Genetic Engineering

1 **Read the article. Then, choose the correct answers.**

MODERN SCIENCE MONTHLY

GMOs: Friend or Foe



Scientists continue to debate the effects of **genetic engineering**. One classic example of the debate is a **transgenic organism** called **Golden Rice**. Scientists used **artificial selection** to **express** a gene in the white rice **genome**. Then, they performed **gene splicing** to add extra Vitamin A to the rice. Scientists say that this new **GMO** can reduce **vitamin deficiencies** in developing countries.

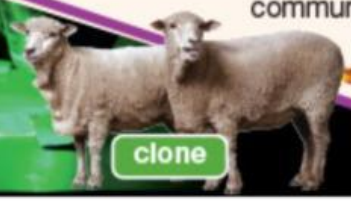
However, not everyone is happy about the new kind of rice. Some scientists, like Dr. Nick Marini, are worried about the **uncertainty** of genetic modification. He questions whether Golden Rice is actually a good thing. "I'm just not sure that artificially adding the vitamin to the rice is safe", he says. Others are concerned that such genetic engineering will encourage **cloning** of animals for consumption. Marini says "We can't predict how eating products created by artificial selection will affect people long-term."

Others, such as Professor Liam Jones, have a positive opinion. "GMOs can be **drought resistant**, disease resistant, and **tolerant** of many herbicides", he comments. For these reasons, Professor Jones points out, GMOs can be beneficial.

There are many different opinions in the scientific community. But it seems like genetic engineering is here to stay.









1 What is the main idea of the article?

- ○ **A** the scientific opinions on GMOs
- ○ **B** the vitamins in Golden Rice
- ○ **C** the ethics of cloning
- ○ **D** the types of transgenic organisms

2 What is Dr. Marini concerned about?

- ○ **A** the possibility of human cloning
- ○ **B** creating disease resistance in crops
- ○ **C** failing to reduce vitamin deficiencies
- ○ **D** the long term effects of artificial selection

3 According to the article, which of the following is NOT a benefit of GMOs?

- ○ **A** They can survive in droughts.
- ○ **B** They are not killed by herbicides.
- ○ **C** They can resist some types of diseases.
- ○ **D** They are able to grow faster than non-GMOs.

2 **Read the article again. What concerns do some scientists have about cloning animals? Fill in the gaps.**

Some scientists are concerned about cloning animals because the _____ - _____ effects of _____ them are unknown.

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3 Match the words or phrases with the definitions (A-J).

Golden Rice	vitamin deficiency	gene splicing	tolerant	GMO	resistant	drought	express	clone	uncertainty

A the process by which one gene is inserted into another

B an organism that has been modified artificially

C a state of lacking vital nutrients

D a period where there is very little rain

E to make a genetically identical copy of an organism

F a lack of certainty or knowledge

G not being affected by something

H a genetically-modified food

I being able to endure the effects of something or exist around it

J to display a trait controlled by a certain gene

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 genetic engineering / artificial selection

A) _____ includes cloning, gene splicing, and creating transgenic organisms.

B) _____ is the process of identifying and bringing out a certain characteristic.

2 transgenic organism / genome

A) DNA from different organisms is combined to create a _____.

B) A _____ contains an organism's full set of DNA.

5 Listen to a conversation between two scientists. Mark the following statements as *True* or *False*.

LIVEWORKSHEETS

1 The woman supports using GMOs. **True** **False**

2 The man thinks cloning animals can help people. **True** **False**

3 The speakers agree about cloning humans. **True** **False**

6 Use the words below to complete the debate on genetic engineering.

cloned | pesticide | ethical | humans | implications | deficiencies | cure | medical | scientific | transgenic

Topic: GMOs

Benefits:

Developing GMOs is a good idea because it can help people in the future. Scientists can find ways to _____ diseases. They can use the GMOs, such as _____ animals, in _____ experiments. GMOs are good for studying different conditions, such as vitamin _____. These new _____ organisms can benefit people's health in many ways. Scientists can learn a lot by developing GMOs.

Negative Effects:

Developing GMOs is a bad idea because there is a lot of _____ uncertainty involved. Scientists don't know all the _____ of GMOs. For example, nearby weeds might become _____-resistant. Farmers would have to use more pesticides. This is bad for the environment. Also, there are _____ issues. Scientists are already cloning animals. Some may want to start cloning _____. That could raise lots of different problems.

LIVEWORKSHEETS