

Key

ENERGY UNIT STUDY GUIDE

1. A dumbbell weighing 20 kg is stored on a shelf 0.75 m high. How much gravitational potential energy does the dumbbell have? Use QQS to solve:

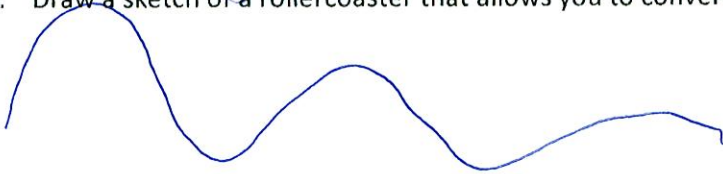
$$GPE = mgh \quad GPE = 20kg \times 9.8 m/s^2 \times 0.75m$$

$$GPE = 147J$$

2. How do you increase the PE of an object?

Increasing the height

3. Draw a sketch of a rollercoaster that allows you to convert PE to KE the most efficiently?



4. If you increase the velocity, which type of energy is increasing?

Kinetic energy

5. What is the kinetic energy of a 20 kg box moving with a velocity of 5 m/s? Use QQS to solve:

$$KE = \frac{1}{2}mv^2 \quad KE = \frac{1}{2} 20kg \times (5m/s)^2 \quad KE = \frac{1}{2} 20kg \times 25m^2/s^2$$

$$KE = 250J$$

6. Define PE:

Stored energy

7. Define KE:

energy in motion

8. Give an example of:

Electrical to Light:

lamp

Chemical to Sound:

fireworks

Chemical to Light:

fire

Chemical to Mechanical:

car / gasoline

9. What type of energy does a battery have? Give an example of an object that uses a battery and what type of energy it transfers to. ~~Chemical~~ Potential energy

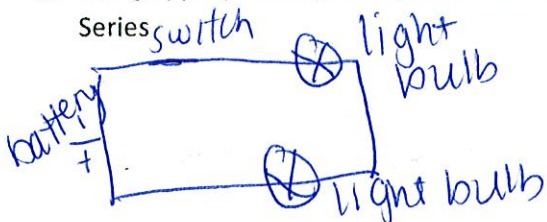
Flashlight → Potential to kinetic

10. What makes a complete circuit?

closed switch, light bulb, battery, and wire

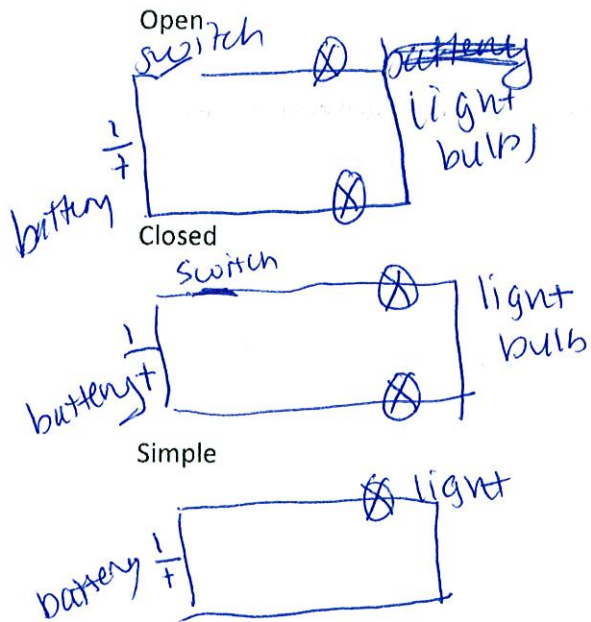
11. Using appropriate symbols, draw and label:

Series



Parallel





12. Define the law of conservation of energy.

Energy can not be created or destroyed just transferred & transformed

13. What is the purpose of a switch?

to turn a circuit on and off

14. Define and give 3 examples of all 6 simple machines.

Lever
Screw
Wheel & axle

Pulley
Wedge
Inclined Plane

15. What is a fulcrum?

the fixed point; the lever pivots

16. What is a compound machine? Give 2 examples and label what simple machines are in it.

a machine which has more than one simple machine
Stapler & wheel barrow

17. Define work. How do you know if work has been done?

The use of force to move an object over a distance, when an object has moved

18. How much work does a crane do if it lifts a 225 N crate from the floor to a height of 13m? Use KQS to solve:

$$W = F \times d \quad 225 \text{ N} \times 13 \text{ m} \\ 2,925 \text{ J}$$

19. An electrical charger uses 144 J in 30 s to charge a mobile phone. How much power did the charger use? Use KQS to solve:

$$P = \frac{W}{t} \quad P = \frac{144 \text{ J}}{30 \text{ s}} \quad P = 4.8 \text{ W}$$