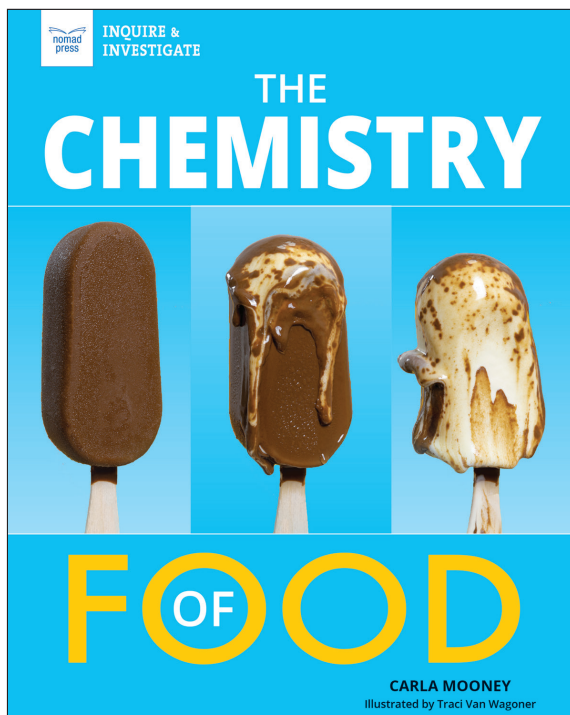




## The Chemistry of Food

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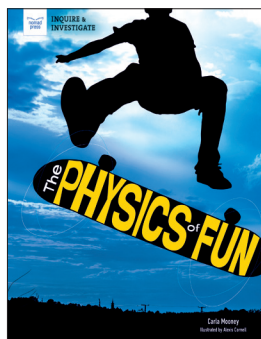
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Focus: Science & Nature / Chemistry

GRL: Y

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## ESSENTIAL QUESTIONS TO ASK

### KEY VOCABULARY

atom, catalyst, chemical reaction, DNA, enzyme, metabolism, minerals, organic, preservative, trans fats

### BEFORE READING

#### 1 Establish Background Knowledge

- Why is chemistry considered to be a foundational science?
- Is it important to know the chemistry of the food you eat? Why or why not?
- Do you think learning more about food and nutrition will encourage people to change their eating habits? Would it encourage you?

#### 2 Skill Introduction

- What do you do when you come to a word or phrase you do not know?
- How do photographs, videos, and maps help someone learn about a topic?

**CCC: CCSS.ELA-Literacy.L.6.5c** Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., stingy, scrimping, economical, unwasteful, thrifty).

**CCC: CCSS.ELA-Literacy.SL.6.1c** Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.

### DURING READING

#### 1 Check for Understanding

- What do you already know about the chemistry in your food and in your own body?
- How can we use knowledge about chemistry to make better choices about food?
- How are chemistry and food science related?

**CCC: CCSS.ELA-Literacy.L.6.4a** Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

**CCC: CCSS.ELA-Literacy.RST.6-8.5** Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.



Chemical bonds and compounds are why bacon smells so good! Take a look!

<https://www.acs.org/content/acs/en/pressroom/reactions/videos/2014/why-does-bacon-smell-so-good.html>



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## ESSENTIAL QUESTIONS TO ASK

### AFTER READING

#### 1 Summary and Expansion

- a What effects do hot and cold temperatures have on food?
- b When you think of delicious food, are you thinking of taste? Texture? How it looks?
- c How does the body use chemistry to break down food into energy?
- d Why are proteins important? What do they do for the body?
- e Why do food producers add certain preservatives to food?
- f Why don't oil and water mix?
- g What are some of the different kinds of fats? What does each one do to the body?
- h What are the different ways heat can be added to food?
- i What are some of the more common chemical reactions in cooking? How does each one work?

**CCC: CCSS.ELA-Literacy.RST.6-8.8** Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

**CCC: CCSS.ELA-Literacy.SL.6.2** Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

**CCC: CCSS.ELA-Literacy.WHST.6-8.8** Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

**CCC: CCSS.ELA-Literacy.WHST.6-8.9** Draw evidence from informational texts to support analysis, reflection, and research.

**CCC: CCSS.ELA-Literacy.RST.6-8.9** Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

### COMMON CORE CONNECTIONS

**Grade: 6 Language CCSS.ELA-Literacy.L.6.3,4,4a,4b,4c,5,5a,5b,5c,6**

**Grade: 6-8 Science & Technical Subjects CCSS.ELA-Literacy.RST.6-8.1,2,3,4,5,6,7,8,9,10**

**Grade: 6 Speaking & Listening CCSS.ELA-Literacy.SL.6.1,1a,1c,1d,2,3,4,5,6**

**Grade: 6-8 Writing HST CCSS.ELA-Literacy.WHST.6-8.1,2,4,6,7,8,9,10**



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## COMMON CORE CONNECTIONS

### Grade: 6 Language

#### CCSS.ELA-Literacy.L.6.3,4,4a,4b,4c,5,5a,5b,5c,6

3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.

4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.

4a Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.

4b Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., audience, auditory, audible).

4c Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

5a Interpret figures of speech (e.g., personification) in context

5b Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.

5c Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., stingy, scrimping, economical, unwasteful, thrifty).

6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

### Grade: 6-8 Science & Technical Subjects

#### CCSS.ELA-Literacy.RST.6-8.1,2,3,4,5,6,7,8,9,10

1 Cite specific textual evidence to support analysis of science and technical texts.

2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6–8 texts and topics.

5 Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.

6 Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.

7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

10 By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.



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## COMMON CORE CONNECTIONS

### Grade: 6 Speaking & Listening

#### CCSS.ELA-Literacy.SL.6.1,1a,1c,1d,2,3,4,5,6

1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

1a Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

1c Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.

1d Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.

2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.

3 Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.

4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.

5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.

6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 here for specific expectations.)

### Grade: 6-8 Writing HST

#### CCSS.ELA-Literacy.WHST.6-8.1,2,4,6,7,8,9,10

1 Write arguments focused on discipline-specific content.

2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.

4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

9 Draw evidence from informational texts to support analysis, reflection, and research.

10 Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.



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**Inquire & Investigate****VOCAB LAB**

Write down what you think each word means.

What root words can you find to help you? What does the context of the word tell you?

**atom, bond, chemical reaction, compound, kinetic energy, mixture, molecule, solution, and temperature.**

Compare your definitions with those of your friends or classmates. Did you all come up with the same meanings? Turn to the text and glossary if you need help.

To investigate more, pick another recipe to watch for physical and chemical change. What physical changes to food ingredients do you observe? What chemical changes? Is there any evidence of a chemical change?

**CHEMICAL OR PHYSICAL?**

In the kitchen, chefs combine and alter food ingredients to create a finished dish. Some of these changes are physical—the food changes form, shape, and size, but the molecules that make up the food do not change. Other changes in food are chemical. When food undergoes a chemical reaction, a new substance is created. During a chemical change, bonds between molecules are created or destroyed. In this activity, you will classify different changes food undergoes during cooking as either physical or chemical.

- **Choose a few of the “recipes” below.**

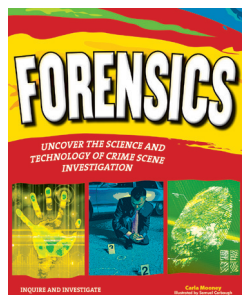
- Prepare a mixed green salad with chopped vegetables, shredded cheese, and sliced almonds
- Make a fruit smoothie by blending fruit, ice, and juice
- Make popsicles by placing fruit juice into popsicle forms and placing in the freezer
- Make pancakes by preparing batter and frying on a griddle
- Sauté onions in butter on a stovetop
- Cut an apple into slices and let it sit for a period of time.

- **Did a physical or chemical change occur?** Is there a new odor or color? Did you hear any kind of sound from the ingredients? These can be signs of a chemical change.

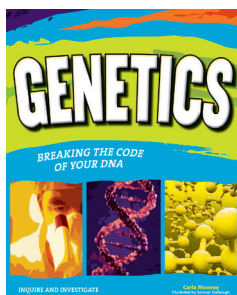
- **Explain your reasoning for your conclusions.** Record your observations in your science journal.



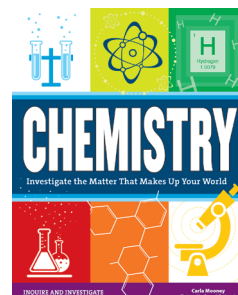
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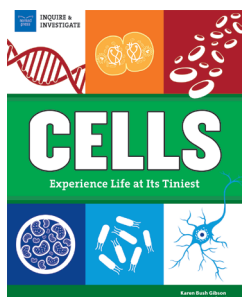
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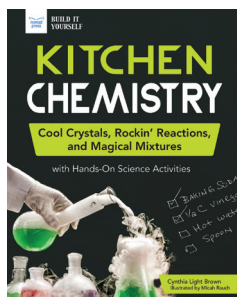
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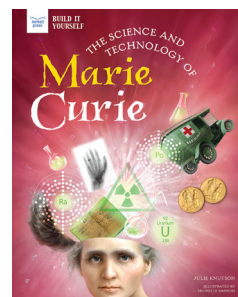
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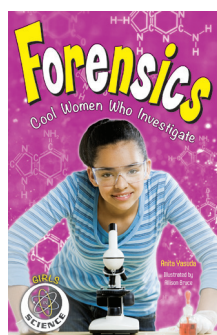
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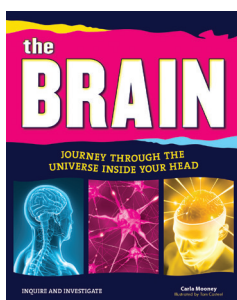
Author: Cynthia Light Brown



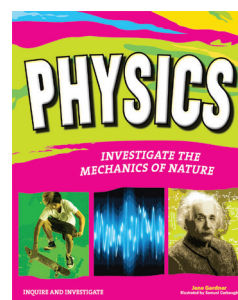
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