Materials for the "Roots, Shoots and Wood" Activity

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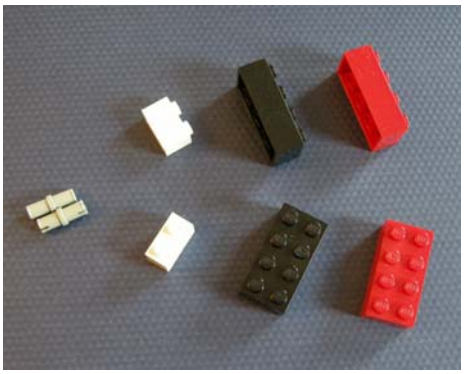
In advance of the lesson, student kits need to be prepared. Select paper or plastic.

There are two kinds of materials to choose between for modeling the atoms, using plastic blocks like LEGO® or pieces of stiff paper. The blocks are much preferred by the students. Paper however, is less expensive. In both cases the materials you purchase for the kits can be shared and used for many years, so you can think of this as an investment.

Plastic building blocks as atom models



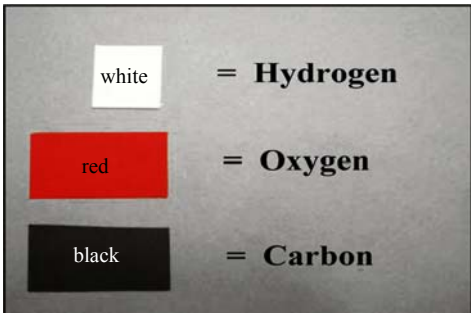
Building blocks (such as LEGO) can be purchased from toy manufacturers. Other colors can be substituted. The colors for the bricks were chosen as they are the same color codes used in chemistry.

Ideally each team of students (2-4 students) should receive the following:

- 12 Black bricks 2X4 size (model of carbon atom)
- 36 Red bricks 2X4 size (model of oxygen atom)
- 24 White bricks 1X2 size (model of hydrogen atom)
- Optional –about 20 connector pegs are needed for class for optional activity that builds cellulose molecules. Not all groups will build them. The connectors are shown on the left in the photo. These hold bricks together, back to back. See Cellulose instructions for further information.
- Some container like a box or clear plastic bag is needed for each kit.
- One large paper (11X17 inches) for writing the photosynthesis equation is needed for each team. Alternatively use 2 paper sheets placed side by side.

If this is too many bricks to purchase, the lesson can be done with half the number of bricks stated above in each student kit with a lesson modification. (6 Black bricks 2X4 size; 18 Red bricks 2X4 size; 12 White bricks 1X2 size) Modify the lesson like this: have students illustrate only left side of the equation (the reactants.) Then have the students take apart these molecules and build the molecules on the right side (the products) with the same atom bricks.

Paper pieces as atom models

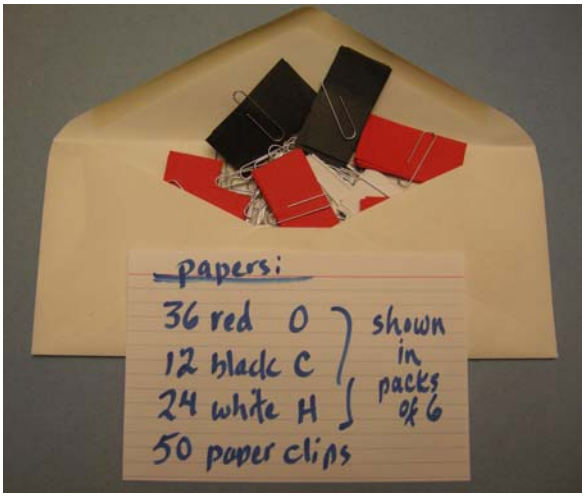


Regular paper is too thin and will rip. Select heavier or stronger paper, such as that used to make posters. The pieces of colored paper should be cut to size and the kits prepared prior to the photosynthesis lesson. Store the paper atom kits in envelopes.

Each group of 2-4 students will need the following materials.

- Carbon = 12 rectangles. Black. 2.5 cm X 5.0 cm (about half a sheet of paper)
- Oxygen = 36 rectangles. Red. 2.5 cm X 5.0 cm (about one sheet of paper)
- Hydrogen = 24 rectangles. White. 2.5 cm X 2.5 cm (about quarter of a sheet)
- Paper clips = 50 clips (size about 3 cm in length) used to hold atoms together.
- Large paper = (11X17 inches) for the photosynthesis equation. Alternatively 2 paper sheets placed side by side may be used. Sheets can be folded and kept inside the envelope.
- One envelope (4 ¼ X 9 ½ inches) for storage. A rubber band to close the envelope, is optional.

Paper atom kits can be stored conveniently in regular business size envelopes as shown in the adjacent photo.



Written Instructions for the Students

- Each student group will need a set of instructions. Select either the plastic brick (LEGO) instructions or the paper atom instructions.
    - Download and photocopy from the website. (Two-sided copies work well.) These instructions for photosynthesis will stay with the kit and can be used again and again. If you can make color copies, this may be worthwhile. However, black and white photocopies will work fine because the colors of red, black, and white can be distinguished in black and white.
    - Note: The instructions for building starch and cellulose are for the optional activities.
- If using plastic bricks, each student group will need a Glucose Component Check Mat. Download and photocopy one per group to be kept with the kit.
    - This Check Mat is particularly helpful for students who do not have much prior experience building with bricks.