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Copper, never ending recycling

Module 1

Objective: the copper webquest

Introduction

Electronics waste, commonly known as e-scrap and e-waste, is the trash we generate from surplus, broken and obsolete electronic devices.

Electronics are full of valuable materials including copper, tin, iron, aluminum, fossil fuels, titanium, gold, and silver. Many of the materials used in making these electronic devices can be recovered, reused and recycled, including plastics, metals, and glass.

Here, we explore the role of copper products in meeting present and future societal needs such as renewable energy, healthcare, more energy efficient transportation and modern communications.

It's hard to imagine a world without copper. We rely on copper for power, lighting, heating, communications, water supply and transport. Copper makes our homes, schools and businesses efficient, comfortable and decorated, and it lasts for many years.

You are going to explore Copper's life cycle, why Copper is considered a circular material and how recycling saves CO_2.

Requirements

- Computer, internet connection

Welcome

Title: Copper from e-waste
Description: This is a trip on the web to introduce you to the fundamental role of recycled metals
Grade Level: 16-19 years
Curriculum: chemistry
Keywords: Copper, metals, Waste, recycle

Introduction

You're most likely already familiar with the concept of recycling, and probably recycle paper, glass, clothing, shoes, aluminum drink cans and baked bean tins, but have you ever thought about recycling copper?

Brass bathroom taps, copper water pipes and electric cables, but in particular electronic devices, all contain copper and are much longer-lasting and more valuable than any of the above. When these components eventually become unusable, possibly due to refurbishment or rebuilding, they are too valuable to be dumped in a trashcan, ending up in landfills. They too can be recycled and the recovered copper used to make new products, which will have the same properties as those made from 'virgin' copper that has been newly mined and refined.

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Recyclability is one property that helps to establish the 'green credentials' of a material, which is to say how environmentally friendly it is.

Demand for copper, along with other metals such as steel, aluminum and nickel, is growing as countries throughout the world continue to develop industrially with a consequent requirement for more raw materials. To help conserve the world's raw materials, there is a growing emphasis on recycling; however, for a more meaningful 'green' rating, a material's sustainability needs to be considered.

Task

A company that mines platinum has recently discovered a rich source of copper near ones of its mines.

Unfortunately, their financial situation is critical so, needing new founds, they are looking for new lenders.

The company has asked to your savvy chemical team to probe the chemistry of copper and some of its compounds and prepare a presentation for the probable partners.

You should show them that its combination of useful properties makes it and its alloys suitable for a wide range of uses that enable and enhance our daily lives. By understanding the chemistry of copper and the great possibilities of use and recycling this metal it hopes to convince them.

Your team must device a synthetic route that is cyclical, allowing them to become aware of the huge utility of copper. The life of copper is infinite and has no end phase. Once mined, it can be recycled over and over with no loss of properties. As such, copper is a sustainable material that is pivotal to building the circular economy.

Process

Webquest

Visit these sites and collect all the information you need about raw materials (copper in particular), e-waste, recycling, circular economy.

- http://criticalrawmaterials.org
- https://en.wikiversity.org/wiki/Critical_materials
- http://www.iai.it/en/pubblicazioni/europes-dependence-critical-raw-materials
- https://youtu.be/f2BhwrJJ-nc
- https://youtu.be/RmaGh4g1JtY
- https://copperalliance.eu/
- https://youtu.be/YhATvmfLKms

Activity: Work in pairs and realize a ppt, a poster, or flyers useful to convince to invest in the copper mines.