

STUDY GUIDE - Ch.2.1 - Matter consists of chemical elements in pure form and in combinations called compounds.

NAME: _____

- **PHYSICALLY PRINT OUT this PDF and HANDWRITE (with a black or blue pen) your answers directly on this PDF.** Typed or digitally-written work is **not** be accepted. Do **not** answer questions on separate paper.
- **Importantly, study guides are NOT GROUP PROJECTS!!!** You, and you alone, are to answer the questions as you **read** your assigned textbook. You are **not** to share answers with other students. You are **not** to copy any answers from any other source, including the internet.
- **Get in the habit of writing LEGIBLY, neatly, and in a medium-sized font.** AP essay readers and I will skip grading anything that cannot be easily read so start perfect your handwriting, and don't write so large you can't add all the relevant details and key elaborations in the space provided.
- **SCAN physical documents in color and with good resolution. Then, upload your final work as PDFs to Archie.** Avoid uploading dark, shaded, washed out, side ways, or upside down scans of homework. Keep completed physical study guides organized in your biology binder to use as future study and review tools.
- **READ FOR UNDERSTANDING and not merely to complete an assignment.** ***First***, read a section quickly to get an overview of the topic covered. Then, read it a **second** time slowly, paraphrasing each paragraph **out loud** and analyzing every figure. Finally, read it a **third** time as you answer the study guide questions if assigned and to start building your memory. Try to write answers out in your own words when possible and to purposefully and accurately use all new terminology introduced.

1. We say that all life on Earth is composed of matter. What is **matter**?
2. a. Matter is made up of elements. What is an **element**?
- b. Scientists have identified 92 elements in nature. Provide an example of an element **not** mentioned in the related paragraph in your textbook.
3. a. **Atoms of an element are the smallest units of matter that retain the properties of that element.** In terms of the electron configuration in the electron cloud, atoms don't always have the number of electrons that allow them to be most stable. In an attempt to reach the most stable (**lowest-energy**) state, which is often when their outmost valence electron shell is filled with the maximum number of electrons possible, atoms may interact, forming ionic or covalent bonds. **When atoms covalently bond, we call the substance that results a molecule.** Molecules can be made of atoms of the same element or atoms of different elements. **When atoms of different elements form ionic bonds we can the substance that results a salt.** Salts and and certain molecules can also be referred to as **compounds**. What is a **compound**?
- b. Provide an example of a compound **not** mentioned in this paragraph.
- c. O₂ gas is made up of two atoms. Is O₂ a compound? Explain.
4. Explain what is meant when it is said that **compounds have emergent properties**.

5. How many of the 92 elements are known to be **essential to life**?

6. a. What is the difference between an **essential element** and a **trace element**?

Essential Element =

Trace Element =

b. Is a trace element an essential element? *(Check your answers by going to the Ch.2.1 Concept Check Question #2 in Appendix A of your textbook)*

c. **Iron (Fe) is one trace element essential to all life forms.** Name four more **trace elements humans must acquire from their diets**, even if they only **make up less than 0.01% of a human's body**. (See Table 2.1).

_____ + _____ + _____ + _____

d. In humans, iron (Fe) is required for the proper functioning of hemoglobin, the molecule that carries oxygen (O₂) in the red blood cells in blood. What do you think might be the effect of an iron deficiency? *(Check your answers by going to the Ch.2.1 Concept Check Question #3 in Appendix A of your textbook)*

7. a. List the four **essential elements** that make up **96%** of all living matter.

_____ + _____ + _____ + _____

b. List the seven **essential elements** that make up most of the remaining **4%** of living matter.

_____ + _____ + _____ + _____

_____ + _____ + _____ + _____