

What Can Pigs Teach Us About Human Resourcefulness?

Pigs are an important renewable resource for food, consumer goods, and medical applications.

Objectives

- Students will develop and defend an argument for the importance of a natural, renewable resource (pigs) in creating life-saving medications and products.
- Students will gain a deeper understanding of how the pig, as a natural resource, can be used to aid in the needs of humans as our populations grow.
- Students will understand the importance of developing and creating products from renewable resources that can have positive impacts on survival.

Supplies/Resources

- Computer/laptops and Internet access
- Claim—Evidence—Reasoning Template
- Posterboard or drawing paper
- Markers, crayons, paints, or colored pencils

Instructions

Using Claim—Evidence—Reasoning, students will gain a greater understanding of some of the most important medications we manufacture from pigs.

Assign each group/student a C-E-R template and a resource or product we get from pigs. Students should have access to computers for research to fully support the claim.

Hints: provide the following questions to help guide students as they conduct their research:

1. What is this product? Educate your reader.
2. What part of the pig is used to help make this product?
3. Could this product be made from another natural resource if the pig was not available?
4. Explain why this product is important to many people.

Ask students to draw a picture/create a collage/write a story that depicts how the assigned medication/product helps people: Heparin, Insulin, Heart Xenotransplantation, Gelatin (how it is used in medications), Zenpep, Acthar, Armour Thyroid, Mosaic Heart Valve. Helpful links are provided at teachkyag.org/pigscience.

Next Generation Science Standards

MS-ESS3-4: Human Consumption of Natural Resources

Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact earth's systems. (Cause and Effect)

MS-PS1-3: Matter and Its Interactions

Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

ELA/Literacy Standards

RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.

WHST.6-8.1 Write arguments focused on discipline content.

WHST.6-8.9 Draw evidence from informational texts to support analysis, reflection, and research.



STUDENT INFORMATION - Are Pigs Natural Resources?



When you think of natural resources, what things come to your mind? You would be correct if you thought of soil, water, sunlight, and air. We also consider oil, coal, and natural gas as natural resources. But plants and animals are natural resources too. "Natural resources" are materials that occur in nature and are used by humans for consumption or to make other types of materials and items that help us meet our needs.

Natural resources are classified into two categories: renewable and nonrenewable. Renewable resources are materials replenished naturally and over a relatively short period. Nonrenewable resources are available in short supply and take a very long time to be replenished or made again. Do you think pigs would be classified as a renewable or nonrenewable resource? To answer this question, ask yourself: Can you make more pigs? How would you do this?

Pigs are considered a renewable resource because they can be bred to make more quickly and easily.

Pigs are a natural resource found most anywhere in the world. Some resources are limited to a few geographical places. For example, only 32 states in the US produce oil. Kentucky has coal resources for mining and heat production. Greenland has no coal but is rich in iron ore, while Kentucky is limited in this resource.

Worldwide there are more than 750 million pigs, which provide not only food for consumption but many of the materials we use daily. Currently, pork provides 40 percent of our world's meat consumption. The Food and Agriculture Organization (FAO) estimates that by 2050 we will need to produce 50 percent more food than we do now to feed a

world population of 9.3 billion. Pigs will continue to be an essential resource to feed our growing world.

Pigs not only feed many people and animals, but they play an important part in keeping us healthy and alive. Many life-saving medications and products we use daily are derived from pigs or pig by-products. Scientists have begun to look at the pig due to its shared characteristics as the demand for human organ replacement grows to exceed the supply. Human and pig organs are similar in size and physiology, and pig diseases are less likely to affect humans, unlike organs from primates. These similarities, and the fact that pigs reproduce and grow quickly, have led to the research of viable options for treating human diseases and disorders. For example, hemoglobin is a protein rich in iron found in red blood cells. It is the pigment that gives red blood cells their color and is responsible for carrying oxygen from the lungs to the rest of the cells in the body. Scientists have been able to genetically modify pigs to produce human hemoglobin. This advancement can provide life-saving hemoglobin when human supplies are scarce or unavailable.

In closing, pigs are a great lesson in how not to waste any part of a natural resource. Nearly 100 percent of a processed pig will eventually get used to create everyday items. An old expression says: "When it comes to the pig, you can use everything but the oink." As the world's population grows and our need for more food, products, medications, and even life-saving organs increases, scientists will continue to look to the pig for help. Although you may love bacon, ham, and ribs, the pig plays a more significant role in our lives. Farmers and scientists working together for humankind will allow us to be creative in our endeavors to meet the needs of our world.

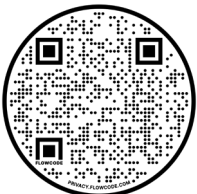
Renewable Resources

Solar Energy
Soil
Trees
Plants
Animals
Algae

Nonrenewable Resources

Oil
Steel
Aluminum
Coal
Lithium

If you want to learn more of the various ways pigs are used, then watch this amazing TedTalk:



CLAIM-EVIDENCE-REASONING: PROVING PIGS ARE IMPORTANT

TOPIC Medication or Product	
QUESTION	Do we need pigs to make this medication or product?
CLAIM A statement that answers the question	
EVIDENCE Scientific data and details that support your claim. What part of the pig is used to help make this product? Are there any concerns with production or use? Are there alternative ways to make this product? How?	REASONING Explains how or why the evidence supports the claim. If this medical product was not available, how would it affect an individual who needs it or a growing society? If pigs were no longer raised for human needs, how would this affect society?
EXTENSION ACTIVITY: Expand your claim to write short statement (no more than 25 words) explaining why pigs are important to a growing society.	