

Wristwatch Design for the Visually Impaired Activity – Engineering Design Process Pre-Test – **Answers**

Question 1

A tire company is creating a new tire for a motorcycle to drive off-road in sandy and rocky conditions as well as on roads. Engineers developed three different tread patterns. Based on the engineering design process, the next step the company should take is to: *(please circle)*

- a. send out a questionnaire about tires to the public
- b. select which tread design will be best**
- c. research the properties of rubber
- d. see which tire is the most expensive

Question 2

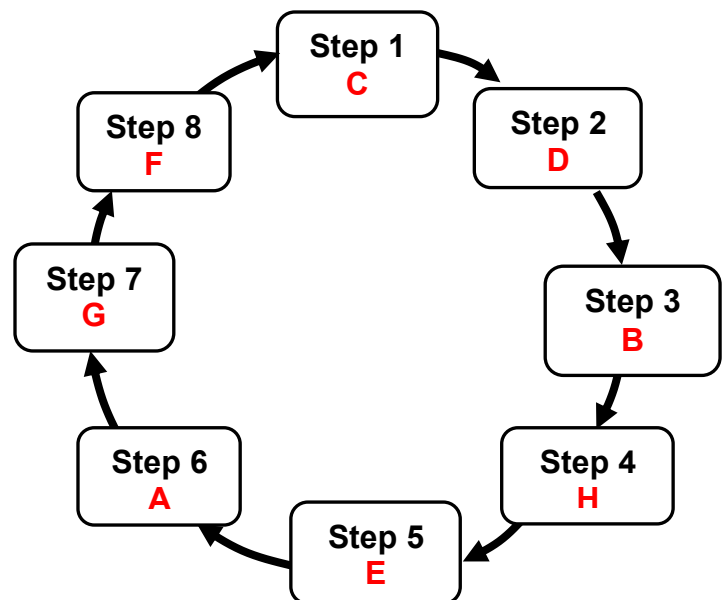
Rob and his team have been chosen to build a wind turbine at a local ski resort that needs to generate electrical energy and withstand the harsh environment of the mountains. Rob and his team have done their research on the problem. What would be the next step for the team? *(please circle)*

- a. create a prototype of the wind turbine
- b. develop possible solution(s) for the turbine and how it will fit the criteria needed**
- c. test the wind turbine on the mountain during the harsh winter months
- d. redesign a new solution for this turbine

Question 3

Below are the eight steps of the engineering design process, and they are not in the correct order. Please fill in the blank boxes (in the image at right) with the number of each of the steps to show the correct order.

- A. Test and evaluate the solution
- B. Develop possible solution(s)
- C. Identify the need or problem
- D. Research the need or problem
- E. Construct a prototype
- F. Redesign
- G. Communicate the solution
- H. Select the best possible solution(s)



(Image Source: Massachusetts Science and Technology/Engineering Curriculum Framework, October 2006, page 84.)

Question 4

John needs to create a boat out of a 20-gram ball of clay. His boat must float and hold 10 marbles. Match a numbered step in the EDP below with the explanation in the list below.

- A. Test and evaluate the solution
- B. Develop possible solution(s)
- C. Identify the need or problem
- D. Research the need or problem
- E. Construct a prototype
- F. Redesign
- G. Communicate the solution
- H. Select the best possible solution(s)

 G John should report and discuss his findings about the clay boat.

 F John should make changes to his design based on the results of testing and feedback.

 D John should find out how boats are made, characteristics of boats and clay, and what makes something buoyant.

 B John should create multiple plans for his boat.

 E John should work with the clay to form it into a shape that will hold 10 marbles and maintain buoyancy.

 H John should decide, based on his research, what boat design will hold all 10 marbles and float.

 C Using a 20g ball of clay, John must make a boat that will float and hold 10 marbles.

 A John should try to float the boat with 10 marbles in it and note how well it works and any issues that come up.

Question 5

Students have a box of ice pops to take to their soccer game to sell on a hot day. The students know they need a device to keep the ice pops from melting for 3 hours. They have a \$15 budget. Which step of the engineering design process does this demonstrate? (*please circle*)

- a.** identify a problem
- b. test and evaluate
- c. redesign
- d. develop possible solutions

Question 6

The image at right shows a smart phone.

Which of the following is *most likely* part of the testing and evaluation stage of designing a smart phone? (*please circle*)

- a. writing an advertisement for the smart phone
- b. defining the specifications for the smart phone
- c. finding the plasticity of a new alloy to be used for the smart phone case
- d. trying the smart phone with a range of voltages to determine when it will fail**



(Image source:
http://www.freedigitalphotos.net/images/Telecommunications_g177-Smart_Phone_p153003.html)

Question 7

Brian is trying to create a motorized scooter for his engineering design project. Which of the following should he do during his *research step*?

- a. Look up current scooter designs online
- b. Ask professionals who work at the local scooter shop
- c. Read the instruction manuals for other scooters
- d. All of the above**