

Kentucky Summative Assessments



Grade 7 Reading Released Items 2022

Directions: Read the excerpt from “Cool Jobs: Making Electronics to Wear.” Then answer the questions.

from “Cool Jobs: Making Electronics to Wear”

by Stephen Ornes

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Meet the researchers who are pushing the boundaries of electronic devices

- 1 Could keeping track of your health be as easy as wearing a temporary tattoo? Materials scientist John Rogers thinks so.
- 2 In his lab at the University of Illinois at Champaign-Urbana, Rogers and his team design electronic devices unlike anything in an Apple store. Their inventions hardly look like electronics at all. Most electronics are boxy, fragile things that have to be handled with care. For a tablet or a cell phone, a minor accident, like spilling water, can quickly turn catastrophic.
- 3 But the inventions from Rogers’ lab are more like high-tech stickers. These adhesive patches, crisscrossed with miniature wires, stick to the skin for weeks at a time. They can survive the wear and tear of life. Already, the scientists have programmed the devices to take a wide variety of measurements. These include temperature, blood pressure and skin moisture levels (or hydration). Rogers says he wants his sensors to look more like parts of living organisms and less like traditional computers.
- 4 “We’re driving the technology by thinking outside the box,” he says.
- 5 Stretchy, wearable electronics interest researchers from a variety of fields. Rogers is a materials scientist, which means he looks for smart ways to use, understand and even create the materials used to build things.
- 6 Developing these devices is appealing, says Rogers, because it has the potential to improve health care. Instead of trudging to the clinic or hospital for every checkup, a patient might be able to download data from a stick-on device and send it to the hospital. This technology offers the potential for more measurements and fewer trips to the doctor.
- 7 Here, Rogers and two other researchers who work on stretchy electronics describe these skin-like devices—as well as what their future may hold.

How to harvest energy from the body

- 8 As a young girl growing up in Turkey, Canan Dagdeviren received a book about the scientist Marie Curie from her father. Curie was the first woman to win a Nobel prize, one of the highest honors given to a scientist. (Curie actually won two.)
- 9 “I think my dad was thinking I would get inspiration from her,” recalls Dagdeviren, who does research on wearable electronics at Harvard University and MIT, both in Cambridge, Mass. “But when I read the book, I fell in love with her husband because he discovered the piezoelectric effect.”
- 10 In the late 19th century, French scientist Pierre Curie and his brother Jacques showed that some crystals generate sparks when they’re under pressure. Sparks mean electricity. So piezoelectric crystals turn mechanical energy, which comes from motion, into electricity. Scientists have looked to piezoelectric materials in recent years as a potential power source for wearable electronics.
- 11 Dagdeviren suspects piezoelectric materials could capture energy from movement in the human body. Even at rest, the body is constantly in motion. Lungs expand and contract as you breathe. The heart beats. Blood streams through your veins and arteries. All of these are examples of mechanical energy, or the energy associated with motion, location or both.
- 12 As a graduate student, Dagdeviren studied with John Rogers in Illinois. She designed devices that could be used inside the body. Her inventions converted the movements of the lungs, heart and diaphragm into electricity. This technology might one day provide power to devices like pacemakers, which help the heart keep up a steady rhythm. Right now, pacemakers need batteries that have to be replaced every five to 10 years. Dagdeviren’s system wouldn’t need batteries.
- 13 “You can generate power, and use this power to run your personal electronics,” she says. . . .
- 14 Wearable, flexible electronics could make it possible to constantly monitor the body. Usually, we take measurements like temperature or blood pressure at a single moment in time. But that snapshot may not tell the whole story. If a person is wearing a sensor, a doctor can study a stream of data and look for patterns.
- 15 “Our organs and our bodies speak to us,” Dagdeviren says. “I use my devices to understand what they’re saying.”

From “Cool Jobs: Making Electronics to Wear” by Stephen Ornes, from *Science News for Students*, Jan. 29, 2016. © 2016 Society for Science & the Public.



1

RE925655269_2

In paragraph 6, when the author says “trudging to the clinic or hospital for every checkup,” he is suggesting that visiting the doctor —

- A is the only option
- B can be bothersome
- C is no longer necessary
- D can get very expensive

2

RE925656051_3

What is the author’s purpose in paragraph 6?

- A To describe how Rogers feels about his work
- B To suggest that clinics and hospitals operate inefficiently
- C To explain how wearable devices can improve health care
- D To persuade doctors to promote wearable devices created by Rogers

3

RE925652813_2

What can be inferred about Dagdeviren’s father from the details in paragraphs 8 and 9?

- A He believed she would win a Nobel prize.
- B He wanted to introduce her to female role models.
- C He knew scientific researchers at Harvard University.
- D He wanted her to understand the piezoelectric effect.

4

RE925655811_3

How do paragraphs 10 and 11 **most** contribute to the development of ideas in the article?

- A By contrasting different sources of mechanical energy
- B By describing the different ways piezoelectric crystals generate electricity
- C By explaining how piezoelectric crystals could convert energy from the body into a power source
- D By introducing the problems associated with capturing energy from the movement of the human body

5

RE925656243

Short Answer Directions: Read the question carefully. Then enter your answer in the space provided.

How does the author convey his belief that the work of Canan Dagdeviren is significant? Support your answer with evidence from the text.

6

RE925653760_5,1

Which sentences **best** state a central idea of the passage? Select **two** correct answers.

- A** Wearable technology can enable more effective healthcare monitoring.
- B** Doctors cannot make accurate diagnoses without analyzing detailed data.
- C** Electronic devices currently in use are inadequate for capturing health data.
- D** The human body can generate enough power to run devices such as pacemakers.
- E** Researchers are using principles of the piezoelectric effect to develop new devices.



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