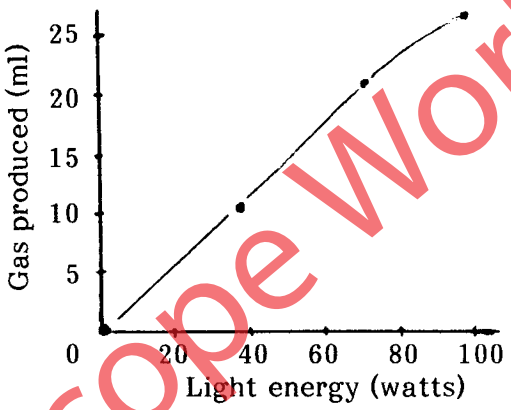
Light and photosynthesis

- How does light intensity effect oxygen production? [hypothetical experiment]
  no materials required

In a hypothetical experiment you don't actually do an experiment but, rather, you work with hypothetical data. This is sometimes called a "dry-lab" experiment and has occasional value. The readings that follow would not be observed in an actual experiment.



Data:

0 watts (dark)	- 0ml
40 watts	- 10ml
75 watts	- 20ml
100 watts	- 25ml

To add more data and give students more experience plotting points, read information off the graph (i.e. 60 watts = 15 ml)

Carbon dioxide, water and leaves

- Plants use carbon dioxide: [demonstration]
  2 test tubes & stoppers elodea plants
  Bromothymol blue (BTB) straw

  1. Have a student blow into BTB solution to add $C0_2$ and change the color from blue to yellow.
  2. Fill 2 test tubes with yellow BTB. Add elodea to one of them. Stopper both tightly
  3. Place both in sunlight for one hour. Compare colors (plant uses $C0_2$ and BTB turns blue, control stays yellow).

Variation: Use three test tubes. Cover the third one with foil so no light gets in. You can successfully do this indoors in front of a 60-watt light bulb.

- Plants give off water vapor: [activities]
  1. Use two jars (same size) with paper barrier between each, leaf in top jar and stem reaching down to water in bottom jar. Mist will appear in a few hours.
  2. Use small cups with plants. Seal around plant stem with plastic. Place in larger jar (seal jar). Control can be a stick in a cup (instead of a plant).
     Note: This works best using plants with large leaf surface area.

- Plants breathe from the bottom of the leaf: [observational activities]
  1. Rub petroleum jelly or shortening on top, bottom or both sides of leaves on a plant. Observe and record results daily (leaves appear to breathe through the bottom of the leaf).
  2. Pinch leaf stem. Immerse leaf in very hot water. Air inside leaf expands and must escape through breathing holes (located on underside of leaf).

- Leaf cross-section: [observational activity]
  prepared slide of leaf cross-section microprojector
  1. Observe veins, top of leaf (with chloroplasts), (1) epidermis, (2) palisade layer, (3) spongy cells, (4) air pockets, (5) stomata (breathing holes) and (6) guard cells.

     Information: c.s. = cross-section
     l.s. = longitudinal section
     w.m. = whole mount