



ADDITIONAL RESOURCE PACK

Classroom
VIDEO
Education with Vision

Genetic Engineering Philosophy of Medical Ethics series

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For Teachers

Brief Summary of Programme

This programme considers some of the possible benefits from detecting and preventing hereditary diseases in people, plants and animals to engineering resilient crops improving the quality and quantity of plants in farming. Potential problems are also considered, alongside secular and religious perspectives on the morality of intervening in nature at the most basic level (our DNA).

Other Background Information for Teachers

Genetic Engineering is defined as the deliberate modification of the genetic code of an organism by the manipulation of genetic material. The purpose of genetic engineering therefore is to introduce desirable properties from one organism into another, and/or to remove undesirable properties from an organism.

Since the 1970s, scientists have learned how to introduce new genes into plants and animals, and even into human cells kept alive in the laboratory. Already, farm animals have been genetically engineered to make them larger and plants have been genetically engineered to resist diseases or insects.

Curriculum Links

NQ Intermediate 1, Intermediate 2, Higher RMPS (SQA)

- Morality in the Modern World – Medical Ethics
 - Genetic Engineering: 'Is the use of human embryos for genetic research morally justifiable?'

NQ Advanced Higher RMPS (SQA)

- Bioethics
 - The Beginning of life - Treatment of embryos, Genetic engineering

OCR - G572: AS Religious Ethics Applied Ethics - topics on Euthanasia, Genetic Engineering, Embryo Research, The Right to a Child.

EDEXCEL - AS Unit 2: Religious Studies — Investigations Area C: The Study of Ethics Medical Ethics

AQA GCSE RELIGIOUS STUDIES Topic 1 Religious Attitudes to Matters of Life (Medical Ethics)

OCR – GCSE - 3.22 Unit B603: Ethics (Relationships, Medical Ethics, Poverty and Wealth)

Other Useful Resources

Books

An Introduction to Philosophy and Ethics, Mel Thompson

Hodder and Stoughton, ISBN 0 340 87642 5

Beliefs, Values and Traditions, Ann Lovelace and Joy White

Heinemann, ISBN 0 435 30261 2

Contemporary Moral Issues, Joe Jenkins

Heinemann, ISBN 0 435 30309 0

Ethical Studies, Robert A Bowie

Nelson Thornes, ISBN 0 7487 5798 8

Issues of Life and Death, Michael Wilcockson

Hodder & Stoughton, ISBN 0 340 72488 9

Making Moral Decisions, Joe Walker

Hodder Gibson, ISBN 0 340 80203 0 (Support Edition ISBN 0 340 80203 0)

Religion and Society, Victor W Watton

Hodder & Stoughton, ISBN 0 340 79967 6

Truth, Spirituality and Contemporary Issues, Lesley Parry

Hodder & Stoughton, ISBN: 0 340 85034 5

Websites

www.bbc.co.uk/religion

www.humanism.org

www.srtp.org.uk

www.hfea.gov.uk

www.bma.org.uk

www.linacre.org/bma.html

news.bbc.co.uk/1/hi/health/7391975.stm

stemcells.nih.gov/index.asp

www.explorestemcells.co.uk/

www.isscr.org/

www.dh.gov.uk/ab/GTAC/index.htm

www.srtp.org.uk/cloning.shtml

www.bbc.co.uk/religion/religions/islam/islamethics/stemcells.shtml

www.bbc.co.uk/learningzone/clips/ethics-of-using-foetal-stem-cells/5888.html

www.nhs.uk/Tools/Pages/Pregnancy.aspx?Tag=

www.bionetonline.org/english/content/db_leg1.htm

www.teachersdomain.org/resource/tdc02.sci.life.gen.growgmcrops/

For Students

Initiate Prior Learning

1) When the atom was split in 1933 people thought it was a move forward for the human race. The knowledge however was abused and led to atomic weapons being used twelve years later.

(a) How could genetic engineering be abused do you think?

(b) Give examples of (i) Science helping humanity, and (ii) Science harming humanity.

2) Group students into pairs. Ask partners to discuss genes and why they are important. Give students five minutes to discuss and write down their ideas.

3) In pairs or groups pupils jot down what they think the term "Genetic Engineering" means and feedback to the rest of the class.

Active Viewing Guide

Answer the following questions:

1. What is genetic engineering?
2. Which country was the largest grower of GM foods in 2009?
3. Give examples of foods that are currently produced with Genetic Modifications.
4. What can be achieved with genetically modified organisms?
5. Why might someone use genetic engineering for having children?
6. Why was Dolly the Sheep important?
7. Which country produces blue roses by genetic engineering?
8. What are some of the organisations that are concerned that GM crops might be dangerous?
9. What is the name of the UK body set up to monitor research and licensing with regard to the use of eggs, sperms and embryos?
10. Why might someone think that using embryos for research and for reproductive treatments is as bad as, or worse than having an abortion?
11. What are some of the Christian concerns about Therapeutic Cloning?
12. What is the benefit of carrying the Sickle Cell gene?
13. What happened to Dolly the Sheep?
14. What do Humanists compare cloning to?
15. What are some concerns surrounding changing the gene line?

Suggested Answers

1. It is a blanket term which includes a range of techniques where it becomes possible to select desirable genetic information, whilst screening out the undesirable.
2. The USA, planting over 64 million hectares.
3. Soybeans, rice, cotton, roses, canola, sugarbeets, maize
4. Small changes, to make things better, possibly producing higher yields in crops.
5. To prevent passing on a gene for a medical condition or disease to their children.
6. She was the first clone made from a somatic cell taken from an adult mammal.
7. Japan
8. Greenpeace, Friends of the Earth
9. HFEA (The Human Fertilisation and Embryology Authority)
10. Rather than terminating one pregnancy, they may end up discarding a large number of embryos and to some people they consider an embryo as exactly the same as a human life.
11. They might believe life begins when the sperm and the egg are fused together to create an embryo which means that this is manipulating the very essence of life.
12. With this gene you cannot contract malaria.
13. She died young. She developed arthritis.
14. Bacteria creating identical copies of themselves or a new plant growing from a cutting.
15. We don't fully understand what the genes are all for and we don't know if we might be getting rid of valuable genes that are needed in the future.

Extension Activities

1) **Cloning Complications**

It took scientists 277 attempts to clone a normal, healthy sheep (Dolly). But what happened to the other 276 sheep? Have students research these previous attempts. What do you think would happen if it took 277 attempts to clone a human being? What does this information tell us about the consequences of cloning?

2) **Pupil Discussions – Pupils work in pairs**

Instructions: Use the following questions to start a discussion with your partner

- 1) What do you think are the advantages and disadvantages of genetically modifying food?
- 2) What are the advantages of therapeutic cloning?
- 3) What do you think about cloning animals?
- 4) Do you agree with cloning working animals, such as those working on a farm or police sniffer dogs?
- 5) Do you agree with cloning of animals that are bred for meat?

3) **Have a class debate – Suggested Motions:**

This house believes that Genetically Modified Crops are of very little risk to society.

This house believes that parents do not have a right to use technology so that their children will not be born with hereditary diseases.

This house believes that genetic engineering and manipulation of human cells breaks religious and moral laws.

This house believes that an embryo is the equivalent of a human life and thus discarding embryos used in research is morally repugnant.

4) **Create an Information Leaflet on Genetic Engineering:**

Using internet WebPages pupils research what types of genetic engineering are available to a couple who do not want to pass on to their children a genetic disease that they are both carriers of. Pupils use the information to produce an information leaflet that explains the couple's options.