animal research at Cambridge
- https://www.youtube.com/watch?v=CK78IXTRH0s
- Understanding Animal Research - A day in the life of an animal technologist
- https://www.youtube.com/watch?time_continue=357&v=dm5ETeX8eNM
- Steven Wise – Chimps have feelings and thoughts. They should also have rights
- https://www.ted.com/talks/steven_wise_chimps_have_feelings_and_thoughts_they_should_also_have_rights
- EFSAchannel - Can we do science without animal testing?
- https://www.youtube.com/watch?v=2hxUMpYFo_Y
- Understanding Animal Research - Why do we use animals in research?
- http://www.understandinganimalresearch.org.uk/resources/video-library/why-do-we-use-animals-in-research/
- Foundation for Biomedical Research - Why Animals Are Needed in Research
- https://www.youtube.com/watch?time_continue=62&v=iA_FfVuTfoM
- Understanding Animal Research - Repairing hearts - now and in the near future
- https://www.youtube.com/watch?time_continue=39&v=qmfdPRTXV0k

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Scientific community has a moral obligation to ban the use of animals in experiments

Material for teachers

With methodological guidelines, a lesson plan and an answer key to worksheets

The educational package "Scientific community has a moral obligation to ban the use of animals in experiments" was developed within "Oxford debates for Youths in Science Education" project.
It is a key material, facilitating the achievement of primary project goals, including increasing reasoning skills and interest in STEM, which in the future may result in taking up a scientific career.
When preparing students for the debate, one should not neglect the development of such skills as: communication excellence, argumentation or public speaking. Students should improve their ability to persuade effectively, argue properly, reason accordingly and speak out correctly. Composition of texts, using rhetorical means in oral statements, speaking in accordance with the rules of language culture, text interpretation, public speaking and presentation of texts, discussions and negotiations are of equally high importance.
In order to achieve the abovementioned goals, the implementation of thematic educational packages should be preceded by classes dedicated to preparation for debating as such. This can be accomplished in consultation with teachers of other subjects and the class teacher. The development of basic communication skills can be included in the class teacher's work plan, and the prepared lesson plans can be used during regular classes. Auxiliary materials can be found in the following documents:

1. **Warm up practice**– Annex No 2to National frameworks for implementation of Oxford debates in STEM in school practice ;
   This document includes the following exercises: active listening, public speaking and debating skills.

2. **Lesson plans aimed at general development of debating skills** – Annex No 2 do National frameworks for implementation of Oxford debates in STEM in school practice ;

   This material consists of 7 lesson plans prepared by Dr. Foteini Englezou, president of the Hellenic Institute for Rhetorical and Communication Research. Scenarios are a guide to work. It is not necessary to follow all the lessons. The teacher can decide which scenarios (or their selected fragments) are most useful for working with a specific group of students. The document offers the following lesson plans:

   1. Communication skills
   2. Express your scientific argument, not your opinion
   3. Build a valid scientific argument
   4. Searching for evidence
   5. Enhancing students' linguistic skills
   6. Rebuttal and refutation
   7. Fallacies

3. Methodological Guide for Teachers. ODYSSEY: Oxford Debates for Youths in Science Education

The final stage of preparation for debates based on specific packages is to familiarize students with the principles of debating, described in detail in the abovementioned document.

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Scientific community has a moral obligation to ban the use of animals in experiments

"Scientific community has a moral obligation to ban the use of animals in experiments" educational package consists of the following elements:

- Multimedia presentation;
- Video-recording based on the presentation: https://youtu.be/MG10Lja6BLc
- Educational package "Scientific community has a moral obligation to ban the use of animals in experiments" - material for students;
- Worksheets (the same for all packages);
- "Scientific community has a moral obligation to ban the use of animals in experiments"- material for the teacher (with answer key).

It is recommended to implement the package during a minimum of three lesson units.

Research on live animals is assumed to have been conducted for two and a half thousand years. Today, there is almost a consensus in the scientific community that the use of animals in scientific experiments should be limited to certain principles. First of all, the number of animals used in experiments should be reduced by improving experimental techniques, improving data interpretation, and sharing information with other researchers, so that there is no need to repeat experiments with animals. Furthermore, experimental techniques should be improved to take into account animal welfare and reduce the suffering caused by testing, by using less invasive experimenting techniques, providing them with adequate medical care, and providing them with better living conditions. Finally, experiments with animal should be replaced, wherever possible, with different testing methods that would include in vitro experimentation, i.e. experiments with cell cultures instead of live animals, the use of computer models and simulations, and the use of human volunteers instead of animals in certain experiments.

The presented educational package "Scientific community has a moral obligation to ban the use of animals in experiments" includes an overview of the use of animals in scientific experiments. It also allows students to formulate arguments for and against the use of animals in these experiments - in view of the results of different medical research, ethical aspects of their use and possible substitutes for animals in biomedical research.

The debate on the resolution: "Scientific community has a moral obligation to ban the use of animals in experiments" may take place both during extracurricular activities in the field of natural sciences, in particular related to ethics in scientific research (medical ethics), and in biology lessons. The level of the materials is adjusted mainly to secondary schools.

Lesson 1. How are animals used in scientific experiments and are there morally acceptable alternatives to standard practices?

Use of animals in scientific experiments is a topic tackled to a certain extent in philosophy classes in the final years of high school within the lesson on applied ethics. This is a modern field of philosophy which intersects with many aspects of biology and psychology, but also subjects that rely on social sciences such as civic education. Researching this topic, students can learn more about the nature of scientific experiments, the neurobiology of animals, but also about the deeper moral issues that open up through the ethical thinking of scientific methods today considered within the concept of Responsible Research and Innovation (RRI).

It is recommended that students receive the materials a few days prior to the lesson. This will allow them to get acquainted with the topic of the lesson initially and facilitate active participation in the classroom. A multimedia presentation or a video recorded by the author of the package can be used during the lesson.

Lesson 2. "Scientific community has a moral obligation to ban the use of animals in experiments" – constructing arguments for and against the resolution

The aim of the second lesson is to formulate as many arguments as possible (both for and against the resolution) that will be used by students during the debate, summarizing the work with the package.

Lesson plan

1. Organizational issues, checking the attendance list, familiarizing with the topic and objectives of the lesson [5 minutes].
2. Preparation of arguments [25 minutes]
3. The teacher divides the class into teams of two. Each team receives 8 question cards available in the educational package (materials for the student) and 2 copies of worksheet No. 1 (one for each student individually). Based on the questions, students formulate arguments for the presented thesis, against the thesis and those that are debatable and can be used in the discussion by both parties. Students work together, but each student individually completes his/her worksheet. There are examples of selected arguments for worksheet 1 are in the answer key.
4. Teams: proposition and opposition are formed [10 minutes].

Team selection may be executed in 2 forms, each of them having both advantages and disadvantages.

Students declare which arguments are closer to their beliefs. The teacher divides the class into teams (each with a similar number of students) in the manner reflecting their convictions. The second method assumes a division similar to the one above, with the difference that ultimately the team consisting of the supporters of a given resolution becomes the "opposition" team, while the opponents of the thesis become “proposition” team. The supporters of such a division assume that it teaches the participants of the debate to a greater extent to use arguments supported by facts, and is less based on emotions. Alternatively, division into teams can also be done randomly.

Finally, team selection can also be made by the teacher in a subjective way, ensuring that each team has both leaders and students who require more help, so that both teams have similar “winning potential”. In order to save time for division, the teacher can do it at the beginning of the lesson, for example by distributing worksheets number 1 to the students, printed on sheets of different colour or marked in some other manner.

5. The teacher distributes worksheets number 2 to the students (one for each student) and explains the homework. An example of a filled out worksheet is available in the answer key.
6. Students in each team read prepared arguments in accordance with the assignment to a given group. Each student receives 1 argument, which he/she will develop (as homework) according to the guidelines in worksheet No. 2.
7. Each team also appoints 3 people who will present the arguments prepared by the entire group. Students decide the order of their speeches. During the debate, other team members who are not directly involved in the debate, fill out worksheet.
8. Summary of the lesson, evaluation of students' work [5 minutes].

Lesson 3. Debate

During the final lesson, the teams conduct a debate according to the guidelines contained in the "Methodological Guide ..." It takes 45 minutes in total to conduct a full debate. During the debate, the teacher does not comment on the arguments or indicate the fallacies made by the students on an ongoing basis.

An exercise-based debate should be structured as follows:

1. Opening of the debate by the moderator/chairperson [3 minutes].
2. Initial vote by the audience [2 minutes].
3. 1 st Researcher-Debater of the A research-team: Constructive Speech [4 minutes].
4. 1 st Researcher-Debater of the B research-team: Constructive Speech [4 minutes].
5. Cross-fire between the researchers-debaters (1) of both research teams [3 minutes].
6. 2 nd Researcher-Debater of the A research-team: Rebuttal Speech [4 minutes].
7. 2 nd Researcher-Debater of the B research-team: Rebuttal Speech [4 minutes]
8. Cross-fire between the researchers-debaters (2) of both research teams [3 minutes].
9. Preparation time for the Summary and Final Rebuttal by both research teams [2 minutes].
10. 3 rd Researcher-Debater of the A research-team: Summary Rebuttal [2 minutes].
11. 3 rd Researcher-Debater of the B research-team: Summary Rebuttal [2 minutes].
12. Grand Cross-fire between the researchers-debaters (1 & 2) of both research-teams [3 minutes].
13. 3 rd Researcher-Debater of the A research-team: Final Focus Rebuttal [2 minutes].
14. 3 rd Researcher-Debater of the B research-team: Final Focus Rebuttal [2 minutes].
15. Final vote by the audience / Short written feedback [3 minutes].
16. Presentation of the results by the moderator [2 minutes].

If the debate takes place during extra-curricular activities, then it is recommended to devote, for example, 90 minutes for this part. This will allow you to prepare the room for the debate, recall the rules, conduct the debate and discuss its course and finally evaluate the work of students.

In terms of classroom conditions, it would be ideal to allocate two adjoining lesson units to the debate. Taking into account the school circumstances, organizational difficulties and the inability to devote too many lessons to content extending the core curriculum, the debate can be conducted in one lesson, while maintaining high discipline in time. In this case, it is recommended that during the next lesson with the class additional 10 minutes are spent discussing the debate, pointing to strengths and mistakes made by the participants of the debate.

In this format, 6 students (3 from each team) actively participate in the debate. The teacher may also appoint a moderator from among the students and a time keeper. The rest of the students will receive worksheet number 3. Their task will be to listen carefully to the debate and to note the opposing team's strengths and areas for improvement, and to justify their choice. Completed worksheet no. 3 may be the basis for issuing a grade for activity in the lesson for students who did not take part in the debate directly, but participated in its preparation and were active observers of its course.

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Worksheet No 1 – answers

FOR	„GREY AREA”	AGAINST
Has the use of animals contributed to cancer research? In the study of cancer, scientists have succeeded in transmitting malignant cells of humans to immunodeficient mice and are observing the development of the disease without endangering human lives. These studies are also important for the development of tumor gene therapy. *Can we say that animal testing was of great significance for the advancement of medicine and veterinary medicine?* Animal testing has been of vital importance for the advancement of medicine in the last century and will remain a necessary tool for studying and searching for successful treatments for deadly diseases and conditions such as malignancies, Alzheimer's disease, Parkinson's disease, AIDS, injuries, and many fatal infectious and hereditary diseases. *Is it possible to abandon the use of animals in scientific research?*	*Is there a substitute for animals in experiments?* Cell cultures, mathematical models and computers which are proposed as adequate substitutes, do not have an immune system that could react to various agents. Also, a computer cannot properly simulate the work of a complex organ such as the brain. *Are people against the use of animals in medical research?* The number of citizens supporting animal tests is significantly lower and amounts to 47 percent. *There are people with an innate insensitivity to pain. Is it right to use those people in scientific experiments instead of animals?* Since some animals used in experiments are more conscious than the human newborn, ethics professor Peter Singer wonders if scientists would agree to test six-month-old babies, or adults with impaired brain function whose cognitive and emotional capacities	*If animals are like people, isn't it justified to treat them the way we treat other people?* If the goal of a society is to reduce pain and suffering, both in humans and animals, then scientific experiments that have animals as subjects and that lead to an increase in pain and suffering are morally problematic. *Can we use a substitute for animals in scientific research?* The use of cell cultures and tissues grown on culture plates reduces the need to use live animals and thus avoids inflicting pain and causing anxiety and suffering. The use of these cultures has contributed to the development of vaccines for polio and rabies. *Can we ignore the differences between people and animals in medical experiments?* Differences between animals and humans - anatomical, cellular and metabolic - and reliance on

Of the 106 Nobel Prizes awarded for physiology and medicine from the start of the 20th century to this day, 94 studies have depended on animal experiments.

Other than being very similar to humans, what makes animals suitable for use in biomedical research?

Since most laboratory animals have a faster life cycle than humans, different diseases and disorders can be studied in vivo on these animals. Owing to the fast (and shorter) life cycle and more efficient reproduction of numerous diseases, disorders and hereditary diseases can be traced from generation to generation. This is maybe most important when it comes to studying and searching for effective treatments to fight malignancies - one of the greatest torments of our time.

Are scientists against the use of animals in medical research?

Statistical data obtained from a representative sample of 3,748 scientists affiliated with the American Association for the Advancement of Science (AAAS) show that 89 percent of scientists support the use of animals in biomedical research.

are approximately on the same level as with the animals they plan to use in the experiments.

the use of animals in biomedical research lead to detrimental consequences to both animals and humans. Jane Goodall points out that a large number of research on animals has sidetracked scientists so that certain drugs have not been put into use for many years, although they turned out to be very useful for humans, while others passed the tests on animals but were detrimental for humans.

Case study: humans and aliens. Shouldn't less intelligent creatures give consent for experiments?

Imagine an intelligent alien species that differs from humans to the extent of cognitive and emotional capacity as much as humans differ from the most commonly used laboratory animals (say, mice and rats). Would it be morally correct for this intelligent species to use humans in scientific experiments in the same way humans use other experimental animals.

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Worksheet No 2 – examples of argument (pro)

Argument with reasoning	Foreseen rebuttals of the other group	Answers to rebuttals
Animal testing has contributed to the development of numerous treatments and drugs that have saved a significant number of human lives.	The use of animals in scientific experiments is cruel and inhumane If the goal of a society is to reduce pain and suffering, both in humans and animals, then scientific experiments that have animals as subjects and that lead to an increase in pain and suffering are morally problematic.	Animal testing has been of vital importance for the advancement of medicine in the last century and will remain a necessary tool for studying and searching for successful treatments for deadly diseases and conditions such as malignancies, Alzheimer's disease, Parkinson's disease, AIDS, injuries, and many fatal infectious and hereditary diseases. Also, there is a consensus in the scientific community that the use of animals in scientific experiments should be limited to reduce the number of animals used in experiments, experimental techniques should be perfected to take into account the welfare of animals and diminish the suffering caused by testing, and to replace animal experiments wherever possible by using different ways of testing. However, this is not always possible. Of the 106 Nobel Prizes awarded for physiology and medicine from the start of the 20th century to this day, 94 studies have depended on animal experiments.
	Nowadays, there are alternative methods that can replace the use of animals in scientific experiments. These alternatives are mainly related to and based on biochemical trials, experiments on cell cultures (in	Cell cultures, mathematical models and computers which are proposed as adequate substitutes, do not have an immune system that could react to various agents. Also, a computer cannot properly simulate the work of a complex organ such as the brain.

	vitro), and some are based on computer simulations and algorithms.	Since most laboratory animals have a faster life cycle than humans, different diseases and disorders can be studied in vivo on these animals. Owing to the fast (and shorter) life cycle and more efficient reproduction of numerous diseases, disorders and hereditary diseases can be traced from generation to generation. This is maybe most important when it comes to studying and searching for effective treatments to fight malignancies - one of the greatest torments of our time.

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Worksheet No 3 – examples of argument (con)

Argument with reasoning	Foreseen rebuttals of the other group	Answers to rebuttals
The use of animals in scientific experiments is cruel and inhumane. If the goal of a society is to reduce pain and suffering, both in humans and animals, then scientific experiments that have animals as subjects and that lead to an increase in pain and suffering are morally problematic.	Animal testing has been of vital importance for the advancement of medicine in the last century and will remain a necessary tool for studying and searching for successful treatments for deadly diseases and conditions such as malignancies, Alzheimer's disease, Parkinson's disease, AIDS, injuries, and many fatal infectious and hereditary diseases.	Since some animals used in experiments are more conscious than the human newborn, ethics professor Peter Singer wonders if scientists would agree to test six-month-old babies, or adults with impaired brain function whose cognitive and emotional capacities are approximately on the same level as with the animals they plan to use in the experiments.
		Imagine an intelligent alien species that differs from humans to the extent of cognitive and emotional capacity as much as humans differ from the most commonly used laboratory animals (say, mice and rats). Would it be morally correct for this intelligent species to use humans in scientific experiments in the same way humans use other experimental animals.
	Also, there is a consensus in the scientific community that the use of animals in scientific experiments should be limited to reduce the number of animals used in experiments, experimental techniques should be perfected to take into account the welfare of animals and diminish the suffering caused by testing,	The use of cell cultures and tissues grown on culture plates reduces the need to use live animals and thus avoids inflicting pain and causing anxiety and suffering. The use of these cultures has contributed to the development of vaccines for polio and rabies.

	and to replace animal experiments wherever possible by using different ways of testing. However, this is not always possible. Of the 106 Nobel Prizes awarded for physiology and medicine from the start of the 20th century to this day, 94 studies have depended on animal experiments.	Differences between animals and humans - anatomical, cellular and metabolic - and reliance on the use of animals in biomedical research lead to detrimental consequences to both animals and humans. Jane Goodall points out that a large number of research on animals has sidetracked scientists so that certain drugs have not been put into use for many years, although they turned out to be very useful for humans, while others passed the tests on animals but were detrimental for humans