Ideas at Work

How research becomes new technology

6.C.6.3.D "Quaternary Sector: Research and intellectual services such as technological advancement and innovation (e.g., Silicon Valley and Sao Paulo's technology centers, Massachusetts Institute of Technology)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one activity in each paragraph that creates new knowledge or improves technology. Circle the factory worker and the store clerk to compare their work with the researchers' work.

What Do Technology Researchers Make?

1. A phone can begin with a question: How could it work faster? In Silicon Valley, a region of California known for technology companies, researchers and engineers test new ideas for chips and software. This kind of work belongs to the quaternary sector, which uses knowledge to create or improve technology. A worker at a factory may later assemble phones from parts. Assembly makes a product, but testing a new chip design creates knowledge that can change many future products. Both jobs matter, though they do different work.

2. Across the country, researchers at the Massachusetts Institute of Technology, or MIT, study problems and try possible solutions. Imagine a team measuring how different materials store energy. They record results, compare them, and publish what they learn so others can test it. Their research may help engineers design better batteries. A company might then make and sell those batteries. The research is quaternary work because its main product is new knowledge; making batteries is manufacturing, and selling them is a different service.

3. In São Paulo, Brazil, technology centers bring people with different skills together. A team might study how to detect unusual activity in digital payments. Programmers could build and test a method, while researchers check whether it finds mistakes or warns about normal payments. That investigation is quaternary work because it develops an improved way to solve a problem. A store clerk who takes a digital payment uses the technology to serve customers instead. When you identify a sector, ask what the workers spend their time producing: knowledge, goods, or an everyday service.

2 ANSWER WITH EVIDENCE

Use the passage

1. In the Silicon Valley example, why is testing a new chip design quaternary work, while assembling a phone is not?

2. In the MIT example, what do researchers do with their test results that helps other people develop technology?

3. How is the possible work of the São Paulo team different from the store clerk's work?

4. What do the MIT researchers and the possible São Paulo team have in common that makes their work quaternary?

3 YOUR TURN

Your own words

Imagine your town wants safer bike routes. In three sentences, describe a research project, what a team would test and an innovation it could create, then explain why the work belongs to the quaternary sector rather than manufacturing or an everyday service.

ANSWER KEY

Ideas at Work

GRADE 6 · 6.C.6.3.D

PART 1 · READ AND MARK

Underline one activity in each paragraph that creates new knowledge or improves technology. Circle the factory worker and the store clerk to compare their work with the researchers' work. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In the Silicon Valley example, why is testing a new chip design quaternary work, while assembling a phone is not?	**Testing the design creates knowledge that could improve future products. Assembling a phone makes a product from parts.**
2	In the MIT example, what do researchers do with their test results that helps other people develop technology?	**They compare the results and publish what they learn so others can test it and use the knowledge to design better batteries.**
3	How is the possible work of the São Paulo team different from the store clerk's work?	**The team would develop and test a way to detect unusual payment activity. The clerk uses payment technology to serve customers.**
4	What do the MIT researchers and the possible São Paulo team have in common that makes their work quaternary?	**Both investigate a problem and test ideas to develop knowledge or an improved technology.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

My town could start a research project to find safer routes for cyclists. A team could test traffic counts at several crossings and use the results to design a route-planning app that avoids busy intersections. This work is quaternary because the team uses evidence to develop a new tool instead of making goods or serving customers.

Accept other accurate examples of research and innovation supported by the passage. For Your Turn, look for a testable investigation, a possible innovation, and a clear distinction from making goods or providing an everyday service.