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***Everyday Compounds***

***Objective:*** Identify compounds found in everyday items, especially foods.

Water is the most common compound on Earth for the human species. We know, two atoms of the element hydrogen (H) plus one atom of the element oxygen (O) make one molecule of water (H2O). Many everyday compounds, things found in almost our kitchen, are almost always nothing more than simple compounds.

For centuries, ingredients have served useful functions in a variety of foods. Our ancestors used salt to preserve meats and fish, added herbs and spices to improve the flavor of foods, preserved fruit with sugar, and pickled cucumbers in a vinegar solution. Today, consumers demand and enjoy a food supply that is flavorful, nutritious, safe, convenient, colorful and affordable. Food additives and advances in technology help make that possible.

Some consumers have concerns about additives because they may see the long, unfamiliar names and think of them as complex chemical compounds. In fact, every food we eat - whether a just-picked strawberry or a homemade cookie - is made up of chemical compounds that determine flavor, color, texture and nutrient value. All food additives are carefully regulated by federal authorities and various international organizations to ensure that foods are safe to eat and are accurately labeled. *(Excerpt from FDA brochure on additives, http://www.fda.gov/food/foodingredientspackaging/ucm094211.htm#types)*

***Materials:*** 4 food labels (water and beverages are unacceptable), scissors, glue, markers, crayons, 2 sheets of paper

You will gather at least 4 food labels found in your homes with an ingredient list with various compounds. This is a one day assignment to be completed in class. Be sure to bring art materials to jazz up your product.

1. Each student must bring in a food label with an ingredient list, nutritional facts chart, and the brand label.
2. You will be assigned groups of 3 or 4 students.
3. As a group choose one of these compounds from each food label.
4. Determine which elements it is composed of. Be sure to choose a different compound within the group.
5. Develop a rough draft of a poster that must measure 17”x 11”.
6. Your poster will be graded on:
   1. Appearance: use of color, 1 drawing per compound (4 pictures minimum),
   2. 4 complete food labels (Compound formulas and steps for determining balanced formula clearly written.)
   3. Significant fact about the compound. Why is the compound found in the food item?

**Types of Food Ingredients** The following summary lists the types of common food ingredients, why they are used, and some examples of the names that can be found on product labels. Some additives are used for more than one purpose.

| Types of Ingredients | **What They Do** | **Names Found on Product Labels** |
| --- | --- | --- |
| Preservatives | Prevent food spoilage from bacteria, molds, fungi, or yeast (antimicrobials); slow or prevent changes in color, flavor, or texture and delay rancidity (antioxidants); maintain freshness | Ascorbic acid, citric acid, sodium benzoate, calcium propionate, sodium erythorbate, sodium nitrite, calcium sorbate, potassium sorbate, BHA, BHT, EDTA, tocopherols |
| Sweeteners | Add sweetness with or without the extra calories | Sucrose glucose, fructose, sorbitol, mannitol, corn syrup, high fructose corn syrup, saccharin, aspartame, sucralose, acesulfame potassium neotame |
| Color Additives | Offset color loss due to exposure to light, air, temperature extremes, moisture and storage conditions; correct natural variations in color; enhance colors that occur naturally; provide color to colorless and "fun" foods | FD&C Blue Nos. 1 and 2, FD&C Green No. 3, FD&C Red Nos. 3 and 40, FD&C Yellow Nos. 5 and 6, Orange B, Citrus Red No. 2, annatto extract, beta-carotene, grape skin extract, cochineal extract or carmine, paprika oleoresin, caramel color, fruit and vegetable juices, saffron) |
| Flavors and Spices | Add specific flavors (natural and synthetic) | Natural flavoring, artificial flavor, and spices |
| Flavor Enhancers | Enhance flavors already present in foods (without providing their own separate flavor) | Monosodium glutamate (MSG), hydrolyzed soy protein, autolyzed yeast extract, disodium guanylate or inosinate |
| Fat Replacers | Provide expected texture and a creamy "mouth-feel" in reduced-fat foods | Olestra, cellulose gel, carrageenan, polydextrose, modified food starch, microparticulated egg white protein, guar gum, xanthan gum, whey protein concentrate |
| Nutrients | Replace vitamins and minerals lost in processing (enrichment), add nutrients that may be lacking in the diet (fortification) | Thiamine hydrochloride, riboflavin (Vitamin B2), niacin, niacinamide, folate or folic acid, beta carotene, potassium iodide, iron or ferrous sulfate, alpha tocopherols, ascorbic acid, Vitamin D, amino acids |
| Emulsifiers | Keep emulsified products stable, reduce stickiness, control crystallization, keep ingredients dispersed, and to help products dissolve more easily | Soy lecithin, mono- and diglycerides, egg yolks, polysorbates, sorbitan monostearate |
| Stabilizers and Texturizers | Produce uniform texture, improve "mouth-feel" | Gelatin, pectin, guar gum, carrageenan, xanthan gum, whey |
| pH Control | Control acidity and alkalinity, prevent spoilage | Lactic acid, citric acid, ammonium hydroxide, sodium carbonate |
| Leavening Agents | Promote rising of baked goods | Baking soda, monocalcium phosphate, calcium carbonate |
| Anti-caking agents | Keep powdered foods free-flowing, prevent moisture absorption | Calcium silicate, iron ammonium citrate, silicon dioxide |
| Humectants | Retain moisture | Glycerin, sorbitol |
| Yeast Nutrients | Promote growth of yeast | Calcium sulfate, ammonium phosphate |
| Dough Strengtheners | Produce more stable dough | Ammonium sulfate, azodicarbonamide, L-cysteine |
| Firming Agents | Maintain crispness and firmness | Calcium chloride, calcium lactate |
| Enzyme | Modify proteins, polysaccharides and fats | Enzymes, lactase, papain, rennet, chymosin |

Source: USDA, Food and Drug July 2010