

Name \_\_\_\_\_

Class \_\_\_\_\_

Topic 3 Science, society, and the environment are all important in the development of mechanical devices and other technology.

### 3.1 Evaluating Mechanical Devices

- During the research phase, when a device is improved upon, certain criteria are taken into account. Of the criteria listed below, which would be the least important ...
  - function
  - efficiency
  - effectiveness
  - convenience
- Mechanical devices are evaluated so that the consumer who is ultimately going to use it can make a better choice. Another important reason to carefully evaluate a mechanical device is to ...
  - determine how it can be improved
  - lower its cost
  - make it more fashionable
  - find its esthetic value
- The design of mountain bikes to handle the rough terrain they would be used in, is considered to be evaluating a function because of this influence ...
  - mass appeal
  - mass demand
  - environment
  - ergonomics
- Opening a can has evolved from the earliest cans which were made from iron in 1810. These can were opened by using a ...
  - church key
  - hammer and chisel
  - push button
  - removable tab
- The design and development of opening mechanisms for aluminum cans went through four distinct designs. To get the liquid out of the can you need one large hole or two smaller holes. If two holes are needed, the first is designed to let air into the can, and the second hole is designed to ...
  - create pressure
  - restrict the flow
  - let the fluid out
  - be just for show
- The church key was the first practical design for opening a can. It was a simple machine that multiplied the force needed to open the can. The simple machine it was designed after was the ...
  - wedge
  - 1<sup>st</sup> class lever
  - 2<sup>nd</sup> class lever
  - 3<sup>rd</sup> class lever

7. Another simple machine was built into the removable tab top. It consisted of a small ring that acted like a lever and would make the necessary hole by removing the tab from the can. This was a huge improvement, but it also created a huge problem. The problem it created was ...
- A scientific
  - B environmental**
  - C industrial
  - D commercial
8. By pressing on one of the buttons first - to release the pressure of the contents - before pressing on the second one - to have a hole large enough to drink out of - button cans were less problematic. The pressure in the can came from ...
- A atmospheric pressure
  - B force applied to the button
  - C the contents of the can**
  - D external force causing internal pressure
9. Environmental concerns created further improvements in can-opening devices throughout the 20<sup>th</sup> century. The 'ecology top' was the name given to the ...
- A Church Key
  - B Removable Tab Top
  - C Button Top
  - D Non-removable Tab Top**
10. CSA is a non-government association that tests and approves a wide range of products to ensure they are safe for use by the consumer. CSA stands for ...
- A Consumer Standards Agency
  - B Consumer Safety Association
  - C Canadian Standards Agency
  - D Canadian Standards Association**
11. In a real evaluation of a mechanical device, designers always begin with ...
- A a list of things that they want in the device**
  - B ideas of how to start mass production of the device
  - C cost-effectiveness issues and marketing strategies
  - D ways that safety and efficiency can be improved upon

### 3.2 Technology Develops through Change

12. Sometimes a new device is designed when someone who thinks there can be an easier way to do something makes an observation. An inventor observed a driver manually cleaning snow and ice off the windshield of a streetcar in freezing cold weather, this observation prompted the invention of this ...
- A windshield heater
  - B windshield washer
  - C windshield wiper**
  - D windshield defroster

13. Advances made in the technological improvement of mechanical devices came as a result electricity. The widespread use of electricity outside of Canadian towns and cities didn't occur until the ...
- A 1700's
  - B 1800's
  - C 1920's
  - D 1940's
14. New technologies often develop from scientific research that seems to be unrelated. Particle accelerator research experiments led to the technology behind trains powered by electricity and magnets. These trains 'float' on the tracks. They are known as ...
- A MAGIC
  - B MALLEG
  - C MAVEEG
  - D MAGLEV
15. A particle accelerator is a huge complex machine that does this ...
- A creates new particles
  - B breaks up atoms
  - C makes new elements
  - D creates space in particles
16. Robot technology is widely available and in use today, mainly in industry. The first use of the term '*robotnik*', which is a Czech word meaning 'workers' or 'slaves', was in a Czechoslovakian ...
- A factory
  - B school
  - C play
  - D storybook
17. Improvements in robot technology came as a result of industry trying to ...
- A Improve the assembly of consumer products
  - B Improve the margin of safety in all products
  - C Reducing the workload of the workers
  - D Replace workers because of high wages
18. Robots are extremely complex devices and vary widely in appearance, depending on the job they are designed to do. A simple robot however has some or all of these basic parts: body, motor devices, power source, sensors, output devices, microprocessors. **Spirit** and **Opportunity** are robot rovers on the planet Mars. The solar panels on the robots are examples of these basic parts ...
- A Motor devices
  - B Sensors
  - C Power source
  - D Microprocessors