Ben D - WHERE challenge script - Where Alkaline AA Batteries come from

Kid : Mom, my flashlight isn’t working.

Mom : Did you try changing the batteries?

Kid : Not yet, can you pass me some?

Mom : If you tell me what's in them.

Kid : If you really want to know I can tell you.

Mom : Okay!

Kid : To narrow things down there is a shell, a separator and an electrolyte, but two of the most important parts are the anode and the cathode. Those are the parts that make energy through a chemical reaction. The material that is in the anode of some double A alkaline batteries is zinc, and the material that is in the cathode is manganese dioxide.

Kid : Zinc is usually hard and brittle. It is mainly mined in Canada , Iran, Australia, the USA, China and Peru. Canadian zinc mines are in BC, Saskatchewan, Manitoba, Ontario, Quebec, Northwest Territories, Yukon and Nunavut.

Kid : Zinc is mined by drilling, blasting and hauling. After the zinc is mined it frothed which means to take all of the water and liquid oil out of it. After that the zinc is filtered from all the other rock. Next the zinc is put in a blast furnace to give it its shape. Finally the zinc is cooled and put into the anode of your battery.

Kid : The material that is in the cathode is manganese dioxide. Like zinc manganese is very hard and brittle. It has a silvery gray colour. Manganese is mainly mined in China, Africa and Australia. In Canada it is mainly mined in New Brunswick.

Kid : Manganese is usually mined by a type of mining called open pit mining. After its sent to a processing plant it is put in a chemical reaction which turns it into manganese dioxide. Manganese dioxide can also be found naturally. Finally the manganese dioxide is put into the cathode of your battery.

Kid : Can I have those batteries now?

Mom : Sure!

Mom: (throws batteries to kid)

Kid: (turns on flashlight)

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911metallurgist. “Froth Flotation Process.” *Mineral Processing & Metallurgy*, 20 Jan. 2021, www.911metallurgist.com/blog/froth-flotation-process.

Betts, Douglas E. “Zinc.” How Products Are Made, 2021, www.madehow.com/Volume-2/Zinc.html.

Canadian Manganese Company, Buchans Resources Limited Inc., 2019., https://www.mincoexploration.com/wp-content/uploads/2020/01/Information\_Concerning\_Canadian\_Manganese\_Company\_Inc.pdf

Chemical Book. “Manganese Dioxide.” *Manganese Dioxide | 1313-13-9*, 2017, www.chemicalbook.com/ChemicalProductProperty\_EN\_cb4139599.htm.

Columbia Electronic Encyclopedia. “Battery, Electric.” FactMonster, 2012, www.factmonster.com/encyclopedia/science/engineering/electrical/battery-electric.

Columbia Electronic Encyclopedia. “Manganese.” FactMonster, 2012, www.factmonster.com/encyclopedia/science/chemistry/elements/manganese.

Downing, James H. “Manganese Processing.” Encyclopædia Britannica, Encyclopædia Britannica, Inc., 23 Aug. 2013, www.britannica.com/technology/manganese-processing.

Energizer Brands LLC. “What Is inside a Battery?” *Energizer*, 2000, www.energizer.com/about-batteries/what-is-in-a-battery.

Gauvin, M.J., et al. “Zinc.” Zinc | The Canadian Encyclopedia, 7 Feb. 2006, www.thecanadianencyclopedia.ca/en/article/zinc.

Kordesch, K, and W Taucher-Mautner. “Primary Batteries.” Manganese Dioxide - an Overview | ScienceDirect Topics, Encyclopedia of Electrochemical Power Sources, 2009, www.sciencedirect.com/topics/chemistry/manganese-dioxide#:~:text=Activated%20manganese%20dioxide%20is%20prepared,manganese%20compounds%20followed%20by%20oxidation.

“Manganese - Element Information, Properties and Uses: Periodic Table.” Manganese - Element Information, Properties and Uses | Periodic Table, Royal Society of Chemistry, 2021, www.rsc.org/periodic-table/element/25/manganese#:~:text=Manganese%20is%20the%20fifth%20most,%2C%20Africa%2C%20Australia%20and%20Gabon.

“Manganese.” Wikipedia, Wikimedia Foundation, 28 Feb. 2021, en.wikipedia.org/wiki/Manganese.

Perkins, Melanie, et al. “Collaborate & Create Amazing Graphic Design for Free - Canva.” *Canva*, 2012, www.canva.com/.

Post, Jeffrey E. “Manganese Oxide Minerals: Crystal Structures and Economic and Environmental Significance.” PNAS, vol. 96, no. 7, 30 Mar. 1999, pp. 3447–3454.

Raw Materials Company. “Raw Materials Company Inc.” What's Inside A Battery, 2021, www.rawmaterials.com/page/education/battery-inside/.

“Zinc.” Britannica School, Encyclopædia Britannica, 18 Feb. 2021, school.eb.com/levels/elementary/article/zinc/353953.

“Zinc.” Wikipedia, Wikimedia Foundation, 3 Mar. 2021, en.wikipedia.org/wiki/Zinc.