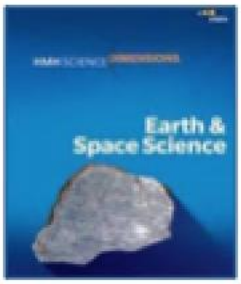
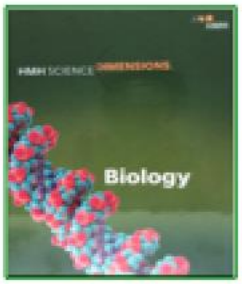
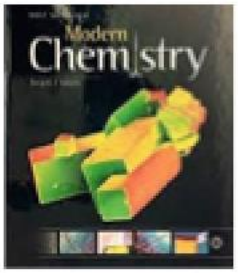
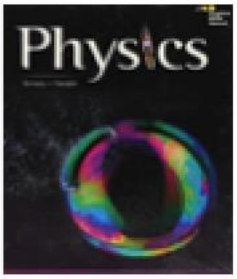
Summer Packet 2020 BioGeoChem

Submit to Ms. Coholic









Biology

To assess the simulations for the Biology section, please click the link below:

https://phet.colorado.edu/en/simulation/membrane-channels

Cell Membrane Transport

1. Access the simulation; consider the upper part as the 'area of low solute concentration' and the lower part as the 'area of higher solute concentration'. Imagine this is a cell. The upper box represents the outside of a cell. The lower box represents the inside of a cell.

2. Add 1 green-gated channel and 1 blue-gated channel.
3. In the upper box 'area of lower concentration', add 10 green circles.
4. In the lower box 'area of higher concentration', add 20 blue diamonds.
5. Assume that the green circles are the solvent (water).
6. Assume that the blue diamonds is an element (potassium).

Answer the following questions below:

Part 1: List 5 observations when you open the blue and green-gated channels:

1.

2.

3.

4.

5.

After listing your observation, click "reset all" and do the same process again, following the instructions listed above. Answer the following questions below.

Part 2:

1. Open the green-gated channel and observe. What did you observe when you open the green gated channel?

   _____

   _____

2. Based on your observations, what type of solution have you observed in the lower box? Is it ‘hypertonic’, ‘hypotonic’ or ‘isotonic’? Explain.

3. Open the blue-gated channel. Observe on what will happen when you open the blue-gated channel. What have you observed?

4. What type of solution have you observed? Is it ‘hypertonic’, ‘hypotonic’ or ‘isotonic’? Explain.

5. Slow down the animation. What did you observe on the motion of the green circles and blue diamonds?

Chemistry

To assess the simulation for the Chemistry section, please click the link below:

https://phet.colorado.edu/en/simulation/balancing-chemical-equations

Balancing Chemical Equations-Critical Thinking Questions

1. For each balanced reaction, indicate the total number of molecules in the table below.

Reaction	Identify the Name and Number of Molecules	
	Reactant Side (Left)	Product Side (Right)
Make Ammonia		
Separate Water		
Combust Methane		

2. Is the number of total molecules on the left side of a balanced equation always equal to the number of total molecules on the right side of the equation? Explain your answer.

3. Is the number of total atoms on the left side of a balanced equation always equal to the number of total atoms on the right side of the equation?

4. In the simulation, were you able to use non-integer numbers (like ½ or 0.43) for the coefficients in a balanced equation? Why do you think this is?

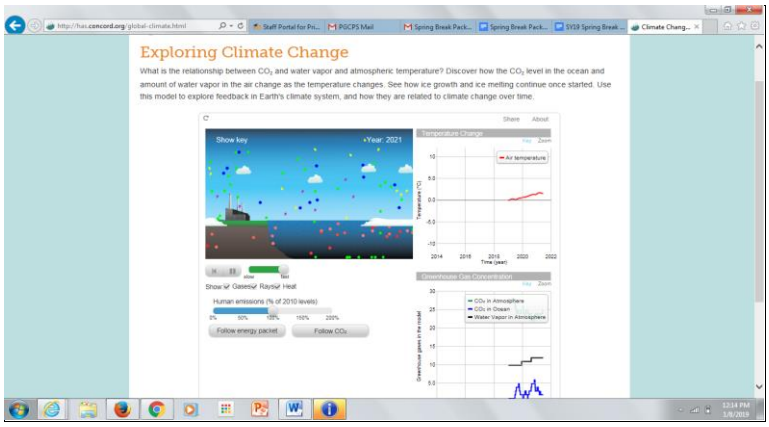
a. Which of the following are coefficients you could use in a balanced equation?

☐ ½ ☐ ¾ ☐ 1 ☐ 2 ☐ 6 ☐ 9

b. If you were balancing an equation containing the O2 molecule, which of the following would be correct representations of O2 and its coefficient?

☐ ½O2 ☐ O2 ☐ 3O2 ☐ 6O2 ☐ 3O ☐ 5O3

Earth and Space Sciences



To assess the simulations for the Earth and Space Sciences section, please click the link below:

http://has.concord.org/global-climate.html

Explore the Climate Change model to answer the following questions.

Making Predictions About Future Climate

Explore how changing human emissions might affect the temperature in the future. The amount of ice cover and number of clouds in the model change in response to temperature and water vapor levels.

The **Human emissions** slider controls how much carbon dioxide comes out of the power plant. Zero percent (0%) means that there are no human emissions. One hundred percent (100%) means that human emissions are the same as in the year 2010. Two hundred percent (200%) means that human emissions are double the 2010 level.

The graphs show relative change of temperature of the planet (upper graph) and concentration of greenhouse gases in the ocean and atmosphere (lower graph) and ocean (lower graph).

NOTE: This model does not show the actual concentration of greenhouse gases in the atmosphere and ocean.

Follow an energy packet or molecule of carbon dioxide to see how they interact with other components in the atmosphere. How do energy packets interact with the ice and clouds?

1. What is the relationship between carbon dioxide emissions and temperature?
2. What happens to the level of carbon dioxide in the ocean as temperatures rise?
3. What happens to the level of water vapor as the temperature rises?
4. What happens to the number of clouds as the temperature rises?
5. What happens to the ice cover as the temperature rises?

Physics

If you have not already done so, please log onto the PhET Simulations website and register/set up an account using your email address.

https://phet.colorado.edu/services/download-servlet?filename=%2Factivities%2F4508%2Fphet-contribution-4508-8020.pdf

Complete the three activities as directed.

Environmental Science

To assess the simulation for the Environmental Science section, please click the link below:

https://www.hhmi.org/biointeractive/understanding-global-change

Using the model in the simulation, write a brief essay describing climate change.
Be sure to explain:

1. The causes of the change.
2. How Earth's systems contribute to the change.
3. Ways to measure the changes.