

Innovation Builds

Trace how scientific and technological advances build on earlier work.

USII.9.a “studying the iterative and ongoing advancements in science and technology; and”

NAME _____

DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each detail that names an earlier technology or a later improvement, then number the steps in each development sequence to show how advances build over time.

How Advances Connect

- ① At the start of the twentieth century, doctors could see broken bones with X-rays, but the images were often blurry and showed only limited detail. Scientists later developed computed tomography, or CT, which uses many X-ray views and a computer to build cross-section images. In the 1970s, CT scanners began helping doctors examine soft tissues as well as bones. Engineers kept improving the machines, making scans faster and lowering the radiation dose for many procedures. Each step built on earlier knowledge, testing, and new computer power.
- ② The same pattern shaped communication technology. In 1947, researchers at Bell Laboratories demonstrated the transistor, a small electronic switch that could replace larger vacuum tubes in many devices. In 1958, the integrated circuit placed several electronic parts on one chip, helping computers become smaller and more reliable. Later, digital cellular networks carried phone calls and data more efficiently than earlier analog systems. Modern smartphones combine a phone, camera, computer, and internet connection. Their features depend on repeated advances in chips, batteries, software, and wireless networks.
- ③ Advancement does not mean that one invention ends the work. New tools can reveal problems that lead to another round of research and design. For example, faster computers allow scientists to study large sets of climate data, while improved sensors collect more precise measurements. Scientists compare results, revise models, and share findings with other researchers. Communities then decide how to use technologies, considering cost, privacy, safety, and access. Studying science and technology means tracing these connected changes and asking how each improvement affects people's lives.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What limitation of early X-ray images did CT scanners help address?

2 How did the integrated circuit improve on earlier electronic technology, and what effect did it have on computers?

3 Name two types of advances that modern smartphones depend on.

4 After collecting climate data, what three actions do scientists take to continue improving their understanding?

3 YOUR TURN _____ Your own words

Choose a technology not named in the passage that has changed since 1900. In 3 or 4 sentences, trace at least three stages of its development, explain how a later stage improved an earlier one, and name one effect or concern connected to its use.

PART 1 • READ AND MARK

Underline each detail that names an earlier technology or a later improvement, then number the steps in each development sequence to show how advances build over time. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What limitation of early X-ray images did CT scanners help address?	Early X-ray images were often blurry and showed only limited detail. CT used many X-ray views and a computer to create cross-section images.
2	How did the integrated circuit improve on earlier electronic technology, and what effect did it have on computers?	It placed several electronic parts on one chip. This helped computers become smaller and more reliable.
3	Name two types of advances that modern smartphones depend on.	Any two: advances in chips, batteries, software, and wireless networks.
4	After collecting climate data, what three actions do scientists take to continue improving their understanding?	They compare results, revise models, and share findings with other researchers.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Solar cells made from silicon were demonstrated in 1954, but they were costly and produced limited power. Later manufacturing methods and improved cell designs made solar panels more efficient and less expensive. Today, solar systems can work with batteries and smart controls, giving homes stored power, though cost and access still matter.

Accept equivalent wording for passage answers when it accurately identifies the sequence of change and its effect. For the open response, accept another accurate technology sequence with at least three stages, a clear improvement, and a relevant effect or concern.