Year 12 Science: The chemistry behind the lithium-ion battery

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Write the oxidation half equation at the graphite electrode during discharge.

2. Give the oxidation number of cobalt in CoO_2 and in $LiCoO_2$, and say whether cobalt is oxidised or reduced on discharge.

3. Explain why water cannot be used as the solvent in the electrolyte.

4. Explain why Yoshino's carbon electrode made the battery safer than Whittingham's.

5. A laptop battery is labelled 11.1 V and 4.0 Ah. How many 3.7 V cells are in series, and how much energy does it store in Wh?

Fix the mistake

6. Correct this statement: "Electrons travel through the electrolyte from one electrode to the other."

7. Correct this statement: "The lithium-ion battery runs out because the lithium gets used up."

8. Correct this statement: "My report lists the history and the equations in separate sections."

9. Correct this statement: "$CoO_2 + e^- \rightarrow LiCoO_2$ is the reduction half equation."