**Cecil Andrews College**

**YEAR 12 CHEMISTRY**

**RESEARCH INVESTIGATION**

Research the following electro-chemical devices:

1. Zinc/carbon dry cell.
2. Hydrogen-oxygen fuel cell.
3. Lead-acid accumulator.

For each device, you need to

1. Draw a diagram, showing the electrolyte, anode and cathode and what each is made of.
2. Write the equations for the reactions at each electrode.
3. State the common uses for the device.
4. List any disadvantages associated with the device.

You may like to use the outline on the back of this page to help your research summary.

**In week 9**, you will be given a test based on this research.

**Commercial dry cell:**



1. Label the diagram below.
2. Write the chemical equation for the reaction at:

Anode:

Cathode:

Overall:

3) State the function of the following in the dry cell.

1. ZnCl2.
2. NH4Cl.

4) List some common uses of the dry cell. Why is this structure called a dry cell?

5) Describe the advantages and disadvantages of dry cells. State one environmental issue

associated with their manufacturing and/or use.

**Fuel cell:**

1. Label the diagram below using the following words:

*(load, oxygen gas, hydrogen gas, electron flow, cathode, anode, electrolyte, water, hydrogen ions or hydroxyl ions).*

****

1. State the equation for:

a) Anode Reaction

1. Alkaline version.
2. Acidic version.

b) Cathode Reaction.

1. Alkaline version.
2. Acidic version.
3. List some common uses of the fuel cell.

4) Describe the advantages and disadvantages of fuel cells. State one environmental issue

associated with their manufacturing and/or use.

**Lead-acid accumulator:**

For the diagrams below i. label the anode and cathode ii. direction of electron and ions flow.

iii. explain the labelling on the electrodes.



1)

a) When the battery **discharges** (in use), state the anode and cathode chemical equations.

1. Anode:
2. Cathode:

b) When the battery **recharges**, state the anode and cathode chemical equations.

1. Anode:
2. Cathode:

√

2) Describe the advantages and disadvantages of lead-acid accumulator. State one environmental

issue associated with their manufacturing and/or use.