

Topic 2.2 Check Your Understanding Questions – KEY

1. How is the atomic number of an element related to the structure of an atom of that element?

Atomic number is the same as the number of protons in an atom of that element.

2. List five pieces of information that are recorded on a typical periodic table.

Answers may vary.

Atomic mass, atomic number, number of protons, ion charge, element name, element symbol, group number, family names, etc.

3. Compare and contrast the alkali metals and alkaline-earth metals.

Alkali metals	Both	Alkaline-earth metals
<ul style="list-style-type: none"> - Softer - More reactive - Different elements: Li, Na, K, Rb, Cs, Fr - Group 1 - Ion charge of +1 	<ul style="list-style-type: none"> - Soft - Reactive - Shiny - Metals 	<ul style="list-style-type: none"> - Less soft - Less reactive (but still quite reactive) - Different elements: Be, Mg, Ca, Sr, Ba, Ra - Group 2 - Ion charge of +2

4. Classify each of the following elements as a metal, a non-metal, or a semi-metal.

- a. Si: semi-metal
- b. Sb: semi-metal
- c. Kr: non-metal
- d. Hg: metal
- e. N: non-metal
- f. Cs: metal
- g. Pb: metal

5. Make a venn diagram to compare physical properties of metals and non-metals.

Metal	Both	Non-metal
<ul style="list-style-type: none"> - Bottom-left of periodic table; hydrogen not included - Shiny - Malleable - Good conductors of heat and electricity - Almost all (except mercury) are solid at room temperature 	<ul style="list-style-type: none"> - Elements on the periodic table - Can include solids at room temperature - A range of atomic numbers and masses - Include highly reactive elements 	<ul style="list-style-type: none"> - Top-right of periodic table, plus hydrogen - If solid, are dull in colour - Poor conductors of heat and electricity - Solid, liquid, or gas at room temperature - Make negative ion charges or none at all

- Make positive ion charges		
-----------------------------	--	--

6. Which group on the periodic table has elements in all three states of matter? Give examples

Group 17. Bromine is the only element that is liquid at room temperature. Fluorine and chlorine are gases. Astatine is a solid.

7. Describe where on the periodic table you find the following:

- Metals: to the bottom-left of the 'staircase'.
- Non-metals: to the top-right of the 'staircase', plus hydrogen
- Semi-metals: between metals and non-metals

8. Anishinaabe Elder Betty McKenna has said that "we contain all those little bits and pieces that's out there. We have calcium, we have salt, we have iron, we have copper, zinc and potassium....[We] go from the universe right down to Mother Earth and that's us." How does this quote relate to what you have learned about the elements?

Answers will vary.

9. In the past, gold rushes in British Columbia and elsewhere saw large numbers of everyday people traveling long distances, hoping to find veins of pure gold. Gold is somewhat unusual among metals – most have to be extracted from compounds and are not found in their elemental form, as gold is. What does this tell you about the reactivity of gold?

Gold is non-reactive. It does not react with other elements to form compounds readily. Therefore, in nature, it is found in elemental form instead of in compound form.

10. On May 6, 1938, a passenger airship called the *Hindenburg* caught fire and crashed, killing nearly half of its passengers as well as one person on the ground. The airship was filled with hydrogen gas. Although people disagree with the sequence of events that led to the disaster, the combustibility of the hydrogen likely contributed.

a. What property of hydrogen would have led to its use in airships?

Hydrogen has a low density. You need low density for an airship because the overall density of the airship + passengers must be lower than the density of the air around it in order for the airship to float. (Reminder from gr 8: less dense things float on top of denser things)

b. Helium is the gas used today for airships. What property of helium makes it more suitable for use in airships than hydrogen?

Helium is a gas so it also has a low density. In addition, helium is non-reactive (inert). It would not catch fire the same way that hydrogen did.