

Title - *Changes of Matter*

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Subject - Science, Multi-Disciplinary

Grade Level - 5-7

A. Goals: The students will be able to describe the changes of matter that occur when chocolate is processed from the bean to the bar.

B. Objectives:

The students will be able to define physical and chemical changes.

The students will be able to identify the area where rainforests are present.

The students will be able to create their own representation of the process by creating sequence charts of the process.

Materials: Chocolate bars, powdered drink mix, cacao beans (if possible), any visuals of chocolate factories. I suggest checking manufacturers like Hersheys to get pictures of virtual tours.

Anticipatory Set: Discuss with the students the differences between physical and chemical changes. Ask students for any changes that they may know of that occur on a daily basis. Inform the students that they will be discussing the effects of these changes without using their books. (My kids love that part!) Inform students that they will be investigating the process of making chocolate to look for different types of changes in state of matter.

Input: Start by telling students how chocolate begins as a bean. Students should be told that this bean is actually picked from the cacao tree in rainforests. Students should be asked to identify areas where rainforests still exist. (Mainly South and Central Americas.) Students can point to these regions on maps to locate them.

Students can also be told that the bean is used in its' entirety when it is ground into a pulp. Now, many chocolate factories sift out the remnants of the shells. When it is ground into a fine powder, the chocolate is mixed with sugar and cream. It is boiled and all of the oil is removed from the mixture. You may choose to talk about the fact that many seeds and beans are high in some type of oil or fat. They are sources of protein that would be used to initially feed the plant in the seedling stage of growth.

This oil is mixed with sugar, milk and butter. This mixture is known as the cacao butter. When completely mixed, the mixture is reconstituted into the chocolate base. From that point on, the chocolate is boiled until all impurities are strained off of what is usually the top layer. The chocolate is then placed into molds to form the candy bar.

Key Points:

*Physical Changes: The beans are ground into a powder. The chocolate is cooled and molded. Liquid is added to the powdered chocolate.

*Chemical Changes: Heat is added to drive out impurities. Other compounds are added to change the properties of the powder. Taste, smell and color are changed many times throughout the process.

*White chocolate does not use the ground cacao bean entirely. Only the cacao butter and vanilla flavoring.

- *The more milk added, the more sugar added, which means the sweeter the chocolate taste.
- *Bakers' chocolate has the least amount of sugar.
- *Milk chocolate has a less bitter taste than semisweet or dark chocolate.
- *Chocolate used to be considered only a delicacy to be enjoyed by the rich. It was also imported to our country from the more central and southern continents. It originally was available only to the royalty in Europe.

Independent classwork

- *Have students discuss other foods that begin as a bean or seedling. (peanut butter and coffee)
Encourage students to take a trip to local grocery stores to get ideas. Have students research exactly how that item is manufactured.
- *Have students sample various types of chocolate and make predictions about what ingredient is dominant. Have students research their predictions.
- *Have students make a sequence chart showing all the different steps in the chocolate making process.

Any ideas or feedback, let me know. My kids love this lesson.

E-Mail [Kimmi!](#)