The Periodic Table of the Elements

Features:
- Essential metals
- Medicinal roles
- Assisted by toxicity

- Actinides
- Lanthanides

Additional Elements:
- Ac (Actinium)
- Th (Thorium)
- Pa (Protactinium)
- U (Uranium)
- Np (Neptunium)
- Pu (Plutonium)
- Am (Americium)
- Cm (Curium)

- Bk (Berkelium)
- Cm (Curium)
- Bk (Berkelium)
- Esp (Espinel)

- Al (Aluminum)
- Si (Silicon)
- Ge (Germanium)
- As (Arsenic)
- Se (Selenium)
- Br (Bromine)
- At (Astatine)
- Tl (Thallium)
- Pb (Lead)
- Bi (Bismuth)
- Po (Polonium)
- At (Astatine)
- Rn (Radon)

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Teaching notes: Just a few... I'd love for people to add teaching notes to this as they go through the exercise

Students often cite sources such as Zicam™ or multivitamins, or personal knowledge from an MRI or CT scan. I try to encourage this as much as possible because the students are

1. Note that Iron has all three classifications. Many essentials are toxic when the concentration is too high. The concentration of these metals must be tightly regulated in an often small window.
2. Toxicity of a metal may depend on oxidation state as well. Cr(III) is essential but hexavalent chromium is highly toxic.
3. In spite of the toxicity of some metals we have found medicinal uses for them. For example, Pt is used in anticancer treatments, and gold is used in treatments for rheumatoid arthritis. This has been especially true in imaging where the decay properties of species like Tc have led to huge advances.