

# A LEVEL **BIOLOGY A**

**You may have to do some research on the principles covered in the questions. Please use online resources to do so.**

## **Hoop Jump (Learner Sheet 1)**

### **Exam-style Questions on Ethics**

#### **Task 1 Exam-style Questions on Ethics**

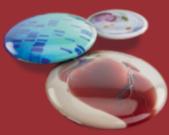
This worksheet brings together questions on ethics in biology from OCR's legacy F215 question papers, with the mark schemes on the reverse of the worksheet. In each case:

- Identify whether the case material is medical, genetic or ecological.
- Write your own answer to the question.
- See how you would have scored overleaf.

#### 1. Movement Disorders Research

Movement disorders are conditions in which people lose the ability to control their body movements.

Scientists have discovered that inserting electrodes to stimulate parts of the brain can help to cure some movement disorders. This discovery has resulted from experimental work with monkeys, which has made the research controversial.



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Suggest why monkeys rather than other laboratory animals, such as rats, were used for this work **and** comment on whether their use in this way is justified or not.

## 2. Introduced Hedgehogs

Three suggested methods to reduce the effect of hedgehogs on the numbers of waders in area 2 were considered. These were:

- trapping and moving hedgehogs to the mainland
- trapping hedgehogs and keeping them in captivity indefinitely
- trapping of hedgehogs followed by humane killing.

The third method was judged to be the most effective and likely to succeed in reducing hedgehog numbers.

Comment on the ethical issues involved in making this decision.



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(To answer this question you need to know that the introduction of hedgehogs to Scottish islands resulted in a catastrophic population decrease of several species of wader birds. The birds nest on the ground and hedgehogs eat their eggs. Hedgehogs have no natural predators on these islands.)

### 3. Golden Rice™ and Gene Therapy

Discuss the **potential benefits** to mankind and the **ethical concerns** raised by the following examples of genetically modified organisms:

- Rice modified for increased vitamin A content ('Golden Rice™').
- Humans having somatic gene therapy treatment for a genetic disease.



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In your answer you should give a balanced account of the benefits and concerns for each example of genetic modification.

## Answers

### Movement Disorders Research

| Answer                          | Marks | Guidance                                   |
|---------------------------------|-------|--|
| <i>monkeys rather than rats</i> |       | <b>MAXIMUM 2 marks from either section</b> |

Version 2



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| Answer    |   | Marks | Guidance  |
|-----------|---|-------|---|
| 1         | <i>idea that</i> (humans and monkeys) closely related/share more genes/share a common ancestor; | 1     | DO NOT CREDIT 'monkeys are closest ancestors to humans'                                       |
| 2         | (humans monkeys) both <u>primates</u> ;   | 2     |   |
| 3         | <i>idea that</i> brain/body, structure/physiology/behaviour, similar (to humans);               | 3     | ACCEPT having a similar response to treatment   |
| Klkkjhkkm | monkey brain bigger (than rat);   | 4     |   |
| 4         | max 2   |       |   |
|           | <i>comment</i>  |       |   |
| 5         | argument in favour;   | 5     | eg to alleviate human suffering/can save lives  |
| 6         | argument against;   | 6     | eg causes, pain/distress/stress to monkeys  |
|           | max 2   |       | <b>DO NOT CREDIT</b> 'cruel to monkeys' unqualified 'right to life of monkeys'/monkeys killed |
|           |   | 3 max |   |



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## Introduced Hedgehogs

| Answer  | Marks | Guidance  |
|---|-------|---|
| <p><i>Idea that the following may be ethically wrong</i></p> <ol style="list-style-type: none"><li>1 Killing hedgehogs;</li><li>2 Letting hedgehogs, kill/decrease number of, waders;</li><li>3 Introducing hedgehogs to island (upset the ecosystem);</li><li>4 Catching/moving, hedgehogs might cause suffering</li></ol> |       | <p><b>CREDIT ORA</b> idea preventing these is ethically right</p> <p><b>IGNORE</b> 'right to life' and 'playing God'</p>  |
| <ol style="list-style-type: none"><li>5 Doing nothing;</li></ol>  | 3 max | <p>2 <b>CREDIT ORA</b> need to conserve waders</p> <p>4 'the other methods are cruel' = 1 mark (mp4)</p> <p>'moving hedgehogs elsewhere causes problem somewhere else' = 1 mark (mp4)</p> <p>5 <b>CREDIT ORA</b> idea of human responsibility</p> |



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| Answer   | Marks | Guidance   |
|--|-------|--|
| <i>'Golden Rice™'</i>  | 9 max |  |
| B1 reduce vitamin (A) deficiency in named area/ora;                  |       | B1 eg Asia/developing world/area where rice is staple diet   |
| B2 reduce, eye problem/blindness;                                    |       |  |
| C1 reduce rice genetic, diversity/variation;                         |       | C1 <b>ACCEPT</b> contributes to genetic erosion  |
| C2 clone may suffer from one, disease/environmental change;          |       |  |
| C3 hybridisation with wild rice/spread genes to wild populations;    |       | C3 <b>ACCEPT</b> superweeds idea   |
| C4 seeds expensive/need to be bought each year;                      |       | C4 <b>CREDIT</b> idea of economic exploitation   |
| C5 rice may not grow in all areas where needed;                      |       |  |
| C6 idea of doubts whether vitamin A content sufficient; <b>4 max</b> |       |  |
| <i>Somatic Gene Therapy</i>  |       |  |
| B3 cure/reduce symptoms/better quality of life/less medication;      |       | B3 <b>DO NOT ACCEPT</b> treat (as in question)   |
| B4 cystic fibrosis/SCID/Parkinson's/thalassaemia/LCA;                |       | B4 eg single gene recessive conditions, cancer   |
| B5 extend lifespan/saves lives;                                      |       | <i>concerns</i> <b>IGNORE</b> references to embryo research, designer babies and germline gene therapy |
| C7 <u>virus</u> vector may cause (viral) disease;                    |       |  |
| C8 procedure may be, invasive/dangerous/painful/stressful            |       | C8 eg bone marrow removal and replacement  |
| C9 temporary/needs to be repeated/limited success;                   |       |  |
| C10 immune system/rejection, problems;                               |       |  |
| C11 animal testing concerns; <b>4 max</b>                            |       |  |
| <i>Either Section</i>  |       |  |
| C12 antibiotic resistance gene transfer to pathogenic bacteria;      |       | C12 <b>IGNORE</b> idea of resistant viruses  |
| C13 unknown effects/cause mutation;                                  |       | C13 <b>ACCEPT</b> cause cancer (in context of gene therapy)  |
| <b>QWC</b> – balanced account; <b>1 max</b>                          |       | Award if 1 <b>C</b> mark and 1 <b>B</b> mark have been awarded for <b>both</b> examples                |

