Grade 5

Georgia
Criterion-Referenced Competency Tests

CRCT Study Guide

Reading
English/Language Arts
Mathematics
Science
Social Studies To be available 2008–09

Table of Contents

Using the CRCT Study Guide

This Study Guide focuses on the knowledge and skills that are tested on the Georgia Criterion-Referenced Competency Tests (CRCT). It is designed for teachers to use with their students and for parents to use with their children. Go to **www.gadoe.org**/ to find further information about and support for the CRCT.

Use the following section of this guide, *About the CRCT*, for an overview of the CRCT and for test-taking strategies to review with your students.

– The content tested on the CRCT is based on the Georgia Performance Standards, which describe what all students should know, understand, and be able to do.

The chapters of this guide are organized by subject. In each chapter you can explore the skills needed to succeed in a specific, tested domain (grouping of similar content standards). The subject chapters include a snapshot of each domain, instructional **Activities** that address covered skills, and a **Practice Quiz** with annotated **Solutions** to help assess student progress.

Overview of the CRCT

What is the CRCT?

The CRCT is a series of state-mandated achievement tests for students in Grades 1 through 8. In Grades 3 through 8, the subject areas of reading, English/language arts, mathematics, science, and social studies are covered.

What does the CRCT measure?

The CRCT measures how well students have learned the knowledge and skills covered by the state curriculum for their grade level. A new statewide curriculum, known as the Georgia Performance Standards (GPS), sets academic standards and expectations for all students in Georgia's public schools. The CRCT corresponds to the new standards.

The tests accomplish the following:

- Ensure that students are learning
- Provide data to teachers, schools, and school districts so they can make better instructional decisions
- Measure accountability, including Adequate Yearly Progress (AYP) as measured by the federal No Child Left Behind Act

CRCT results measure the academic achievement of students, classes, schools, school systems, and the state. This information can be used to identify individual student strengths and weaknesses, or, more generally, to measure the quality of education throughout Georgia.

How are CRCT questions scored?

The CRCT currently uses only selected-response (multiple-choice) questions. There are four choices for each question, labeled A, B, C, and D.

Students are not compared to each other. Each is measured on his or her achievement in meeting the standards. Scores are reported according to three performance levels: Does Not Meet the Standard, Meets the Standard, and Exceeds the Standard. For more information, go to the website **www.gadoe.org/ci_testing.aspx?PageReq=CI_TESTING_CRCT** and click the link for "2007 CRCT Interpretive Guide."

Since the spring of 2006, performance on the reading portion of the CRCT has been linked to the Lexile scale. Visit **www.gadoe.org/lexile.aspx** for more information on this national reading measure.

Preparing for the CRCT

Test-Taking Strategies

Weeks Before the Test

Set academic goals with students for the upcoming weeks and months (short and long term). Write down and post students' goals where they can be seen at least once a day.

Help students gather study materials ahead of time.

Set up a place to work that is free of distractions.

Build in time to review what was learned in the last study session.

Divide assignments into manageable chunks. Studying for a long time non-stop is not productive!

Model and have students mark the main idea of each paragraph with a pencil as they read. This will help them focus on what they are reading.

Have students ask questions that arise while they are studying and encourage them to find the answers.

At the end of each study session, review what they have learned.

Day Before the Test

Remind students to get a good night's rest.

Remind students that they can talk to a teacher or parent if they are feeling nervous about the test.

Assure students that this test is only one measure of their knowledge.

During the Test

Remind students of the following strategies to use during the test:

Relax by taking slow, deep breaths.

Read the directions carefully. Make sure you understand what you need to do. If you are not sure, ask the teacher.

Read each question carefully.

When you use scratch paper, make sure that you copy the problem correctly from the test onto your paper.

You can underline and make marks on your test to help you while you work, but the only answers that will be scored are those in the correct locations on your answer sheet.

Fill in the corresponding circle fully when you choose your answer. Erase any marks outside of the circle.

Use your time wisely. Leave a question blank if you are unsure of the answer, then return to it at the end.

Don't spend too much time on one question.

Be sure to answer all of the questions.

Review your answers when you have finished the test.

Try to stay calm during the test. This is a chance for you to show what you know. Do the best you can!

Related Links

Below are links to important resources that contain information related to the CRCT.

Georgia Performance Standards:
www.georgiastandards.org/

CRCT Content Descriptions:
www.gadoe.org/ci_testing.aspx?PageReq=CITestingCRCTDesc

Lexile Framework for Reading:
www.gadoe.org/lexile.aspx

Best practices in education indicate that teachers should first model new skills for students. Next, teachers should provide opportunities for guided practice. Only then should teachers expect students to successfully complete an activity independently.

The activities in this guide are no exception. They are designed to be used by teachers and parents to help students with the skills on the Georgia CRCT.

Since different students have different strengths and needs, the activities in this study guide can be scaffolded for students who need more support, extended to challenge advanced students, or presented as is (with appropriate modeling) for grade-level students.

Reading

Reading

Students in Grade 5 expand and deepen the concepts, skills, and strategies learned in earlier grades. Grade 5 students read and comprehend texts from a variety of genres (fiction, nonfiction, poetry, and drama) and subject areas math, science, social studies, and English/language arts, and they make new connections as they encounter new ideas and begin to study subjects in more formal ways.

The Reading activities focus on some of the concepts that are assessed on the Grade 5 CRCT Reading domains. These domains are as follows:

1 **Reading Skills and Vocabulary Acquisition**

2 **Literary Comprehension**

3 **Information and Media Literacy**

Activities

❶ Reading Skills and Vocabulary Acquisition

Georgia Performance Standard ELA5R3

Within the Reading Skills and Vocabulary Acquisition domain, students learn a variety of skills to read and interpret difficult text. Students will determine the meaning of unfamiliar words by using context clues and applying their knowledge of common roots, prefixes, and suffixes. Students will also identify and understand words with multiple meanings and apply their knowledge of antonyms, synonyms, and homophones.

The following activities develop skills in this domain:

− To reinforce students' knowledge of words with multiple meanings, hold a *Word Auction*. Write words that have two or more meanings on index cards. (See the table below.) Hold one word up at a time in front of students. Working in small groups or pairs, students will race against each other to think of as many different meanings of the word that they can. They will write a different sentence for each meaning of the word, and the student who comes up with the most meanings first will get the sale. If the word on the card is *run*, act as the auctioneer and call out: *Do we have one sentence for the word run? Going once, going twice…one sentence….* Students who have at least one sentence should raise their hand. If a lot of hands go up, continue calling out, *Do we have two sentences for the word run? Do we have three sentences? etc.,* until the highest bid is reached. Do not declare, *Sold!* until students read their sentences to prove they have used the different meanings of the word correctly.

account	cut	mean	rally	sink
average	dash	might	reason	skip
bank	deck	mind	record	smell
bark	estimate	nail	reflect	snap
bat	face	order	represent	sound
bear	fast	paint	ring	stick
bend	flip	pen	rock	stock
bowl	float	pet	roll	table
box	group	plane	rose	tape
can	judge	plant	row	tip
change	jump	play	run	track
charter	kind	profit	season	trick
check	lap	promise	serve	trip
color	light	race	shell	watch
crop	look	raise	ship	wind

– To familiarize students with dictionary entries, play *Match My Word*. Write advanced vocabulary words on individual index cards. Then write or paste the printed definitions on separate index cards. Scramble the cards and pass them out. Students will walk around the room and engage each other in conversation as they try to find the match for their word or definition. Students with definition cards might say, *My word can be a verb or noun and can mean _____, _____, or _____.* If alternate word choices are provided in their definitions, they might also say, *Another way to say my word is _____.* Students who have a word card might say, *My word is _____. I think it means _____.* Once students find their partners they should sit down together and create a sentence with their word. At the end of the sentences they should indicate which part of speech they used. For example, if their word is *estimate* and they write the sentence, *The woman will estimate the charges*, they should specify that they used *estimate* as a verb.

– To develop students' understanding of common Greek and Latin roots, create tree diagrams. Present students with a list of Greek and Latin root words and their meanings (see tables below). To show students how to start a tree diagram, draw the trunk of a tree and write one of the root words at the bottom. Draw branches that lead away from the trunk. On each branch write a different word that shares the root word. If the root word is *port*, which means *to carry*, the tree branches would be lined with words such as *import*, *export*, *portable*, *transport*, *portal*, and *porter*. Students should choose a root word and create their own tree diagram posters. They can use the Internet or dictionaries to search for words that contain specific roots. As students read the words' definitions, they will see how each root influences the meanings of the words that contain it.

Greek Roots

aer: air	*cosmo:* universe	*hyder:* water	*nym:* name	*sphere:* ball
agog: leader	*cycl:* wheel	*hyper:* over, beyond	*phe/phem:* to speak	*st/sta/stat:* to stand
arch: ruler	*derm:* skin	*hypo:* below, beneath	*phil:* love	*techn:* art, skill
aster/astr: star	*eco:* house	*logo:* word, reason	*phon:* sound	*tele:* far
auto: self	*gram:* letter	*meter/metr:* measure	*photo/phos:* light	*therm:* heat
bio: life	*gram:* thing written	*micro:* small	*pod/pus:* feet	*trac/tract:* to pull
chron: time	*graph:* writing	*mono:* one	*scope:* viewing instrument	*zoo:* animal

| Latin Roots				
ann/enn: year	*duct:* to lead	*jus/jud/jur:* law	*rupt:* to break	*terr:* land
aud: to hear	*fac:* to do, to make	*lum/lus/luc:* light	*scope:* see	*vert/vers:* to turn
bene: well, good	*flec/flex:* to bend	*man:* hand	*scrib/script:* to write	*vict/vinc:* conquer
capit/capt: head	*form:* shape	*mar/mer:* sea	*sect/sec:* cut	*vid/vis:* to see
cent: hundred	*fract:* to break	*mini:* small	*spect:* to look	*viv/vit:* live
circ: around	*geo:* earth	*mort/mors:* death	*spir:* to breathe	*voc:* voice, to call
corp: body	*ject:* throw	*ped:* foot	*st/sta/stat:* to stand	*volv:* roll
cred: to believe, trust	*jud: judge*	*port:* to carry	*struct:* to build	*vor:* eat
dict: to speak	*junct: to join*	*quer/ques/quis:* seek	*tang/tact:* to touch	*zo:* animal

- To help students determine the meaning of unfamiliar words using context clues, provide them with sentences that contain either direct definitions or contrasts for unknown words. Direct definitions are often signaled by *or*, like in the sentence: *Chaps, or protective leg coverings, are worn by cowboys.* Contrasts can imply an unfamiliar word's meaning, as in the sentence, *The population of jaguars is thriving, while the population of macaws is declining.* By contrasting the two clauses of this sentence, students can figure out that *thriving* means the opposite of *declining* (i.e., *thriving* means growing or increasing). Students should read the sentences provided and write definitions for the unknown words. They can double-check their definitions with dictionary definitions to see how well the context clues helped them uncover the meaning of the unknown words.

Further support can be found in the GPS Reading Framework at
www.georgiastandards.org/elaframework.aspx

Activities
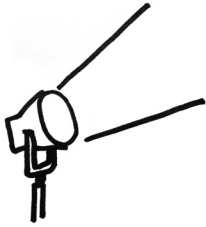
❷ Literary Comprehension
Georgia Performance Standard ELA5R1

Within the Literary Comprehension domain, Grade 5 students learn to identify and analyze the setting, characters, plot, and conflict of literary works such as short stories, dramas, folktales, poetry, fables, and descriptive narratives. They should be able to interpret the author's use of dialogue and description, and understand that theme refers to the implied or stated message about life and the world. Students in Grade 5 should also be able to analyze and understand imagery, rhythm, flow, and figurative language, such as simile (comparison of one thing to another using *like* or *as*), metaphor (comparison using *is*), hyperbole (exaggeration), idiom (expression particular to a given language), and personification (description of an inanimate object as animate). When reading poetry, Grade 5 students should evaluate line length and the use of capital letters, stanzas, and refrains. They should also analyze the effects of sound devices such as onomatopoeia (words like *Bang!* that are pronounced like the sounds they describe) and alliteration (phrases like *lively leaping lizards* in which each word shares the same beginning sound). Finally, Grade 5 students will analyze how a work of fiction fits within its historical and cultural context.

The following activities develop skills in this domain:

– To help students identify and analyze literary elements, challenge them to fill in empty story maps. (See example, on next page.) Create a story map template that includes spaces for students to name and describe the characters, identify the setting, summarize the plot, and list the major conflicts that take place within a fictional story. Students can reread or skim over the text as they work to fill in their maps. They should mark the names of the main characters and describe the setting by identifying both time and place of the story. They should also label the conflicts according to the following categories: character vs. character, character vs. self, character vs. nature, or character vs. society. Once students have completed maps on more than one story, they should use them to compare texts and analyze the similarities and differences among characters, settings, plots, and conflicts. In addition, students should use the maps to practice asking and answering questions about characters that begin with the word *why*. For example, students could discuss why a character makes certain statements or takes certain actions.

Title:	Conflicts	Plot Summary
	(Number each conflict and label type: character vs. character, character vs. self, character vs. nature, or character vs. society.)	
Author:		
Setting **Where:**		
When:		
Characters: (Star the main characters)		

– To familiarize students with different types of figurative language, provide students with examples that they can categorize and explain. Prepare for the activity by creating four boxes or bins, each labeled either *personification*, *simile*, *metaphor*, *hyperbole* or *idiom*. Write examples of each type of figurative language on separate strips of paper and pass them out to students. Call on students to read their sentences, identify the types of figurative language they contain, and explain what the sentences mean. A student who receives the sentence *Flowers danced in the breeze* would identify it as an example of *personification* and explain, *The author means that the flowers moved around in the breeze*. Students will place their sentences in the appropriate box or bin to start a class collection. As students read literary texts, they should look for examples of figurative language that they can write down and add to the bins. Students should use the class collection to help them add figurative language to their own writing.

– To develop students' understanding of theme, read a literary text and create *common thread* posters. Explain that the themes of a literary text are ideas the author expresses about life, the world, and human nature. Examples of themes are *hard work pays off* and *jealousy can ruin a relationship*. After reading a literary work, students should think of the themes the author communicates. List students' ideas on the board so they can choose one to investigate. Then, give each student a piece of yarn and a piece of construction paper. Students should glue their yarn toward the tops of their posters, leaving enough room to write the themes they want to investigate above it. Students will reread texts to look for events or short passages in the text that support the themes they have chosen. Students should draw lines

coming down from the yarn on their poster and list evidence from the text that support the identified themes. This activity will help students see the thematic threads that are woven throughout literary texts.

– To build students' appreciation for the effects of sound in poetry, review *onomatopoeia*, *rhyme*, and *alliteration*. With students, read poems that contain these sound devices. Students should rewrite the poems by removing all the sound devices, then compare the two versions of the poems and discuss how the sound effects contribute to the original poem's meaning (e.g., emphasize important ideas, create vivid imagery, etc.).

Further support can be found in the GPS Reading Framework at
www.georgiastandards.org/elaframework.aspx

Activities
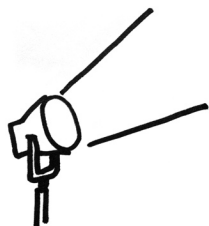
❸ Information and Media Literacy
Georgia Performance Standards ELA5R1 and ELA5LSV2

Within the Information and Media Literacy domain, Grade 5 students learn the skills necessary to comprehend and analyze information from various texts such as informational essays, non-fiction articles, subject-area texts, biographies, book and film reviews, diary entries, letters, advertisements, web pages, encyclopedias, and other reference materials. They also learn to understand and evaluate workplace, consumer, and media reading materials. Students should understand and apply their knowledge of textual features such as paragraphs, topic sentences, concluding sentences, and glossaries. Using their knowledge of organizational structures such as classification schemes, cause and effect, chronological, and logical order, they should determine the main idea and supporting details of a text. They should make perceptive and well-developed connections to draw conclusions and make predictions. In addition, students should identify and use common graphic features, such as charts, maps, diagrams, captions, and illustrations. They should understand how media plays a part in dispensing information, and forming public opinion, in addition to providing entertainment.

The following activities develop skills in this domain:

– To help students understand the purpose and value of graphic features (charts, maps, diagrams, captions, and illustrations), provide students with short, descriptive or explanatory texts from which all graphic features have been removed. (Sample texts are available online and in many academic textbooks.) Students should read the texts and create graphic features that clarify or extend the meanings of the texts. For challenging texts, give students specific guidelines, such as, *Create a line graph showing the population growth of Georgia from the year 2000 to 2005*. In order to create the graphic features, students must read the texts carefully.

– To show students how authors can influence readers' opinions, provide a forum for students to write and present reviews of books, movies, or articles. A student review should begin with an introductory paragraph that includes the title, author, or director, and genre of the book, movie, or article. Next, the review should provide a brief summary of the story or subject matter. When relevant, students should also describe the main characters, their conflicts, and major events. The review should end with a recommendation, such as to read (or not read) the book. Students should support their recommendations by explaining the positive and negative aspects of the material. Students should specify what types of readers and audiences would be likely to enjoy the book, movie, or article. Finally, students present their reviews and discuss whether a review they've read altered their opinions. They also make predictions about what other books, movies, or articles that they would likely enjoy.

– To increase students' awareness of author's purpose in media, give students examples of various media texts, such as newspapers, magazines, advertisements, television shows, and Internet articles. Students should then analyze the examples to identify target audience and author's purpose for each. Secondly, students should select a writing topic (such as a movie review or a persuasive essay) and decide what type of media would be most appropriate for carrying the message. Students' plans should include the following components: identification of the media they chose and their reasons for choosing it, the audience their project would target, and a brief description of what they would like to write. Finally, students should write, revise, and—if appropriate—develop, record, or videotape the piece that they've written.

Further support can be found in the GPS Reading Framework at
www.georgiastandards.org/elaframework.aspx

Practice Quiz

Genre: Nonfiction
Read the passage below and answer the questions that follow.

The Really Real Story of Celia Spencer

Reviewed by: Janice Moy

If you're in the mood for an adventure, go see the new movie *The Really Real Story of Celia Spencer.* It tells the story of Celia Spencer, a ten-year old with an amazing life. Her parents are circus performers. For the first ten years of her life, she lives with the circus, traveling all across Australia, Europe, and America. When the circus goes out of business, Celia's parents decide it is time to settle down. The movie takes viewers along as Celia gets used to living in one place instead of traveling the globe. Celia makes new friends and has plenty of adventures. She also learns a lot along the way. If you're in the mood to laugh, go see this movie.

The Really Real Story of Celia Spencer gives viewers a look at a life that most people do not know much about: the life of a circus performer. It was very interesting to learn about the lives of the performers. They get into trouble, have fun, and learn new tricks. Celia even gets to teach some dogs tricks to perform in the ring. Although it was one of the most fascinating aspects of the film, the movie only showed the lives of the circus performers at the beginning. I think it would have been more interesting if the movie spent more time showing what circus life is like.

When the circus goes out of business and Celia's parents decide to settle down, the story becomes a little sad. Celia is not used to living in one place, and it is hard for her. Then Celia meets Charlie, a ten-year old girl in her neighborhood. They become best friends. They visit the zoo, hang out listening to opera music, and even come up with ideas for making girls' clothes that look like circus costumes. They get in a lot of trouble during the movie, but they find a way of getting out of it without hurting themselves or anyone else. They are always happy with who they are, even when they do not fit in with the rest of the crowd.

Fans of actress Sarah Woods, who plays Celia, will love this movie. Woods does a great job as Celia. She makes the character very believable. Lisa Manning, who plays Charlie, shows off her talents as an actress, too. All of the actors in the movie do a great job.

Overall, this was a funny and entertaining movie that kids ages 8–14 will really enjoy. Certain parts of the movie were a little slow, but there were enough funny moments to make up for it. If you want to be entertained, go see this movie!

1   **Why did the author MOST LIKELY include the final paragraph?**
   A   to describe her favorite part of the movie
   B   to keep kids her age from seeing the movie
   C   to summarize her thoughts about the movie
   D   to explain the roles each actor played in the movie

2   **Which of these BEST describes the main idea of the passage?**
   A   This movie is not made for young children.
   B   Some movies can be funny even if they are slow.
   C   Action and adventure movies are not for everyone.
   D   People who like to be entertained should go see this movie.

3   **What is MOST LIKELY the reason that Celia and Charlie become such good friends?**
   A   They are shy and quiet.
   B   They are not used to living in one place.
   C   They are adjusting to life outside the circus.
   D   They are each a little different from most other kids.

4   **Which of these movies would the author MOST LIKELY enjoy?**
   A   a cartoon about opera music
   B   a true story about a family of acrobats
   C   a biography of a famous fashion designer
   D   a story about two boys who train rescue dogs

5   **Which of these BEST describes the author's purpose in writing this passage?**
   A   to explain why she liked the movie
   B   to discuss the message of the movie
   C   to persuade people to go see the movie
   D   to summarize what happens in the movie

6   **Which of these BEST describes how the description of the movie in the first paragraph is organized?**
   A   chronological order
   B   in order of importance
   C   as a series of causes and effects
   D   arguments with supporting details

7   **Which of these sentences from the passage BEST supports the idea that Celia enjoys life with the circus?**
A   They become the best of friends.
B   If you're in the mood to laugh, go see this movie.
C   Celia even gets to teach some dogs tricks to perform in the ring.
D   It was very interesting to learn about the lives of the performers.

8   **Which of these is a synonym of *talents* as it is used in the sentence?**

Lisa Manning, who plays Charlie, shows off her <u>talents</u> as an actress, too.

A   studies
B   abilities
C   favorites
D   messages

9   **What is the meaning of the word *aspects* as it is used in the sentence?**

Although it was one of the most fascinating <u>aspects</u> of the film, the movie only showed the lives of the circus performers at the beginning.

A   parts
B   themes
C   minutes
D   conflicts

10   **Which word BEST replaces the word *hard* in the sentence?**

Celia is not used to living in one place, and it is <u>hard</u> for her.

A   firm
B   solid
C   difficult
D   unhappy

Solutions

Number	Correct Answer	Explanation
1	**C**	*Identifies and uses knowledge of common textual features (e.g., paragraphs, topic sentences, concluding sentences, glossary). (ELA5R1b)*
		The correct answer is **Choice (C) to summarize her thoughts about the movie.** The last paragraph begins with the clue word *Overall*, which signals that a summary is to follow, and reiterates the author's thoughts about the movie. Choice (A) is incorrect because the last paragraph does not describe the author's favorite part of the movie. The author's favorite part is described in the second paragraph. Choice (B) is incorrect because the last paragraph does not try to keep kids from seeing the movie—it encourages them to see it. Choice (D) is incorrect because the last paragraph does not explain the roles each actor played in the movie. The roles each actor played are explained in the second to last paragraph.
2	**D**	*Identifies and analyzes main ideas, supporting ideas, and supporting details. (ELA5R1f)*
		The correct answer is **Choice (D) People who like to be entertained should go see this movie.** The main idea of the passage is that *The Really Real Story of Celia Spencer* is an entertaining movie that people should go see. Choices (A) and (C) are incorrect because the passage does not state or imply that the movie is not made for young children, or that action and adventure movies are not for everyone. Choice (B) is incorrect because, although the last paragraph states that the movie was funny and entertaining overall, despite certain parts that "were a little slow," this is not the main idea of the whole passage.
3	**D**	*Distinguishes cause from effect in context. (ELA5R1e)*
		The correct answer is **Choice (D) They are each a little different from most other kids.** The third paragraph says, "They are always happy with who they are, even when they don't fit in with the rest of the crowd." Choice (A) is incorrect because there is nothing to indicate that they are both shy and quiet, and choices (B) and (C) are incorrect because they only apply to Celia, not to Charlie.

Number	Correct Answer	Explanation
4	**B**	*Makes perceptive and well-developed connections. (ELA5R1g)* The correct answer is **Choice** (**B**) **A true story about a family of acrobats.** In the second paragraph the author writes, "It was very interesting to learn about the lives of performers," and she calls this part of the movie, "one of the most fascinating aspects of the film." Both of these statements support the prediction that she would also like a story about a family of acrobats. Choices (A) and (C) are incorrect because nothing in the passage states or implies that the author would enjoy either of these topics. Choice (D) is incorrect because although the author enjoyed a movie about two girls who teach dogs tricks, this does not mean she would enjoy a movie about two boys who train rescue dogs.
5	**C**	*Evaluates the role of the media in focusing attention and in forming an opinion. (ELA5LSV2b)* The correct answer is **Choice** (**C**) **to persuade people to go see the movie.** The first and last sentences of the first paragraph and the last sentence of the passage, tell the reader to "go see the movie." Choices (A), (B), and (D) are incorrect because although the author explains what she likes about the movie, discusses the messages of the movie, and summarizes what happens in the movie, the overall purpose of the passage is to persuade people to go see the movie.
6	**A**	*Identifies and uses knowledge of common organizational structures (e.g., chronological order, logical order, cause and effect, classification schemes). (ELA5R1d)* The correct answer is **Choice** (**A**) **chronological order.** The description of the movie in the first paragraph tells what happens in movie in the order that it occurred on screen. Choices (B) and (D) are incorrect because the description is not listed in order of importance, nor is it presented as arguments with supporting details. Choice (C) is incorrect because although some of the description includes cause and effect examples (e.g., "When the circus goes out of business, Celia's parents decide it is time to settle down."), the description is not a series of causes and effects.

Number	Correct Answer	Explanation
7	**C**	*Identifies and analyzes main ideas, supporting ideas, and supporting details. (ELA5R1f)*
		The correct answer is **Choice** (**C**) **Celia even gets to teach some dogs tricks to perform in the ring.** The phrase "even gets to" implies that what follows is something enjoyable. The author's word choice shows that Celia likes this aspect of circus life. Choice (A) is not correct because it refers to Celia and Charlie's friendship, which was not a part of Celia's *life with the circus*. Choices (B) and (D) are incorrect because they are not about Celia—Choice (B) addresses the reader, and Choice (D) describes the author's thoughts.
8	**B**	*Identifies and applies the meaning of the terms antonym, synonym, and homophone. (ELA5R3i)*
		The correct answer is **Choice** (**B**) **abilities.** The word *abilities* and the word *talents* are synonyms. Choices (A), (C), and (D) are incorrect because *studies*, *favorites*, and *messages* do not mean the same thing as *talents*.
9	**A**	*Determines the meaning of unfamiliar words using context clues (e.g., definition, example). (ELA5R3b)*
		The correct answer is **Choice** (**A**) **parts.** In this sentence, the word *aspects* refers to the part of the movie that "showed the lives of circus performers." Choices (B), (C), and (D) are incorrect because the word *aspects* does not mean *themes*, *minutes,* or *conflicts* in this sentence.
10	**C**	*Recognizes and uses words with multiple meanings (e.g., sentence, school, hard) and determines which meaning is intended from the context of the sentence. (ELA5R3h)*
		The correct answer is **Choice** (**C**) **difficult.** In this sentence, *hard* means *difficult*. Living in one place was difficult for Celia. Choices (A) and (B) are incorrect because although *firm* and *solid* can be synonyms for *hard*, they do not mean the same as *hard* in this sentence. In this sentence, something is hard emotionally. Choice (D) is incorrect because although Celia may have felt *unhappy*, the word *unhappy* does not make sense in this sentence.

English/Language Arts
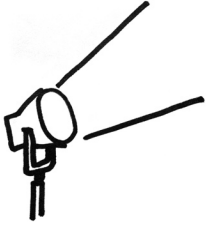
English/Language Arts

Grade 5 students use writing as a tool for learning, and they write for a variety of purposes and audiences. These students write daily in order to maximize and formalize their writing skills. Students communicate their personal voices in writing, expressing ideas through journals, notes, and e-mails. They understand and articulate how authors use a variety of techniques and craft in their writing, and they show evidence of the author's craft in their own writing. Additionally, students are aware of the connections between reading and writing, and they use those skills to learn and understand more about their world and different cultures. Students continue to increase vocabulary knowledge through reading, word study, discussion, and content area study.

The English/Language Arts activities focus on some of the concepts that are assessed on the Grade 5 CRCT English/Language Arts domains. These domains are as follows:

1 **Grammar/Sentence Construction**

2 **Research/Writing Process**

Activities

❶ Grammar/Sentence Construction
Georgia Performance Standard ELA5C1

Within the Grammar/Sentence Construction domain, students learn to recognize and apply standard rules of capitalization, punctuation, language usage, and standard spelling. Students identify and analyze various sentence patterns, problematic sentences including sentence fragments and run-ons, and the basic parts of a sentence. Students revise paragraphs by combining sentences using proper conjunctions and punctuation, select verb phrases that maintain consistency in tense, and differentiate between compound, complex, and compound-complex sentences. In addition, students demonstrate appropriate use of varied sentence structures by removing misplaced and dangling modifiers from sentences and differentiating between the four sentence types: imperative, declarative, exclamatory, and interrogative.

The following activities develop skills in this domain:

–   To help students recognize the various types of sentences, run-ons, and fragments, play *Grammar Bingo* in small groups or as a whole class. To begin, prepare a Bingo card for each student that looks like a variation of the following model, with each blank square containing a sentence type:

B	I	N	G	O
interrogative	exclamatory	declarative	imperative	declarative
compound-complex	declarative	compound	interrogative	complex
exclamatory	interrogative	free space!	compound	compound-complex
compound	complex	imperative	complex	exclamatory
imperative	compound	compound-complex	declarative	interrogative

Next, students will cut out bingo markers to cover the called blanks on their cards during the game. Explain that you will randomly select a *B*, *I*, *N*, *G*, or *O* by rolling a modified dice cube (use tape to cover the dots with letters). Then write a sentence on the board that corresponds to one of the sentence types on the Bingo cards. On their *Grammar Bingo* cards, students try to cover the appropriate blanks under the rows for the letter rolled. Many sentences will fall into more than one category, so students can cover up more than one blank if appropriate. For example, if you roll *G* and then say, *I ate grilled cheese for lunch, and then I had roast beef for dinner,* a student with a *compound* square and a *declarative* square under letter *G* can cover both. To win, students must cover a full diagonal, horizontal, or vertical line. Check the winners for accuracy by referring to the sentences on the board.

- To improve their writing skills, students should practice combining and punctuating sentences. Hand out sheets containing different paragraphs spaced apart on the pages. These paragraphs should contain many simple sentences. Before the activity begins, spend a minute or two modeling combining sentences—by adding conjunctions such as *and* or *but* and commas, if necessary. Sample sentences to combine may include:

  - *Our teacher was out sick. A substitute came to teach our class.*
    (Our teacher was out sick, but a substitute came to teach our class.)
  - *Last night, the rain kept falling. My dog got very wet. (Last night, the rain kept falling, and my dog got very wet.)*

  Then give students several minutes to combine the simple sentences on their paragraph sheet. When students have finished working with their paragraphs, they should pass the sheet to a classmate. Students will review others' corrections and discuss the conjunctions and commas they have used.

- To practice using consistent verb tenses and eliminating dangling modifiers, students will write in a daily journal for one week. (*Consistent verb tense* means that writing remains in the same tense throughout. A *dangling modifier* is a phrase-modifying word that isn't clearly stated. For example: *Having completed the meal, the dishes were done*. This sentence includes a dangling modifier; readers do not know who or what completed the meal. The sentence, as written, suggests that the dishes completed the meal.) Explain that students can write about anything they choose in their journals; their writing will not be shared with others. At the end of the week, model either inconsistent verb tenses or dangling modifiers for students by writing a sample sentence incorporating the error on the board. Focusing on the selected writing error, students will check their own journal writing and highlight examples of the error wherever it appears. Then students will fix the sentences they've highlighted. After spending a week focusing on one writing error, focus on the other using the same approach.

Further support can be found in the GPS English/Language Arts Framework at **www.georgiastandards.org/elaframework.aspx**

Activities
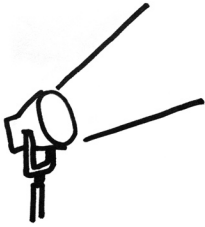
❷ Research/Writing Process
Georgia Performance Standards ELA5W1, ELA5W2, ELA5W3, and ELA5W4

Within the Research/Writing Process domain, students learn to use and analyze the purpose of research and technology, use resources to support the writing process, and evaluate the various strategies, styles, and purposes of written organization. Students analyze the organizational structure of a paragraph by determining the most appropriate pattern for a writing purpose, and apply knowledge of appropriate transition elements between paragraphs, passages, and ideas. Students determine main ideas and relevant details, as well as appropriate topic sentences and closing sentences. To achieve clarity, students reorganize sentences in a paragraph. Students analyze various reference sources used to support writing, including a dictionary and thesaurus, and demonstrate knowledge of elements such as citations, end notes, footnotes, bibliographic entries, and appendices.

The following activities develop skills in this domain:

– To help students recognize and demonstrate an understanding of citations, end notes, footnotes, tables of contents, bibliographic entries, and appendices, play *Element Hunt*. Select examples (from any appropriate texts) of each of the following: an in-text citation, an end note, a footnote, a bibliographic entry, a table of contents, and an appendix. Copy these elements onto sheets of paper. Then, remove one component from each, such as the page numbers (from a table of contents) or a city of publication (from a bibliographic entry). For the activity, students (working individually or in pairs) should review the elements and try to find their missing components.

– Identifying the main ideas and relevant details of paragraphs is an important part of becoming a good researcher. First, make sure students understand the terms *main idea* and *details*. Then read a series of paragraphs aloud to students from an encyclopedia or Internet article. Read each paragraph slowly and project it on an overhead while students write down the main idea in their own words. When students have finished identifying the main idea, discuss the details in the paragraph. *What could be added or taken away? Should any of the sentences be reorganized? Why does finding the main idea and relevant details efficiently make researching a topic easier?* A variation of this activity is to place students in pairs in order to discuss the reasons for their choices.

– To give students practice creating appropriate closing sentences, play *That's a Wrap*. Write several paragraphs on the board or a piece of paper. These paragraphs should explain an event that happened, describe a topic, or give instructions for doing or making something. The sentences may even come from reading selections the students have already seen. However, for each paragraph, eliminate the closing sentence. Students should read the paragraphs and write strong closing sentences for each of them. When students have finished, discuss their sentences and whether they properly summarized the information in the paragraphs. As an extension activity,

students should remove the last sentence from paragraphs they've written. Then in pairs, students should read their partner's paragraphs and create new closing sentences. Finally, the students should compare the different closing sentences.

Further support can be found in the GPS English/Language Arts Framework at **www.georgiastandards.org/elaframework.aspx**

Practice Quiz

1 **What part of speech is the underlined word in the sentence?**

I wanted a glass of juice, <u>but</u> my mother gave me a glass of milk.

A adverb
B adjective
C preposition
D conjunction

2 **Which verb phrase BEST completes the sentence?**

Because the factory closed last year, all the workers _____ away.

A is moving
B are moved
C has been moved
D have been moving

3 **Which sentence uses *question* as an adjective?**
A The sentence needs a question mark.
B I have a question about how to fix my bike.
C Can you answer my question about the homework?
D Did you question your neighbor about the missing dog?

4 **What type of sentence is this?**

Please keep off of the grass.

A declarative
B imperative
C exclamatory
D interrogative

5 **Which sentence uses commas correctly?**
A I was born on, Sunday June 21, 1992, in Athens Georgia.
B I was born on Sunday June 21, 1992, in Athens, Georgia.
C I was born on Sunday, June 21, 1992, in Athens, Georgia.
D I was born on, Sunday, June 21 1992, in Athens Georgia.

6   **The following paragraph is an example of what organizational structure?**

> Andrew Jackson was sworn in as the seventh president of the United States on March 4, 1829. Jackson was a very popular president because he represented the common man. During presidential speeches, crowds of thousands would gather to support Jackson. He was liked and respected by many. As a result, Jackson was elected to serve a second term as president of the United States.

A   cause and effect
B   chronological order
C   question and answer
D   similarity and difference

7   **Which transition would BEST connect the two sentences?**

> Most maple trees grow tall. The Japanese maple tree is a smaller kind of maple tree.

A   so
B   and
C   however
D   therefore

8   **Which supporting detail is MOST important to add to the paragraph below?**

> A colorful Spanish fan is easy to make, and it looks beautiful, too. First, take a sheet of paper and decorate it with a bright pattern. When you have finished, fold the paper back and forth, making sure that all the folds are equal in size. Staple the folds at one end, and attach a popsicle stick for the handle. That is all there is to it!

A   Madrid is the capital of Spain and has a population of over three million.
B   Ceiling fans help keep people cool during hot summer months.
C   Some Spanish dance music is played on the guitar.
D   Glitter can add extra sparkle to your pattern.

9 **Which sentence in the paragraph below repeats an idea?**

> [1]Joshua and Carrie walked to the store to buy several supplies for lunch. [2]They needed to buy a number of items. [3]Joshua needed some juice, and he also needed bread to make sandwiches. [4]Carrie needed paper towels and milk. [5]Both of them were able to purchase the items on their list.

A   sentence 2
B   sentence 3
C   sentence 4
D   sentence 5

10 **Which is the BEST closing sentence for the paragraph below?**

> Jasmine bounced into the kitchen, but she came to a sudden halt as she looked around the room. Sammy, her little brother, had decided to make brownies, but he had never done any cooking before. One broken egg made a bright yellow spot on the floor. The yellow of another egg dripped down the side of the cabinet. A box of brownie mix lay on its side on the counter, and more brownie mix lay in a pile on the floor.

A   Sammy called to her.
B   Jasmine liked to make brownies.
C   Her brother would make pizza next.
D   The kitchen was certainly a huge mess.

Solutions

Number	Correct Answer	Explanation
1	**D**	*Uses and identifies the eight parts of speech (noun, pronoun, verb, adverb, adjective, conjunction, preposition, interjection). (ELA5R3h)*
		The correct answer is **Choice** (**D**) **conjunction**. A conjunction joins two complete sentences. '*I wanted a glass of juice*' and '*my mother gave me a glass of milk*' can both stand alone but have been joined by the conjunction *but*. Choice (A) is incorrect because an adverb modifies a verb. Choice (B) is incorrect because an adjective modifies a noun. Choice (C) is incorrect because even though a preposition links nouns and phrases together in a sentence, it generally describes a relationship between two things in space or time.
2	**D**	*Uses and identifies verb phrases and verb tenses. (ELA5C1c)*
		The correct answer is **Choice** (**D**) **have been moving.** The helping verb *have* must be used with the plural *workers*. *Have been moving* signifies an action that hasn't been completed yet. The workers are gradually moving away. Choice (A) is incorrect because *is* is a singular verb and does not agree with the plural noun *workers*. Choice (B) is incorrect because even though *are* is a plural verb and agrees with the plural noun *workers, moved* implies that the action is in the past, which doesn't make as much sense as a gradual change. In addition, *are moved* implies that someone else moved them. Choice (C) is incorrect because *has* is a singular verb and does not agree with the plural noun *workers*.
3	**A**	*Recognizes that a word performs different functions according to its position in the sentence. (ELA5C1d)*
		The correct answer is **Choice** (**A**) **The sentence needs a question mark.** *Question* is an adjective in this sentence because it describes the noun *mark*. An adjective describes a noun. Choices (B) and (C) are incorrect because *question* is a noun in both sentences. Choice (D) is incorrect because *question* is a verb in this sentence.

Number	Correct Answer	Explanation
4	**B**	*Varies the sentence structure by kind (declarative, interrogative, imperative, and exclamatory sentences and functional fragments), order, and complexity (simple, compound, complex, and compound-complex). (ELA5C1e)* The correct answer is **Choice** (**B**) **imperative.** An imperative sentence gives a command, or tells someone to do something, which is what the sentence in the question does. Choice (A) is incorrect because a declarative sentence simply makes a statement. Choice (C) is incorrect because an exclamatory sentence is one with emotion or urgency, generally ending in an exclamation point. Choice (D) is incorrect because an interrogative sentence is one that asks a question and ends in a question mark.
5	**C**	*Uses additional knowledge of correct mechanics (e.g., apostrophes, quotation marks, comma use in compound sentences, paragraph indentations), correct sentence structure (e.g., elimination of fragments and run-ons), and correct Standard English spelling (e.g., commonly used homophones) when writing, revising, and editing. (ELA5C1g)* The correct answer is **Choice** (**C**) **I was born on Sunday, June 21, 1992, in Athens, Georgia.** Commas are used between a day of the week and a month, between a date and a year, and after a year to set it off from the rest of the sentence. A comma is also used between a city and a state. Choice (A) is incorrect because it lacks commas after *Sunday* and *Athens*, and includes an unnecessary comma after *on*. Choice (B) is incorrect because it lacks a comma after *Sunday*. Choice (D) is incorrect because it lacks commas after *21* and *Athens*, and includes an unnecessary comma after *on*.

Number	Correct Answer	Explanation
6	**A**	*Uses traditional structures for conveying information (e.g., chronological order, cause and effect, similarity and difference, and posing and answering a question). (ELA5W1c)*
		The correct answer is **Choice (A) cause and effect.** The use of *because* and *as a result* identifies this paragraph as *cause* and *effect* organizational structure. The *causes* in the paragraph include the facts that Jackson was popular, supported, and respected by many. The *effect* is he was elected to serve a second term. Choice (B) is incorrect because the paragraph lacks a series of dates and transition words (next, then, finally) that are found in a chronological structure. Choice (C) is incorrect because the paragraph does not contain any questions. Choice (D) is incorrect because the paragraph does not compare two things or ideas in order to point out their similarities and differences.
7	**C**	*Uses appropriate structures to ensure coherence (e.g., transition elements). (ELA5W1d)*
		The correct answer is **Choice (C) however.** The Japanese maple is a contrast to most maple trees because it is small. *However* signifies a contrast between the first part and the second part of the sentence. Choices (A) and (D) are incorrect because *so* and *therefore* suggest that the second sentence describes an effect caused by the first. Choice (B) is incorrect because *and* does not express the fact that the second sentence is a contrast to the first sentence.
8	**D**	*Includes appropriate facts and details. (ELA5W2d)*
		The correct answer is **Choice (D) Glitter can add extra sparkle to your pattern.** Only this sentence provides details about how to make a Spanish fan. Choices (A), (B), and (C) have nothing to do with the topic of making Spanish fans.

Number	Correct Answer	Explanation
9	**A**	*Excludes extraneous details and inconsistencies. (ELA5W2e)*
		The correct answer is **Choice** (**A**) **sentence 2.** The phrase *several supplies* from sentence 2 means the same thing as *number of items* from sentence 3. Choice (B) and (C) are incorrect because they provide different information about the types of supplies needed (juice, bread, paper towels, and milk). They are not repetitive because they are specific to two different people. Choice (D) is incorrect because it summarizes the paragraph by telling that Carrie and Joshua were successful and were able to buy everything they needed.
10	**D**	*Provides a sense of closure to the writing. (ELA5W2h)*
		The correct answer is **Choice** (**D**) **The kitchen was certainly a huge mess.** A closing sentence usually summarizes the paragraph. Choice (D) is the only one that sums up what the paragraph is about. Choice (A) is incorrect because it describes an action that has little to do with what is described in the rest of the paragraph. Choice (B) is incorrect because it is simply a detail about Jasmine and does not summarize what the paragraph is about. Choice (C) is incorrect because it describes what may happen in the future without summarizing what the paragraph describes.

Mathematics

Mathematics

By the end of Grade 5, students will further develop their understanding of multiplication and division of whole numbers and decimal fractions. They will also understand and investigate algebraic mathematical expressions. Students will expand their understanding of computing area and volume of simple geometric figures. Students will understand the meaning of congruent geometric shapes and the relationship of the circumference of a circle to its diameter. They will also use percentages and circle graphs to interpret statistical data.
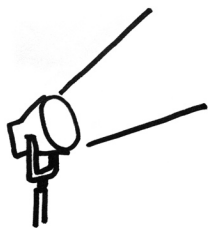
The Mathematics activities focus on some of the concepts that are assessed on the Grade 5 CRCT Mathematics domains. These domains are as follows:

1 **Number and Operations**

2 **Measurement**

3 **Geometry**

4 **Algebra**

5 **Data Analysis**

The *Mathematical Process Skills* are integrated throughout the domains. These are skills used to acquire and apply content knowledge.

Mathematical Process Skills refer to students' dexterity in applying concepts and skills in the context of authentic problems, and understanding concepts rather than merely following a sequence of procedures. Process skills are used to acquire and apply content knowledge. Process skills include solving problems that arise in Mathematics and other contexts; reasoning and evaluating mathematical arguments; communicating mathematically; making connections among mathematical ideas and to other content areas; and representing mathematical ideas in multiple ways.

Activities

❶ Number and Operations
Georgia Performance Standards M5N1, M5N2, M5N3, M5N4, and M5N5

Within the Number and Operations domain, students will further develop their understanding of whole numbers by classifying the set of counting numbers into subsets with distinguishing characteristics (odd/even, prime/composite), finding multiples and factors, and using divisibility rules. They will further develop their understanding of place value and decimals in the base-ten number system by analyzing the effect on the product when a number is multiplied by 10, 100, 1000, 0.1, and 0.01. Students will model and explain the process of multiplication and division using whole numbers, and decimals less than one and greater than one. They will understand that the relationships and rules for multiplication and division of whole numbers also apply to decimals. Students will understand that division of whole numbers can be represented as a fraction ($\frac{a}{b} = a \div b$) and that the value of a fraction is not changed when both numerator and denominator are multiplied or divided by the same number. They will find equivalent fractions, simplify fractions, and model the multiplication and division of common fractions, including estimation of products and quotients. Students will explore finding common denominators using concrete, pictorial, and computational models. They will use <, >, or = to compare fractions, and add and subtract common fractions and mixed numbers with unlike denominators. They will use proper and improper fractions and decimals interchangeably. Students will model percent on 10 × 10 grids and apply percentage to circle graphs.

The following activities develop skills in this domain:

– To apply multiplication and division to a real-life context, students can explore a problem involving invitations to a party. Present students with the following scenario: *E-mail invitations to 25 friends asking if they would like to attend a party. Tell each friend that he or she can forward the invitation along to some others. Assume that each recipient forwards the invitation on to 16 people and each of those recipients, in turn, sends the invitation out to 9 more people. No other invitations are sent.* Tell students they better order plenty of pizzas— each student should write down an estimate of how many pizzas they think they might need before doing any calculations. Ask students, *What would happen if half of the invitation recipients attended?* Responses will change depending on their sense of how many invitations were sent out. Then students should calculate the total number of people who have received the e-mail invitation. Students will observe the effect of multiplying by 0.1 and 0.01 by calculating how many people would show up if 10% of the recipients attended and if 1% attended. Using these results, students should calculate how many people will have to share each pizza by dividing the number they estimated they would need by the number of attendees. Discuss with students how their planning would have changed if they had done the calculations first.

– Students can understand and derive factors by working with manipulatives. Give students a large set (100 or more, if possible) of linking cubes, square wooden tiles, or squares cut from posterboard. Choose a number for students to work with, starting with a number like 12. Students will draw 12 squares from the pile and use them to make as many different rectangles as possible.

Students should start with one long row of squares to form a rectangle and then try adding rows to find other combinations that form a complete rectangle. With 12 squares, they can form 1 row of 12 squares, 2 rows of 6 squares, 3 rows of 4 squares, 4 rows of 3 squares, 6 rows of 2 squares, and 12 rows of 1 square (see examples below). Attempting to form 5 rows will result in an incomplete rectangle or leftover squares. Students will eliminate any rectangles with repeated dimensions (e.g., a rectangle with 2 rows of 6 squares is the same as a rectangle with 6 rows of 2 squares). The remaining pairs of dimensions represent the factors of the number 12: {1, 12, 2, 6, 3, 4}.

1×12

2×6

3×4
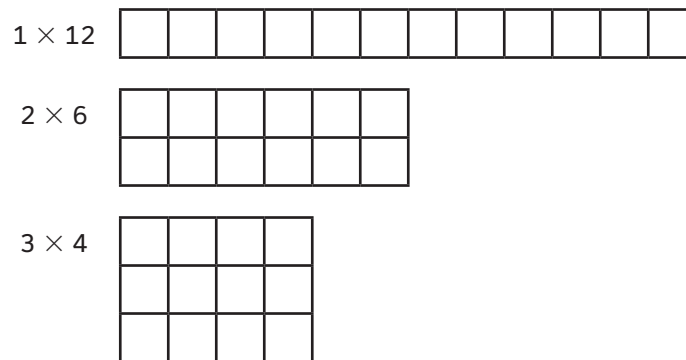
Students should repeat this with a variety of numbers, looking for patterns in the results. For instance, numbers for which students can only form one rectangle, such as 7 or 13, represent prime numbers. And for any even number students can form a rectangle with two rows, while for any odd numbers students cannot form a rectangle with two rows.

– To compare and simplify fractions, students should use randomly chosen fractions. Label three index cards with the symbols for less than (<), greater than (>), and equal to (=). Give students 15–20 index cards to use for writing down fractions of their choosing, one fraction per side. The fraction on one side should be in simplest form (e.g., $\frac{3}{8}$)and the fraction on the other should not (e.g., $\frac{24}{36}$ which can be simplified to $\frac{2}{3}$). All numerators and denominators should be one- or two-digit numbers. Display the symbol cards with plenty of space between them. Put all the index cards with written fractions in a container and have students draw two at random. Students should place the fractions on either side of the appropriate symbol card (<, >, or =) in order to make the equation true. If students are unsure of the relationship between the two fractions, they can find the greatest common factor (GCF) to simplify one or both fractions. If the relationship between two simplified fractions is still unclear, students can divide to compare decimal equivalents.

Further support can be found in the GPS Mathematics Framework:
Unit 1: *Groovy Graphing*; Unit 2: *Divine Decimals*; and Unit 3: *Funky Fractions*.

The Mathematics Framework documents are available at
www.georgiastandards.org/mathframework.aspx

Activities
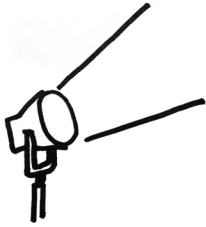
❷ Measurement
Georgia Performance Standards M5M1, M5M3, and M5M4

Within the Measurement domain, students will estimate and compute the area of fundamental geometric plane figures (rectangles, squares, triangles, parallelograms, polygons, and circles). They will derive and use the formula for the area of a parallelogram (e.g., cut the parallelogram apart and rearrange it into a rectangle of the same area) and for the area of a triangle (e.g., demonstrate and explain its relationship to the area of a rectangle with the same base and height). Students will estimate the area of a circle through partitioning, tiling, and then with the formula (using π = 3.14). They will also find the area of a polygon (regular and irregular) by dividing it into squares, rectangles, and/or triangles, and then finding the sum of the areas of those shapes. They will use milliliters, liters, fluid ounces, cups, pints, quarts, and gallons to measure capacity, and compare one unit with another in the same system of measurement (e.g., 1 quart = 2 pints). Students will understand that a cubic unit (u^3) is represented by a cube in which each edge has the length of 1 unit, and identify the units used in computing volume as cubic centimeters (cm^3), cubic meters (m^3), cubic inches (in^3), cubic feet (ft^3), and cubic yards (yd^3). They will derive the formula for finding the volume of a cube and a rectangular prism using manipulatives, and use the formula to compute volumes. Students will estimate the volume of a simple geometric solid, and understand the similarities and differences between volume and capacity.

The following activities develop skills in this domain:

–   Students can use the layout of a house or other building to develop skills for finding the area of regular and irregular polygons by dividing them into squares, rectangles, and triangles. Copy or print from a magazine page or Internet site a floor plan of a one-story house that gives dimensions for each of the rooms. Discuss with students which rooms should be carpeted and which should be tiled, based on their own experience. Students will create a chart listing each room, type of floor covering, and area. For rooms and spaces with an unusual shape, students should break the full area up into recognizable shapes and add up the areas to find the total. If any measurements are not listed, students will estimate using given measurements. After calculating the area for each room and space, students should add the carpeted areas to figure out the total square feet of carpeting needed, and then repeat for the tiled areas.

–   To work with radius and area of circles, students should explore the real-world situation illustrated by the diagram on the next page. A farmer buys a new system to water crops that uses a rotating steel arm that sprays water over a circular area. The arm rotates around a center point of an existing square field. The arm will reach exactly to the edges of the square field, as shown on the followiing page. The square field measures 100 feet along each edge. Students will answer the following questions:

- What is the length of the arm?
- What is the area watered by the system?
- What area of the square field will NOT be watered?
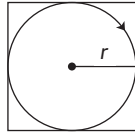
- Students will compare units of capacity by making their own recipe for punch. Students will find or invent a recipe for a delicious punch using 3–5 ingredients, such as soda, juices, and chopped fresh fruit. Tell students that they can use whole numbers, mixed numbers, and fractions of a cup for each ingredient. The total of all ingredients must be equal to 1 gallon. Students will use the following conversions as they work:

  - 1 gallon = 4 quarts
  - 1 quart = 2 pints
  - 1 pint = 2 cups
  - 1 cup = 8 ounces

  NOTE: If containers are available in each size, students should determine (or confirm) the conversions by filling the larger containers with water from the smaller ones.

  Once students have chosen the amount of each ingredient and written this down in a table, they should confirm that the total adds up to exactly one gallon. Students will figure out how many people their recipe will serve if each person drinks exactly one cup of punch (1 gallon = 16 cups, so 1 gallon serves 16 people). Tell students you are planning a big celebration and need one cup for each of the 48 guests. Students should now calculate how much of each ingredient will be needed to make enough punch to serve all the guests, if each of the 48 guests drinks exactly one cup of punch.

Further support can be found in the GPS Mathematics Framework:
Unit 4: *Plane Figures*; Unit 5: *Super Solid Figures*.

The Mathematics Framework documents are available at
www.georgiastandards.org/mathframework.aspx

Activities
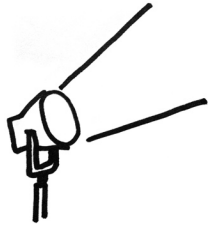
❸ Geometry
Georgia Performance Standards M5G1 and M5G2

Within the Geometry domain, students will understand congruence of geometric figures and the correspondence of vertices, sides, and angles. They will understand the relationship of the circumference of a circle, its diameter, and pi ($\pi \approx 3.14$).

The following activities develop skills in this domain:

–   Students will manipulate congruent geometric figures and observe the correspondence of their vertices, sides, and angles by working with shapes they have created. Congruent geometric figures have the same size and shape, since all corresponding angles and sides are equal. Students should explain why it is important that all rectangular CD cases are congruent, but not all shoeboxes are. Discuss the importance of congruence for other shapes in the real world, such as floor tiles, printer/copy paper, envelopes, and ATM cards. Break students into small groups or pairs. One student will draw a triangle using only a ruler and label each side and angle using letters. Others should ask questions until they are able to create a congruent figure on their own page using a ruler and protractor. Questions might include, *What are the lengths of sides? The measures of angles?* When they have completed the figures, they will cut them out and check accuracy by placing them on top of the original.

–   To establish the relationship between a circle's circumference, diameter, and pi, discuss the way a bicycle odometer works. Explain that a bicycle odometer measures how far a bike has traveled by counting how many times the wheel goes around. Thinking of the common measurements of a circle (radius, diameter, circumference), students will describe which measurement represents how far the bike has moved when the wheel has gone around exactly once. Since different bikes have different tire sizes, the odometer has to be set up for the proper tire size or its measurements will be wrong. Discuss why this is the case. Next, give students a chart with columns for *Diameter, Radius, Circumference,* $\frac{Diameter}{Radius}$ and $\frac{Circumference}{Diameter}$. Students will fill out the chart for each of the following common diameters of bicycle tires: 16 in, 20 in, 24 in, 26 in, and 27 in. Students will describe what pattern they see when the diameter is divided by the radius. Repeat for the circumference divided by the diameter.

–   To work with measurements of circles, students should gather circumference measurements of common objects using string. They will first brainstorm several circular objects in their surroundings for which they are able to measure circumference using string, such as a tire, lampshade, frying pan, clock, or trash can. Students will explain why it might be difficult to measure the radius or diameter of an object (e.g., hard to pinpoint the center, can't measure inside a solid, etc.). Give students expressions they can use to

discover the diameter and radius once they have measured the circumference:

$d = C \div \pi$, where d = diameter, C = circumference, and $\pi \approx 3.14$
$r = d \div 2$, where r = radius and d = diameter

Students will substitute the values for C they measured and find the values for diameter and radius. They should create a table to record the circumference, diameter, and radius of each object.

Further support can be found in the GPS Mathematics Framework: Unit 4: *Plane Figures*.

The Mathematics Framework documents are available at **www.georgiastandards.org/mathframework.aspx**

Activities
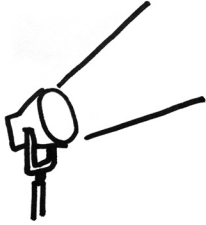
❹ Algebra
Georgia Performance Standard M5A1

Within the Algebra domain, students will represent and interpret the relationships between quantities using variables (such as *n* or *x*) for unknown quantities in algebraic expressions. Students will investigate simple algebraic expressions by substituting numbers for the unknown quantities. They will determine that a formula will be reliable regardless of the type of number (whole numbers or decimals) substituted for the variable.

The following activities develop skills in this domain:

– Students will investigate simple algebraic expressions by substituting numbers for unknown quantities using the scenario of a scuba diving trip. Tell students that they are going to plan a trip to go scuba diving with four friends. The group will share one boat. Each person has to rent a diving tank, a mask, and a wet suit for the day. Students should derive a formula that will represent the known and unknown quantities, such as: $b + 5d + 5m + 5w =$ Total, where b = the cost of renting the boat, d = the cost of renting a diving tank, m = the cost of renting a mask, and w = the cost of renting a wet suit. After they have established the formula, give them the information in the table below. Students should calculate the total cost for using each scuba shop and decide which scuba shop will be the least expensive option for their group.

	Aqua Nuts Dive Shop	Captain's Corner Dive Shop
Boat (*b*)	$200	$145
Diving Tank (*d*)	$20 each	$25 each
Mask (*m*)	$18 each	$20 each
Wet Suit (*w*)	$11 each	$16 each

– To use variables for unknown quantities in algebraic expressions, students should explore real-life situations that can be expressed mathematically. For instance, you might not know the exact prices charged at a given movie theater. You can still represent the total for four people who each buy 1 ticket, 1 soda, and share 2 tubs of popcorn: Total $4t + 4s + 2p$ where t is the price of a ticket, s is the price of a soda, and p is the price of a tub of popcorn. Find out the cost for each at any movie theater to calculate the total using the formula. Another example is the relative age of siblings. Say Ali is 9 years old and Bart is 13. That means that Bart is 4 years older than Ali, which can be expressed as: $B = 4 + A$, where B represents Bart's age and A represents Ali's age. Similarly, if Bart's allowance is twice as much as Ali's plus another $5, the expression would be: $b = 2a + 5$, where b = Bart's allowance and a = Ali's allowance. Brainstorm with students to come up with more examples.

- Students will investigate simple algebraic expressions by solving application problems. Offer students the following scenario: The Camping Club is planning a series of camping trips this fall. The club will provide equipment and organize transportation. Participants must bring enough food and water for the trip and be prepared to carry a backpack with all necessary equipment and food. The club would like to develop formulas to provide members an easy way to figure out how much weight they will need to carry for each trip. Consider the following to create the formulas:

  - Trips between October 15 and November 15 will use warm-weather gear (lighter tent and sleeping bag), which weighs 21 lbs including backpack.
  - Trips between November 16 and December 15 will use cold-weather gear (heavier tent and sleeping bag), which weighs 27 lbs including backpack.
  - Trips longer than 4 days will require an extra 7 lbs of gear (extra fuel for cooking and more cooking gear).
  - Students should plan to bring 1.75 lbs of food per day (water will be filtered along the way).

  Formulas should allow members to figure out how much weight they will need to carry depending on when the trip occurs and how long it lasts. Students will use the formulas they create to determine how much weight each camper will be carrying at the start of each of the following trips:

  - Second week of August – Black Rock Mountain State Park – 2-day trip
  - First week of September – Unicoi State Park – 5-day trip
  - Third week of November – Fort Mountain State Park – 4-day trip
  - First week of December – Vogel State Park – 7-day trip

Further support can be found in the GPS Mathematics Framework:
Unit 1: *Groovy Graphing*; Unit 2: *Divine Decimals*; Unit 3: *Funky Fractions*; and Unit 4: *Plane Figures*.

The Mathematics Framework documents are available at
www.georgiastandards.org/mathframework.aspx

Activities
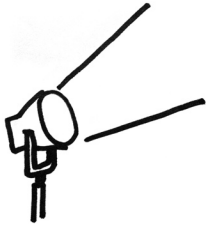
❺ Data Analysis
Georgia Performance Standards M5D1 and M5D2

Within the Data Analysis and Probability domain, students will analyze data presented in a graph. They will compare and contrast multiple graphic representations (circle graphs, line graphs, bar graphs, etc.) for a single set of data and discuss the advantages/disadvantages of each. Students will collect, organize, and display data using the most appropriate graph.

The following activities develop skills in this domain:

– Students will better display data using the appropriate graph when they regularly ask questions about displays of data they encounter. Gather examples of simple graphs found in newspapers or through Internet searches. The graphs may represent data from a survey or study in a number of simple formats, including bar graphs, circle graphs, line graphs, and pictographs. Choose examples that will be interesting and meaningful for students. Regularly analyze one of these graphs with students so they are able to ask questions about the graph: *Why was the data represented in this form? Can you think of another way to present the data that would also be successful? If not, why do you think this data cannot be presented in another way?*

– To effectively gather, organize, and display data, give students an exercise in thinking critically about the steps involved. Write the following five questions on index cards:

  – *What is the main question posed (the reason for the experiment or survey)?*
  – *How can I decide who should take my survey or participate in my experiment?*
  – *How can I best organize my data as I collect it?*
  – *What characteristic does the data have which will help me to decide how to represent it? (Why shouldn't I choose other types?)*
  – *Is my final display clear and easy to read?*

Mix up the cards and have students put them in the correct order. Students should try to connect the questions to surveys and information-gathering they have done in the past.

– Students will understand the advantages and disadvantages of different types of graphs by working with tangible and meaningful examples. Students will determine how the same set of data can be displayed in different formats. Present several data-gathering situations for students to analyze, such as:

  – The measure of a student's height at each annual doctor's visit
  – The percentage of time the school bus is early, on time, and late

- The number of miles a student runs each week while preparing for a race
- The percentage of customers voting for each of 5 flavors of ice cream at the neighborhood ice cream store
- The results of a vote on whether to have a school dance, showing the portion of students who voted yes or no—compare this to the results of the same vote, showing the numbers of yes and no votes broken down by gender

Students will then decide on values for each of the scenarios. Students should display the results after deciding how to best represent the data.

Further support can be found in the GPS Mathematics Framework:
Unit 1: *Groovy Graphing*.

The Mathematics Framework documents are available at
www.georgiastandards.org/mathframework.aspx

Practice Quiz

1   **Jane is solving a riddle. She needs to find a number that is ALL of these:**
   - **a 3-digit number**
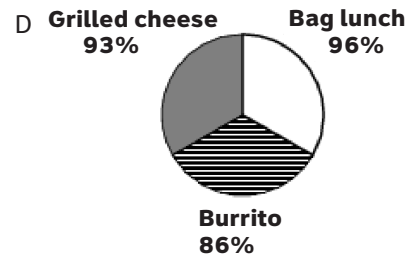   - **a multiple of 2**
   - **a multiple of 3**
   - **a multiple of 9**
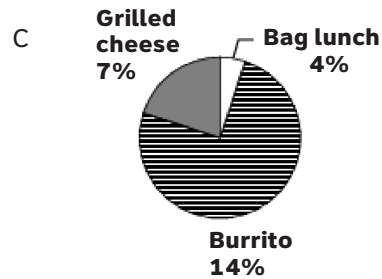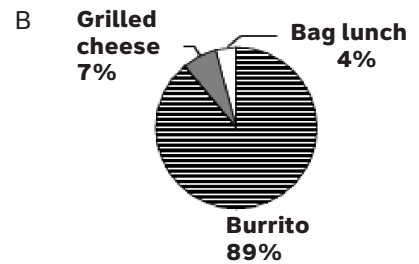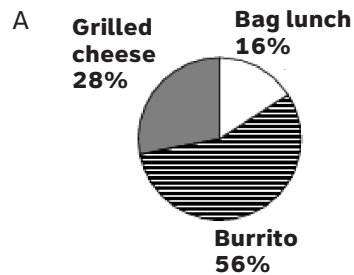
   Which of these numbers is a correct answer to the riddle?
   A   36
   B   138
   C   243
   D   522

2   **Tyra's family went on a trip to Canada. Tyra had $25 in United States currency to exchange for Canadian dollars. For every one U.S. dollar, Tyra received 1.17 Canadian dollars. How many Canadian dollars did Tyra receive for her 25 U.S. dollars?**
   A $21.36
   B $23.83
   C $26.17
   D $29.25

3   **Marcy has $2\frac{1}{4}$ cups of flour. Her cookie recipe calls for $\frac{2}{3}$ cups of flour. After she makes her cookies, how much flour will she have left?**

   A $1\frac{3}{7}$ cups

   B $1\frac{7}{12}$ cups

   C $2\frac{3}{7}$ cups
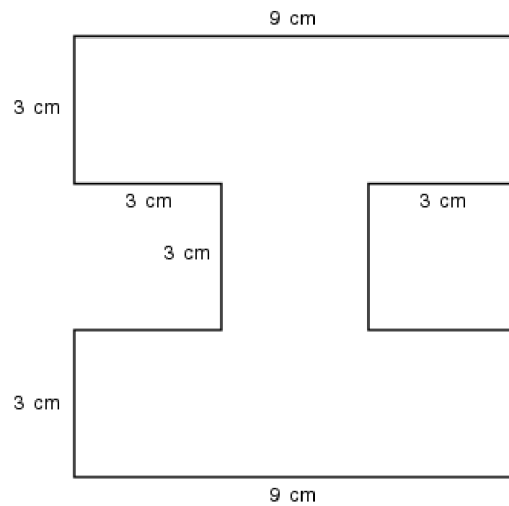
   D $2\frac{11}{12}$ cups

4   **Mr. Robinson's 25 students have three choices for lunch each day. On Tuesday:**
- **14 students ordered burritos**
- **7 students ordered grilled cheese**
- **4 students brought bag lunches from home**

Which circle graph correctly shows the percentage of students who chose each type of lunch?

A
Grilled cheese 28%   **Bag lunch 16%**
Burrito 56%

B
Grilled cheese 7%   **Bag lunch 4%**
Burrito 89%

C
Grilled cheese 7%   **Bag lunch 4%**
Burrito 14%

D
Grilled cheese 93%   **Bag lunch 96%**
Burrito 86%

5   **Edgar is using this shape on his Spirit Day poster.**

9 cm
3 cm
3 cm
3 cm
3 cm
3 cm
3 cm
9 cm

What is the area of his shape?
A   21 square centimeters
B   54 square centimeters
C   63 square centimeters
D   81 square centimeters

6   **Thomas is making fruit punch for his friends. One tablespoon of mix makes 1 pint of fruit punch. He wants to make 2 gallons of fruit punch. How many tablespoons of mix will he need?**
A   4 tablespoons
B   8 tablespoons
C   16 tablespoons
D   24 tablespoons

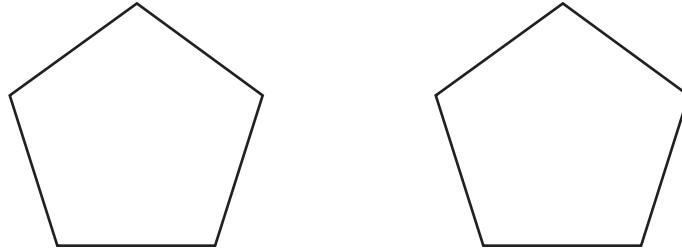7   **Claudia's hamster cage is in the shape of a rectangular prism.**
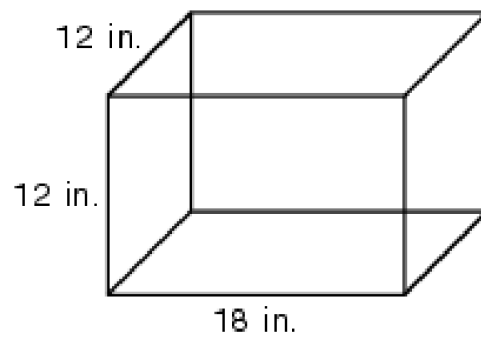
What is the volume of the cage?
A   1,296 cubic inches
B   1,728 cubic inches
C   2,592 cubic inches
D   5,832 cubic inches

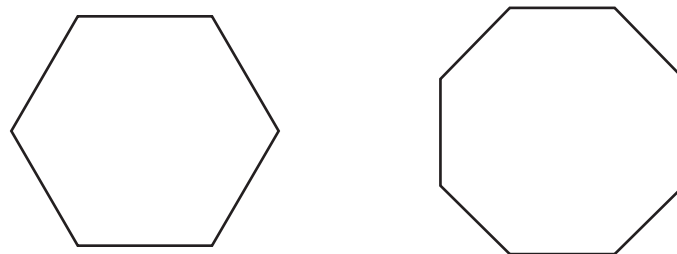8 **Brandon cut out shapes that are congruent for his Math project. Which pair of shapes is congruent?**

A

B

C

D
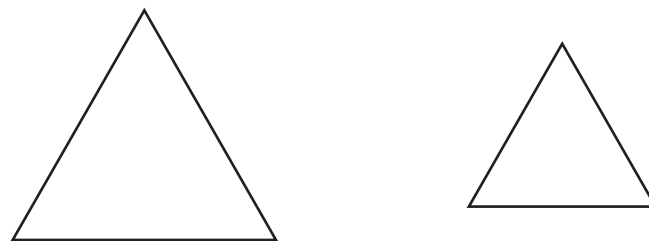
9   **Dustin's age can be found by using the expression 2*x* + 3, where *x* is
    Veronica's age. If Veronica is 8 years old, how old is Dustin?**
    A   13
    B   16
    C   19
    D   31

10 **The manager at Joel's Music made this line graph to show the number
    of CDs sold during a five-week period.**

CDs Sold at Joel's Music
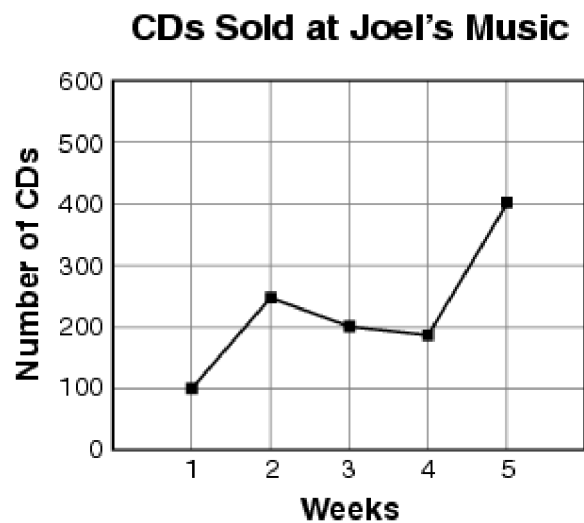
**Which statement is true about the CD sales at Joel's Music during
the five weeks?**
A   More CDs were sold in week 1 than in week 4.
B   Half as many CDs were sold in week 1 as in week 2.
C   The same number of CDs was sold in week 3 and in week 5.
D   Twice as many CDs were sold in week 3 as in week 1.

Solutions

Number	Correct Answer	Explanation
1	**D**	*Find multiples and factors. (M5N1b)*

The correct answer is **Choice** (**D**) **522.** To find the answer, eliminate any choice which doesn't meet *ALL* of the characteristics listed. The number 522 is a 3-digit number and has no remainder when divided by 2, 3, or 9. Choice (A) is incorrect because *36* is not a 3-digit number. Choice (B) is incorrect because *138* is not a multiple of 9. Choice (C) is incorrect because *243* is not a multiple of 2.

Number	Correct Answer	Explanation
2	**D**	*Multiply and divide with fractions including fractions less than one and greater than one. (M5N3c)*

The correct answer is **Choice** (**D**) **$29.25.** Since each U.S. dollar is worth 1.17 Canadian dollars according to the question, multiply the amount in U.S. dollars by the exchange rate: $25 \times 1.17 = $29.25. Another method is to set up a proportion:

$$\frac{1 \; U.S. \; dollar}{1.17 \; Canadian \; dollars} = \frac{25 \; U.S. \; dollars}{x \; Canadian \; dollars}$$

and solve for *x*. Choice (A) is incorrect because $21.36 is the result of 25 ÷ 1.17. Choice (B) is incorrect because $23.83 is the result of 25 − 1.17. Choice (C) is incorrect because $26.17 is the result of 25 + 1.17.

Number	Correct Answer	Explanation
3	**B**	*Add and subtract common fractions and mixed numbers with unlike denominators. (M5N4g)*

The correct answer is **Choice** (**B**) $\mathbf{1\frac{7}{12}}$ **cups.** The question asks for the amount of flour left, so subtract the amount used in the recipe from the original amount. The mixed fractions have different denominators so find the like denominator, which is 12. Rewrite the fractions so that $2\frac{1}{4}$ becomes $2\frac{3}{12}$ and $\frac{2}{3}$ becomes $\frac{8}{12}$. To subtract $\frac{8}{12}$ first rewrite $2\frac{3}{12}$ as $1\frac{15}{12}$. The resulting operation is: $1\frac{15}{12} - \frac{8}{12} = 1\frac{7}{12}$. Choices (A) and (C) are incorrect because the original denominators of 3 and 4 were added to find the like denominator rather than being multiplied, giving an incorrect like denominator of 7. Choice (D) is incorrect because it is the result of addition of the two numbers, not subtraction.

Number	Correct Answer	Explanation
4	**A**	*Apply percentage to circle graphs. (M5N5b)*

The correct answer is **Choice** (**A**). Circle graphs represent parts of the whole with numbers representing percentages out of a total of 100%. Since there is a total of 25 students, each number will have multiplied by 4 in order to find the percent. So 14 students ordering burritos represent 56% of the total. Alternately, find the fraction of students ordering burritos ($\frac{14}{25}$) in decimal form (0.56) and then multiply by 100 to give a percent. Using either method, 56% ordered burritos, 28% ordered grilled cheese, and 16% brought brown bags. Choice (B) is incorrect because grilled cheese was chosen by 7 students, not 7% of the students, and bag lunch was chosen by 4 of the students, not 4% of the students. Choice (C) is incorrect because the total is less than 100% since the numbers shown on the graph represent the number, rather than percentage of students choosing each food. Choice (D) is incorrect because the total is greater than 100% since each percentage was incorrectly obtained by subtracting the number of students choosing the food from 100.

Number	Correct Answer	Explanation
5	**C**	*Find the area of a polygon (regular and irregular) by dividing it into squares, rectangles, and/or triangles and find the sum of the areas of those shapes. (M5M1f)*

The correct answer is **Choice** (**C**) **63 square centimeters.** Begin by dividing the shape into 2 rectangles (each 9 cm $\times$ 3 cm) and 1 square (3 cm $\times$ 3 cm). To find the area of each rectangle, use the formula $A = b \times h$ where A is area, b is base, and h is height: 9 cm $\times$ 3 cm = 27 square cm. To find the area of the square use the same formula: 3 cm $\times$ 3 cm = 9 square cm. To find the total area, add the areas of the two rectangles and the square: $27 + 27 + 9 = 63$. Choice (A) is incorrect because if the shape is broken down into 7 squares, each 3 $\times$ 3 square has an area of 9, not 3. Choice (B) is incorrect because 54 square centimeters is the area of the two rectangles without the central square. Choice (D) is incorrect because 81 is the result of multiplying 9 $\times$ 3 $\times$ 3, not the sum of the areas of the rectangles and square.

Number	Correct Answer	Explanation
6	**C**	*Compare one unit to another within a single system of measurement (e.g., 1 quart = 2 pints). (M5M3b)* The correct answer is **Choice** (**C**) **16 tablespoons.** To solve, figure out the number of pints in 2 gallons and then set up a proportion to solve for the unknown number of tablespoons. Choice (A) is incorrect because 4 tablespoons is the amount needed to make 2 quarts, not 2 gallons. Choice (B) is incorrect because 8 tablespoons is the amount needed to make 1 gallon, not 2 gallons. Choice (D) is incorrect because 24 tablespoons is the amount needed to make 3 gallons, not 2 gallons.
7	**C**	*Compute the volume of a cube and a rectangular prism using formulae. (M5M4d)* The correct answer is **Choice** (**C**) **2,592 cubic inches.** Use the formula for the volume of a rectangular prism and substitute the values given in the figure: $V = 18\ in \times 12\ in \times 12\ in = 2{,}592\ in^3$. Choice (A) is incorrect because 1,296 is the surface area of the figure when erroneously using 18×12 as the area of all six faces. Choice (B) is incorrect because 1,728 is the result of $12 \times 12 \times 12$. Choice (D) is incorrect because 5,832 is the result of $18 \times 18 \times 18$.
8	**A**	*Students will understand congruence of geometric figures and the correspondence of their vertices, sides, and angles. (M5G1)* The correct answer is **Choice** (**A**). Two figures are congruent if they are exactly the same size and shape, like the two pentagons shown. Choices (B) and (D) are incorrect because the two figures are the same shape but not the same size. Choice (C) is incorrect because the two figures are not the same shape.

Number	Correct Answer	Explanation
9	**C**	*Investigate simple algebraic expressions by substituting numbers for the unknown. (M5A1b)*
		The correct answer is **Choice** (**C**) **19.** Replace the *x* in the expression with 8, which is the value given for Veronica's age and solve: $2x + 3 = 2(8) + 3 = 16 + 3 = 19$. Choice (A) is incorrect because 13 is the result when you substitute 8 for *x* in the expression $2x - 3$. Choice (B) is incorrect because 16 is the result when you substitute 8 for *x* in the expression $2x$. Choice (D) is incorrect because 31 is the result when writing the expression as $28 + 3$ rather than $2(8) + 3$.
10	**D**	*Analyze data presented in a graph. (M5D1a)*
		The correct answer is **Choice** (**D**) **Twice as many CDs were sold in week 3 as in week 1.** The graph shows that 200 CDs were sold in week 3 and 100 CDs were sold in week 1. Choice (A) is incorrect because almost 200 CDs were sold in week 4 but only 100 CDs were sold in week 1, so the opposite of the statement is true. Choice (B) is incorrect because 100 CDs were sold in week 1 and 250 CDs were sold in week 2, so less than half as many were sold in week 1. Choice (C) is incorrect because 200 CDs were sold in week 3 and 400 CDs were sold in week 5, so twice as many were sold in week 5.

Science

By the end of Grade 5, students should offer reasons for findings and consider reasons offered by others. They keep records of investigations and observations and understand why they should not alter records. They use numerical data to describe and compare objects. They use reference books, back issues of magazines or newspapers, and computer databases to locate scientific information. They use the information found in these sources to support statements. Grade 5 students realize that safety is a fundamental concern in all experimental science and follow safety guidelines. They wear goggles any time chemicals, glassware, or heat is used. Grade 5 students investigate scientific concepts. They understand that Science is a process for gaining knowledge about the natural world. Students are active learners and use hands-on activities to discover and explain phenomena. They are able to conduct experiments and report their findings in the form of written reports, charts, and various other presentations including multi-media projects. Their scientific explanations emphasize evidence and begin to use scientific principles, models, and theories. They will convert the fractions (halves, thirds, fourths, fifths, tenths, and hundredths) to decimals in scientific calculations. They identify the largest and smallest possible value of something. Grade 5 students use cameras and tape recorders to gather and record information.

The following Science activities focus on some of the concepts that are assessed on the Grade 5 CRCT Science domains. These domains are as follows:
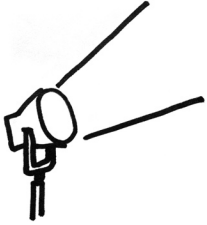
1 **Earth Science**

2 **Physical Science**

3 **Life Science**

The *Characteristics of Science* skills are integrated throughout the domains. These skills are co-requisites for understanding the content of each science domain.

Characteristics of Science refer to understanding the process skills used in the learning and practice of Science. These skills include testing a hypothesis, record keeping, using correct safety procedures, using appropriate tools and instruments, applying Math and technology, analyzing data, interpreting results, and communicating scientific information. *Characteristics of Science* also refer to understanding how science knowledge grows and changes, and the processes that drive those changes.

Activities

❶ Earth Science
Georgia Performance Standard S5E1

Within the Earth Science domain, students are expected to identify surface features of the Earth caused by constructive and destructive processes. These include, but are not limited to, volcanoes, earthquakes, erosion, and weathering. Students should also be able to relate the role of technology and human intervention to the control of constructive and destructive processes.

The following activities develop skills in this domain:

- To understand the mechanisms of weathering and erosion, students will perform hands-on activities and relate what they have learned to Georgia landforms. Students will fill a plastic bottle to the top with water, put on the cap, and place it in a large, sealed freezer bag overnight. When they observe the bottle the next day, they should find that it has cracked. Students should use Science textbooks or other resources provided by the teacher to answer in their journals: *How does freezing water lead to the weathering and erosion seen on the Blue Ridge Mountains?* To demonstrate another example of weathering, students will place a piece of chalk or sea shells in a jar and add white vinegar, observing the results. Students should write a response to: *How is the demonstration similar to the formation of Georgia's limestone caves (e.g., Ellison's Cave, Byer's Cave, Pettijohn's Cave, Climax Caverns)?* Provide photos of these formations or direct students to images on Internet sites.

- In order to understand how deposition forms river deltas, students will work with a model of flowing water and sand. This activity should be done outdoors. Construct a two- to three-foot long trough using attached shoeboxes (remove the short ends) covered with aluminum foil (or other materials). On a paved area, rest the trough on a ramp or platform so that it tilts downward at approximately a 45° angle. Place one cup of sand near the top of the trough and pour two liters of water onto the sand. Students will observe how far the sand was transported and record the results. Repeat the procedure several times, each time tilting the trough less and less until it is flat on the ground. Discuss how a shallower tilt causes the water to flow more slowly. Ask, *How does the speed of the water affect how far it carries sediment in a river?* Students should conclude that quickly moving water carries material farther and that a slower flow causes material to be deposited sooner. Discuss Georgia's Altamaha River, which becomes broader and therefore slower as it nears the ocean, depositing nutrient-rich sediment and forming estuaries.

- In order to understand the role of human intervention in natural geological processes, students will explore the issue of beach renourishment (the addition of imported sand) on Georgia's barrier islands. Students should use resources such as an expert or a guest speaker provided by the teacher to learn about beach renourishment on Sea Island and Tybee Island. They should explain the importance of barrier islands to Georgia's coastline and coastal ecosystems. Demonstrate the function of barrier islands by partially

filling a tray with sand and tipping it so the sand collects on one side. Gently add water to the sand-free side and generate waves by tapping or tilting the tray. Students should observe that the sand has moved below the waterline. Students will use what they have learned to decide whether beach renourishment should be tried on St. Simons Island. They should then write a persuasive letter explaining their position to the state's Department of Natural Resources—Coastal Resources Division.

Further support can be found in the GPS Science Framework: *Earth*.

The Science Framework documents are available at
www.georgiastandards.org/scienceframework.aspx

Activities
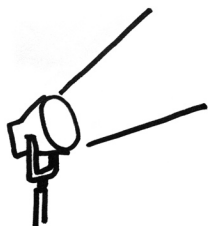
❷ Physical Science
Georgia Performance Standards S5P1, S5P2, and S5P3

Within the Physical Science domain, students will carry out investigations to become familiar with the characteristics of magnetic forces and static electricity. They should have a basic understanding of the conditions that produce magnetic fields in electromagnets and electric currents in simple circuits. Students will gain an understanding of the relationship between magnetism and electricity. Students will learn that batteries are used as energy sources, and flashlight bulbs obtain that energy to become the energy receivers, thereby producing light. Students should explain the difference between chemical and physical changes. They should conduct basic experiments and determine whether matter has changed physically by separating mixtures or chemically by observing changing in the properties of substances before, during, and after a chemical reaction. They should develop a basic understanding of the Law of Conservation of Matter.

The following activities develop skills in this domain:

– To help students understand that mass is conserved during a chemical change, conduct a two-part experiment with baking soda and white vinegar. First, students will measure the mass of the baking soda and vinegar samples using a balance scale and then combine the substances, following appropriate safety procedures. Students should identify the reaction as a chemical change, and should find that the mass of the resulting liquid has decreased. Ask students how they can explain what has happened to the mass that is missing. Next, demonstrate that mass is conserved by showing what happens when the reaction takes place in a sealed container. Prop up a 1-gallon sealable freezer bag so that the bottom corners hang lower than the center. Add 4–5 grams white vinegar to one corner and 1–2 grams of baking soda to the other corner. Seal the bag. Tilt it so that the baking soda falls into the vinegar; the resulting gas will be trapped in the bag. As an alternative, place the baking soda in a deflated balloon and pull it snuggly over the neck of a bottle containing the vinegar. Raise the balloon so that the baking soda falls into the bottle. Ask students, *Were the baking soda and vinegar changed in the reaction? Did the mass of the substances change before and after the reaction?* Students should conclude that while the substances involved in the reaction have changed, their mass was conserved. From the mass of the starting and final substances, they should infer the mass of the gas produced. Students should write a report on their observations.

– Students will explore static electricity by examining the interactions between similarly- and oppositely-charged objects. Students will rub a balloon on their hair. This will make their hair move toward the balloon. Students should do the same with a second balloon, and bring it close to the first. The two balloons will repel each other. Students should conclude that similarly charged objects repel. Students will charge other objects in the same way: rubbing a glass rod with a silk cloth, or rubbing a hard rubber comb on wool. They should determine whether these attract or repel each other. Students

should also test the effect of the charged objects on small pieces of paper, ground pepper, or puffed cereal. They will find that these lightweight substances are attracted to a charged object for a short while. Students should conclude that charging an object has a temporary effect.
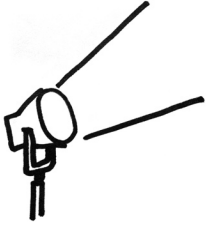
– Students will reinforce their understanding of how mixtures can be separated through playing a quiz-show game. Create index cards with the following words and/or pictures: water, salt, pepper, sand, oil, iron filings. Students will draw two or more cards at random and must think of a way to separate a mixture made from the substances they chose. Specify materials students can use (e.g., coffee filters, strainers). For example, students may respond, *Oil and salt can be separated by letting the salt settle to the bottom and pouring off the oil.* Or, *Salt and pepper can be separated by adding water and straining out the pepper, then boiling off the water to leave the salt.* Students should demonstrate their understanding by brainstorming ways to separate a mixture of all of the materials listed above. Analyze and discuss students' ideas.

Further support can be found in the GPS Science Framework: *Chemical and Physical Changes* and *Electricity and Magnetism.*

The Science Framework documents are available at
www.georgiastandards.org/scienceframework.aspx

Activities

❸ Life Science

Georgia Performance Standards S5L1, S5L2, S5L3, and S5L4

Within the Life Science domain, students should demonstrate how plants and animals are sorted into groups (e.g., fish, amphibian, reptile, bird, mammal). They should compare and contrast the characteristics of learned behaviors and inherited traits, and describe what a gene is and the role genes play in the transfer of traits. Students should explain how magnifiers such as microscopes or hand lenses are used to observe cells and their structure, and recognize and determine the functions of plant and animals cell structures (membrane, cell wall, cytoplasm, nucleus, chloroplasts). They will distinguish between the structure and function of cells in multi-celled organisms and single-celled organisms. Students will identify beneficial microorganisms and explain why they are beneficial, and identify harmful microorganisms and explain why they are harmful.
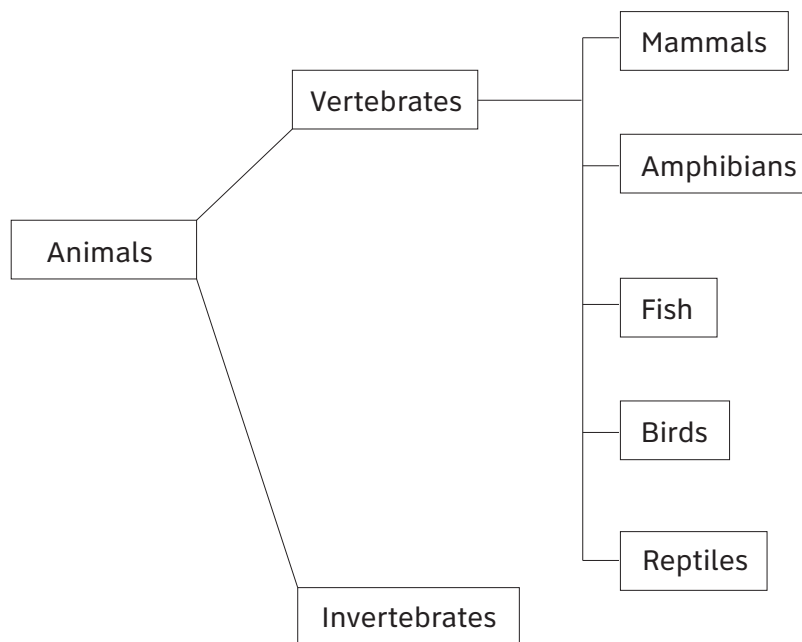
The following activities develop skills in this domain:

– Creating a three-dimensional model of a cell will help students understand the structure and function of cells and compare and contrast cells of different organisms. Students will make a model animal cell using gelatin for the cytoplasm and a piece of candy, fruit, or vegetable for the nucleus. Prepare a light-colored gelatin using 25% less water than the recipe calls for and allow it to begin setting after pouring it into a resealable plastic bag, which represents the cell membrane. Students will open the bag to insert the other ingredient into the gelatin before it has completely set. They should explain the functions of the cell membrane, cytoplasm, and nucleus. Students should then come up with materials to make a model plant cell (which also contains chloroplasts and a cell wall).

– To understand the good and bad effects of microorganisms, students will inquire about everyday things people do or make because of microorganisms. Students will keep a journal in which they explore and answer the following questions, using information gathered through hands-on inquiry or resources provided by the teacher (such as a textbook or other reference book).

– *Do you wash your hands before eating and after using public transportation or visiting a crowded mall? Why can doing this keep you from getting sick?*
– *Do adults in your home keep raw meat from touching other things in the kitchen? Have you ever been told to not eat uncooked batter or cookie dough that contains raw eggs? Why do these practices keep you safe?*
– *Do you try to brush your teeth regularly? Have you been told you might get cavities if you don't brush or if you drink many sugary drinks? Why is this so?*
– *Have you ever made bread or seen someone make bread? Why is yeast used in making bread? Have you eaten yogurt, kim-chee, blue cheese, or sauerkraut? How are microorganisms such as yeast or bacteria used in making these foods?*

– *Have you or anyone you know ever had "stomach problems" after taking antibiotics (drugs that kill bacteria)? What is the function of the good bacteria that live in our large intestines?*

– To better understand how scientists classify living things, students will observe, record, and classify the animals found in their area. Students should observe at least 10 creatures that are not household pets (e.g., birds, squirrels, beetles, worms). They will record their observations in a notebook or computer file. Encourage students to take photos or videos of what they observe, find images in magazines or on the Internet, or draw what they see. This activity provides a good opportunity to examine tiny soil organisms using a microscope or hand lens. Students should research how the organisms are classified as invertebrate or vertebrate, and whether they fit into a group such as fish, insect, amphibian, reptile, bird, or mammal. As an end goal, students should create a large poster with names, descriptions, and images of the animals they observed; the poster should show how they are classified.

```
                                        ┌──────────┐
                                        │ Mammals  │
                          ┌─────────────┤          │
                    ┌─────────────┐     └──────────┘
                    │ Vertebrates │     ┌───────────┐
                    │             │     │ Amphibians│
         ┌──────────┴─────────────┤     └───────────┘
         │ Animals  │             │     ┌──────────┐
         │          │             │     │ Fish     │
         └──────────┬─────────────┤     └──────────┘
                    │             │     ┌──────────┐
                    │             │     │ Birds    │
                    │             │     └──────────┘
              ┌─────────────┐     ┌──────────┐
              │ Invertebrates│    │ Reptiles │
              └─────────────┘     └──────────┘
```

– To understand how some traits are inherited, students will explore tongue rolling. The ability to roll one's tongue into the shape of a tube is a dominant trait. Students should test classmates to determine how prevalent this trait is. Students should then test family members. If students can identify a biologically-related family of two or more generations in which some members can roll their tongues and other cannot, they should create a pedigree showing their results. Otherwise, they should examine the pedigree on the next page.

KEY

◯ Female

◻ Male

⬤ Can roll tongue

◯ Cannot roll tongue
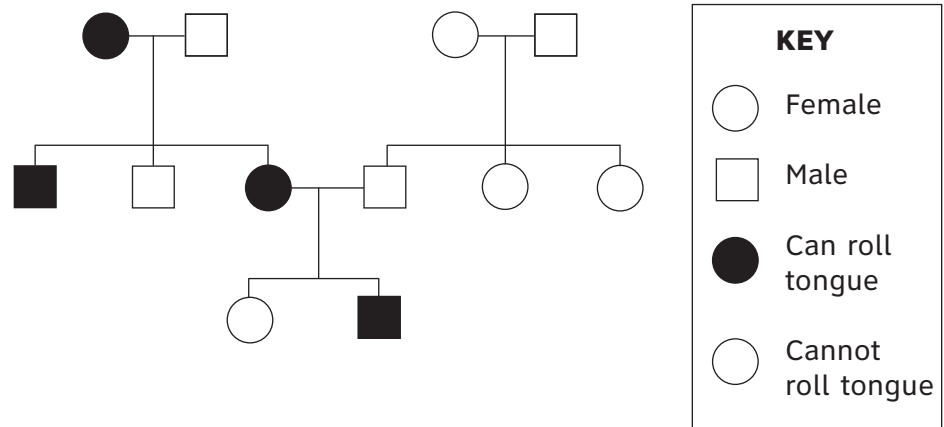
- Discuss the conclusion that tongue-rolling is a dominant allele (gene version) based on the observation that it does not skip generations. Alternately, another trait can be examined, such as a widow's peak hairline (dominant trait) compared with a continuous hairline (recessive trait) or freely hanging earlobes (dominant trait) compared with attached earlobes (recessive trait).

Further support can be found in the GPS Science Framework: *Cells, Classification, and Genetics.*

The Science Framework documents are available at **www.georgiastandards.org/scienceframework.aspx**

Practice Quiz

1   **Which single-celled microorganism is helpful in making foods like yogurt and pickles?**
A   bacteria
B   fungus
C   parasite
D   virus

2   **Which of these methods would be BEST to separate a mixture of water, sand, and iron filings?**
A   Filter the iron filings from the water and sand, and then boil off the water to leave the sand.
B   Filter the sand from the water and iron filings, and then boil off the water to leave the iron filings.
C   Filter the sand and iron filings from the water, and then use a magnet to separate the iron filings from the sand.
D   Filter the sand and iron filings from the water, and then heat the mixture to separate the iron filings from the sand.

3   **A human is made of many cells, while an amoeba is made of only a single cell. Which of these statements BEST describes how a human cell and an amoeba are similar?**
A   An amoeba and a human cell are the same size.
B   An amoeba and a human cell both have a cell wall.
C   An amoeba and a human cell perform the same jobs.
D   An amoeba and a human cell both hold genetic information.

4   **During a cooking demonstration, a chef dissolves 100 grams of sugar by stirring it into 1000 grams of hot water. How much will the sugar and water solution weigh after the sugar is dissolved?**
A   900 grams
B   1000 grams
C   1100 grams
D   2000 grams

5   **Which part of a plant cell changes energy from sunlight into food?**
A   chloroplast
B   cytoplasm
C   membrane
D   nucleus

6   **The diagram below shows a single-celled organism called a Euglena.**
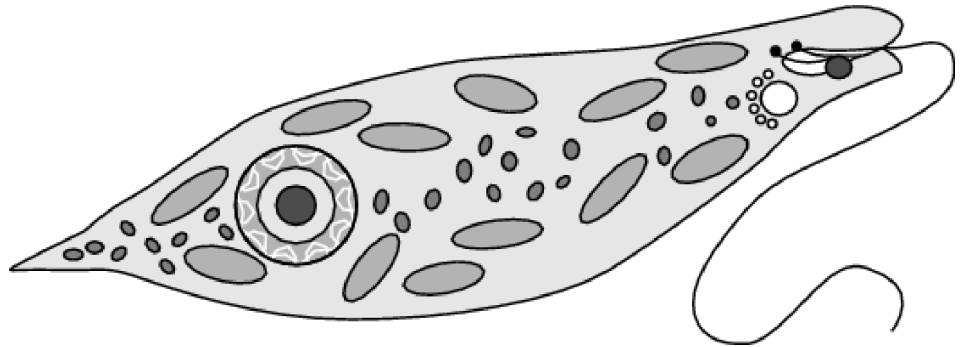
Which of these parts of a cell are found in both a human cell and a Euglena?
A   cell wall
B   chloroplast
C   flagellum
D   nucleus

7   **Clarinda builds a tower out of three blocks. The mass of the blue block is 3 grams, the mass of the white block is 2 grams, and the mass of the red block is 1 gram. What is the mass of the tower?**
A   3 grams
B   5 grams
C   6 grams
D   7 grams

8   **José set up an electrical circuit to determine whether certain items will allow electricity to flow through them to light a bulb in the electrical circuit. Which of these items will conduct electricity?**
A   metal pin
B   plastic bag
C   rubber ball
D   wood block

9   **David watches a burning candle to determine whether a chemical reaction is taking place. Which of these observations shows evidence of a chemical reaction?**
A   The wax is melting.
B   The candle is in a glass jar.
C   The color of the candle is blue.
D   The candle gives off light and heat.

10 **Dr. Preston works at a seismic station, recording information about seismic waves, which are waves produced by earthquakes. Which of these could NOT be determined by recording information about seismic waves?**

A   the point on Earth's surface above the place an earthquake starts

B   data that allows scientists to learn more about Earth's interior

C   the size of an earthquake that has already happened

D   when future earthquakes are going to occur

Solutions

Number	Correct Answer	Explanation
1	**A**	*Identify beneficial microorganisms and explain why they are beneficial. (S5L4a)* The correct answer is **Choice** (**A**) **bacteria.** Beneficial bacteria carry out fermentation to make foods such as yogurt and pickles. Choice (B) *fungus* is incorrect because fungi such as yeast are used to make bread, not yogurt and pickles. Choices (C) *parasite* and (D) *virus* are incorrect because these are harmful, not beneficial, organisms, and are not used to make food.
2	**C**	*Investigate physical changes by separating mixtures and manipulating (cutting, tearing, folding) paper to demonstrate examples of physical change. (S5P2a)* The correct answer is **Choice** (**C**) **Filter the sand and iron filings from the water, and then use a magnet to separate the iron filings from the sand.** Choices (A) and (B) are incorrect because iron filings are similar in size to sand particles and therefore cannot be separated with a filter. Choice (D) is incorrect because sand and iron melt only at extremely high, dangerous temperatures; using a magnet is a much easier way to separate the two materials.
3	**D**	*Explain how cells in multi-celled organisms are similar and different in structure and function to single-celled organisms. (S5L3c)* The correct answer is **Choice** (**D**) **An amoeba and a human cell both hold genetic information.** Cells of living organisms generally have DNA. Choices (A) and (C) are incorrect because amoeba and human cells differ in size and in the jobs they perform. Choice (B) is incorrect because neither cell type has a cell wall.

Number	Correct Answer	Explanation
4	**C**	*Demonstrate that the mass of an object is equal to the sum of its parts by manipulating and measuring different objects made of various parts. (S5P1a)*
		The correct answer is **Choice (C) 1100 grams.** When the sugar and the water are combined, their masses remain the same and add up to equal the mass of the solution. Choice (A) is incorrect because *900 grams* results from subtracting, not adding, the masses. Choice (B) is incorrect because *1000 grams* is the mass of the water alone and does not include the mass of the sugar. Choice (D) is incorrect because *2000 grams* is twice the mass of the water, and does not represent the combined masses of the water and sugar.
5	**A**	*Identify parts of a plant cell (membrane, wall, cytoplasm, nucleus, chloroplasts) and of an animal cell (membrane, cytoplasm, and nucleus) and determine the function of the parts. (S5L3b)*
		The correct answer is **Choice (A) chloroplast.** Chloroplast refers to the organelle in which photosynthesis (the making of food from sunlight and carbon dioxide) occurs. Choices (B) *cytoplasm*, (C) *membrane*, and (D) *nucleus* are present in both plant and animal cells. Choice (B) *cytoplasm* is the jelly-like substance that other call structures float in. Choice (C) *membrane* is the flexible outer covering that holds the cytoplasm. Choice (D) *nucleus* is the structure that contains the chromosomes.
6	**D**	*Explain how cells in multi-celled organisms are similar and different in structure and function to single-celled organisms. (S5L3c)*
		The correct answer is **Choice (D) nucleus.** A nucleus is found in both Euglena (protist) and human liver (animal) cells. Choices (A) *cell wall* and (B) *chloroplast* are only found in plant cells. Choice (C) *flagellum* is incorrect because human liver cells do not move around in a fluid.

Number	Correct Answer	Explanation
7	**C**	*Add, subtract, multiply, and divide whole numbers mentally, on paper, and with a calculator. (S3CS2a)*
		The correct answer is **Choice (C) 6 grams.** This is equal to the combined masses of the blue, white, and red blocks (3 g + 2 g + 1 g = 6 g). Choices (A), (B), and (D) do not add up to the combined mass of the blocks making up the tower. Choice (A) *3 grams* is equal to the mass of the blue block alone, while Choice (B) *5 grams* is equal to the mass of the blue and white blocks only. Choice (D) *7 grams* is incorrect because it would require more blocks then the ones stated.
8	**A**	*Investigate common materials to determine if they are insulators or conductors of electricity. (S5P3c)*
		The correct answer is **Choice (A) metal pin.** A *metal pin* will conduct electricity and cause the bulb to light. Metal is a good conductor of electricity. Choices, (B) *plastic bag*, (C) *rubber ball*, and (D) *wood block* are incorrect because they are all made of materials that do not conduct electricity.
9	**D**	*Investigate the properties of a substance before, during, and after a chemical reaction to find evidence of change. (S5P2c)*
		The correct answer is **Choice (D) The candle gives off light and heat.** Light and heat are clues that a chemical reaction is occurring. Choice (A) is incorrect because *melting* is a physical change. Choice (B) is incorrect because *being in the glass jar* does not indicate a chemical change. Choice (C) is incorrect because it describes the color of the candle but does not describe a change.
10	**D**	*Relate the role of technology and human intervention in the control of constructive and destructive processes. (S5E1c)*
		The correct answer is **Choice (D) when future earthquakes are going to occur.** Although seismic waves tell scientists many things, they cannot reliably predict future earthquakes. Choices (A), (B), and (C) are incorrect because they can all be determined by recording and studying seismic waves.