

## Why ....oh...why are my cookies so dense?

**WebQuest Description:** What happens when you bake a cookie that makes it so difficult to eat? Does it have anything to do with the physical and chemical changes?

**Grade Level:** 6-8

**Curriculum:** Life Skills / Careers

**Keywords:** Density, phase change, chemical changes, measuring

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Lets get physical!

### Introduction

Have you ever wondered why some cookies are hard and dry while others are soft and chewy? Well you have found the right web-quest! Yes, it is a mystery for some bakers' cookies to be, well, good; and others just plain horrible. Your terrible, horrible, rotten cookie making days are at an end! Have you ever wondered what happens to cookie dough in the oven? Just what happens to all that goo that causes it to turn into a yummie cookie? Well, we will start with some quests for information about physical and chemical changes in matter.

### Tasks

Students will complete a web quest that will help them understand changes in matter that are chemical and physical. Students will describe the changes that occur when cookies bake and relate these to a phase change diagram. Students will determine when a change is physical or chemical during the cookie construction and, finally, baking. Students will select a recipe from a pre-selected web-site. Students will be able to determine the variables that are present in the recipe that can cause the cookie to be, well--yucky. Students will determine the variables associated with the baking of the cookie that may cause to be, well-- not only yucky but down right YUCKY! Students will prepare cookie dough, bake cookies, eat and evaluate each other's cookies using the word document that they must print from the evaluation page. Students will also create a time line of the history of the cookie! Students will design the time line using word or microsoft publisher. The students will then submit a hard copy to the instructor and e-mail a copy. Students will also be given the opportunity to get physically active and play "Cookie Monster Tag."

### Process

Well, if you have ever wondered what happens to your cookies in the oven, now is your chance to find out! First we need to learn a little science. You will investigate web-sites to find out how matter changes. You remember what matter is, right? If not, click on the Matter site below and it will tell you all about it. While you are there take the quiz at the bottom of the page on the right. Click on the quiz and try it out! Now that you remember what matter is, let's see what you can find out about the properties of matter. Matter can not be created or destroyed; it can only be changed. You are about to find out how matter can be changed. Look at the web-site provided: What is the difference in chemical and physical changes. Now that you understand what matter is and how it can change, check out just how it changes. Look at the video, relate to a phase change. Once you have seen the video draw a phase change diagram using microsoft word applying draw. Include the labels and a brief explanation as to what is happening in the diagram. Then in a short two point response, explain how the cookie dough relates to the diagram while it is baking. Create a t-chart that will compare chemical and physical changes while preparing the cookie dough and another for the process of baking. Create this on your word document. When you have selected your recipe copy and paste it to your word document that you will print and e-mail to your instructor. Use the web-site provided. Bake your cookies! Evaluate cookies using the evaluative tool provided that you have already printed. Finally once cookies have been baked and evaluated, write a two point response that explains your understanding of the baking process as it relates to ingredients and properties of matter during a phase change. You may go back to the web sites provided for hints and detailed information to do this. Submit this through a word document either printed or e-mailed to your instructor. You are almost done! The time line is required and can be done using microsoft word. Use the website provided to complete this. Submit this through printed material or e-mail. There is a game that you can play to burn off some of your calories or just relieve your stress from the whole quest! Click on the game page. It's called cookie monster! Go play! Don't forget your cookies!

## Evaluation

Students are evaluated using the evaluation rubrics provided. At the end of the quest the students will be able to determine the variables that are present in the recipe and the variables associated with the baking of the cookies that might cause their cookies to be yucky.

Category and Score	No understanding of concepts	Developing understanding of concepts	Basic understanding of concepts	Proficient understanding of concepts	Score
Draw phase change diagram and label it correctly	No diagram	Diagram drawn but no labels.	Diagram drawn and labels not correctly placed.	Diagram drawn and labeled correctly.	4
Students will complete a T-chart with appropriate information to describe the differences between physical and chemical changes in matter.	No T-chart completed.	T-chart completed but only one comparison has been made.	T-chart completed with at least two comparisons made.	T-chart completed with at least two comparisons and examples provided.	4
Recipe submitted from web site provided. The item also must be e-mailed to the instructor.	No recipe	Recipe provided through assigned web-site, but not from assigned web site.	Recipe provided from assigned web site but not present in the e-mail attachment.	Recipe provided and present in the e-mail as an attachment.	4
History of the cookie time line.	No time line provided	Time line provided but information is not accurate.	Time line provided and some information is accurate.	Time line is provided and all information is accurate and sequential.	4
				Total Score	16

## Conclusion

What was the best portion of this web- quest for you? What was the most interesting topic that you learned more about? What would you have done differently if you were to have created this web- quest? Did your cookies taste good? Respond through an e-mail to the authors of this web-quest.

## Teacher Page

This is another interesting way to connect students and teachers to different parts of their curriculum. The idea of interconnected lessons is time consuming but a great deal of fun. This asks students to think about cooking in a more scientific way. Students can get relate some concepts of science to the real world.

### Standards

The standards are for New York State and are as follows:

- Standard 1: Analysis, Inquiry, and Design. Key idea 1: The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process. Key idea 3: The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into natural phenomena. Performance indicators: S1.1b identify appropriate references to investigate a question. S1.3, Represent, present, and defend their proposed explanation. S3.1a, generate graphs, organize results, and models to show relationships.
- Standard 7: Interdisciplinary Problem Solving. Key Idea 2: Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among common themes of mathematics, science, and technology; and presenting results. Performance indicator: 2.1 Students will work effectively, gather and process information, gather and analyze ideas, unite common themes, and finally present a realistic plan of the findings.
- Family and Consumer Sciences-Intermediate Standard 1—Personal Health and Fitness Students will have the necessary knowledge and skills to establish and maintain physical fitness, participate in physical activity, and maintain personal health. 1. Students will use an understanding of the elements of good nutrition to plan appropriate diets for themselves and others. They will know and use the appropriate tools and technologies for safe and healthy food preparation.
- Standard 2—A Safe and Healthy Environment Students will acquire the knowledge and ability necessary to create and maintain a safe and healthy environment. 1. Students will know the basic principles of home and community safety. They can demonstrate the skills necessary to maintain their homes and workplaces in a safe and comfortable condition. They can provide a safe and nurturing environment for themselves and others.
  - demonstrate personal and social skills which enhance personal health and safety
  - understand the need for personal involvement in improving the environment.
- Standard 3—Resource Management Students will understand and be able to manage their personal and community resources. 1. Students will understand and be able to manage personal resources of talent, time, energy, and money and make effective decisions in order to balance their obligations to work, family, and self. They will nurture and support positive relationships in their homes, workplaces, and communities. They will develop and use their abilities to contribute to society through pursuit of a career and commitment to long-range planning for their personal, professional, and academic futures. They will know and access community resources.

Science : The Physical setting.

Key Idea 3:

Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

Objects in the universe are composed of matter. Matter is anything that takes up space and has mass. Matter is classified as a substance or a mixture of substances. Knowledge of the structure of matter is essential to students' understanding

of the living and physical environments. Matter is composed of elements which are made of small particles called atoms. All living and nonliving material is composed of these elements or combinations of these elements. Observe and describe properties of materials, such as density, conductivity, and solubility.

Major Understandings:

3.1a Substances have characteristic properties. Some of these properties include color, odor, phase at room temperature, density, solubility, heat and electrical conductivity, hardness, and boiling and freezing points.

3.1b Solubility can be affected by the nature of the solute and solvent, temperature, and pressure. The rate of solution can be affected by the size of the particles, stirring, temperature, and the amount of solute already dissolved.

3.1c The motion of particles helps to explain the phases (states) of matter as well as changes from one phase to another. The phase in which matter exists depends on the attractive forces among its particles.

3.1d Gases have neither a determined shape nor a definite volume. Gases assume the shape and volume of a closed container.

3.1e A liquid has definite volume, but takes the shape of a container.

3.1f A solid has definite shape and volume. Particles resist a change in position.

3.1g Characteristic properties can be used to identify different materials, and separate a mixture of substances into its components. For example, iron can be removed from a mixture by means of a magnet. An insoluble substance can be separated from a soluble substance by such processes as filtration, settling, and evaporation.

3.1h Density can be described as the amount of matter that

#### **Credits**

Thank you to all whose web-sites we used! Without your help we could not have completed this task. Thank you New York State Department of Education !

#### **Other**