Stoichiometry Foldable

This is a foldable to help students understand the steps of conversions in stoichiometry. Depending on what information they are given to start with and what they are looking for (unknown) will determine which flaps will be opened or closed. They will then follow the steps that are visible solve the problem.

Materials Needed

- One sheet of plain paper
- 2 colors of pens
- 3 colors of highlighters/colored pencils

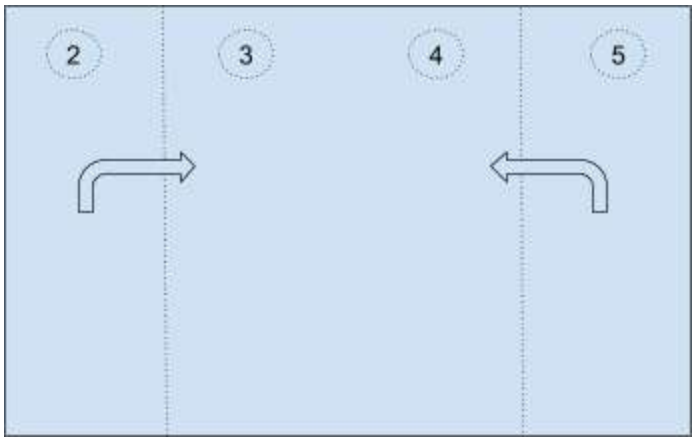
For the Extension

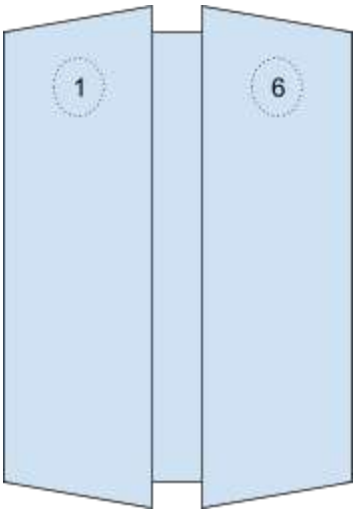
- Some extra paper for cutting small rectangles
- Scissors
- Additional colors of highlighters/colored pencils
- Cellophane tape

How to create the Foldable:

Folding

Students will start with a blank sheet of paper and fold the two short sides in so they meet in the middle.





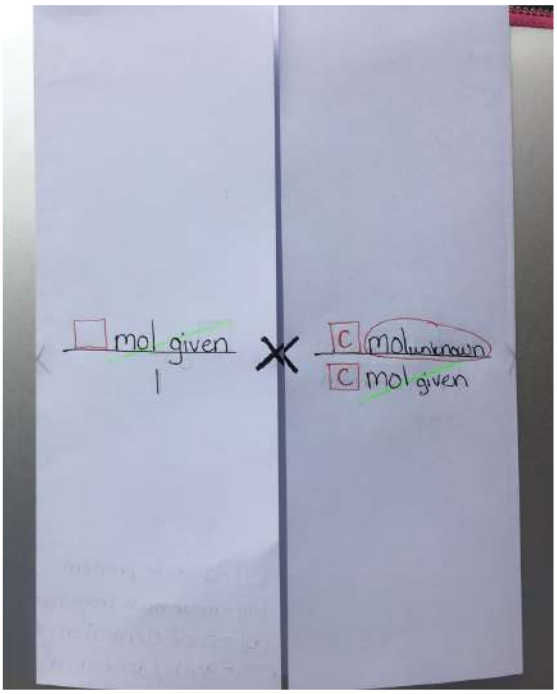
Panel numbers are indicated by a circle with a number inside. Students do not need to write this on their foldable, but it is shown to help explain how to make and use the foldable.

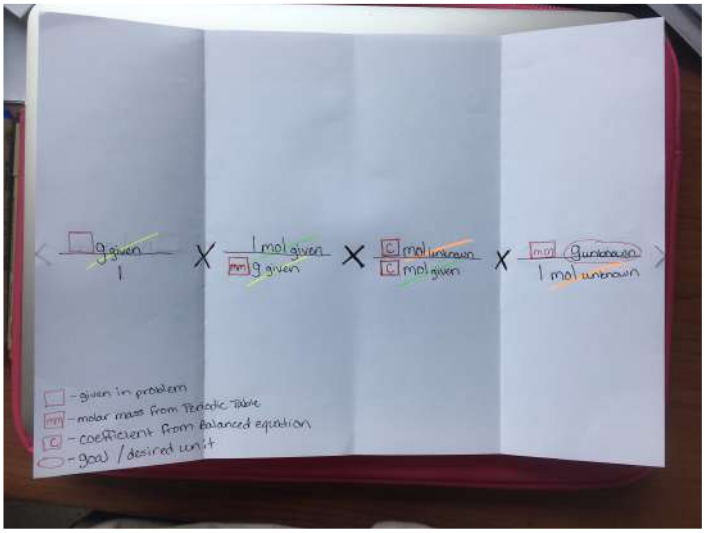
Adding Content

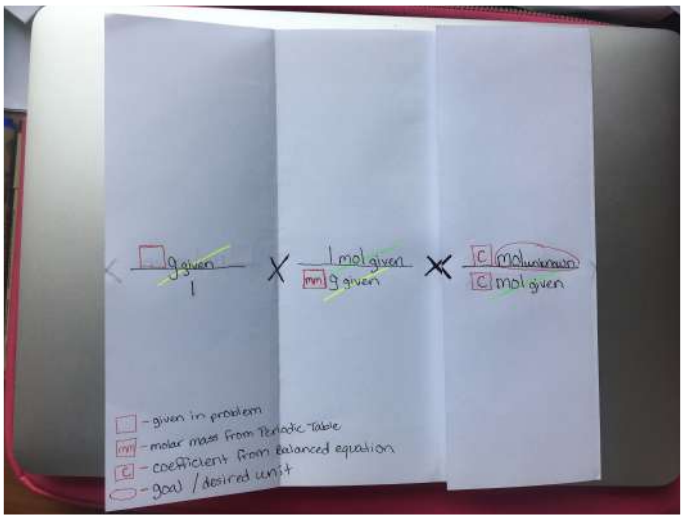
- Add content according to the pictures of the final product.
- Have students draw a red box to indicate where they will need to write a number in each step.
- Use the key to fill in the boxes with the correct symbols (this tells students where to find the values that will be added when solving problems).
- Circle the goal/desired units in the numerators on panels 5 and 6.
- Use different colors of highlighters/colored pencils/pens to cancel out similar units (example: cancel all “mol given” with a green highlighter, cancel all “grams given” in a yellow highlighter, etc.). NOTE: Be sure not to cancel the goal/desired units on panels 6 and 6.

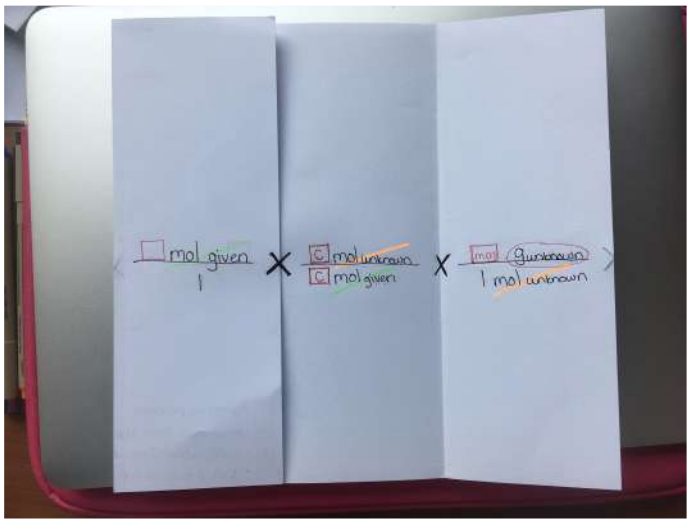
Final Product:

Students will then fill in the flaps as shown in the pictures below:



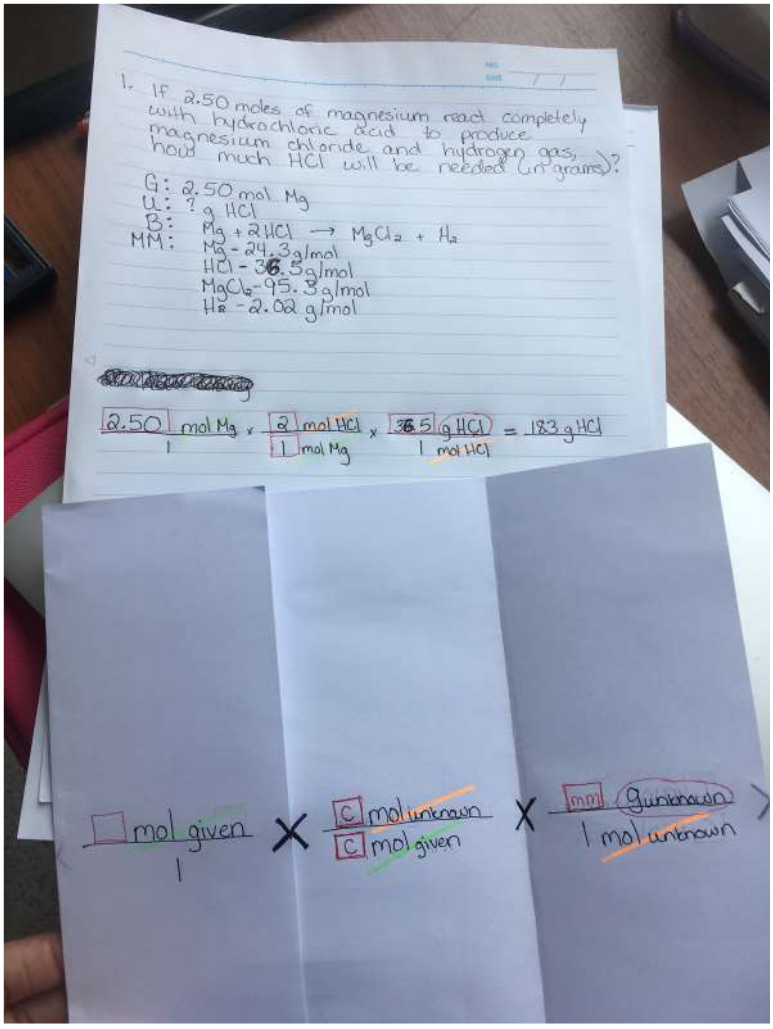




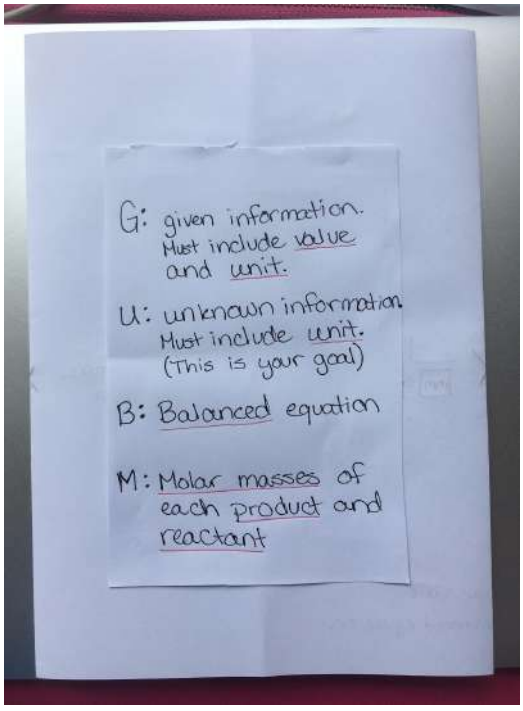


How to use:

1. When students are given a problem, they should begin answering the problem on another sheet of paper (or whiteboard) by identifying the **given**, **unknown**, **balanced equation**, and **molar mass** of each reactant and product (or at least for the given and unknown).
2. Students will open the proper flaps so that the **given** is found in the upper left of the equation, and the **goal/desired uni**t is found in the upper right.
    a. Mol given → mol unknown : Close both flaps to reveal panels 1 and 6
    b. Mol given → g unknown : Close the left flap only to reveal panels 1, 3 and 4
    c. Grams given → g unknown : Open all flaps to reveal panels 2, 3, 4, and 5
    d. Grams given → mol unknown : Close right flap only to reveal panels 2, 3, and 6
3. Have students use the foldable as a guide as they write the steps to solve the problem being sure to include the correct chemical formulas and numbers.
4. Once all the information is correctly copied from the foldable, students can then solve the problem by multiplying the numerators and denominators across, then dividing to get the final answer. DON'T FORGET THE UNIT!!!



I had students write the required elements of all problems on the back of their foldable. For us, this is **G**iven, **U**nknown, **B**alanced equation, and **M**olar masses. They must fill out these required elements before beginning the calculation. (Pasting it on helps prevent bleed through if you are using copy paper)

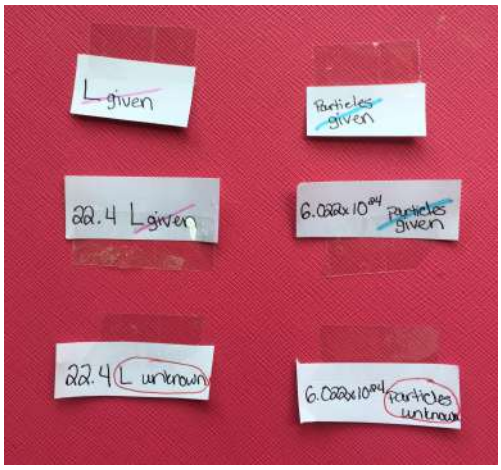


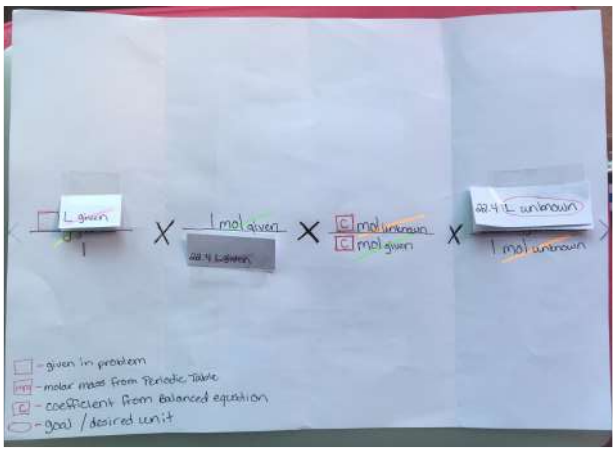
Extension: Adding different content

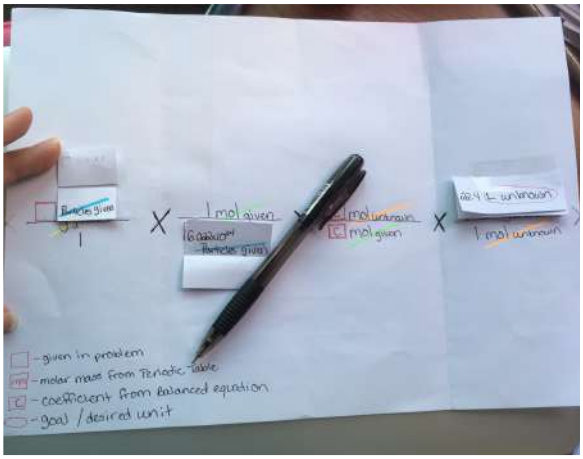
Making the flaps

Once students have grasped this concept, many do not need any assistance when adding new steps like conversions from moles to volume or moles to formula units. However, some need to visually see these new steps. So I have students tape in flaps to account for additional conversions. **Helpful Hint:** I recommending adding the flaps only after students are comfortable using the foldable.

1. Cut 3 small rectangles for each concept to be added (*eg*. 3 rectangles for mole to volume conversions; 3 for moles to formula units, etc.) Rectangles should be just large enough to cover the units that are already written on the foldable, and the one that goes on panel 2 should be slightly shorter.
2. Write labels on the flaps as shown to the right. You can also write the red box on the top ones, or just tape them so that the red box that is already on the foldable is visible.
3. Circle the units of the unknowns.
4. Use the same color to cross out similar units.
5. Put tape as shown (on the bottom of the middle two, on the top of all others).
6. Tape them onto your foldable as shown in the picture below. Flaps in the numerator should flip up, and flaps in the denominator should flip down.







How to Use

Students will flip up of the flaps to show the steps that are necessary for solving different kinds of problems. **HELPFUL HINT:** Remind students that they should always see a pair of the same color canceling marks (one in the numerator, and one in the denominator).