



## Food Chemistry Pacing Guide

Use the information below to assist you in determining the amount of time needed to complete the entire unit. These recommendations assume the average science class period is 50 to 60 minutes in length. We recommend teaching science a minimum of three sessions per week in order to maintain consistency and keep students engaged. Many teachers accomplish this by rotating a science unit with a social studies unit, enabling you to teach more science sessions in one week and finish the unit in fewer weeks. We highly recommend that all teachers participate in the Expository Writing and Science Notebooks Program in order to further develop students' science understandings, as well as their scientific thinking and writing skills. To implement the science-writing curriculum requires, for most lessons, a separate 20 to 30 minutes for a science-writing minilesson and independent writing time. These are not included in this pacing guide.

Lessons and Common Assessments (see corresponding lesson in Instructional Guide (IG) for lesson planning)	Recommended Number of Periods	GLEs Addressed/Big Idea(s) of the Lesson	Considerations for Planning	Recommended Applications and Extensions
<b>Pre-Assessment and Lesson 1: Thinking about Foods We Eat</b>  Students share prior knowledge about nutrients in foods. Students discuss the foods they eat for breakfast, lunch and dinner.	1	GLE 1.3.8: Understand that living things need constant energy and matter. <b>Big Idea:</b> Nutrients are essential to human health.	This lesson will highlight the food similarities and differences in various cultures represented in your classroom. Endeavor to build and maintain a tolerant and accepting atmosphere so all students feel respected.	
<b>Lesson 2: Identifying Healthy Foods: Getting Ready</b>  Students use their senses to observe the foods they will be testing throughout the unit.	1	GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules. <b>Big Idea:</b> Nutrients are essential to human health.		
<b>Lesson 3: Testing Liquids for Starch</b>  Students test liquids (water, milk, cornstarch, corn syrup, corn oil) for starch using iodine as the indicator. Data is recorded and analyzed.	1	GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules. <b>Big Idea:</b> Specific tests can be done to determine whether a food contains specific nutrients. A chemical reaction occurs when testing for starch.	Teacher provides milk for testing, preferably nonfat, but 1% or 2% will work. Other liquids are included in kit, except for tap water.	
<b>Lesson 4: Testing Foods for Starch</b>  Students test foods (rice, flour, apple, egg white, beef jerky, oat cereal, onion, and	2	GLE 2.1.3: Understand how to construct a reasonable explanation using evidence. 2.2.3: Understand why similar investigations may not produce similar results. <b>Big Idea:</b> Varying amounts of starch are found in		Encourage students to bring in 1 food from home to test or encourage them to save a food sample from the lunch room. There are 2 extra cups for these

coconut) for starch.		different foods.		foods in each group's bag.
<b>Lesson 5: Learning More about Starch</b>  Students read to find out more about starch, what it does for the body and various foods that it is in.	1-2	GLE 1.3.8: Understand that living things need constant energy and matter. Reading GLE 3.1: The student reads to learn new information. <b>Big Idea:</b> Foods containing starch provide energy.	Language Arts integration: nonfiction reading in the context of science. Readings found on pgs. 65-67 in manual and on pgs. 13-14 in the book: <i>Food Chemistry</i> . Multiple copies come in the science kit.	
<b>Lesson 6: Testing Liquids for Glucose</b>  Students test the same liquids as in Lesson 3 for the presence of glucose. Data is recorded and analyzed.	1	GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules. <b>Big Idea:</b> Specific tests can be done to determine whether a food contains specific nutrients. A chemical reaction occurs when testing for glucose.	Teacher provides milk for testing, preferably nonfat, but 1% or 2% will work. Other liquids are included in kit, except for tap water.	
<b>Lesson 7: Testing Foods for Glucose</b>  Students test the same foods as in Lesson 4 for the presence of glucose. Data is recorded and analyzed.	1	GLE 2.1.3: Understand how to construct a reasonable explanation using evidence. 2.2.3: Understand why similar investigations may not produce similar results. <b>Big Idea:</b> Varying amounts of glucose are found in different foods.		Discuss how more and more people have diabetes in the U.S. Read pgs. 41-43 in the book, <i>Food Chemistry</i> . Multiple copies come in the science kit.
<b>Lesson 8: Learning More about Glucose</b>  Students read to find out more about glucose and other forms of sugar, what it does for the body and various foods that it is in.	1-2	GLE 1.3.8: Understand that living things need constant energy and matter. Reading GLE 3.1: The student reads to learn new information. <b>Big Idea:</b> Glucose is a type of sugar that provides energy. Foods containing glucose and other types of sugar can cause too much weight gain and need to be eaten sparingly.	Language Arts integration: nonfiction reading in the context of science. Readings found on pgs. 94-95 in the manual and on pgs. 15-16 in the book: <i>Food Chemistry</i> . Multiple copies come in the science kit.	
<b>Assessment A: Comparing Starch and Glucose</b>	Can be embedded into Lesson 8	GLE 1.2.8, Evidence of Learning: <i>Describe how the systems allow the human body to take in and use nutrients for living, growth, and repair.</i>		
<b>Lesson 9: Testing Liquids for Fats</b>  Students test the same liquids as in Lessons 3 & 6 for the presence of fat. Data is recorded and analyzed.	1	GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules. <b>Big Idea:</b> Specific tests can be done to determine whether a food contains specific nutrients. When testing for fats, a physical change occurs when grease is left on the paper.	Teacher provides milk for testing, preferably nonfat, but 1% or 2% will work. Other liquids are included in kit, except for tap water.	

<p><b>Lesson 10: Testing Foods for Fats</b></p> <p>Students test the same foods as in Lesson 4 &amp; 7 for the presence of fat. Data is recorded and analyzed.</p>	1	<p>GLE 2.1.3: Understand how to construct a reasonable explanation using evidence. 2.2.3: Understand why similar investigations may not produce similar results.  <b>Big Idea:</b> Varying amounts of fat are found in different foods.</p>		<p>This point in the unit would be a good time to discuss different diets, such as vegetarianism. Have students read pgs. 51-54 in the book, <i>Food Chemistry</i>. Multiple copies come in the science kit.</p>
<p><b>Lesson 11: Learning More about Fats</b></p> <p>Students read to find out more about the different types of fats, what they do for the body and various foods that they are in.</p>	1-2	<p>GLE 1.3.8: Understand that living things need constant energy and matter.  Reading GLE 3.1: The student reads to learn new information.  <b>Big Idea:</b> Some fats are good and others are bad for the body. Fat provides energy, but we need to limit saturated and hydrogenated fats. Eating unsaturated fats is most nutritious.</p>	<p>Language Arts integration: nonfiction reading in the context of science. Readings found on pgs. 116-117 in the manual and on pgs. 24-25 in the book: <i>Food Chemistry</i>. Multiple copies come in science kit.</p>	
<p><b>Lesson 12: Testing Liquids for Protein</b></p> <p>Students test the same liquids as in Lessons 3, 6 &amp; 9 for the presence of protein. Data is recorded and analyzed.</p>	1	<p>GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules.  <b>Big Idea:</b> Specific tests can be done to determine whether a food contains specific nutrients. A chemical reaction occurs when testing for protein.</p>	<p>Teacher provides milk for testing, preferably nonfat, but 1% or 2% will work. Other liquids are included in kit, except for tap water.</p>	
<p><b>Lesson 13: Testing Foods for Protein</b></p> <p>Students test the same foods as in Lesson 4, 7, &amp; 10 for the presence of protein. Data is recorded and analyzed.</p>	1-2	<p>GLE 2.1.3: Understand how to construct a reasonable explanation using evidence. 2.2.3: Understand why similar investigations may not produce similar results.  <b>Big Idea:</b> Varying amounts of protein are found in different foods.</p>		
<p><b>Lesson 14: Learning More about Protein</b></p> <p>Students read to find out more about protein, what it does for the body and various foods that it is in.</p>	1-2	<p>GLE 1.3.8: Understand that living things need constant energy and matter.  Reading GLE 3.1: The student reads to learn new information.  <b>Big Idea:</b> The body uses complete proteins to build and repair muscle and tissues. Some foods have complete proteins and others only incomplete proteins. People need to be aware of what is in foods.</p>	<p>Language Arts integration: nonfiction reading in the context of science. Readings found on pgs. 140-141 in the manual and on pgs. 19-20 in the book: <i>Food Chemistry</i>. Multiple copies come in the science kit.</p>	
<p><b>Assessment B:</b> Comparing Fats and Protein –</p>	Can be embedded into Lesson 14	<p>GLE 1.2.8, Evidence of Learning: <i>Describe how the systems allow the human body to take in and use nutrients for living, growth, and repair.</i></p>		

<p><b>Lesson 14.5: The Digestive System</b></p> <p>Students learn how all the parts of the digestive system work together to break the nutrients in food down into smaller particles that can be used by other parts of the body. Students learn that food contains energy that is transformed into chemical energy, heat energy, and energy of motion (kinetic).</p>	<p>1-2</p>	<p>GLE 1.1.4: Understand that energy comes in many forms. 1.2.2: Understand that energy can be transferred and transformed. 1.2.1: Analyze how parts of a system go together and how these parts depend on each other. 1.2.8: Understand the organization and function of human body structures and organs and how they interconnect.</p> <p><b>Big Idea:</b> Food energy is an input into the digestive system. Food energy is transformed into chemical energy, heat energy, and energy of motion (kinetic) within the system.</p>	<p>This lesson is not found in the teacher manual. It has been added to the Instructional Guide in order to address the standards on systems and transfer and transformation of energy in the digestive system.</p>	<p>Beecher’s Flagship Program: 2-hour classroom workshop provided by a trained representative from Beecher’s Cheese Co. about food additives and the differences between processed and whole foods. Look under <i>Resources</i> at the end of the Instructional Guide.</p>
<p><b>Lesson 15: Examining Labels: Making the Connection</b></p> <p>Students find out more about nutrients in foods by reading food labels. They read about vitamins C, A, B, and D to find out how they are used by the body.</p>	<p>1</p>	<p>GLE 1.3.8: Understand that living things need constant energy and matter. Reading GLE 3.1: The student reads to learn new information.</p> <p><b>Big Idea:</b> Food labels provide information about nutrients. Micronutrients, which the body needs in smaller quantities, include vitamins and minerals.</p>	<p>Language Arts integration: nonfiction reading in the context of science. Readings found on pgs. 156-157 in the manual and on pgs. 26-29 in the book: <i>Food Chemistry</i>. Multiple copies come in the science kit.</p>	<ul style="list-style-type: none"> <li>• <i>The Food Label &amp; You</i> video – look under <i>Resources</i> at the end of the Instructional Guide.</li> <li>• Ask students to bring in packages containing labels of foods commonly eaten at home. Use these to determine the most nutritious foods and to plan sample menus for healthy eating.</li> </ul>
<p><b>Lesson 16: What Is in a Marshmallow?</b></p> <p>Applying What We Have Learned – Students test a new food, a marshmallow, to find out if it would provide the nutrients needed to sustain the body on a long hike. Students can be assessed on how well they perform the tests for the 4 nutrients and how well they infer which nutrients provide energy to a body getting strenuous exercise.</p>	<p>1-2</p>	<p>GLE 2.1.2: Understand how to plan and conduct simple investigations following all safety rules. 2.2.1: Understand that all scientific observations are reported accurately and honestly even when the observations contradict expectations. 2.2.4: Understand how to make the results of scientific investigations reliable.</p> <p><b>Big Idea:</b> Marshmallows contain glucose and starch, which would provide a lot of energy for a long hike.</p>	<p>This is an embedded assessment, which can be used as a post assessment for the unit.</p>	<ul style="list-style-type: none"> <li>• Have students read pgs. 7-10, Exploring the Food Guide Pyramid, in the book <i>Food Chemistry</i>.</li> <li>• Consider having students use <i>Google</i> to find a vegetarian food pyramid.</li> </ul>
<p><b>Assessment C:</b> End of Unit Assessment Writing Conclusions – Using Evidence from the Marshmallow Tests</p>	<p>Can be embedded into Lesson 16</p>	<p>GLE 2.1.3, Evidence of Learning: <i>Write a conclusion including supporting data from an investigation. Describe a reason for a given conclusion using evidence from an investigation.</i></p>		