Approximate Composition of Air.

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This experiment gives the pupils a simple, clear, and lasting idea of the composition of air.

Previous work bearing on this experiment:

1. Study of atmospheric pressure.
2. Experimentation with oxygen.
3. Discussion of slow oxidation and burning.
4. Analysis of what really happens when a substance burns and how to name the product.
5. Definition of kindling temperature.

Last question before the class:

Why do substances burn better in oxygen than in air?

The Experiment:

Use a lightning fruit jar—much depends upon the selection of the jar. Use new rubber rings—two if possible—and grease each on both sides. After introducing the class to yellow phosphorus, cut off a piece under water—small yet large enough to insure some being left over. Around this phosphorus wind a very fine wire so that it does not cross in any place and enclose it on a porcelain crucible cover in the fruit jar with the ends of the wire projecting. Then pass a current through the wire—use resistance in the circuit, diminishing it until the phosphorus ignites.

After the smoke has settled and the jar has had a chance to cool, open it under water and allow the water to take the place of the consumed oxygen. If done carefully this ought to look very much like 1-5 of the jar. I do not measure the jar nor the water entering unless some pupil suggests it—results are fairly satisfactory even at that. Thrust a lighted splinter in the remaining 4-5 of the air and your freshman pupils will be surprised.

While the smoke is settling we discuss what this special smoke is, what smoke in general is, what has happened so far in the experiment and what is likely to happen when the jar is opened under water.

At the Everett High School, we require simple diagrams from our science pupils. The experiment is explained as far as possible by labels on the diagram and what cannot be thus shown—written un-

derneath. This all takes time and energy but is worth while, we think. The following is a sample of what we want and get from some pupils:

Note. Drawn by Edith Rhine, E. H. S. 1921.

Points pupils are expected to get from this experiment:

1. Approximate composition of air by volume.
2. Nature of nitrogen.
3. Much about phosphorus.
4. What smoke is.
5. Products from burning not always invisible.
6. Heating effect of electric current.
7. New proof that three conditions must be met to have combustion.

TO ILLUSTRATE EXPLOSIVE MIXTURE.

When can is practically filled with gas, remove glass tube and light gas at A.

When you have the "right mixture" of gas and air, you will know it.