G8 Science: Class 5 Homework

Read the following excerpt and answer the questions below. Adapted from Nelson Science and Technology Perspectives 8 (2009), p. 72-73.

THE PROS AND CONS OF AUTOMATION

Figure 1   One of the benefits of automation is the increased freedom it allows.

Automation is the use of mechanical and electronic equipment to reduce the need for human labour. There are many benefits to automation. Machines can be used for repetitive and boring work. In factories, automation can produce more goods in less time with fewer materials. Dangerous tasks can be done with increased safety. Automation in our homes helps us wash our clothes and dishes, clean our carpets, and search for information around the globe. Specialized automated devices such as the Smart Wheelchair let persons with physical challenges enjoy greater independence.

Automation also has environmental benefits. Modern heating and cooling system controls help us reduce energy for heating and cooling when we are asleep or away from home. Robots are used in mining, resulting in less waste. Environmental protection—from oil spill cleanup to forest firefighting—relies on various forms of automation.

There are also disadvantages to automation. Traditional skills may be lost as machine-made products replace handmade goods. When this happens, local communities may suffer. Unemployment often results when machines do the work that people can do. Increased demand for energy to run machines consumes additional resources and produces more environmental pollution.

In the agriculture industry, automation has resulted in improved crop yields. However, it has also led to the increased use of chemical fertilizers, herbicides, and pesticides. Automated food delivery systems and animal waste removal systems help livestock production by concentrating animals into smaller and smaller areas. Unfortunately, this can result in groundwater contamination by animal waste. In surface mining operations, automation enables us to move vast amounts of material quickly but the environmental effects of doing so may be devastating and long-lasting.

QUESTIONS

1. Define "automation". **[1 mark]**

2. List five positive and five negative effects of automation. **[10 marks]**

Positive Effects	Negative Effects

3. List three manual tasks at home that have now been replaced by automated machines **[3 marks]**

4. State whether it is a good idea or bad idea to automate the following tasks and give your reasoning.

   a) Filling toothpaste tubes at a manufacturing plant **[2 marks]**

   b) Selling drinks, snacks and other food from vending machines **[2 marks]**

   c) Creating a customized piece of jewelry **[2 marks]**

   d) Supervising a group of kindergarten children **[2 marks]**

   e) Making new friends **[2 marks]**

5. Are humans still necessary in an automated world? Explain your reasoning. **[2 marks]**

6. Your grandparents always say that things are not made like they were before. Explain what they mean. **[2 marks]**