

GRAYS TUITION CENTRE – Online Tutoring

WEEK: 4

Week Beginning: (11/01/2021)

Subject: SCIENCE

Year: 7

Lesson Objective:

- Teach Topic 1: Atoms and Elements
- Topic 2: Compounds

Keywords/ Concepts

- Elements, Periodic Table
- Compound and Chemical Reactions

Class Questions

1. What is the definition of atoms?
2. What is an element?
3. Where are elements arranged?
4. Give the element for the following symbols:
 - a. C
 - b. Zn
 - c. Mg
 - d. Al
5. Give the symbol for the following elements?
 - a. Aluminium
 - b. Radon
 - c. Argon
 - d. Helium
6. What are groups and what are periods?
7. Which elements have similar properties?
8. Which elements react violently with water?
9. What's a compound?
10. What's a molecule?
11. How are compounds formed? 12. Give an example of a chemical formula?

Homework

- 2x Worksheets attached

Additional Notes

All lessons is split into 3 sections:

- Topic 1 + questions
- Topic 2 + questions
- Quiz + Recap

Make sure students mark their homework with the answers provided

Answers for Week 6 Pg 70

- Q1
- T
 - F
 - F
 - T
 - T
 - T
 - T

Q2

	Particles are close together	Particles are held in fixed positions	Particles are moving or vibrating
Solid	✓	✓	✓
Liquid	✓		✓
Gas			✓

Q3

A — X, B — Z, C — Y

Answers for Week 6 Pg 71

Q4 E.g. the forces between particles in solids are very strong, they hold the particles very close together and stop the particles being able to move much. In liquids the forces between the particles are slightly weaker. The particles are held close together, but they can move past each other. In gases the forces between particles are very weak, so the particles are far apart.

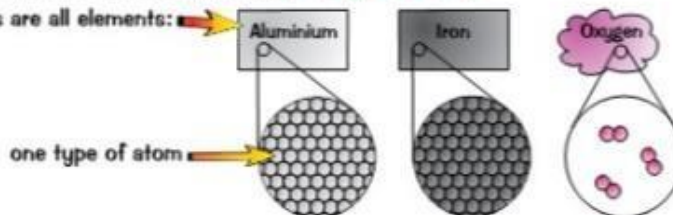
Q5 a) Yes
b) No

Q6 a) E.g. particles are close together but able to move past each other. They're constantly moving in all directions.
b) E.g. constant volume, ability to flow, not easily compressed.

Atoms and Elements

Everything on Earth is Made up of Atoms

- 1) **ATOMS** are pretty much the **smallest, simplest** type of **particle**.
- 2) An **ELEMENT** is a substance that contains only **one type of atom**.
- 3) These substances are all elements:



Every Element Has a Name and a Symbol

- 1) The symbol for an element can be **one or two letters**.
 - The symbol for **oxygen** is **O**.
 - The symbol for **aluminium** is **Al**.
- 2) Some symbols **make sense** (like **O** for **oxygen**). But some are a bit **weird** — like **Fe**, the symbol for **iron**.
- 3) You can find the symbols for **all the elements** in the **periodic table**.

The Periodic Table Lists All the Elements

- 1) Elements in the periodic table are arranged in **GROUPS** and **PERIODS**.



- 2) All the elements in a **GROUP** have **similar properties**.
For example, all the elements in **Group 1** are **soft, shiny metals**.
- 3) But the **properties** of elements **change** as you go **DOWN** a group.
E.g. all the **Group 1** metals **react** with **water**.
But elements at the **bottom of the group** react **more violently** than elements at the **top**.

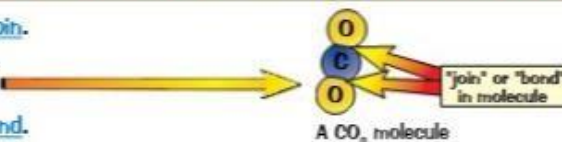
A Periodic Table for two please Sir...
You don't need to learn the name or symbol for every element. You do need to learn **everything else**.

Compounds

It would be pretty boring if we only had elements to play with. Luckily **compounds** give us all sorts of **exciting materials**...

Compounds Contain Two or More Elements Joined Up

- 1) **Molecules** are formed when **atoms** **join**.
- 2) **Compounds** are formed when atoms from **different elements** **join**.
- 3) The "join" is known as a **chemical bond**.



You need to know the difference between **elements** and **compounds**:

An ELEMENT which is made up of **atoms**

atom

The atoms are **all the same**. It must be an **element**.

Some elements are molecules. Just remember: as long as all the atoms are the same, it's an element.

Molecules in a COMPOUND

The atoms are **different** and **joined together**. It must be a **compound**.

Compounds are Formed from Chemical Reactions

- 1) In a **chemical reaction** chemicals **combine** together or **split** apart to form **new** substances.
- 2) When a **new** compound is **made**, elements **combine**.
- 3) **New compounds** produced by any chemical reaction are **different** from the **original elements**. An **example** of this is **iron** reacting with **sulfur**:

Iron is **magnetic**. It reacts with **sulfur** to make **iron sulfide**. This is a totally new substance which is **not magnetic**.



All Compounds Have a Chemical Formula

- 1) The formula contains the **symbols** of the **elements** that make up the compound. For example: The symbol for **iron** is **Fe**. The symbol for **sulfur** is **S**. The **FORMULA** for **iron sulfide** is **FeS**.
- 2) **Numbers** in the formula tell you if there's **more than one atom** of a particular element. → **H₂O** (water) has **two H atoms** and **one O atom**.

Learn about Compounds — and try and make it stick...

Teachers really do like seeing if you know the difference between elements and compounds. It's not that tricky — but you do have to make sure you **learn** all the **picky details** on this page.

Atoms and Elements

Q1 Why didn't scientists know much about atoms for a long time?

.....

Q2 Fill in the blanks in these sentences about the discovery of the atom using the words on the right.

Dalton was the first scientist to try and explain things about
 He said that all was made up of atoms. He also said that
 there were kinds of atom, and that each
 contained a different type of atom.

element
 matter
 atoms
 different

Q3 Write agree or disagree for each of the statements below.

- a) Elements are substances that contain only **one type** of atom.
- b) An element can be **split up** into simpler parts by chemical methods.
- c) All **matter** on Earth is made up of elements.
- d) There are over **100** different elements.
- e) Each element has a **name** and a shorthand **symbol**.
- f) Each element contains at least **two** atoms joined up.
- g) The symbol for an element is always the **first letter** of its name.

Q4 Put a tick (✓) next to all the things below that are elements.

- | | |
|---|---|
| Carbon <input type="checkbox"/> | Nitrogen <input type="checkbox"/> |
| Air <input type="checkbox"/> | Carbon dioxide <input type="checkbox"/> |
| Uranium <input type="checkbox"/> | Steel <input type="checkbox"/> |
| My pet hamster <input type="checkbox"/> | Helium <input type="checkbox"/> |



Atoms and Elements

Q6 Give the names of the elements represented by the following symbols:

- | | |
|-------------|-------------|
| a) C | d) Cu |
| b) Cl | e) Na |
| c) Ca | f) F |

Q7 Give the names of those elements whose symbols appear in this shop sign.

.....

.....

.....

.....



Q8 Here are pictures of six elements. Write their names in the spaces below.



A —

B —

C —

D —

E —

F —

The Periodic Table

Periods		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20																									
Group 0	Group 1	Group 2																	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12																		
4 He Helium	7 Li Lithium	9 Be Beryllium	11 Na Sodium	12 Mg Magnesium	13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon	19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton	37 Rb Rubidium	38 Sr Strontium	39 Y Yttrium	40 Zr Zirconium	41 Nb Niobium	42 Mo Molybdenum	43 Tc Technetium	44 Ru Ruthenium	45 Rh Rhodium	46 Pd Palladium	47 Ag Silver	48 Cd Cadmium	49 In Indium	50 Sn Tin	51 Sb Antimony	52 Te Tellurium	53 I Iodine	54 Xe Xenon
89-103 Fr Francium	87 Rn Radon	88 Ra Radium	89-103 Actinides																85 At Astatine	86 Rn Radon																										



Compounds

Q1 What is the difference between an element and a compound?

.....

.....

.....

Q2 Divide the following into elements and compounds by writing them on the correct lines below.

Sulfur

Magnesium Oxide

Water

Lead

Sodium Chloride

Carbon Dioxide

Oxygen

Helium

Calcium

Sulfuric Acid

Sulfur Dioxide

Carbon Monoxide

Chlorine

Elements

.....

.....

Compounds

.....

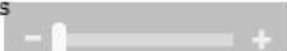
.....

Q3 Which elements do the following compounds contain?

sodium chloride

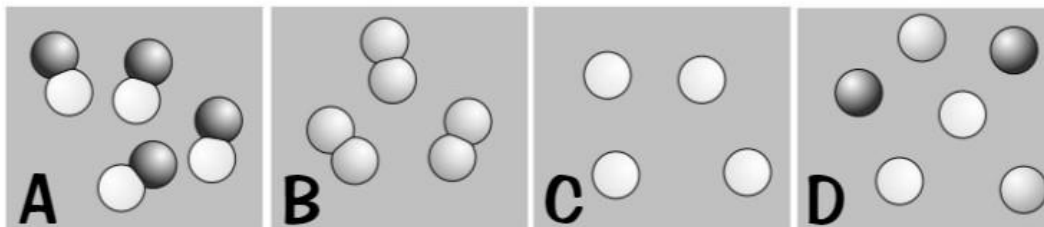
carbon dioxide

water



Compounds

Q4 Here are the pictures of particles in four different substances.



- a) Which picture shows a **compound**?
- b) Explain your answer to part a).
.....
.....
- c) Which **two** pictures show **elements**?
- d) What is the **difference** between the two elements in part c)?
-
- e) Which picture shows a **mixture**?

Q5 When iron and sulfur are mixed together and heated, they react together to make iron sulfide.