

Ocean Acidification Mat

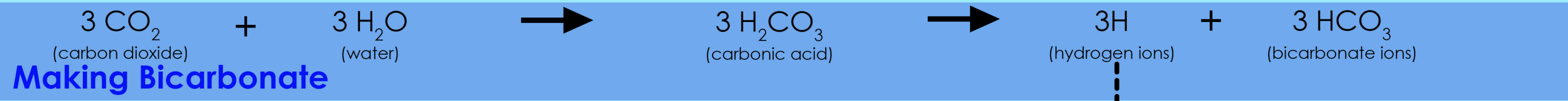
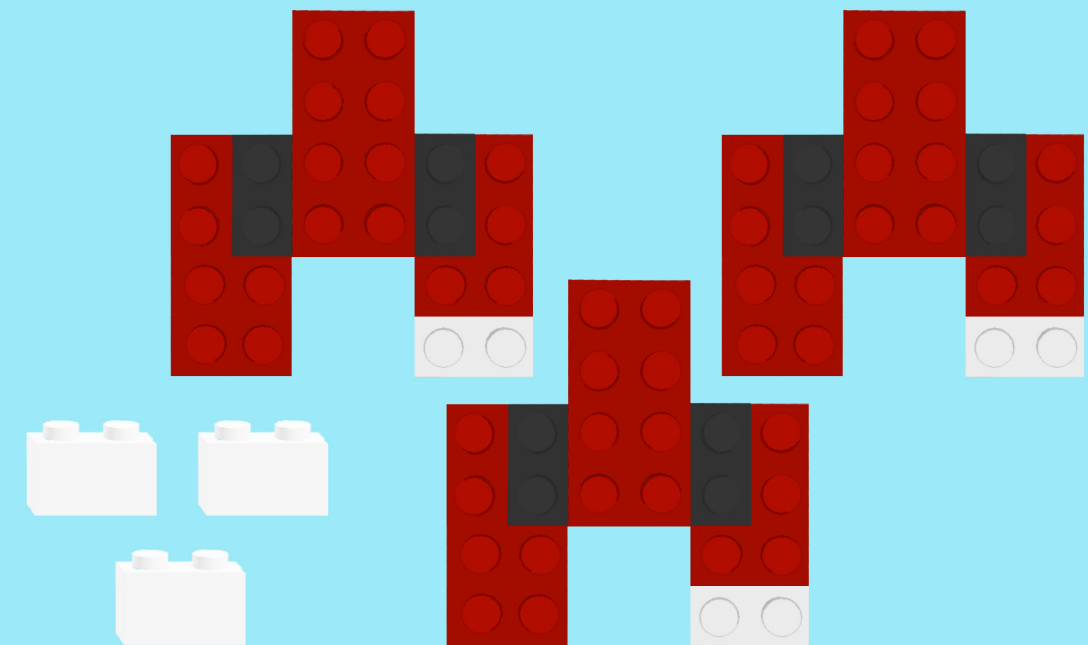
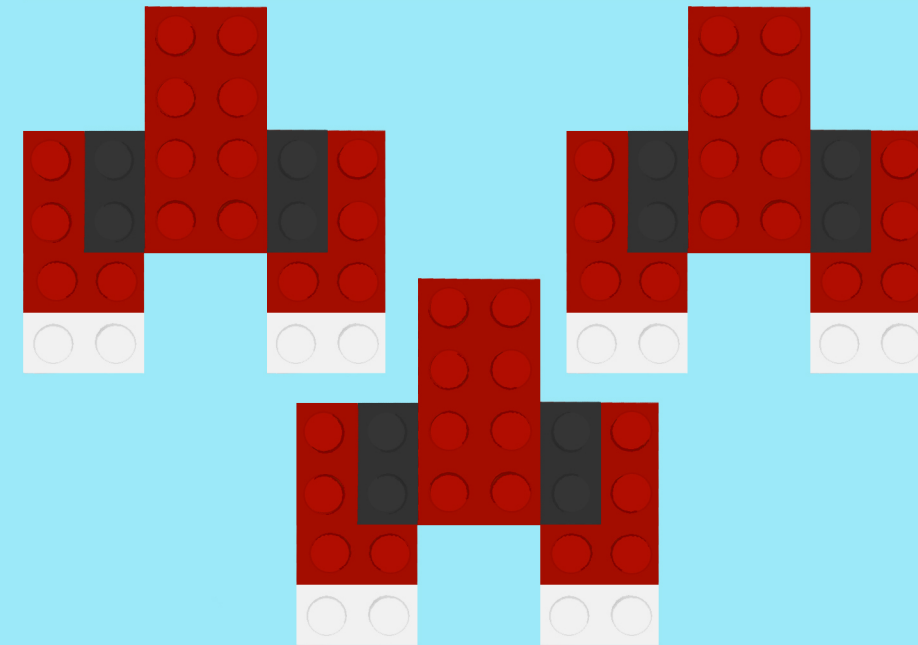
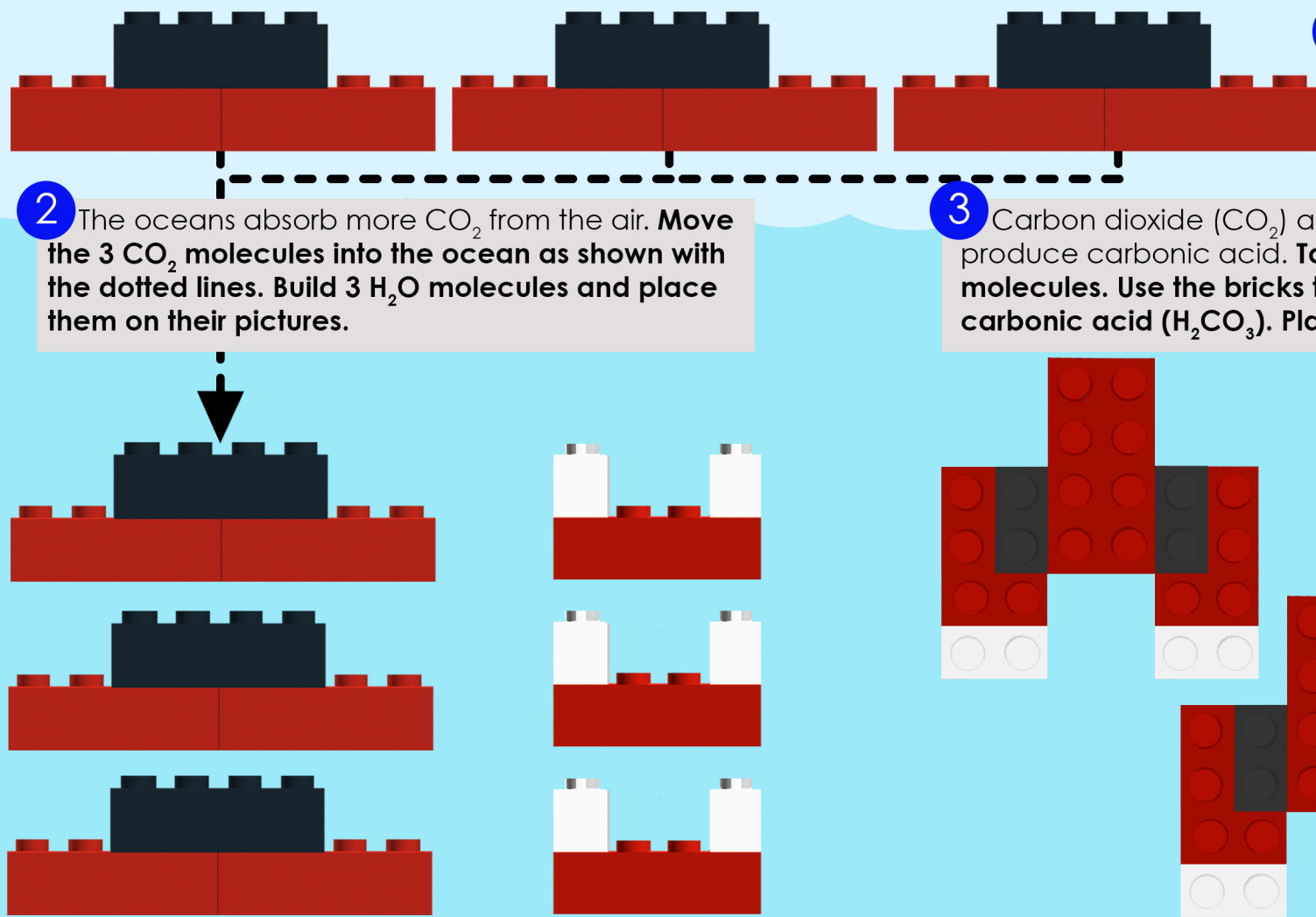
Follow the numbers for the two different chemical reactions.

1 Every day more carbon dioxide (CO_2) is released into the air from the burning of fossil fuels. **Build 3 CO_2 molecules and place them on their pictures in the air.**

2 The oceans absorb more CO_2 from the air. **Move the 3 CO_2 molecules into the ocean as shown with the dotted lines. Build 3 H_2O molecules and place them on their pictures.**

3 Carbon dioxide (CO_2) and water (H_2O) react to produce carbonic acid. **Take apart the 3 CO_2 and 3 H_2O molecules. Use the bricks to build 3 molecules of carbonic acid (H_2CO_3). Place them on their pictures.**

4 The hydrogens in carbonic acid (H_2CO_3) are not tightly attached. One hydrogen can easily fall off. **Take off 1 hydrogen from each carbonic acid molecule. Place the hydrogens and bicarbonates (HCO_3) on their pictures and leave them there. Start the next reaction with new bricks.**

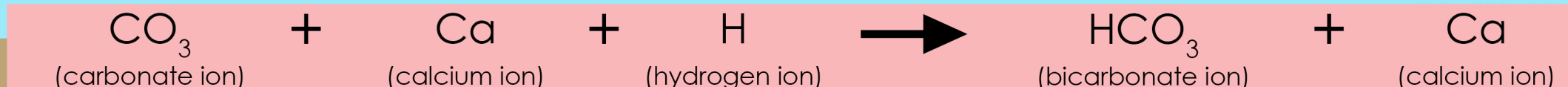
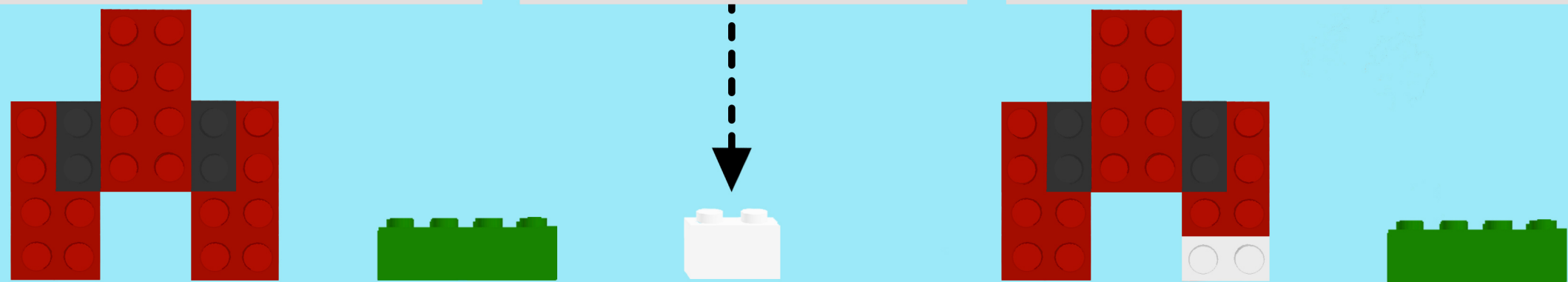


Making Bicarbonate

1 Calcium (Ca) and carbonate (CO_3) are molecules that are dissolved in ocean water. **Build the models of Ca and CO_3 and place them on their pictures.**

2 More CO_2 in the air creates many free hydrogens in the ocean. **Move 1 hydrogen as shown with the dotted line. Place it on its picture.**

3 Too many free hydrogens interfere with normal ocean chemistry. **Add the H to CO_3 and place the bicarbonate (HCO_3) on its picture. Place the unused Ca on its picture below. Read the conclusion.**



Making Less Chalk

Conclusion
 Burning fossil fuels releases CO_2 into the air. Additional CO_2 in the air is absorbed by the ocean and more free hydrogens are created. The process of creating more free hydrogens in the ocean is called acidification.
 When ocean acidification occurs, the free hydrogens bond to carbonates, making it harder for sea creatures to make chalk. Weaker shells are produced and there are fewer healthy coral reefs in the ocean.

Where's my home?

