Section 10.4 Powerful Charges

1) Define Power. **Power is defined as energy per unit of time.**

2) What is electrical power? **Electrical power is the amount of electrical energy that is converted into heat, light, sound, or motion every second.**

3) What is the symbol for power? **The symbol for power is P.**

4) What is the equation that defines power? **P = E/t**

5) How can power be expressed? **Power can be expressed in joules per second.**

6) What has the joule per second been renamed as? **The joule per second has been renamed The Watt (W).**

7) What do many electrical devices have marked on them? **Many electrical devices have their power rating on them.**

8) What does that number tell you? **That number tells you how much energy they use every second that they are in operation.**

9) How can you find out how much electrical energy a device uses? **Energy (joules) = Power (watts) x time(seconds) or E = Pt**

10) Do electrical devices convert all of the electrical energy into the desired form of energy? **No, some of the electrical energy gets converted into heat.**

11) What is some electrical energy always converted to? **Some electrical energy always gets converted into heat.**

12) What do engineers try to do when designing electrical appliances? **Engineers try to design electrical appliances and devices as high in efficiency as possible without making them too expensive.**

13) How can you determine the efficiency of an electrical device?
Percent efficiency of the electrical device = Useful energy output/ Total electrical energy input x 100%

14) What does it mean to say that a radio is not 100% efficient?
It is not 100% efficient because it does not use all of the electrical energy input for its function.

15) A washing machine has a power rating of 512W. If one cycle lasts 30 min, how much energy does the machine use per cycle?

E = P x t 30 min = 1800 seconds E = 512 x 1800
E = 921 600 J

The washing machine uses 921 600 J of energy every cycle.

16) A CD player that was on for 1 hour used 360 000 J of electrical energy. What is its power in watts?
E = P x t 60min = 3600 seconds 360 000 = P x 3600

360000/ 3600 = P P = 100 Watts The CD player has a power rating of 100W

17) If a light bulb uses 30 000 J of electrical energy and emits 900 J of light energy, what is the percent efficiency of the light bulb?

Use the formula from question 13. (900/ 30 000) x 100 = 3% The light bulb is 3% efficient.