

To our teachers:

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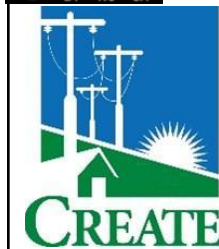
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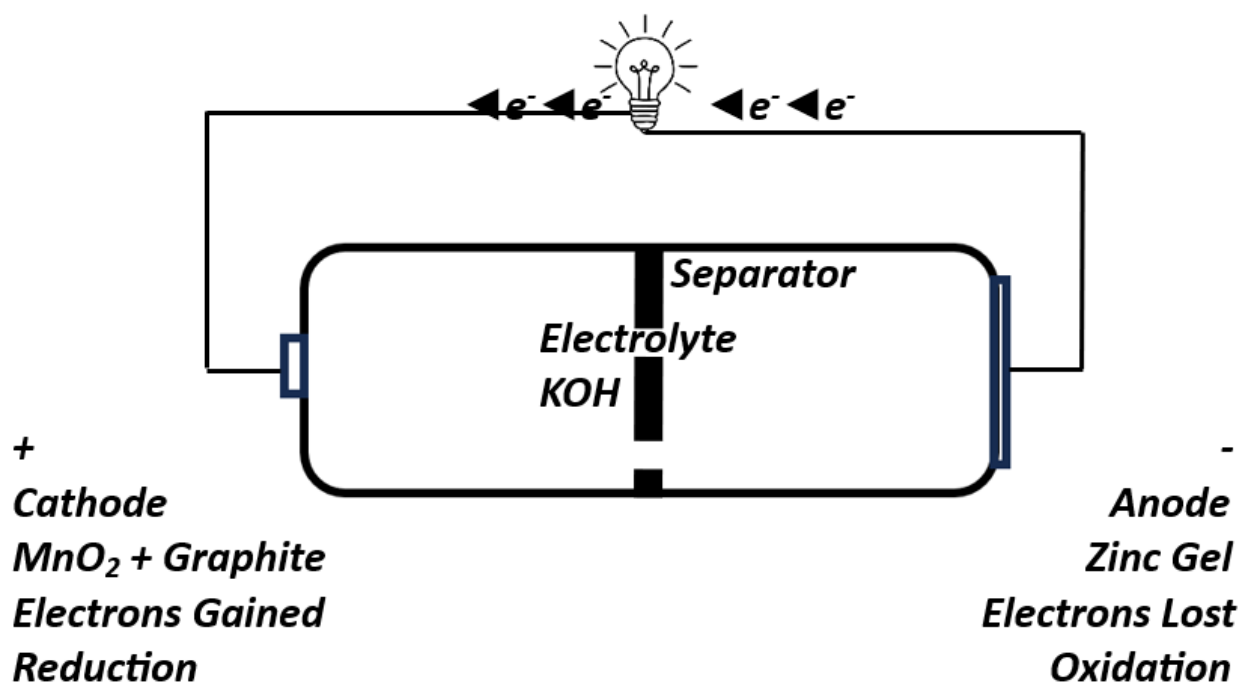


Wisconsin Public Service
SolarWise for Schools
and the
The CREATE Energy Center

BATTERY BASICS:

CHAPTER TWO – THE PRIMARY BATTERY

INSTRUCTOR ANSWER KEY



Write and draw on the picture from the preceding page according to the directions that follow. For digital submission, take a cell photo of your completed picture, delete our picture, and paste your photo in its place.

1. Draw a **wired electrical circuit** connecting the zinc electrode to the copper electrode through a **small light bulb load**.
2. Write **+** (a positive sign) at the terminal, or electrode, that is positive.
3. Write **Cathode** at the electrode that is called the cathode.
4. Write **—** (a negative sign) at the terminal, or electrode that is negative.
5. Write **Anode** at the electrode that is called the anode.
6. Draw several **e⁻** (electrons) flowing through your electrical circuit. Indicate the direction of their flow with **→** (an arrow).
7. Write **Zinc Gel** at the electrode where it is found.
8. Write **Electrons Lost** at the electrode where electrons are lost.
9. Write **Oxidation** at the electrode where oxidation takes place.
10. Write **MnO₂ + Graphite** at the electrode where it is found.
11. Write **Electrons Gained** at the electrode where electrons are gained.
12. Write **Reduction** at the electrode where reduction takes place.
13. Write **Electrolyte** where it is likely to be found.
14. Write **KOH** beneath where you wrote the word electrolyte.
15. Draw a separator where it is likely to be found.
16. Write **Separator** next to your drawing of the separator.

17. In your own words, explain the purpose of the separator.

The separator “is a safety feature...a physical barrier to prevent an internal short circuit. It prevents physical contact between, and the direct transfer of electrons from, the anode to the cathode materials. The separator must also allow ions to move through the electrolyte for the battery to produce electricity. For this reason, the separator has microscopic pores (or holes) in it that allow for the passage of ions and molecules. Close up, you can see the separator is made up of microscopic fibers, often made of plastic. It does not allow anode and cathode materials to contact each other, but dissolved ions and electrolyte chemicals may pass through it.”

18. In your own words, explain why an alkaline primary battery is called (or labeled) as “alkaline.”

“In an alkaline battery, the electrolyte is usually a solution of potassium hydroxide, KOH, dissolved in a water-based paste. Potassium is an alkali metal. Hence the name, alkaline battery.”