BIO DISTILLED

MODELING CONSERVATION OF MATTER IN PHOTOSYNTHESIS

by Ms. Lucania

TARGETS NGSS HS-LS1 5

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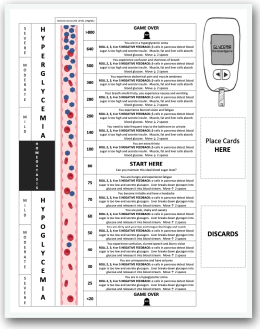
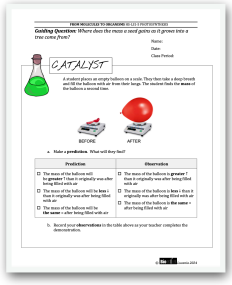
OTHER BIO DISTILLED **RESOURCES** YOU MIGHT enjoy



GLYCEMIA BOARD GAME

Students explore homeostasis and feedback mechanisms through an interactive board game

PHOTOSYNTHESIS 5E Lesson



A structured-inquiry lesson that complements the Conservation of Matter in Photosynthesis Model. Differential for 2-Levels of Learners

LIVING SYSTEMS

FROM *Molecules* TO **ORGANISMS** PHOTOSYNTHESIS

A structured-inquiry unit exploring plant structure and function, photosynthesis, and conservation of matter and energy through labs, modeling activities and scaffolded analysis questions.

PHOTOSYNTHESIS

1 Build the reactants and find their masses

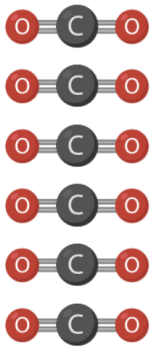
REACTANTS

Carbon Dioxide
CO_2

To build, connect…

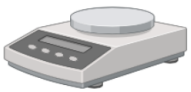
- ☐ 1 **black** Lego
- ☐ 2 **red** Legos

Repeat **6** times to build all 6 molecules



Find the mass of all **6** carbon dioxide molecules

Mass = _____ g

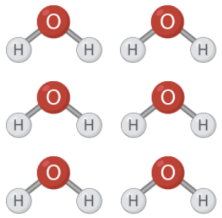


Water
H_2O

To build, connect…

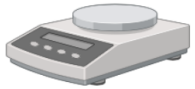
- ☐ 1 **red** Lego
- ☐ 2 **white** Legos

Repeat **6** times to build all 6 molecules



Find the mass of all **6** water molecules

Mass = _____ g



Find the mass of **all REACTANT** molecules

TOTAL Mass = _____ g

2

Disassemble the **REACTANTS** and use ONLY these Legos to build the **PRODUCTS**

4

What do you notice about the mass of the **reactants** when compared to the mass of **products**?

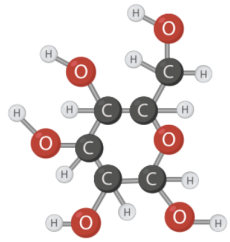
3 Build the products and find their masses

PRODUCTS

Glucose
$C_6H_{12}O_6$

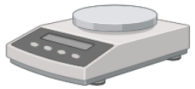
To build, connect…

- ☐ 6 **black** Lego
- ☐ 6 **red** Legos
- ☐ 12 **white** Legos



Find the mass of **1** glucose molecule

Mass = _____ g

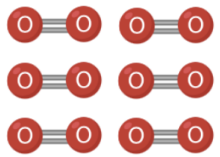


Oxygen
O_2

To build, connect…

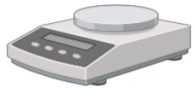
- ☐ 2 **red** Legos

Repeat **6** times to build all 6 molecules

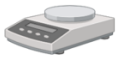


Find the mass of all **6** oxygen molecules

Mass = _____ g



Find the mass of **all PRODUCT** molecules



TOTAL Mass = _____ g

☐ The mass of the reactants is **greater** ↑ than the mass of the products ☐ The mass of the reactants is **less** ↓ than the mass of the products

☐ The mass of the reactants is **equal** = to the mass of the products

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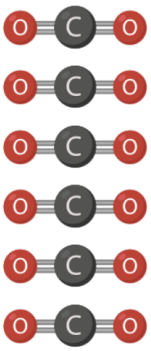
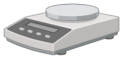
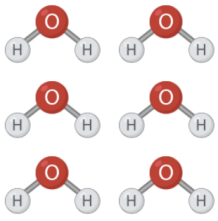
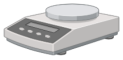
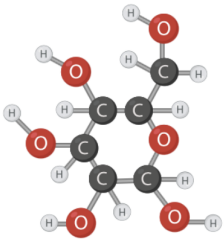
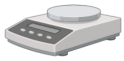
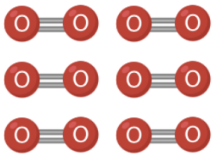
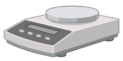
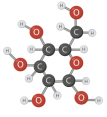
Guiding Question: *Where does the mass a seed gains as it grows into a tree come from?*

1. Use the **Reactants and Products of Photosynthesis Build Map** you just completed on the previous page to fill in the missing masses for each reactant/product of photosynthesis pictured below:

✂ REACTANTS		PRODUCTS	
Carbon Dioxide CO_2  **Mass = _____ g** 	**Water** H_2O  **Mass = _____ g** 	**Glucose** $C_6H_{12}O_6$  **Mass = _____ g** 	**Oxygen** O_2  **Mass = _____ g** 

2. Use scissors ✂ to **cut out** the reactants and products of photosynthesis pictured above

3. Use the following information to determine where each reactant/product of photosynthesis should be placed in your **System and System Models** Graphic Organizer on the following page.

- ☐ Plants **inhale** carbon dioxide  during photosynthesis
- ☐ Plants **exhale** oxygen  during photosynthesis
- ☐ Plants **absorb** water  from the soil (and air) to carry out photosynthesis
- ☐ Plants **store** the glucose  (sugar) made during photosynthesis in their bodies

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System and System Models

1. Describe the **phenomenon** your model is constructed for: Photosynthesis helps a tiny seed to grow into a large tree.

ENVIRONMENT

The rest of the universe

SYSTEM

3. Identify **inputs**
What molecules are going <u>into</u> the system?

Record the **mass** of all <u>inputs</u>

2. Define the **system**
Are there any relevant molecules present <u>in</u> the system?

Record the **mass** of the <u>system</u>

4. Identify **outputs**
What molecules are coming <u>out</u> of the system?

Record the **mass** of all <u>outputs</u>

5. **Explain** why the <u>mass</u> of the system increases, decreases or stays the same

The <u>mass</u> of the system ☐ increases ☐ decreases ☐ stays the same because...

ACKNOWLEDGEMENTS

FONTS, GRAPHICS AND INSPIRATION FROM...

THANK YOU TO ALL OF THE **EDUCATORS** WHO HAVE INFLUENCED MY WORK!