

WHAT'S IT MADE OF? CHEMISTRY PROJECT

Chemistry is involved in every aspect of your life, due to the fact that everything is a chemical. There are about 112 elements known to humans. These elements make up all the molecules and hence all the matter that exists. When you eat pizza, you are eating, among other things, cheese and bread. The cheese contains proteins that are composed of the elements carbon, oxygen, nitrogen, hydrogen, sulfur, and several others. In the same way that all food is composed of elements, so is all matter. Chemistry is the study of matter.

In this project you will study the chemical composition of common substances. You may choose almost any product or material you like. However, it must be something that you have the means to make from raw ingredients. By raw ingredients, I mean anything that is the same as you would find it in nature (or at least very close).

Project

- Purpose:**
1. To chemically analyze a common material.
 2. To identify the types of molecules and atoms present (and to know the difference.)
 3. To learn and apply chemical procedures for producing a product.
 4. To share your work with the class.

Topic

Ideas: Candy, bread, sausage, cereal, sauce, pasta, perfume/cologne, glue, soap, cosmetics, soil, candles, paint, concrete, clay, pottery . . .

Project

- Components:**
1. Research paper
 2. Lab notes, procedure, data (will be included in the research paper)
 3. Presentation to the class

Project

- Specifications:**
1. You may work alone or with ONE partner. DO NOT ASK TO WORK IN LARGER GROUPS.
 2. All papers must be word processed.
See me if you need help finding equipment.
 3. See the attached rubric for topics and length.
 4. You must be prepared to bring in at least one small sample (about 1/4 cup) of the product you choose.
You will be allowed to bring in samples for the class, but you will not receive any extra credit for doing so.
 5. Near the end of the semester you will give a 10-15 minute presentation of your work to the class.

Topic Selection: Clearly some materials are simpler than others. Part of your grade will be determined by the complexity of your choice. For example, "flour" would be a fairly simple topic, most likely limiting you to a grade of C; while, "oatmeal cookie" is a complex choice (with many ingredients) that has the potential to earn an A. In general 5-10 ingredients is adequate.

Research Paper should include the following:

1. A description of the substance and its use. The recipe.
2. Throughout the report, integrate as much material from class as possible.
3. A multi-level breakdown of each ingredient, starting with its common name and ending with atoms. Identify the molecules, ions, and the atoms present in your material. (For example: Wood is composed of fibrous proteins; fibrous proteins are large molecules made up of smaller molecules called amino acids. There are twenty different amino acids, 15 of which are found in wood. These molecules are made up of carbon, hydrogen, oxygen, nitrogen, sulfur, and potassium atoms. **THIS EXAMPLE IS VERY BRIEF AND NOT THOROUGH ENOUGH FOR "A" CREDIT.** It is meant to explain the concept of a "multi-level" description.) ***This break down should include the structural diagrams of the molecules, hand-drawn by you (not cut and pasted from your sources).***
4. An explanation of where each ingredient comes from and how it is obtained.
5. Observations made while preparing your material. In particular, note all changes (chemical and physical) in the ingredients as they are cooked/prepared.
6. An analysis of the process (recipe) that answers the following questions:
 - ❖ What is the purpose of each step?
 - ❖ What chemical changes does the preparation involve? What is the evidence?
 - ❖ Identify any chemical reactions. (**Minimum of one, no maximum**)
 - ❖ What physical changes does the preparation involve? What is the evidence?
7. Conclusion: How can the mere 90 naturally occurring atoms make up so many different substances? What were the most important things you learned from this project? ("Nothing" is not an acceptable answer.) How did the material you covered in this course help you with your experiment?.....
8. Photographs, magazine clippings, and/or drawings of as many levels as possible. You must include structural diagram drawings (hand-drawn!) of all significant molecules. These should be placed throughout the report.
9. A bibliography including all sources: books, magazines, internet addresses....
You must cite all of your sources!

