Shedding Light on Electricity Episode 1: Sources of Electricity   Name: _____
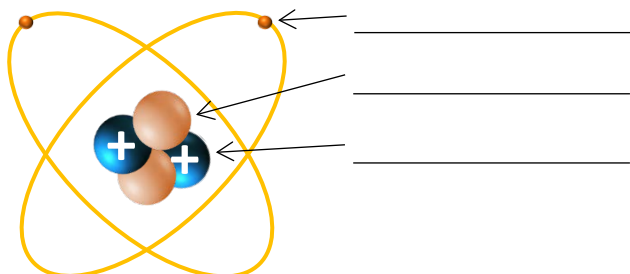
Part A

1. To use electricity, four things are required:

    (a) a source of electricity, three examples of which are _____

    _____,

    (b) a load, three examples of which are _____

    _____,

    (c) _____ and

    (d) _____.

Part B

2. Label the atom below.

    _____

    _____

    _____

3. What is electric current? _____

    _____

    _____

    _____

    _____

    _____

Part C

4. (a) Draw a diagram of a coal-fired power station.

    (b) Describe how it works.

    _____

    _____

    _____

    _____

    _____

    _____

    _____

    _____

5. What is a uranium-235 atom? _____

    _____

6. How do nuclear power stations generate heat? _____

    _____

    _____

    _____

7. (a) Draw a diagram of a hydroelectric power station.

    (b) Describe how it works.

    _____

    _____

    _____

    _____

    _____

    _____

    _____

8. Describe how wind turbines work. _____

_____

_____

9. Obviously when the wind isn't blowing, wind turbines don't produce electricity. How is this problem overcome? _____

_____

_____

_____

10. Describe how solar panels work. _____

_____

_____

11. Why are wind turbines and solar panels called "intermittent" sources of energy? _____

_____

_____

12. Fill in the table below.

Source of Electricity	% production in Australia	% production globally
Coal-fired		
Gas-fired		
Nuclear		
Hydroelectric		
Wind		
Solar		

Electrical Power Demand in Victoria over a 24-hour Period
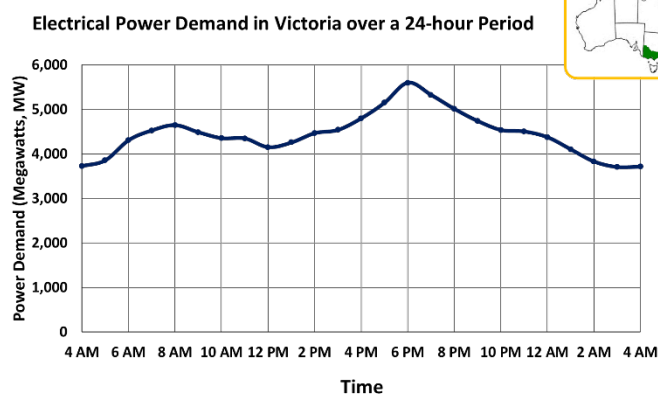
13. Describe, using examples, why electricity demand varies throughout the day. _____

_____

_____

_____

_____

_____

_____

_____

_____

_____

14. Describe two ways that the electricity supply is increased when electricity demand increases.

_____

_____

_____

_____

_____

15. What are some advantages and disadvantages of different forms of electricity generation?

Source of Electricity	Advantages	Disadvantage
Coal and gas		
Nuclear		
Hydroelectric		
Wind		
Solar		

16. A friend tells you that Australia needs to shut down all of our coal- and gas-fired power stations because they produce too much carbon dioxide. How would you respond?

_____
_____
_____
_____
_____

SKILL-BUILDING EXERCISES

The percentage increase in a quantity can be worked out by the following formulas:

percentage increase $= \frac{\text{change in quantity}}{\text{initial quantity}} \times 100\%$ OR percentage increase $= (\frac{\text{final quantity}}{\text{initial quantity}} \times 100\%) - 100\%$

Eg. If a value increases from 8 to 14, the percentage increase is

% increase $= \frac{\text{change in quantity}}{\text{initial quantity}} \times 100\% = \frac{\text{final quantity - initial quantity}}{\text{initial quantity}} \times 100\% = \frac{14\text{-}8}{8} \times 100\% = \frac{6}{8} \times 100\% = 75\%$

OR

% increase $= (\frac{\text{final quantity}}{\text{initial quantity}} \times 100\%) - 100\% = (\frac{14}{8} \times 100\%) - 100\% = 175\% - 100\% = 75\%$

In other words, 75% of the original value (6 is 75% of 8) has been added to the original value.

17. Using the graph in Part E, determine the power demand for Victoria at 4 am. _____
18. Using the same graph, determine the power demand for Victoria at 6 pm. _____
19. Calculate the change in power demand between 4 am and 6 pm. _____
20. Calculate the percentage increase in power demand from 4 am to 6 pm?

21. In other words, power demand increased by _____% from 4 am to 6 pm.
22. What was the percentage increase in power demand from 2 pm to 6 pm?