

Dear 2nd Grade Parents/Guardians:

This unit in Amplify Science is called: ***Properties of Materials***. In this unit, the students will take on the role of glue engineers. The unit begins with a letter from the principal requesting the students' help to make a glue for school use. Over the course of four chapters, the students will go about solving that problem. They will conduct hands-on investigations to observe properties of a variety of possible glue ingredients and learn how certain materials respond to heating and cooling. The students will conduct tests, graph their data, analyze and interpret results, and then use that evidence to design a series of glue mixtures, each one better than the one before. By the end of the unit, the students will be able to speak knowledgeably about their choices and argue for how a particular glue mixture best meets their design goals.

In **Chapter 1**, the students will attempt to answer the question ***How can you make a sticky glue?*** They will investigate two mystery glues to determine if they are the same glue or two different glues? In their first written argument, the students will make claims to answer that question and support their claims with evidence. The class will observe and test possible glue ingredients, graph test data, and search for information about these ingredients in the unit's reference book. Using all of the gathered evidence, the students will work individually to plan, make, and test their own glue recipes.

In **Chapter 2**, the students will work to answer the **question *Can heating an ingredient (and returning it to its original temperature) make a better glue?*** They will discover that some substances change when heated or cooled, while other substances remain substantially unchanged. Then the class will observe and test a glue ingredient that has been heated and the same ingredient that has not been heated. They will discuss how the properties change with heating, and predict whether those changes would result in a stickier glue. The students will discuss the concept of cause and effect and apply the concept to explain the effects they are observing. The chapter ends with another opportunity for the students to practice making and supporting claims.

In **Chapter 3**, students figure out ***What ingredients can be used to make a glue that is sticky and strong?*** The class will add another design goal—the glue must be strong as well as sticky. The students will test possible glue ingredients for strength, do more research, and use a table to evaluate their evidence. Based on the evidence they gather, the students will make an argument for what ingredients to include in their second glue. At the end of the chapter, the students will make and test their second glue.

In **Chapter 4**, the students will answer the question ***What is the glue recipe that best meets our design goals?*** They will evaluate the results of their second glue, choose another design goal, and then work in pairs to plan, make, and test two more glues. At the end of the chapter, the students will write a culminating argument about the glue recipe that they think best meets the design goals.

Important Vocabulary for this unit can be found in the glossary on the back of this letter. Students should be able to understand and apply the vocabulary words during class discussions and investigations and in their written explanations. The concepts and vocabulary for each chapter are cumulative and build upon the understandings from previous chapters.

Thank you,
The Second Grade Teachers

Unit 2: Key Vocabulary

**All vocabulary in this unit is presented in Chapter 1 and used throughout all four chapters*

design: to try to make something new that solves a problem

engineer: a person who uses science knowledge to design something in order to solve a problem

materials: the stuff that makes up everything

predict: to use what you already know to decide what you think might happen

property: something about a material that you can see, hear, smell, taste, or feel

evidence: information that supports an answer to a question

observe: to use any of the five senses to gather information about something

substance: a specific kind of material

test: to try something and find out what happens

claim: a proposed answer to a question

ingredient: anything used in a recipe or mixture

mixture: two or more ingredients mixed together

record: to draw or write down information

Essential Understandings

Different materials have different properties. Materials are the stuff that makes up everything. Materials have properties. These properties are observable things such as color, texture, smell, and taste. Different materials have different properties.

Mixtures have different properties, depending on their ingredients. Sometimes a material is made of a combination of other materials; we call this combination a mixture, and we call the materials that make it up substances. Some mixtures have different properties, depending on their ingredients.

Heating or cooling a substance can change it to a new substance. Properties of substances can change when they are heated or cooled. Some substances change into a different substance when they are heated or cooled, so they have different properties when they return to their original temperature. Other substances remain the same, so they have the same properties when they return to their original temperature.

A mixture may have a combination of the properties of its ingredients. The properties of a mixture may be a combination of the properties of the ingredients. Therefore, by combining certain substances, the resulting mixture will have certain properties.