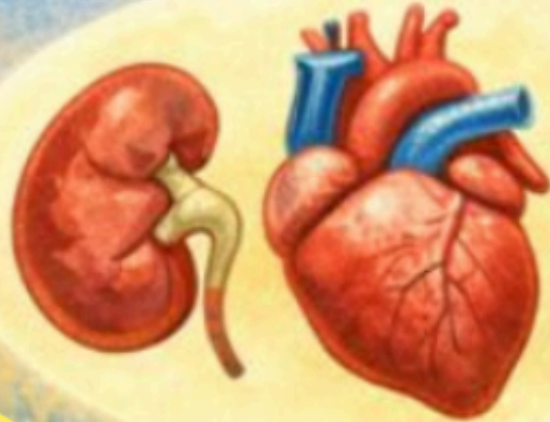


XENOTRANSPLANTATION AND PIG ORGAN TRANSPLANTS 6TH, 7TH, 8TH GRADE READING



Improve students'
literacy skills

Sub Plan

Science Applicability



Teach With
Fergy

Reading Comment



★★★★★ Extremely satisfied - Great resource to work on student reading comprehension and it tied into the topic I was teaching. My students have been struggling with reading and I've been incorporating more reading into my lessons. Thank you for the resource.



SCROLL
to take a look inside!

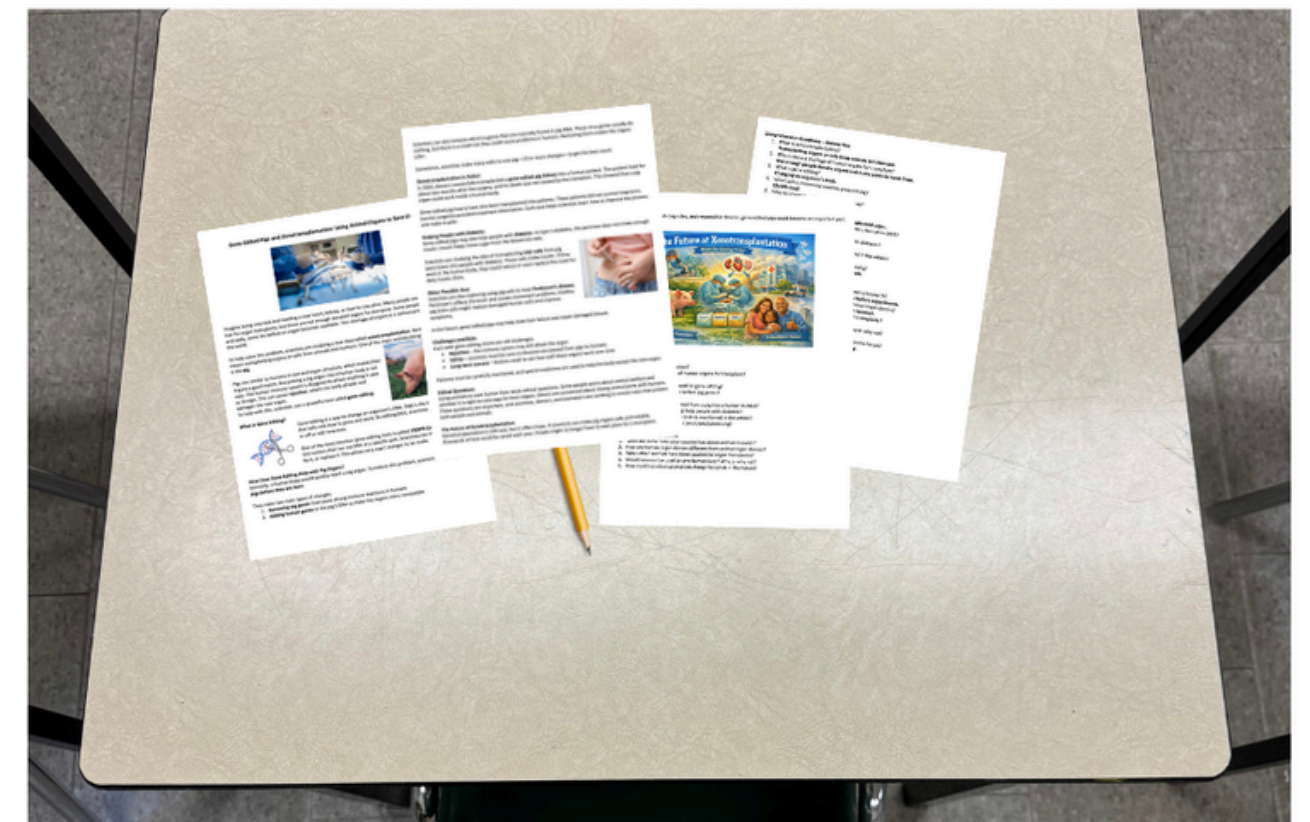


THE PROBLEMS YOU FACE

- Limited time to teach scientific literacy and strengthen students' reading and analysis skills.
- Need meaningful extension activities to engage fast-moving learners.
- Difficulty creating effective last-minute sub plans that still support student learning.

NO-PREP - PRINT/UPLOAD

- Questions and Answer Key
- **No Prep, Ready-to-Use:** Print or assign digitally with Google Docs, Microsoft Word, and PDF formats for flexible classroom use
- **Includes Varied Question Types:** Knowledge, thinking, connecting, application, and open-ended questions.



What Will Your Students Learn?

READING COMPREHENSION ARTICLE & QUESTIONS

- What Is Xenotransplantation?
- The Global Organ Shortage
- What Is Gene Editing?
- CRISPR and DNA Basics
- Why Pigs Are Used for Transplants
- How Gene Editing Makes Pig Organs Safer
- Immune Rejection and Compatibility
- Pig Organs and Diabetes Treatment
- Ethical Questions and Animal Welfare
- The Future of Xenotransplantation

Article with
Comprehension
Questions

6th, 7th, 8th Grade

Print & Digital

Comprehension Questions

1. What is xenotransplantation?
2. Why is there a shortage of human organs for transplant?
3. What is gene editing?
4. What is CRISPR?
5. Why do scientists use pigs for transplants?
6. What are the risks of xenotransplantation?
7. What are the benefits of xenotransplantation?
8. How does gene editing work?
9. What is the future of xenotransplantation?
10. Why is it important to study xenotransplantation?

Extension /

1. What are the ethical considerations of xenotransplantation?
2. How can we ensure the safety of xenotransplantation?
3. What are the challenges of xenotransplantation?
4. Should we use animals for transplants?
5. How can we improve the quality of human organs?

Gene-Edited Pigs and Xenotransplantation: Using Animal Organs to Save Lives



Imagine being very sick and needing a new heart, kidney, or liver to stay alive. Many people are on waiting lists for organ transplants, but there are not enough donated organs for everyone. Some people wait years, and sadly, some die before an organ becomes available. This shortage of organs is a serious problem around the world.

To help solve this problem, scientists are studying a new idea called **xenotransplantation**. Xenotransplantation means transplanting organs or cells from animals into humans. One of the main animals being studied for this is the pig.

Pigs are similar to humans in size and organ structure, which makes them a good match. But putting a pig organ into a human body is not as easy. The human immune system is designed to attack anything it sees as foreign. This can cause **rejection**, where the body attacks and damages the new organ.

To help with this, scientists use a powerful tool called **gene editing**.



Gene editing is a way to change an organism's DNA. DNA is the instruction code that tells cells how to grow and work. By editing DNA, scientists can turn genes on or off or add new ones.

One of the most common gene-editing tools is called **CRISPR-Cas9**. It works like tiny scissors that can cut DNA at a specific spot. Scientists can then remove a gene, fix it, or replace it. This allows very exact changes to be made.

How Does Gene Editing Help with Pig Organs?

Normally, a human body would quickly reject a pig organ. To reduce this problem, scientists **edit the genes** of pigs before they are born.

They make two main changes:

1. Remove genes that cause strong immune responses.
2. Add genes that make the pig's DNA more compatible with humans.

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PDF



Your Reading

Gene-Edited Pigs and Xenotransplantation: Using Animal Organs to Save Lives



Imagine being very sick and needing a new heart, kidney, or liver. There are long lists for organ transplants, but there are not enough donated organs, and sadly, some die before an organ becomes available. This is the current state of the world.

To help solve this problem, scientists are studying a new idea called xenotransplantation, which means transplanting organs or cells from animals into humans. One of the animals being studied is the pig.

Pigs are similar to humans in size and organ structure, which makes them a good match. But putting a pig organ into a human body is not easy. The human immune system is designed to attack anything it sees as foreign. This can cause **rejection**, where the body attacks and damages the new organ.

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What Is Gene Editing?



Gene editing is a way to change an organism's DNA that tells cells how to grow and work. Scientists can turn genes on or off or add new ones.

One of the most common gene-editing tools is CRISPR, which uses tiny scissors that can cut DNA at a specific location to fix it, or replace it. This allows very exact changes.

How Does Gene Editing Help with Pig Organs?

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1. **Removing pig genes** that cause strong immune reactions in humans.
2. **Adding human genes** to the pig's DNA to make the organs more compatible.

Scientists can also remove old virus genes that are naturally found in pig DNA. These virus genes can cause nothing, but there is a small risk they could cause problems in humans. Removing them makes the process safer.

Sometimes, scientists make many edits to one pig—10 or more changes—to get the best results.

Xenotransplantation in Action

In 2024, doctors successfully transplanted a **gene-edited pig kidney** into a human patient. About two months after the surgery, the patient's health improved, and his death was not caused by the transplant. This shows that a pig organ could work inside a human body.

Gene-edited pig hearts have also been transplanted into patients. These patients did not survive, but the surgeries provided important information. Each case helps scientists learn how to improve the process and make it safer.

Helping People with Diabetes

Gene-edited pigs may also help people with **diabetes**. In type 1 diabetes, the pancreas does not produce enough insulin. Insulin helps move sugar from the blood into cells.

Scientists are studying the idea of transplanting **islet cells** from pig pancreases into people with diabetes. These cells make insulin. If they work in the human body, they could reduce or even replace the need for daily insulin shots.



Other Possible Uses

Scientists are also exploring using pig cells to treat **Parkinson's disease**. Parkinson's affects the brain and causes movement problems. Healthy pig brain cells might replace damaged human cells and improve symptoms.

In the future, gene-edited pigs may help treat liver failure and repair damaged tissues.

Challenges and Risks

Even with gene editing, there are still challenges.

- **Rejection** – the immune system may still attack the organ
- **Safety** – scientists must be sure no diseases are passed from pigs to humans
- **Long-term success** – doctors need to see how well these organs work over time

Patients must be carefully monitored, and special medicines are used to help the body accept the organ.

Ethical Questions

Using animals to save human lives raises ethical questions. Some people worry about animal welfare, whether it is right to raise pigs for their organs. Others are concerned about mixing animal DNA with human DNA. These questions are important, and scientists, doctors, and lawmakers are working to create guidelines to protect both people and animals.

The Future of Xenotransplantation

Xenotransplantation is still new, but it offers hope. If scientists can make pig organs safe and reliable, thousands of lives could be saved each year. People might no longer have to wait years for a transplant.

With careful research, strong rules, and responsible choices, gene-edited pigs could become an important part of future medicine.



Comprehension Questions

1. What is xenotransplantation?
2. Why is there a shortage of human organs for transplant?
3. What is gene editing?
4. What tool is commonly used for gene editing?
5. Why do scientists remove certain pig genes?
6. What is rejection?
7. What organ was transplanted from a pig into a human in 2024?
8. How could gene-edited pigs help people with diabetes?
9. What disease affecting the brain is mentioned in the article?
10. Why is xenotransplantation considered promising?

Extension / Research Questions

1. What are some rules your country has about animal research?
2. How are human organ donors different from animal organ donors?
3. What other animals have been studied for organ transplants?
4. Should animals be used to save human lives? Why or why not?
5. How could xenotransplantation change hospitals in the future?

Questions – Answer Key

1. What is xenotransplantation?
Transplanting organs or cells from animals into humans.
2. Why is there a shortage of human organs for transplant?
Many people donate organs and many patients need them.
3. What is gene editing?
Editing an organism's DNA.
4. What tool is commonly used for gene editing?
CRISPR.
5. Why do scientists remove certain pig genes?
To prevent immune rejection.
6. What is rejection?
The immune system attacks a transplanted organ.
7. What organ was transplanted from a pig into a human in 2024?
A kidney.

8. How could gene-edited pigs help people with diabetes?
By producing insulin-producing cells.
9. What disease affecting the brain is mentioned in the article?
Parkinson's disease.

Answer Key Included Office, Google, and PDF Versions

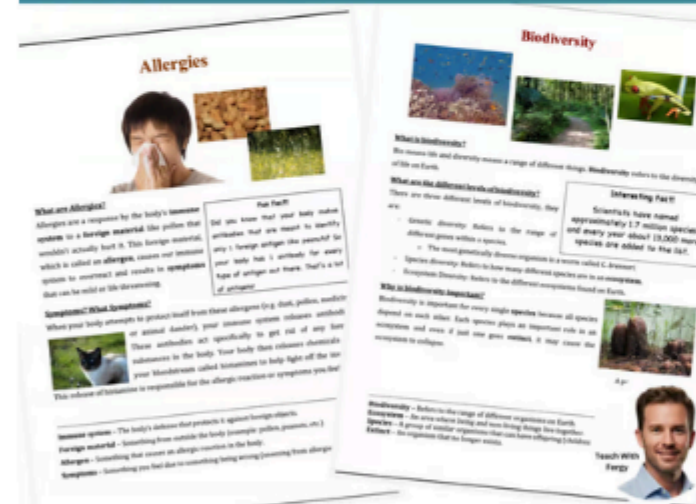


Comprehension and Extension Questions

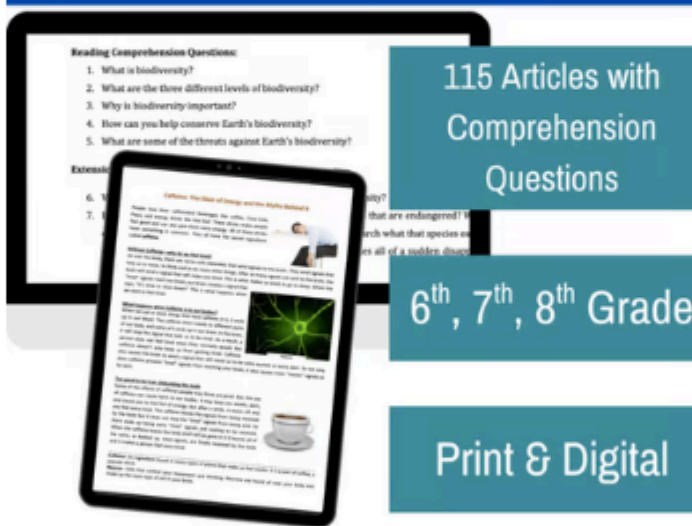
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learn more!**

★★★★★ Extremely satisfied - So many comprehensive readings for all science fields. PDF and DOCX versions included so they can be edited if needed. Each one includes short answer questions at the end, the first set are easy to find the answers to in the readings, the second set require a bit more critical thinking. Includes an answer key. Great to use to fill in time or for sub plans.

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