

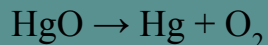
# Lesson 12

Chemistry 0

Jan 2021, L. Tracey Gao

## Week 12 HW Review

- Please balance the following chemical equations and also identify the chemical reaction type:



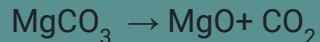
**Balancing the equation:**  $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$

**Reaction type:** Decomposition reaction



**Balancing the equation:**  $\text{N}_2\text{O}_5 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3$

**Reaction type:** Synthesis reaction



**Balancing the equation:**  $\text{MgCO}_3 \rightarrow \text{MgO} + \text{CO}_2$

**Reaction type:** Decomposition reaction



# Week 12 HW Review



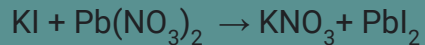
**Balancing the equation:**  $2\text{Al} + 3\text{FeO} \rightarrow \text{Al}_2\text{O}_3 + 3\text{Fe}$

**Reaction type:** Single replacement reaction



**Balancing the equation:**  $\text{Ca}(\text{OH})_2 + \text{H}_2\text{SO}_4 \rightarrow \text{CaSO}_4 + 2\text{H}_2\text{O}$

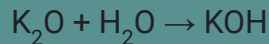
**Reaction type:** Double replacement reaction



**Balancing the equation:**  $2\text{KI} + \text{Pb}(\text{NO}_3)_2 \rightarrow 2\text{KNO}_3 + \text{PbI}_2$

**Reaction type:** Double replacement reaction

# Week 12 HW Review



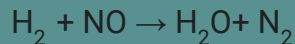
**Balancing the equation:**  $\text{K}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{KOH}$

**Reaction type:** Synthesis reaction



**Balancing the equation:**  $2\text{MgNH}_4\text{PO}_4 \rightarrow \text{Mg}_2\text{P}_2\text{O}_7 + 2\text{NH}_3 + \text{H}_2\text{O}$

**Reaction type:** Decomposition reaction



**Balancing the equation:**  $2\text{H}_2 + 2\text{NO} \rightarrow 2\text{H}_2\text{O} + \text{N}_2$

**Reaction type:** Single replacement reaction

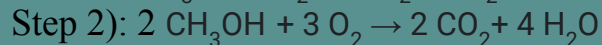
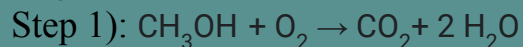
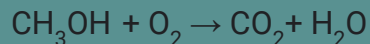
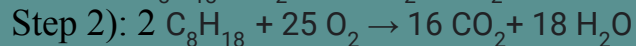
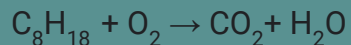
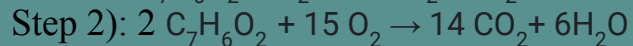
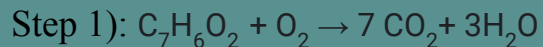
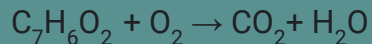


**Balancing the equation:**  $\text{SiO}_2 + 4\text{HF} \rightarrow \text{SiF}_4 + 2\text{H}_2\text{O}$

**Reaction type:** Double replacement reaction

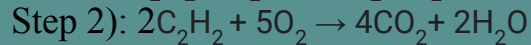
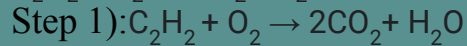
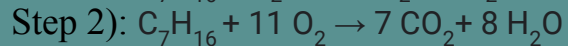
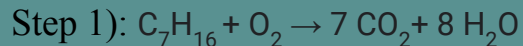
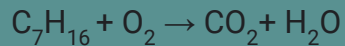
## Week 12 HW Review

- Please balance the following combustion reactions:





# Week 12 HW Review





# Conservation of Mass in Chemical Reactions

- In a chemical reaction, atoms in the reactant molecules unbond from one another and then rearrange and rebond in different ways to form the products.
- The equal number of atoms on each side of the equation shows that mass is conserved during a chemical reaction.

# Baking Soda Reacts with Vinegar





# Counting Atoms

Vinegar

Baking Soda



(Acetic Acid) (Sodium Bicarbonate) (Sodium Acetate)

	Left (reactants)	Right (products)
Sodium	1 from baking soda- total <b>1</b>	1 from sodium acetate- total <b>1</b>
Carbon	2 from vinegar, 1 from baking soda- total <b>3</b>	2 from sodium acetate, one from carbon dioxide- total <b>3</b>
Hydrogen	4 from vinegar, 1 from baking soda- total <b>5</b>	3 from sodium acetate, 2 from water- total <b>5</b>
Oxygen	2 from vinegar, 3 from baking soda- total <b>5</b>	2 from sodium acetate, 1 from water, 2 from carbon dioxide- total <b>5</b>

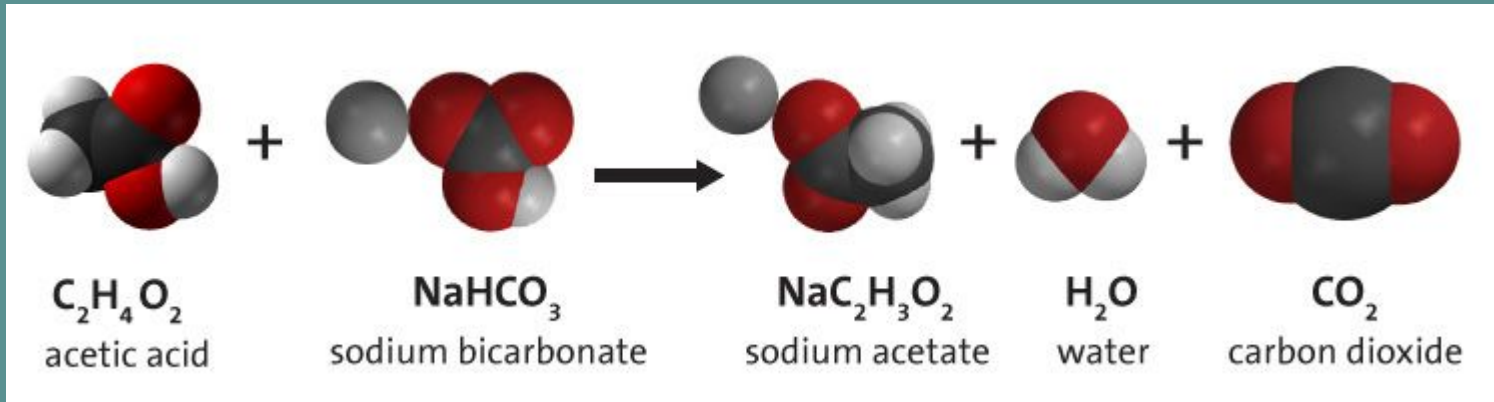
# Mass is conserved

Vinegar

Baking Soda



(Acetic Acid) (Sodium Bicarbonate) (Sodium Acetate)



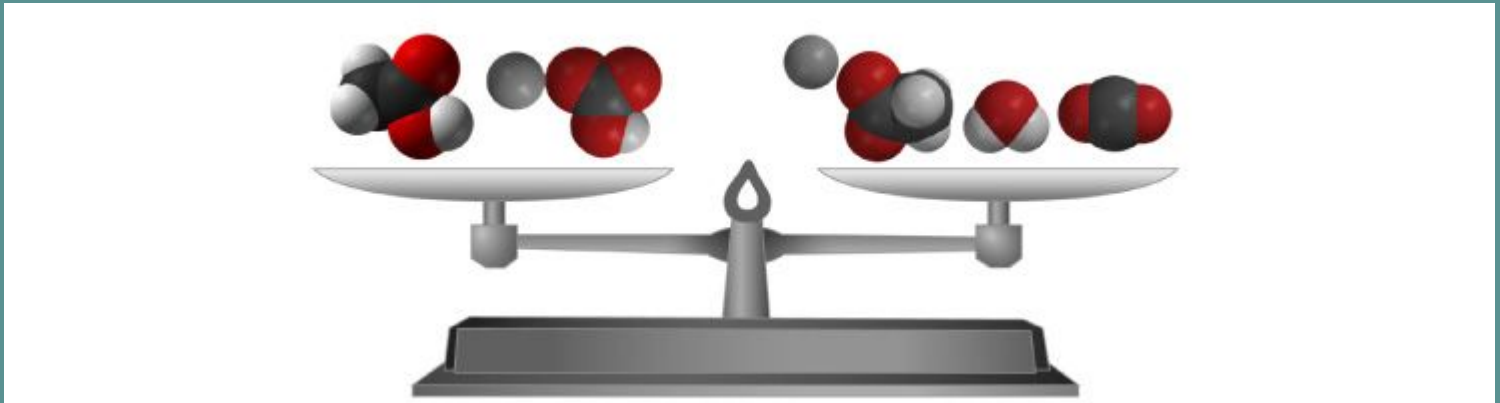
# Mass is conserved

Vinegar

Baking Soda



(Acetic Acid) (Sodium Bicarbonate) (Sodium Acetate)



- All of the atoms in the reactants are in the products.
- The mass of the reactants and products is the same.

# Controlling amount of products formed

Vinegar

Baking Soda



(Acetic Acid) (Sodium Bicarbonate) (Sodium Acetate)

- Products are made from the reactants, so adding more reactants will produce more of the products.
- Using less baking soda, produces less carbon dioxide gas because there are fewer atoms from the baking soda to produce the carbon dioxide.
- Question: Could you just keep adding more and more baking soda to the same amount of vinegar to get more carbon dioxide?



# Glow stick experiment

- How can you tell whether the chemical reaction is happening faster or slower in each glow stick?
- Some people place glow sticks in the freezer to make them last longer. Why do you think this works?
- Do you think that starting with warmer reactants increases the rate of other chemical reactions? Why?



# Effect of temperature on the rate of chemical reaction

- Reactants must be moving fast enough and hit each other hard enough for a chemical reaction to take place.
- Increasing the temperature increases the average speed of the reactant molecules.
- As more molecules move faster, the number of molecules moving fast enough to react increases, which results in faster formation of products.