# 1201307 – English for Information Technology 4

## Worksheet 1

**Article:** Researchers create a T-shirt that monitors the wearer’s breathing rate in real time.

**Summary:** Researchers have created a smart T-shirt that monitors the wearer's respiratory rate in real time. This innovation paves the way for manufacturing clothing that could be used to diagnose respiratory illnesses or monitor people suffering from asthma, sleep apnea, or chronic obstructive pulmonary disease.

**Full story:**
Researchers at Université Laval's Faculty of Science and Engineering and its Center for Optics, Photonics, and Lasers have created a smart T-shirt that monitors the wearer's respiratory rate in real time. This innovation, the details of which are published in the latest edition of *Sensors*, paves the way for manufacturing clothing that could be used to diagnose respiratory illnesses or monitor people suffering from asthma, sleep apnea, or chronic obstructive pulmonary disease.

Unlike other methods of measuring respiratory rate, the smart T shirt works without any wires, electrodes, or sensors attached to the user's body, explains Younes Messaddeq, the professor who led the team that developed the technology. "The T-shirt is really comfortable and doesn't inhibit the subject's natural movements. Our tests show that the data captured by the shirt is reliable, whether the user is lying down, sitting, standing, or moving around."

The key to the smart T-shirt is an antenna sewn in at chest level that's made of a hollow optical fiber coated with a thin layer of silver on its inner surface. The fiber's exterior surface is covered in a polymer that protects it against the environment. "The antenna does double duty, sensing and transmitting the signals created by respiratory movements," adds Professor Messaddeq, who also holds the Canada Excellence Research Chair in Photonic Innovations. "The data can be sent to the user's smartphone or a nearby computer."

As the wearer breathes in, the smart fiber senses the increase in both thorax circumference and the volume of air in the lungs, explains Messaddeq. "These changes modify some of the resonant frequency of the antenna. That's why the T-shirt doesn't need to be tight or in direct contact with the wearer's skin. The oscillations that occur with each breath are enough for the fiber to sense the user's respiratory rate."

To assess the durability of their invention, the researchers put a T-shirt equipped with an antenna through the wash -- literally. "After 20 washes, the antenna had withstood the water and detergent and was still in good working condition," says Messaddeq.

**Source:** https://www.sciencedaily.com/releases/2017/05/170518140254.htm

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**Vocabularies:**

| **Words** | **Meaning** |
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