

Grade 8

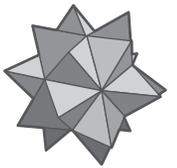


Criterion-Referenced Competency Tests

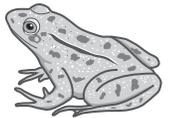
CRCT



Study



Guide



Reading

English/Language Arts

Mathematics

Science

Social Studies



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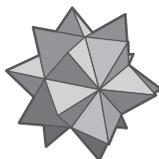
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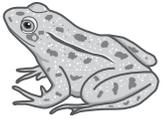
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Using the CRCT Study Guide

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.



The following section of this guide, “About the CRCT,” contains an overview of the CRCT and test-taking strategies to review with your students.

- The content tested on the CRCT is based on Georgia’s state-adopted curriculum, which describes 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.



This document is intended as a student resource. Photocopying is allowed as needed for student use.

Overview of the CRCT

What is the CRCT?

The grade 8 CRCT is a state-mandated achievement test that measures the subject areas of Reading, English/Language Arts, Mathematics, Science, and Social Studies.

What does the CRCT measure?

The CRCT is designed to measure student acquisition and understanding of the knowledge, concepts, and skills set forth in the Common Core Georgia Performance Standards (CCGPS) for Reading, English/Language Arts, and Mathematics and the Georgia Performance Standards (GPS) for Science and Social Studies.

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
- Provide data for use in Georgia’s accountability measures and reports.

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. They are measured on their 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 CRCT website www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/CRCT.aspx.

Since the spring of 2006, performance on the Reading portion of the CRCT has been linked to the Lexile® Framework for Reading. Visit **www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Lexile-Framework.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.

CCGPS/GPS Resources:

www.georgiastandards.org

CRCT Content Descriptions:

www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/CRCT.aspx

CCGPS/GPS Frameworks:

www.georgiastandards.org

Lexile Framework for Reading:

www.gadoe.org/Curriculum-Instruction-and-Assessment/Assessment/Pages/Lexile-Framework.aspx

The Study Guides are intended to serve as a resource for parents and students. They contain a few activities and short practice quizzes for each content area. They also provide teachers an additional tool for student practice. The standards identified in the Study Guides address a sampling of the state-adopted curriculum. For the purposes of day-to-day classroom instruction, teachers should consult the wide array of resources that can be found at www.georgiastandards.org.

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

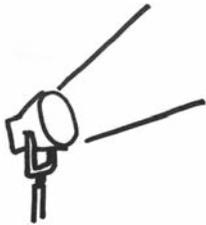
By Grade 8, students have developed the analytical reading skills to read, understand, and analyze both literary and informational texts. Additionally, these students successfully read and understand many different types of texts across subjects. Students should be able to determine what unfamiliar words mean based on how they are used. Students should also grasp how authors use language differently depending on their purpose and the literary genre.

The Reading activities focus on some of the concepts that are assessed on the Grade 8 CRCT Reading domains. These domains are as follows:

- ❶ **Reading Skills and Vocabulary Acquisition**
- ❷ **Literary Comprehension**
- ❸ **Information and Media Literacy**



Activities



1 Reading Skills and Vocabulary Acquisition

Common Core Georgia Performance Standards ELACC8.L.4 and ELACC8.L.5

By Grade 8, students have developed sophisticated vocabularies as well as the skills to determine the meaning of unfamiliar and multiple-meaning words using context clues and common Greek and Latin roots and affixes. Students also need to use reference materials to clarify or determine the precise meaning of unfamiliar and multiple-meaning words. In addition to figuring out word meanings, students should use these words within different contexts (e.g., subject areas). Additionally, they should demonstrate understanding of figurative language (e.g., figures of speech), word relationships, and nuances in word meanings (connotations).

The following activities develop skills in this domain:

- To help students develop vocabulary skills, students should play the *Synonym and Word-Part Match* game. For this activity, create pairs of synonyms and a list of word-parts with matching definitions. (Synonyms, word-parts, and word-part definitions are available online and in many grammar books.) Then, write each synonym or definition on a card, and give each student one card. At the beginning of the game, tell students to find their matching cards. For some groups, students should take turns reading their cards aloud. For other groups (or as a variation on the original game), students should find their matches without speaking. Sample word pairs include the following: *hesitant* and *indecisive*; *ponder* and *contemplate*; *courageous* and *valiant*; *auto-* and *self*; *re-* and *again*; *intra-* and *within*; *noun* and *person, place, thing, or idea*.
- To develop vocabulary skills, students should have *Literary Word Banks*. In these “banks,” students “deposit” unfamiliar words as they are reading in the first of three columns. In the second column, each student guesses what the word means based on its context. In the third column, the student writes down the dictionary definition he or she has looked up. On another page of the “bank,” students write down sentences using their new words. Students could also draw illustrations of these new vocabulary words and display them for others.
- To promote students’ engagement with new vocabulary words, students should do personalized vocabulary assignments with these words. Students may use their friends’ names as part of the exercises. Demonstrating that they understand the meanings of the vocabulary words, students must respond to personalized questions or statements such as, *Issue a decree to Sasha* or *Describe Chris being churlish to Elizabeth* or *Describe a time you were scapegoated by your brother*.

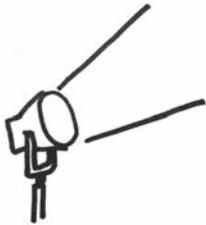


- To help students distinguish among the connotation of words with similar denotations, students should play the Loaded Words game. For this activity, students read each list of words below. Each word has a different connotation, but has the same general denotation. Students then decide what the general denotation is for each group. They write their answer on the line provided. They then number the words in each group from most positive connotation to most negative connotation.

<p>Example: <u>3.</u> thin <u>4.</u> bony <u>1.</u> slim <u>2.</u> slender</p> <p>General denotation: Light in weight</p>	<p>___ fetid ___ foul ___ funky ___ putrid ___ rancid ___ reeking ___ stinking</p> <p>General denotation:</p>	<p>___ alluring ___ appealing ___ beautiful ___ elegant ___ fair ___ magnificent ___ sublime</p> <p>General denotation:</p>
<p>___ changeable ___ doubtful ___ faltering ___ flexible ___ hesitating ___ indecisive ___ uncertain</p> <p>General denotation:</p>	<p>___ awkward ___ casual ___ dingy ___ erratic ___ mediocre ___ sloppy ___ unplanned</p> <p>General denotation:</p>	<p>___ annoy ___ dishearten ___ distress ___ oppress ___ overwhelm ___ saddle ___ strain</p> <p>General denotation:</p>



Activities



② Literary Comprehension

Common Core Georgia Performance Standards ELACC8.RL.1, ELACC8.RL.2, ELACC8.RL.3, ELACC8.RL.4, ELACC8.RL.5, ELACC8.RL.6, and ELACC8.RL.9

Grade 8 students read and understand many different types of literary texts. How an author crafts a literary text is as significant as what the text literally states. Students must determine themes, provide summaries, and analyze how story elements interact, using explicit textual evidence to support their analyses. Students must also analyze the impact of the author's language and structure on the meaning of a literary text, as well as how the author develops the points of view of different characters in relationship to the reader to create such effects as dramatic irony. Finally, students should compare and contrast modern literary texts to traditional stories to develop an understanding of how modern fiction draws on similar themes, patterns of events, or character types.

The following activities develop skills in this domain:

- To help students understand the concept that dialogue and events help to reveal aspects of a character and provoke decisions, students should examine characters' reactions after significant events in a story. Students should imagine they are newspaper reporters assigned to interview the participating characters and script several interviews with the characters. The interviewer should elicit responses from the characters that reveal both a deep understanding of the characters' traits and motivations and also an awareness of the plot events that have occurred. The interviewer's questions should reveal certain conclusions he or she has made about the characters being interviewed. Students should write their mock interviews in the style of a play.
- To supplement students' reading of poetry and to help them understand metaphor as a literary device, students should examine several metaphors such as *my love is a rose* and *her hair is golden silk*. Students should explain why the speaker would call his love a flower and describe hair as golden silk. Students should discuss what qualities the speaker's love has that would warrant these comparisons. Students should practice writing with their own metaphors. After reading a poem, such as Langston Hughes's "Mother to Son," in which the speaker compares his life to a staircase, students should choose something to which they can compare their lives. They then should make lists of the shared aspects of both. For example, for the statement *my life is a roller coaster* students could write the following: both have ups and downs, both can be scary, both have slow times and fast times. Students should take these statements and create short poems. To enhance students' appreciation of the visual power of metaphors, students should illustrate their metaphors.

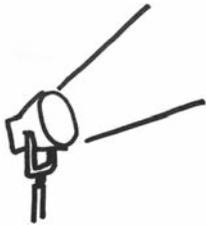


- To help enhance students' knowledge of sensory details and the impact of specific word choice on meaning and tone, students should close their eyes and listen to a descriptive, sensory-rich excerpt of literature. After the passage has been read aloud, students should identify the tone of the passage and the elements that contributed to it. To encourage students to pay attention to sensory details, students should taste differently flavored hard candies and describe them together. They should smell a series of spices and describe what they are reminded of. Then, they should feel and describe several objects of varying textures. Next, students should write their own sensory detailed pieces in which they describe objects using all five senses.

- To help students understand dramatic irony, have students view television programs/movies on their own and write about the dramatic irony they find. How does the audience have more knowledge than the characters? Finally, have students rewrite the story with all of the characters knowing what the audience knows. How is the story different?



Activities



3 Information and Media Literacy

Common Core Georgia Performance Standards ELACC8.RI.1, ELACC8.RI.2, ELACC8.RI.3, ELACC8.RI.4, ELACC8.RI.5, ELACC8.RI.6, ELACC8.RI.7, ELACC8.RI.8, and ELACC8.RI.9

As students encounter various types of media as well as workplace and consumer materials, they need strong skills to analyze the development of central ideas, the ways in which a text makes connections between individuals, events, and ideas, as well as the figurative, connotative, and technical meanings of words and phrases. Students must also analyze the structure authors use to organize a text, how authors distinguish their point of view from that of others, where different authors disagree in matters of fact or opinion, and if authors support their arguments and claims with sound reasoning and evidence. Because a great deal of informational texts are in a multi-media format, students must also be able to compare and contrast different media versions of text and determine how each format impacts the portrayal of the subject and whether it was an advantage or disadvantage to use a particular format for a subject.

The following activities develop skills in this domain:

- To help students examine a piece of text that has a strong point of view and understand how the author structures his or her argument, students should analyze and organize sentences in a persuasive paragraph. Magazine articles can be effective and readily available sources for such paragraphs. For this activity, a persuasive paragraph is divided into sentences, each written on a blank index card. Several sentences that are not relevant and do not support the thesis of the paragraph should be included as distracters. Students should arrange the index cards to create a cogent and logical argument. First, students must determine the author's position. Next, they should choose the sentences that support the author's argument and put them in an effective sequence. Students must also recognize and remove the distracter sentences, making sure they can explain why the sentences do not belong. Finally, students should present their paragraph arrangements and describe the development of the author's perspective and argument.
- To enhance students' inferential skills and to enhance their ability to integrate information from multiple texts, students should compare and contrast different arguments on the same topic from several sources. Students should examine two different sources and analyze the ways in which these sources address the same topic(s). First, students should brainstorm a list of the arguments or claims in each of the sources. Next, they should examine their lists and see the common thread(s) among them. Then, students should list the ways in which the topic is addressed similarly and the ways it is addressed differently in these sources. Finally, students should write essays comparing and contrasting the different arguments. The paper should include which argument they felt was the most valid and persuasive.



- To help students evaluate the advantages and disadvantages of using different mediums, present the students with a list of different topics. Ask them to decide what type of medium would be best to address the topic. Once they have presented their observations, present several different types of mediums that address the topic. How did the students' initial observations compare to the actual presentation? Was one type of presentation better than another?



Practice Quiz



Genre: Literary Text

Read the passage below and answer the questions that follow.

Memories

My cat sits comfortably
On our windowsill.
Her tail flicks
Her whiskers flare.
A primitive grumble rises out of her throat.

Outside a chipmunk nibbles innocently,
Seemingly unaware of the threatening cat.
He sits straight up
His ears rotate.
In the blink of an eye he is gone.

I sit back in my chair
And giggle to myself.
For even if my brave hunter could get out,
The domestic cat now lacks
The tools to fulfill the old desires.

- 1 How does the author of the poem build suspense in the first two stanzas?**
 - A by making it clear that the chipmunk knew the cat was watching
 - B by providing the perspective of both the cat and the chipmunk
 - C by limiting the amount of information provided to the reader
 - D by sharing with the reader the perspective of the speaker
- 2 Which of these BEST reflects a theme in the poem?**
 - A Wisdom comes with age.
 - B Appearances can be deceiving.
 - C Joy can be found in small events.
 - D Observation can be a good teacher.



- 3 **Which of these can be concluded about the cat based on the last two lines?**

The domestic cat now lacks
The tools to fulfill the old desires.

- A She cannot get outside.
B She is not an indoor pet.
C She does not want to be a hunter.
D She does not have the skills to hunt.
- 4 **Why does the speaker MOST LIKELY refer to the cat as *my brave hunter*?**
- A The speaker is using a pun to show how silly the cat is.
B The speaker is using irony to create humor about the real nature of the cat.
C The speaker is using a comparison to demonstrate how fierce the cat is.
D The speaker is using personification to illustrate how much suspense the cat is experiencing.

- 5 **Which event creates the MOST change in the cat?**

- A Outside a chipmunk nibbles innocently,
B In the blink of an eye he is gone.
C I sit back in my chair
D And giggle to myself.

- 6 **Which of these details BEST develops the theme of the poem?**

- A A primitive grumble rises out of her throat.
B Seemingly unaware of the threatening cat.
C In the blink of an eye he is gone.
D The tools to fulfill the old desires.

- 7 **What does this line from the poem reveal about the chipmunk?**

In the blink of an eye he is gone.

- A He was not aware of any danger.
B He closed his eyes suddenly.
C He was never really there.
D He ran away quickly.



8 **Which phrase BEST expresses the meaning of *her whiskers flare* as it is used in the first stanza?**

- A The cat is excited about what she sees.
- B The cat's whiskers have a unique ability.
- C The cat's whiskers start to shine in the light.
- D The cat is amused that there is an animal in the yard.

Use the information in the box below to answer the question.

primitive adj. **1.** lacking refinement **2.** without official training
3. related to an ancient time **4.** at an early stage of development

9 **What does *primitive* mean in this line from the poem?**

A primitive grumble rises out of her throat.

- A definition 1
- B definition 2
- C definition 3
- D definition 4

10 **The word *rotate* is derived from the Latin root *rota*, which means "wheel." Based on the root, what is the BEST meaning of *rotate*?**

- A to turn
- B to build
- C to travel
- D to shape



Solutions

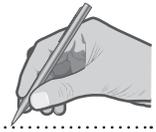
Number	Correct Answer	Explanation
1	B	<p><i>Analyzes how differences in the points of views of the characters and the reader create such effects as suspense or humor. (ELACC8.RL.6)</i></p> <p>The correct answer is Choice (B) by providing the perspective of both the cat and the chipmunk. There is more suspense because the reader sees the same situation through both characters. Choice (A) is incorrect because the chipmunk is originally presented as being “seemingly unaware” of the cat. Choice (C) is incorrect because the reader is in fact provided more information through the different character perspectives. Choice (D) is incorrect because the speaker’s portion of the poem does not create suspense but rather removes it.</p>
2	B	<p><i>Determine a theme of a text. (ELACC8.RL.2)</i></p> <p>The correct answer is Choice (B) Appearances can be deceiving. The cat represents danger in the poem, but it is revealed that despite the outward appearance she really is not a threat to the chipmunk. Choice (A) is incorrect because even though the past is mentioned in the poem, it does not reflect a theme in the poem. Choice (C) is incorrect because even though the speaker giggles it does not reflect a theme in the poem. Choice (D) is incorrect because even though the speaker observes the events it does not reflect the theme of the poem.</p>
3	D	<p><i>Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text. (ELACC8.RL.1)</i></p> <p>The correct answer is Choice (D) She does not have the skills to hunt. This inference can be drawn based on the fact that she now “lacks the tools to fulfill the old desires.” Choices (A), (B), and (C) are based on a misunderstanding of the information presented in the lines.</p>



Number	Correct Answer	Explanation
4	B	<p><i>Interprets figures of speech in context. (ELACC8.L.5a)</i></p> <p>The correct answer is Choice (B) The speaker is using irony to create humor about the real nature of the cat. The speaker really is meaning the opposite of what she says in the poem. Choices (A), (C), and (D) are incorrect because the speaker is not using a pun, comparison, or personification.</p>
5	A	<p><i>Analyzes how incidents propel the action. (ELACC8.RL.3)</i></p> <p>The correct answer is Choice (A) Outside a chipmunk nibbles innocently. It is this event in the poem that propels the cat to have a reaction and reveal her nature. Choice (B) is incorrect because it occurs after the cat has reacted. Choices (C) and (D) are incorrect because they are related to the speaker's reaction and not the cat's reaction.</p>
6	D	<p><i>Analyzes the development of theme over the course of the text. (ELACC8.RL.2)</i></p> <p>The correct answer is Choice (D) The tools to fulfill the old desires. This line establishes that looks can be deceiving. Choice (A) is incorrect because it only establishes that the cat appears to be threatening. Choices (B) and (C) are incorrect because they help develop the character of the chipmunk and not the theme of the poem.</p>
7	D	<p><i>Determines the meaning of figurative language. (ELACC8.RL.4)</i></p> <p>The correct answer is Choice (D) He ran away quickly. The line uses figurative language to express the speed in which the chipmunk disappeared. Choice (A) is incorrect because even though the chipmunk was not in danger, this idea is not expressed in the figurative language. Choices (B) and (C) are incorrect because they represent a literal interpretation of the figurative language.</p>



Number	Correct Answer	Explanation
8	A	<i>Determines the meaning of words and phrases as used in a text. (ELACC8.RL.4)</i> The correct answer is Choice (A) The cat is excited about what she sees. The phrase is used to illustrate that the cat is excited. Choices (B) and (C) are incorrect because they are based on a misunderstanding of the word <i>flare</i> . Choice (D) is incorrect because it represents an unsupported inference based on the phrase.
9	C	<i>Consults general and specialized reference materials. (ELACC8.L.4c)</i> The correct answer is Choice (C) definition 3. Based on the context of the line this is the best definition. Choices (A), (B), and (D) all represent definitions that would not be accurate in the context of the line.
10	A	<i>Uses common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word. (ELACC8.L.4b)</i> The correct answer is Choice (A) to turn. Based on the root this would be the most appropriate definition. Choices (B), (C), and (D) are based on a misunderstanding of how the root helps to provide meaning to a word.



English/Language Arts

By the end of Grade 8, students have a strong understanding of standard rules of grammar and punctuation, and correct spelling. Additionally, students know and understand the appropriate use of voice and mood to achieve particular effects in writing. Students should convey good command of different modes of writing, including argumentative, as well as an understanding of how each mode is used. Students have increased their ability to use descriptive words and complex sentences. They continue to gain proficiency in critiquing their own and others' writing constructively, gaining practice with editing and proofreading. When researching, Grade 8 students use primary and secondary sources appropriately. Grade 8 students should be able to select effective organizational structures for their writing and ensure coherence by using transitional words and phrases. They should bring closure to their compositions with strong conclusions.

The English/Language Arts activities focus on some of the concepts that are assessed on the Grade 8 CRCT English/Language Arts domains. These domains are as follows:

- 1 Grammar/Sentence Construction**
- 2 Research/Writing Process**

Activities



1 Grammar/Sentence Construction

Common Core Georgia Performance Standards ELACC8.L.1, ELACC8.L.2, and ELACC8.L.3

Within the Grammar/Sentence Construction domain, students should be able to understand and use verbals in sentences, form and use active/passive voice, recognize/correct inappropriate shifts in verb voice and mood, and use voice and mood (active, passive, conditional, subjunctive) to achieve particular effects. Students should also be able to correctly use punctuation to indicate a pause or break in writing, and use an ellipsis to indicate an omission.

The following activities develop skills in this domain:

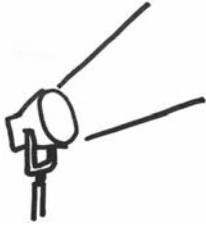
- To gain an understanding of active and passive voice, students should analyze the sentences below. Working in pairs, students should read the sentences to each other and determine if the sentence is using active (A) or passive (P) voice. Students should review briefly the concept that sentences using active voice show a subject performing an action. For example, consider the sentence "John folded the laundry." In this sentence, the subject ("John") is performing an action ("folded the laundry.") Thus, the sentence is in active voice. Now consider the sentence "The laundry was folded by John." In this sentence, the subject ("The laundry") is not performing an action. Instead the subject is receiving the action. Thus, the second sentence is in passive voice. In pairs, the students should read the sentences below to each other and determine whether the subject is performing or receiving the action. Students should mark an "A" for active voice next to the sentences where the subject is performing an action, and a "P" for passive voice next to sentences where the subject is receiving an action.

- ___ Carl put away his materials and prepared to go home.
- ___ The playground was cleaned by a group of student volunteers.
- ___ Students with perfect attendance were given a certificate by the principal.
- ___ Mr. Givens sent a letter to the mayor requesting that the project be postponed.
- ___ My cousin Dawn was chosen to represent her school at the regional band competition.
- ___ Several students complained that they were unable to hear the speaker during the assembly.

For further practice, students should rewrite any sentence identified in passive voice to be in active voice.



Activities



② Research/Writing Process

Common Core Georgia Performance Standards ELACC8.W.1, ELACC8.W.2, ELACC8.W.3, ELACC8.W.4, ELACC8.W.7, and ELACC8.W.8

For the writing process, students should apply appropriate organizational structure as they write paragraphs or longer compositions. They will use appropriate transitions between paragraphs, passages, and ideas, and they will develop appropriate closing sentences to give their compositions closure. They will develop their compositions with supporting evidence and details. They will be able to eliminate extraneous information from their writing and to reorganize sentences to improve clarity. Students should also be able to differentiate between formal and informal language and to revise sentences accordingly to maintain formal style when writing. Finally, students should be able to locate and evaluate a variety of resources to use in their research.

The following activities develop skills in this domain:

- For practice evaluating research sources, students should select a research topic with which they are already familiar. For instance, a student who likes stargazing might investigate different types of telescopes. Taking the role of researcher, students should search for books and articles online using any search engine and list the resources available. Students need to skim as many of the resources as time allows, checking to see which ones are reliable sources. From the resources, students should select three that seem to provide useful information on the chosen topic. Students should examine those articles carefully to answer the following questions:
 - *Did an authority (expert in the field) write the article?*
 - *Is the article intended to give information or is it meant to sell something?*
 - *Does the article give evidence to support the claims that it makes?*
 - *For what audience is the article intended?*
 - *Does the author give documentation to show where the information came from?*
 - *Does the author have a bias that might affect the accuracy of the information presented?*
- For help in writing effective closing statements, students should consider the possible strategies listed below. They should examine textbooks, newspapers, and leisure reading to find an example of each of the strategies in use. Then each student should write the beginning and middle of a paragraph, leaving a blank space for the conclusion. Finally, the students should exchange papers and use one of the following ideas to add a strong conclusion to the incomplete paragraph.
 - *A restatement of the main idea*
 - *A quotation from an authority*
 - *A question that leads readers to think further about the main point*

- A prediction based on the main idea
 - A brief story that illustrates the main idea
 - A warning based on the main idea
- For help recognizing formal and informal writing, students should review the characteristics of formal and informal writing style, including:

Style	Colloquial language/Slang	Contractions	Second person/ Imperative voice
Formal	No	Avoid	No
Informal	Okay	Okay	Okay

Now review the following paragraph:

¹Students often complain that they are given too much homework. ²However, studies show that most students could finish their homework easily if they were more efficient. ³Keep in mind that you're probably wasting a lot of time. ⁴For example, students often forget or lose their materials. ⁵If you have to call friends to find out what the assignment is, this delays starting (and finishing) an assignment. ⁶Plus, when you're on the phone chatting with your friends, it's really easy to lose track of time. ⁷In addition, students should find a quiet place to study and do homework. ⁸When studying in a busy area or with the television or radio turned on, students can become distracted. ⁹You may only chat with your brother for a minute or two, or stop to listen to that favorite song, but all these small interruptions add up. ¹⁰Students often find they have plenty of time to complete tasks when they are prepared and stay on task.

Now analyze the sentences. Next to the sentence number check whether the sentence is written in formal or informal style. For sentences written in informal style, list the element(s) that make the sentence informal (e.g., contains the contraction "they're"). Then, in the spaces provided, revise the informal sentences so that they are in formal style.

Sentence 1: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 2: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____



Sentence 3: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 4: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 5: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 6: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 7: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 8: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 9: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____

Sentence 10: Formal _____ Informal _____ Informal elements _____

Sentence Revision: _____



Practice Quiz



- 1 **Which of these correctly explains how the underlined words function in the sentence?**

My brother enjoys hiking in the mountains.

- A as the direct object
- B as the indirect object
- C as an independent clause
- D as the predicate of the sentence

- 2 **Which revision should the writer make to maintain the active voice in the paragraph?**

¹Carl always enjoyed going camping with his uncle Mike. ²Each year a different location would be chosen and careful plans made. ³First, they would choose the best date for their trip. ⁴Next, they would make a list of supplies and equipment that they would need. ⁵Finally, they would create a schedule of activities. ⁶The trips were always fun and relaxing because all of the work had been done in advance.

- A Change sentence 2 to "Each year they chose a different location and made careful plans."
- B Change sentence 3 to "First, the best date for their trip would be chosen by them."
- C Change sentence 4 to "Next, a list of supplies and equipment that they would need would be made by them."
- D Change sentence 5 to "Finally, a schedule of activities would be created."

- 3 **Which form of the verb correctly completes the sentence?**

The man demanded that he _____ allowed to speak to the manager.

- A is
- B be
- C was
- D were



4 **Which sentence uses commas correctly?**

- A Debbie put away her things and left, rushing out the door, without a word.
- B Additionally, the doctor advised John to drink plenty of fluids, and get more rest.
- C After the game ended, Frances looked for her brother, but he had already gone home.
- D When the teacher finished the lesson, Larry raised his hand, and asked several questions.

5 **Which sentence should be added to the paragraph to BEST support the writer's argument?**

Dear Principal Rodgers:

I was disappointed to learn that the computer lab would no longer be available to students during lunch. I think this decision was a mistake. Many students use the computer lab during the lunch period to finish homework. It is also a great place for students to do research for school projects. Although the computer lab is open after school, students who ride the bus cannot take advantage of this time. I hope you will reconsider this decision and reopen the computer lab to students during the lunch period.

Sincerely,

A Hopeful Student

- A Ms. Harrison, the computer lab instructor, is very knowledgeable and patient.
- B In addition to the computer lab, many students use the library during their lunch.
- C Working in the computer lab also helps students learn to use the latest technology.
- D Ms. Harrison reports that only a few students use the computer lab during lunch period.



- 6 **Where is the BEST place to move sentence 4 in the paragraph to create a more logical order?**

¹Thomas Edison is well known for his work with electricity, but another scientist also deserves recognition as a pioneer of electricity. ²Arriving in New York with just four cents in his pocket, Tesla soon secured a job with Edison’s company. ³A brilliant engineer, Tesla is best known for creating the process that allowed electricity to be transmitted over long distances. ⁴Nikola Tesla was a Serbian immigrant who came to the United States in 1884. ⁵He also was a pioneer in wireless communication.

- A before sentence 1
- B between sentences 1 and 2
- C between sentences 2 and 3
- D after sentence 5

- 7 **Which of these phrases should be added to sentence 2 to BEST link the ideas in the paragraph?**

¹Although early research into linked computer networks began back in the 1960s, the modern internet is a relatively new system. ²_____, computer networks were used mainly by government agencies and scientists at research centers. ³As personal computers became more popular, companies began offering internet access to individuals. ⁴Since that time, the use of the internet has grown steadily as use of internet-based services such as email have gained popularity. ⁵Today, about a third of the world’s population uses the internet.

- A Until about twenty years ago
- B Difficult for most people to learn
- C Requiring several years to complete
- D To prevent problems from occurring



8 **What is the BEST way to organize the sentences into a paragraph?**

1. "Are you lost, fellow?" Tess asked, bending down to pat the tiny pooch on its head.
2. Picking up her phone, Tess dialed the phone number on the tag.
3. "Let's see if we can find out where you belong," she said.
4. Looking at the dog's collar, she noticed a tiny tag from a local veterinarian.
5. Tess looked at the scared little dog that had wondered onto the porch of her family's house and shook her head.
6. The dog whimpered and wagged its tail in response.

- A 5, 6, 1, 3, 2, 4
- B 1, 4, 2, 5, 6, 3
- C 1, 3, 4, 2, 5, 6
- D 5, 1, 6, 4, 2, 3

9 **Which sentence should be added to the end of the paragraph to provide the BEST conclusion?**

Stacey looked at the clock radio and frowned. The game would be starting in just a few minutes. Stacey had been looking forward to watching it on television all week. However, her social studies report was taking much longer than she had expected. She could put off the report until after the game, but that would mean staying up late.

- A The game would be starting soon, but Stacey still had not decided what to do.
- B "I hope my team wins today," Stacey thought with a feeling of nervous excitement.
- C If she stayed up late finishing her work, she would be tired and might make mistakes.
- D "I should be finished in time for the second half," she told herself, getting back to work.



- 10 **Which sentence should be removed because it does NOT support the purpose of the letter?**

Dear Mr. Rollins:

¹Thank you for agreeing to take part in this year's career day event.

²To help make the event a success, participants are asked to attend an orientation meeting next Friday at 4:00 in the school library. ³Please

bring copies of any materials that you plan to present to students, so that they can be approved by the principal. ⁴The principal is also

encouraging everyone to consider joining the school PTA. ⁵Participants should also make a list of any special equipment they will need for their presentation and bring it to the meeting. ⁶We look forward to seeing you soon!

Sincerely

Mr. Bill Anderson
Assistant Principal

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



Solutions

Number	Correct Answer	Explanation
1	A	<p><i>Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. Explain the function of verbals (gerunds, participles, infinitives) in general and their function in particular sentences. (ELACC8.L.1a)</i></p> <p>The correct answer is Choice (A) as the direct object. In this sentence, <i>hiking in the woods</i> receives the action of the verb <i>enjoys</i>. The sentence does not have an indirect object, so choice (B) is incorrect. The phrase <i>hiking in the woods</i> cannot stand on its own as a sentence. Therefore it is not an independent clause and choice (C) is incorrect. Choice (D) is also incorrect as <i>hiking in the woods</i> is not the predicate of the sentence.</p>
2	A	<p><i>Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. Form and use verbs in the active and passive voice. (ELACC8.L.1b)</i></p> <p>The correct answer is Choice (A) Change sentence 2 to “Each year they chose a different location and made careful plans.” The revision of this sentence changes the subject of the sentence from “a different location” to “they.” In the revised sentence, the subject (“they”) is performing an action (“chose”). The sentence is now in active voice. The original sentence had the subject (“a different location”) receiving the action, and therefore was written in passive voice. Choices (B), (C), and (D), all revise the sentences so that the subjects (<i>the best date for their trip, a list of supplies and equipment, and a schedule of activities</i>) are receiving rather than performing an action. Therefore, these revised sentences are in passive voice and the answer choices are incorrect.</p>

Number	Correct Answer	Explanation
3	B	<p><i>Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. Form and use verbs in the indicative, imperative, interrogative, conditional, and subjunctive mood. (ELACC8.L.1b)</i></p> <p>The correct answer is Choice (B) “be allowed”. Clauses of order using “that” (“demanded that he...”) call for the subjunctive form of the verb. The subjunctive form of the verb <i>be</i> is “be.” Choice (A) which uses the present tense (<i>is</i>) is incorrect. Choice (C) which uses the past tense (<i>was</i>) is also incorrect. Likewise, choice (D) which uses the plural past tense (<i>were</i>) is incorrect.</p>
4	C	<p><i>Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. Use punctuation (comma, ellipsis, dash) to indicate a pause or break. (ELACC8.L.2a)</i></p> <p>The correct answer is Choice (C) “After the game ended, Frances looked for her brother, but he had already gone home.” This sentence correctly uses a comma to separate the introductory adverbial dependent clause (<i>After the game ended</i>) from the independent clause (<i>Frances looked for her brother</i>). The sentence also correctly uses a comma to separate the two independent clauses (<i>Frances looked for her brother</i>) and (<i>he had already gone home</i>) along with the coordinating conjunction (<i>but</i>). Choice (A) incorrectly uses a comma to separate the phrase (<i>without a word</i>). Choice (B) incorrectly uses a comma to separate the phrase (<i>and to get more rest</i>). Likewise, choice (D) incorrectly uses a comma to separate the phrase (<i>and asked several questions</i>).</p>



Number	Correct Answer	Explanation
5	C	<p><i>Write arguments to support claims with clear reasons and relevant evidence. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. (ELACC8.W.1b)</i></p> <p>The correct answer is Choice (C) “Working in the computer lab also helps students learn to use the latest technology.” This sentence supports the argument that the decision to close the computer lab during the lunch period is a mistake because it limits students’ ability to use the lab where they are able to learn the latest technology. Choice (A) is incorrect because the detail about the computer lab instructor does not support the argument that closing the lab during the lunch period is a mistake. Similarly, choice (B) is incorrect because the detail that students also use the library during lunch does not support the argument of the letter. Finally, choice (D) is also incorrect because the detail that only a few students use the lab during lunch does not support the argument and actually lends support to the decision to close the lab at lunch.</p>

Number	Correct Answer	Explanation
6	B	<p><i>Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. (ELACC8.W.2a)</i></p> <p>The correct answer is Choice (B) between sentences 1 and 2. The topic sentence of the paragraph (sentence 1) states that while Edison is famous for his work with electricity, another scientist also deserves credit as a pioneer of electricity. The topic sentence, however, does not name the scientist. The target sentence (sentence 4) of the paragraph identifies this scientist. As written, sentence 2 begins a description of the scientist's arrival in America using only his last name (Tesla). This suggests the writer has already identified the scientist and indicates that sentence 4 should come before sentence 2. Choice (A) is incorrect because introducing Nikola Tesla before the current sentence 1 and then beginning to talk about Edison and another scientist would confuse readers. Choice (C) is incorrect because it would not correct the current problem of beginning to describe Tesla's life before he is clearly identified to the reader. Choice (D) is incorrect because Tesla is not clearly identified to the reader until the very end of the paragraph after his contributions to electricity have been described.</p>



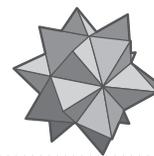
Number	Correct Answer	Explanation
7	A	<p><i>Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. (ELACC8.W.2c)</i></p> <p>The correct answer is Choice (A) Until about twenty years ago. The topic sentence of the paragraph (sentence 1) states that the modern internet is a relatively new system. This sentence suggests that the paragraph will describe the creation of the internet using sequential organization. Based on the first sentence, as well as sentences 3 through 5, a transition helping readers understand the time element is needed. Choices (A) and (C) both describe time. However, choice (C) is incorrect because it describes the time it took to complete the system and does not relate to the remainder of the sentence (<i>these networks were mainly used by government agencies and scientists</i>). However, choice (A) relates well and indicates that the remainder of the sentence (<i>these networks were mainly used by government agencies</i>) has changed in the past twenty years, which fits with the topic sentence and the description in following sentences as well. Choice (B) is incorrect because (<i>Difficult to learn</i>) does not relate well to the information in the topic and target sentence nor to the rest of the paragraph. Choice (D) is incorrect because (<i>To prevent problems from occurring</i>) does not relate to the paragraph as potential or actual problems are not discussed in the paragraph.</p>



Number	Correct Answer	Explanation
8	D	<p><i>Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. (ELACC8.W.3a)</i></p> <p>The correct answer is Choice (D) 5, 1, 6, 4, 2, 3. Based on the sentences, the reader can recognize that the short narrative is about a girl who finds a lost dog and tries to help it get home. The student should look for a sentence that sets the scene to start the narrative. Based on the answer choices, the scene either begins with sentence 1 or sentence 5. Choices (B) and (C) both begin with sentence 1 (<i>Are you lost, fellow? Tess asked, bending down to pat the tiny pooch on its head.</i>) The words (<i>the tiny pooch</i>) suggest the dog has already been talked about, which would not be the case if this were the first sentence of the narrative. In addition, the order of the following sentences for choices (B) and (C) does not make sense as they introduce the conflict (sentence 5) after Tess has begun to take action to solve it. Therefore, choices (B) and (C) are incorrect. Sentence 5 (<i>Tess looked at the scared little dog that had wondered onto the porch of her family's house and shook her head.</i>) introduces the characters and conflict of the narrative. Both choices (A) and (D) begin with sentence 5, but choice (A) is incorrect because it describes Tess dialing the number on the dog tag (sentence 2) before noticing the tag on the collar (sentence 4).</p>



Number	Correct Answer	Explanation
9	D	<p><i>Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. Provide a conclusion that follows from and reflects on the narrated experiences or events. (ELACC8.W.3e)</i></p> <p>The correct answer is Choice (D) “I should be finished in time for the second half,” she told herself, getting back to work. Based on the paragraph, Stacey has a decision to make: watch the game or finish her homework. Choice (D) clearly indicates that she decides to finish her homework first and watch what is left of the game afterward. Choice (A) is incorrect because the conflict of the short narrative is not resolved, but just restated (the game would start soon, and she had not decided what to do). Choice (B) is incorrect because Stacey’s desire for her team to win does not relate to the conflict described in the paragraph. Choice (C) relates to the conflict, but is incorrect because ending with a sentence about the potential consequences of waiting to do her homework does not bring closure to the paragraph as it leaves the reader wondering about Stacey’s decision.</p>
10	C	<p><i>Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (ELACC8.W.4)</i></p> <p>The correct answer is Choice (C) sentence 4. This question asks students which sentence needs to be removed because it does not relate to the purpose of the letter. Based on the other sentences, the purpose of the letter is clearly to give information about an orientation meeting for the school’s upcoming career day. Sentence 4 does not relate to this meeting, but instead expresses the principal’s desire for people to join the school PTA. Therefore sentence 4 should be removed. Choice (A) is incorrect because sentence 2, which asks participants to attend the orientation meeting clearly relates to the meeting. Choice (B) is incorrect because sentence 3, which describes materials participants should bring to the meeting, also relates to the meeting. Finally, choice (D) is incorrect because sentence 5, which asks participants to bring a list of materials they will need for their presentation, also relates to the meeting.</p>



Chapter 3

Mathematics

By the end of Grade 8, students will know that there are numbers that are not rational, and approximate them by rational numbers. Students will work with radicals and integer exponents. Students will understand congruence and similarity using physical models, transparencies, or geometry software. Students will understand and apply the Pythagorean Theorem. Students will solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. Students will understand the connections between proportional relationships, lines, and linear equations. Students will analyze and solve linear equations and pairs of simultaneous linear equations. Students will define, evaluate, and compare functions, and use functions to model relationships between quantities. Students will investigate patterns of association in bivariate data.

The Mathematics activities are focused on some of the concepts that are assessed on the Grade 8 CRCT Mathematics domains. These domains are as follows:

- ❶ **Number and Operations**
- ❷ **Geometry**
- ❸ **Algebra**
- ❹ **Data Analysis and Probability**

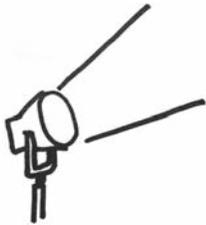
The *Mathematical Process Skills* are integrated throughout the domains.

Mathematical Practices are listed with each grade's mathematical content standards to reflect the need to connect the mathematical practices to mathematical content in instruction. The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly,

accurately, efficiently, and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).



Activities



1 Number and Operations

Common Core Georgia Performance Standards MCC8.NS.1, MCC8.NS.2, MCC8.EE.1, MCC8.EE.2, MCC8.EE.3, and MCC8.EE.4

Within the Number and Operations domain, students learn that there are numbers that are not rational, and approximate them by rational numbers. They will work with radicals and integer exponents.

The following activities develop skills in this domain:

- To practice finding square roots and using radicals, students will set up and solve simple radical equations involving the side lengths of squares in this problem. In *The Perfect Square Gardens*, there are currently four gardens that are perfectly square. Garden A has an area of 81 square yards; Garden B has an area of 121 square yards; Garden C has an area of 196 square yards; and Garden D has an area of 225 square yards. The head gardener is going to make four new square gardens and he wants:
 - The side length of Garden E to be twice the side length of Garden C
 - The side length of Garden F to be the sum of the side lengths of Gardens A and B
 - The side length of Garden G to be the difference of the side lengths of Gardens A and D
 - The ratio of the side lengths of Garden H to Garden B to have the same ratio as the side lengths of Garden D to Garden A

Use $\sqrt{81}$, $\sqrt{121}$, $\sqrt{196}$, and $\sqrt{225}$ to set up and solve equations and proportions to find the side lengths of the four new perfectly square gardens. After finishing the problem, students should describe in their own words the relationship between the radical sign, the square root of a number, and the side length of a square with a given area.

- To develop fluency with the laws of exponents, students will build exponential expressions that are equivalent to a given exponential expression. Each student will write a different simple exponential expression, such as a^6 , on three index cards. For their unique expression, the students should make five additional index cards according to these rules:
 - The first index card should have an expression that reduces to the original exponential expression using the addition law of exponents. For example, for a^6 students might write $a^2 \times a^4$, $a^3 \times a^3$, or $a^5 \times a$.
 - The second index card should have an expression that reduces to the original exponential expression using the multiplication law of exponents. For example, for a^6 students might write $(a^3)^2$ or $(a^2)^3$.

- The third index card will have an expression that reduces to the original exponential expression using the division law of exponents. For example, for a^6 students might write $\frac{a^{12}}{a^6}$ or $\frac{a^{10}}{a^4}$.
- The fourth index card will have an expression that reduces to the original exponential expression using the addition and division laws of exponents. For example, for a^6 students might write $\frac{a^4 a^5}{a^3}$ or $\frac{a^2 a^6}{a^2}$.
- The fifth index card will have an expression that reduces to the original exponential expression using the multiplication and division laws of exponents. For example, for a^6 students might write $\frac{(a^3)^3}{a^3}$.

Students then shuffle the cards, exchange them, find and match all the equivalent expressions, and label each index card with the law or laws that were used to reduce the expression on it.

- To apply converting to, and using numbers in, scientific notation, students will make a model of the universe and calculate the time it would take to travel to the different locations at the speed of light. On a large sheet of paper or poster board, students should draw the sun, the eight planets, Alpha Centauri, Sirius, Deneb, and the Galactic Center. Students should label their distances from Earth in scientific notation and should not be concerned with making the drawing to scale.

Location	Distance from Earth in standard form (km)	Distance from Earth in scientific notation (km)	Column 3/speed of light = number of seconds	Column 4/seconds per year = years to reach location
Sun	149,570,000			
Mercury	91,620,000			
Venus	41,460,000			
Mars	78,270,000			
Jupiter	628,570,000			
Saturn	1,277,430,000			
Uranus	2,720,730,000			
Neptune	4,350,330,000			
Alpha Centauri	40,396,400,000,000			
Sirius	81,738,800,000,000			
Deneb	13,263,600,000,000,000			
Galactic Center	262,151,000,000,000,000			



Students will then:

- 1 Divide the distances by the speed of light (3.0×10^6 km/s).
 - 2 Divide the quotient from No. 1 by the number of seconds in a year (3.1556926×10^7 s) to determine the time it would take in years to reach Earth by traveling at the speed of light. This information should also be included on their drawings.
- Students will review definitions and follow the steps of a flow chart to help them distinguish between rational and irrational numbers. Irrational numbers will include the estimated value of a non-perfect square. Prepare a deck of 3×5 -inch cards ahead of time. On each card, write either a rational or an irrational number:
 - Rational numbers can include fractions, terminating decimals, square roots of perfect squares (showing the perfect square inside a radical with an equal sign indicating the root), repeating decimals, and integers.
 - Irrational numbers can include square roots of non-perfect squares (showing the non-perfect square inside a radical with an equal sign indicating the root), and non-terminating, non-repeating decimals.

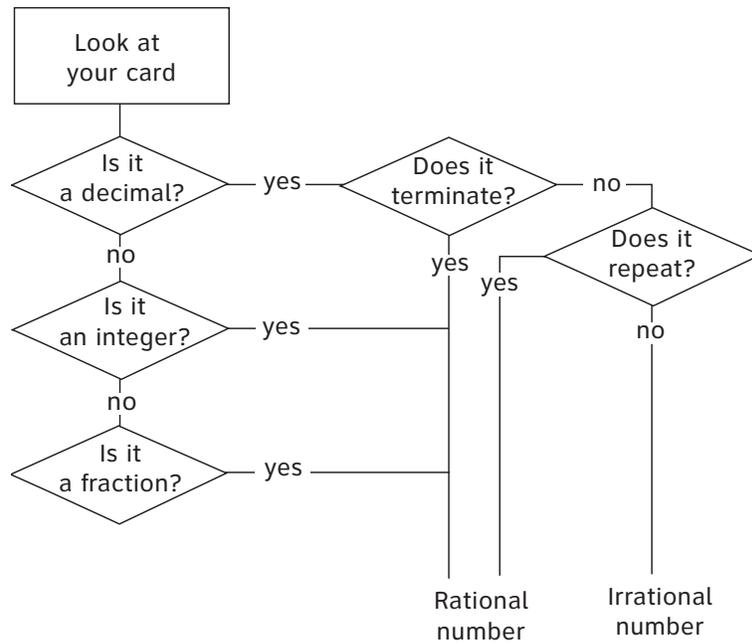
To begin the lesson, post the following definitions:

- **Rational number:** A number that can be expressed as a ratio of two integers. In other words, a rational number can be written as a fraction, a repeating decimal, a terminating decimal, or a whole number.
- **Irrational number:** A number that cannot be expressed as a ratio of two integers. In other words, one that is not rational.

Next, use the board or chart paper to show examples of rational and irrational numbers:

- For a rational number, show that the fraction $1/1000$ can also be expressed as 0.001.
- For an irrational number, write the symbol π and ask students for what value the symbol is given. Elicit that π is usually written as the rounded off decimal of 3.14. Demonstrate that π is an irrational number because it can be written as 3.1415926535897932384626433832795... Explain that the value of π goes on forever, without repeating or terminating.

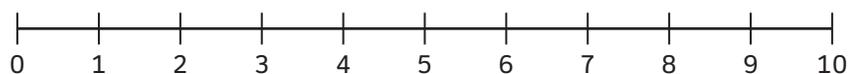
Then, display the following flow chart. Explain that students will determine whether various numbers are rational or irrational numbers using the chart. They will begin at the rectangle and follow the various pathways depending upon how they answer questions about each rational or irrational number. Demonstrate using $\frac{1}{1000}$ and $3.1415926535897932384626433832795\dots$



Next, distribute one prepared index card to each student. Students will use the flow chart to determine if his or her card displays a rational or irrational number. They may achieve this process in one of the following ways:

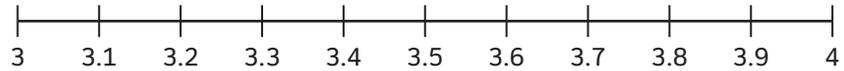
- Post the flow chart on the board or chart paper. One student at a time will tell the class how he or she moves through the flow chart for his or her number.
- Distribute a copy of the flow chart to each student. Students will trace the correct path for the numbers on their cards.
- Reproduce the flow chart with masking tape on the floor. Students will walk through the flow chart.

As a group, plot the approximate location of π on a number line between 0 and 10 in increments of 1.

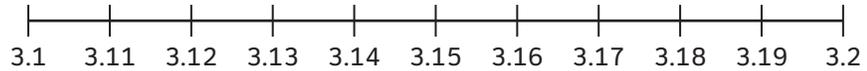




Repeat again on a number line from 3 to 4 in increments of tenths.



Repeat a third time using a number line from 3.1 and 3.2 in increments of hundredths.



Discuss with students which number line gives the most accurate approximation.

How could they make a number line that is even more accurate?

Have students work in pairs or alone to create number lines to accurately approximate the locations of irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, Golden Ratio (1.6180339887...), $\sqrt{99}$, etc.

Compare different number lines created by the students and discuss which ones show the best approximation of the number.

Activities



② Geometry

Common Core Georgia Performance Standards MCC8.G.1, MCC8.G.2, MCC8.G.3, MCC8.G.4, MCC8.G.5, MCC8.G.6, MCC8.G.7, MCC8.G.8, and MCC8.G.9

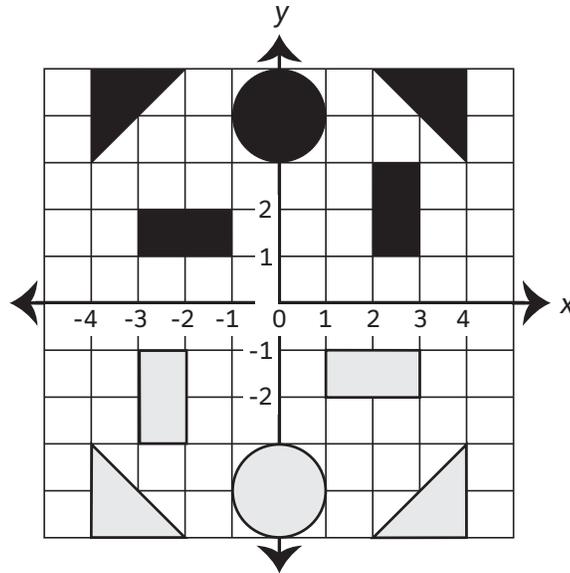
The Geometry domain addresses students' understanding of congruence and similarity using physical models, transparencies, or geometry software. They will understand and apply the Pythagorean Theorem. Student will solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

The following activities develop skills in this domain:

- To experience the outcome when parallel lines are cut by a transversal, students will make and put together puzzles formed by parallel lines and transversals. Students place masking tape on paper to make two parallel lines, one transversal, and a second set of parallel lines that cross the first set. Students then separate the angles by cutting the piece of paper along the masking tape edge. Students will measure and label one angle formed by the single transversal and one angle formed by the parallel line crossings. They then switch pieces, put the puzzle back together, and label all the angles. After they finish, students should be able to explain the following:
 - Why they needed only one angle measurement from each set of line crossings
 - Why they couldn't have found the measures of all the angles if they had been given only one angle from a single transversal intersection
 - The rules they used to find the missing angle measures
- Students will strengthen their ability to use congruence by labeling corresponding angles and sides of congruent figures in different positions. First, students should cut out different triangles, quadrilaterals, and polygons from a piece of paper. On separate pieces of paper for each shape, students should choose a position for tracing the figure. Then, based on that position, students should do the following:
 - Trace the figure translated right two inches.
 - Trace the figure reflected horizontally and vertically.
 - Trace the figure rotated 90° and 270° .
 - Measure and label the angles and side lengths of the original figure.

Students then exchange tracings and use different colored markers to show congruent sides and angles. They will label the angle measures and side lengths and briefly describe how they used the properties of congruence to find the measurements.

- To develop students' sense of transformations in the coordinate plane, students will play a game in which the board is a portion of the coordinate plane, and the pieces are plane figures that move around the board by transformations. Students should make a 10×10 grid, highlight the middle lines as the x - and the y -axes, cut out the five pieces of each color shown in the sample below, and start with them in the given positions.



The goal of the game is to capture all of your opponent's pieces. The rules are:

- On any turn only one piece can be moved:
 - Rectangles can rotate 90° , 180° , or 270° about the origin, but cannot move in any other way. (Note: To challenge students, describe the rotations as -90° , -180° , and -270° rotations. Point out that when a degree is positive, the object is moved in a counterclockwise direction. When it is negative, the object is moved in a clockwise direction. Students should experiment until they see that pairs of rotations [-90° and 270° , 90° and -270° , and 180° and -180°] make the object rotate to the exact same position on the grid.)
 - Triangles can translate horizontally and vertically a total of three units or reflect across the y -axis.
 - Circles can translate one unit horizontally or vertically.
 - Only rectangles can move over another piece.
- A player cannot have two pieces occupying the same square.
- If a player places any part of one of his or her pieces on top of any part of one of his or her opponent's pieces of the same shape, he or she captures that piece.



-
- If a player places any part of one of his or her pieces on any part of one of his or her opponent's pieces of a different shape, the opponent's piece is frozen until the player's piece moves on.

Students will make a table to use as a transformation log. They will record the type of transformation in the left column, the coordinates before the transformation in the middle column, and the coordinates after the transformation in the right column. They should identify the relationship between each pair of coordinates and explain how this relationship is associated with the transformation recorded. For example, if the transformation was a horizontal translation, the values of the y -coordinates would not change, but the values of the x -coordinates would. In evaluating a horizontal translation, students should also note the similarity to a reflection across the y -axis and the inverse relationship to a vertical translation.

- Students will apply the Pythagorean Theorem to construct lines with lengths that are irrational numbers. The square root of any positive integer that is not a perfect square is an irrational number. Students should first draw four right triangles with the following leg lengths:
 - 1 inch and 1 inch
 - 1 inch and 2 inches
 - 2 inches and 3 inches
 - 4 inches and 4 inches

Students will then find the lengths of the hypotenuses, leaving them in radical form. Students should then answer the following questions:

- 1 Which lines have lengths that are irrational?
 - 2 How did you find the lengths?
 - 3 Could you have measured these lengths accurately using a standard ruler?
 - 4 How were you able to use the Pythagorean Theorem to create and measure the lengths accurately?
- To make a connection between the algebraic equation and geometric meaning of the Pythagorean Theorem, students will find the square of the hypotenuse of a right triangle using the squares of its legs. Students will cut out 1-inch squares from two 8.5×11 pieces of paper.
 - 1 First, students should draw a right triangle with leg lengths 3 inches and 4 inches. They will then use the 1-inch square papers to build a 3×3 square and a 4×4 square along the respective legs. They then will use those 1-inch square papers to build a square along the hypotenuse and write what happened in their own words.

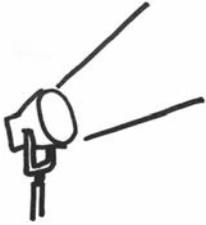


- 2** Second, students should draw an acute triangle that has side lengths 3 inches and 4 inches. Students should predict and verify whether the third side length will be less than or greater than 5 inches. They then will build 3×3 and 4×4 squares along the 3- and 4-inch sides using inch squares. Students will then try to build a square along the third side and write what happens.
- 3** Finally, students should draw an obtuse triangle with side lengths 3 inches and 4 inches. They should predict and verify whether the third side length will be less than or greater than 10 inches. They then build the 3×3 and 4×4 squares on the 3- and 4-inch sides with the 1-inch paper squares. Students will then try to build a square of 1-inch paper squares along the third side and write what happens.
- 4** Students then repeat steps 1–3 using leg lengths and side lengths of 6 inches and 8 inches, and 5 inches and 12 inches.

After finishing the activity, students will answer these questions:

- 1** What does the Pythagorean Theorem say about the areas of the squares formed on the legs and hypotenuse of a right triangle?
 - 2** Was the third side of the acute triangle shorter or longer than the hypotenuse of the right triangle? How did this affect the relationship between the areas of the squares formed on the 3- and 4-inch sides and the area of the square formed on the third side?
 - 3** Was the third side of the obtuse triangle shorter or longer than the hypotenuse of the right triangle? How did this affect the relationship between the areas of the squares formed on the 3- and 4-inch sides and the area of the square formed on the third side?
 - 4** Why didn't the Pythagorean Theorem work for the acute and obtuse triangles?
- Volume is a common measure used for cylinders, cones, and spheres. To apply volume measures, students should choose the cylindrical water storage container that will meet Williamsburg's water storage needs, as outlined in the activity below:
- The new water storage system Williamsburg is installing must have a capacity (volume) that is at least the same as the capacity of a spherical water tank with a radius of 5 meters. The town would like to keep the height of the container as small as possible. Which tank should the town choose and why? Be sure to give details comparing the various options.
- Tank One: radius 3 m, height 8 m
 - Tank Two: radius 3 m, height 3 m
 - Tank Three: radius 7 m, height 4 m
 - Tank Four: radius 7 m, height 3 m
 - Tank Five: radius 8 m, height 3 m
 - Tank Six: radius 8 m, height 2 m

Activities



3 Algebra

Common Core Georgia Performance Standards MCC8.EE.5, MCC8.EE.6, MCC8.EE.7, MCC8.EE.8, MCC8.F.1, MC.C8F.2, MCC8.F.3, MCC8.F.4, and MCC8.F.5

The Algebra domain addresses students' ability to understand the connections between proportional relationships, lines, and linear equations. They will analyze and solve linear equations and pairs of simultaneous linear equations. Students will define, evaluate, and compare functions, and use functions to model relationships between quantities.

The following activities develop skills in this domain:

- Students will work with data about the Georgia state bird, the brown thrasher, to recognize relations and functions, to distinguish between relations and functions, and to show how the same function can be represented in a variety of ways. First, review the definitions of *relations* and *functions* with the class. Post the following definitions on the board or chart paper:
 - **Relation:** A set of ordered pairs, showing a correspondence between two groups.
 - **Function:** A rule of matching elements of two sets of numbers in which an input value from the first set has only one output value in the second set.

Next, explain to students that they will work with data about the brown thrasher's nest-building heights and the number of eggs the brown thrasher lays in the nest.

Distribute copies of the following table or post on the board or chart paper:

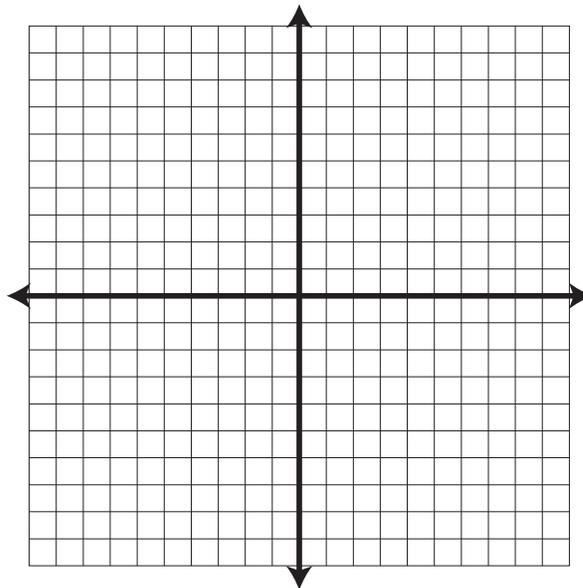
Height of the nest from the ground in inches (<i>x</i>)	Number of eggs in the nest (<i>y</i>)
6	2
8	1
10	5
2	3
5	5
3	4
4	6
6	4
9	4
7	2



Then, ask the class whether the information provided in the table represents a relation that is a function or is not a function. Elicit the correct answer: the table represents a relation that is not a function. Students will notice that for the x value of 6, there are two possible y values, 2 and 4.

Tell students to use the Vertical Line Test as an additional way to prove whether or not a group of ordered pairs represents a relation that is a function. Explain that a relation is not a function if a vertical line can be drawn through two or more points because, for some value of x , there are at least two values for y . Have students test this proof:

- Provide each student with a grid similar to the one that follows.



- Students will plot the 10 ordered pairs from the nest/egg table.
- Students will then examine the plot to see whether a vertical line can be drawn to connect any two or more plotted points.
- Students will find that the ordered pairs (6, 2) and (6, 4) can be connected by a vertical line, proving that the relation is *not* a function.

Distribute or post the following table and inform the class that the table shows data regarding a brown thrasher population. Explain that the table shows the population of one group of brown thrashers, which began with 500 birds and declined at a constant rate over five years due to the loss of habitat.

Year (<i>x</i>)	Population (<i>y</i>)
0	500
1	450
2	405
3	365
4	328
5	295

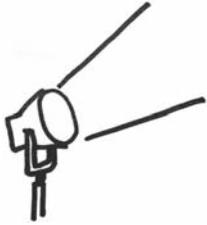
Once again, ask the class whether the information provided on the table represents a relation that *is* or *is not* a function. Elicit the correct answer: the table represents a relation that is a function. For each *x* value, there is one, and only one, *y* value.

Distribute another grid. Students will use the Vertical Line Test to prove that the population data does represent a function. Students will not be able to draw a vertical line to connect two or more plotted points.

Conclude the activity with a discussion of how functions can be represented in a variety of ways. Explain that the two columns of data represent the function in a **tabular representation**. Have students connect the plotted ordered pair points from their second grid and explain that the downward sloping line is a **graphical representation** of the function.



Activities



4 Data Analysis and Probability

Common Core Georgia Performance Standards MCC8.SP.1, MCC8.SP.2, MCC8.SP.3, and MCC8.SP.4

The Data Analysis and Probability domain addresses students' ability to investigate patterns of association in bivariate data.

The following activities develop skills in this domain:

- Students will practice making inferences from statistics by gathering price data for cereals, and making a scatter plot. Students will go to the grocery store and record the prices and weights of 15 different cereals. Students will then plot the values with the weights on the x-axis and the prices on the y-axis. Students will explain in their own words what they think is the relationship between the amount of cereal purchased and the purchase price.

Sam collected the following data about students in his grade at his school:

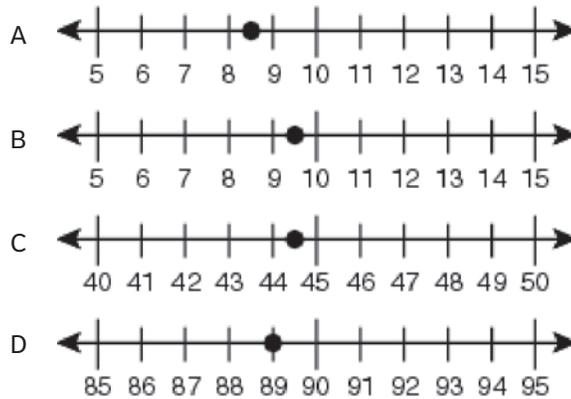
- 78 boys participate in an afterschool sport
- 52 girls participate in an afterschool sport
- 28 boys watch more than 3 hours of television on weekdays
- 34 girls watch more than 3 hours of television on weekdays

Construct a two-way table with this data. Construct a two-way table using relative frequencies. What conclusions can be drawn about the differences in the behaviors of boys and girls at Sam's school and grade? What associations can be made between participating in afterschool sports and watching more than 3 hours of television on weekdays?

Practice Quiz



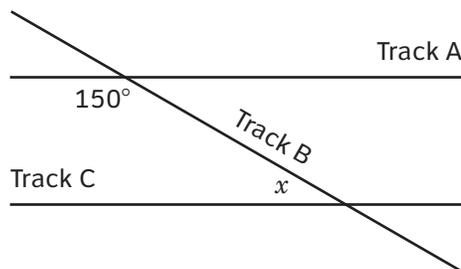
1 Which number line shows the value that is closest to $\sqrt{89}$?



2 What is the value of $(3^6)(3^{-2})(3)$?

- A 9
- B 27
- C 81
- D 243

3 At a train station, Track A is parallel to Track C. Track B intersects Track A and Track C. Track A and Track B intersect at an angle of 150° as shown.

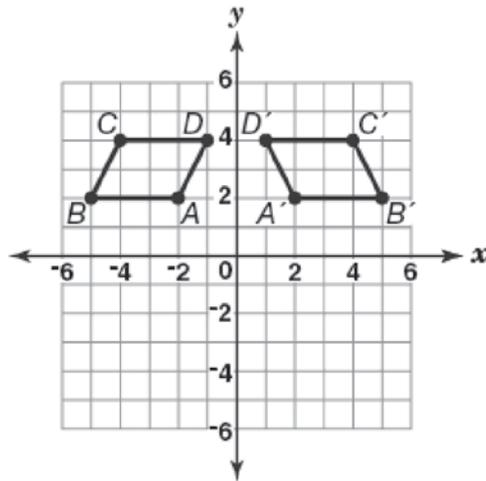


What is the measure of the angle, x , formed by the intersection of Track B and Track C?

- A 30°
- B 50°
- C 150°
- D 180°



- 4 In this figure, $A'B'C'D'$ is a transformation of $ABCD$.



Which type of transformation is $A'B'C'D'$?

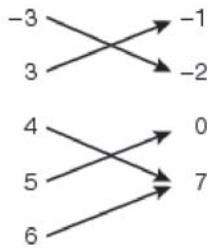
- A dilation
 - B rotation
 - C reflection
 - D translation
- 5 Which expression is equivalent to $4^{-4} \times 4^2$?

- A $\frac{1}{16^2}$
- B $\frac{1}{4^2}$
- C 4^2
- D 16^2

6 Which relation does NOT represent a function?

A $\{(3, 2), (-3, 2), (2, 3)\}$

B **Input** **Output**



C $x = -2$

D

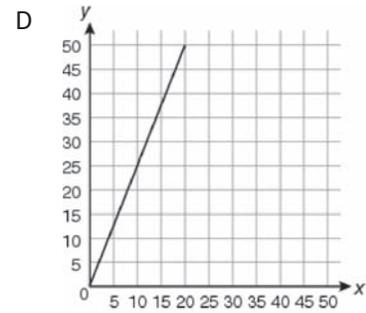
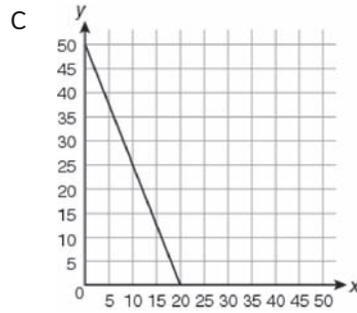
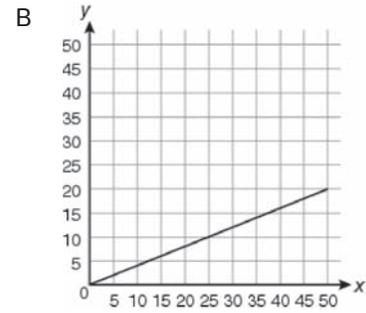
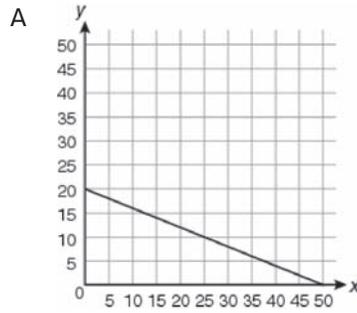
x	y
3	4
5	7
7	10
9	13



7 Look at the equation.

$$2x + 5y = 100$$

Which graph represents this equation?



8 John gets price quotes from two different lawn-mowing services for the cost of mowing the field next to his house. Company A charges \$8 plus an additional \$5 per hour. Company B charges \$2 plus an additional \$6 per hour. The total price quote for each company is the same amount.

How many hours do the companies estimate it will take to mow the field?

- A 6
- B 10
- C 21
- D 38

9 **Which equation represents a linear function?**

- A $y = 3x^2 - 5$
- B $y = 64x + 12$
- C $y = 8x^3 + 27$
- D $y = \frac{15}{x} - 8$

10 **Jerome asked students at his school if they played a musical instrument and how many different sports they played in a year and how many minutes they spent on homework each week.**

	Less than 2 hours	2 to 5 hours	5 to 10 hours	More than 10 hours	Totals
No Sports	2	3	6	5	16
1 Sport	1	6	12	8	27
2 Sports	2	8	20	10	40
3 Sports	1	10	6	3	20
4 Sports	3	6	5	1	15
Totals	9	33	49	27	118

Which statement is correct?

- A Students who play 4 sports are more likely to spend 2 to 5 hours on homework than students who play 1 sport.
- B Students who play 4 sports are less likely to spend 5 to 10 hours on homework than students who play 3 sports.
- C Students who play 1 sport and students who play 3 sports are equally likely to spend less than 2 hours on homework.
- D Students who play 2 sports are more likely to spend 10 or more hours on homework than students who play 1 sport.



Solutions

Number	Correct Answer	Explanation
1	B	<p><i>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). (MCC8.NS.2)</i></p> <p>The correct answer is Choice (B). Because 89 is between 81 and 100, its square root will be between $\sqrt{81} = 9$ and $\sqrt{100} = 10$. Choice (A) is incorrect because it is between 8 and 9, possibly a calculation error. Choice (C) is incorrect and is half of 89. Choice (D) is incorrect and is 89 itself.</p>
2	D	<p><i>Know and apply the properties of integer exponents to generate equivalent numerical expressions. (MCC8.EE.1)</i></p> <p>The correct answer is Choice (D) 243. When multiplying powers with the same base, the exponents 6, -2, and 1 are added to give an exponent of 5: $3^5 = 243$. Choice (A) is incorrect and may result from dividing 6 by 2 and then subtracting the unlabeled exponent of 1 to get $3^2 = 9$. Choice (B) is incorrect and may result from dividing 6 by 2 and then ignoring the unlabeled exponent of 1 on top of 3 to get $3^3 = 27$. Choice (C) is incorrect and may result from mistakenly dividing 6 by 2 and then adding 1 to get $3^4 = 81$.</p>
3	A	<p><i>Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle–angle criterion for similarity of triangles. (MCC8.G.5)</i></p> <p>The correct answer is Choice (A) 30°. Angle x is congruent to either of the acute angles formed by the intersection of Track A and Track B. When one of the acute angles is added to the 150° angle, the result is a line forming a straight angle of 180°. Subtracting 150° from 180° gives an acute angle measuring 30°. Angle x is congruent to these acute angles and has the same angle measure, 30°. Choice (B) is incorrect and may result from a calculation error when solving $x + 150 = 180$. Choice (C) is incorrect and may result from thinking that angles inside the parallel lines on the same side of the transversal should be equal. Choice (D) is incorrect because 180° represents the sum of 150° and 30°.</p>

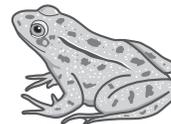
Number	Correct Answer	Explanation
4	C	<p><i>Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. (MCC8.G.3)</i></p> <p>The correct answer is Choice (C) reflection. Parallelogram $ABCD$ is reflected across the y-axis to become parallelogram $A'B'C'D'$. Choice (A) is incorrect because the figure would have changed size, and not orientation, under a <i>dilation</i>. Choice (B) is incorrect. A 270-degree <i>rotation</i> would put the image in quadrant I, but the coordinates of the vertices would be different. Choice (D) is incorrect because the figure has changed orientation, which does not happen under a <i>translation</i>.</p>
5	B	<p><i>Know and apply the properties of integer exponents to generate equivalent numerical expressions. (MCC8.EE.1)</i></p> <p>The correct answer is Choice (B) $\frac{1}{4^2}$. It is a simplified form of the expression $4^{-4} \times 4^2$. First the two factors are combined by adding the exponents $-4 + 2 = -2$ to 4^{-2} then the reciprocal is used to get a positive exponent. Choice (A) is not correct because the two 4s are multiplied before combining the exponents. Choice (C) is not correct because the exponent is shown as positive and not negative when combined. Choice (D) is not correct because the two 4s are multiplied and the exponent is shown as positive when combined.</p>
6	C	<p><i>Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (MCC8.F.1)</i></p> <p>The correct answer is Choice (C) $x = -2$. $x = -2$ is a vertical line, which means there is more than one y value that corresponds to the x value of -2. Choice (A) is incorrect and could represent a function because we do not see any repeated values in the input positions of the coordinate pairs. Choice (B) is incorrect. It represents a function because every input has only one arrow coming from it and, therefore, has only one output. Choice (D) is incorrect and represents a function because we don't see different y outputs for a repeated x input.</p>



Number	Correct Answer	Explanation
7	A	<p><i>Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (MCC8.F.4)</i></p> <p>The correct answer is Choice (A). The y-intercept of the equation is 20 and the x-intercept is 50. The only graph with a line with those intercepts is the graph in Choice (A). Choice (B) is incorrect and results from using the x- and y-intercepts as the x and y values of a point on the line. Choice (C) is incorrect and results from making the x-intercept 20 and the y-intercept 50. Choice (D) is incorrect and results from using the x-intercept as the y value and the y-intercept as the x value of a point on the line.</p>
8	A	<p><i>Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. (MCC8.EE.8b)</i></p> <p>The correct answer is Choice (A) 6. If h = hours, the expression for the price quote from Company A is $8 + 5h$, and the expression for the price quote from Company B is $2 + 6h$. Because the two price quotes are equal, the two expressions should be written as an equality, $8 + 5h = 2 + 6h$; by simplifying the equation (by subtracting $5h$ from both sides and subtracting 2 from both sides) to isolate the variable, the result is $h = 6$. Choice (B) is incorrect and may result from incorrectly adding 2 to both sides instead of subtracting. Choice (C) is incorrect and results from simply adding all the given numbers: $8 + 5 + 2 + 6 = 21$. Choice (D) is incorrect and results from finding the dollar amount of the price quotes from either company.</p>



Number	Correct Answer	Explanation
9	B	<p><i>Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. (MCC8.F.3)</i></p> <p>The correct answer is Choice (B) $y = 64x + 12$ because the equation $y = 64x + 12$ is in the form of $y = mx + b$ and the graph would be a straight line. Choice (A) is not correct because the equation $y = 3x^2 - 5$ is not in the form of $y = mx + b$ and the graph would not be a straight line. Choice (C) is not correct because the equation $y = 8x^3 + 27$ is not in the form of $y = mx + b$ and the graph would not be a straight line. Choice (D) is not correct because the equation $y = \frac{15}{x} - 8$ is not the form of $y = mx + b$ and the graph would not be a straight line.</p>
10	A	<p><i>Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. (MCC8.SP.4)</i></p> <p>The correct answer is Choice (A) Students who play 4 sports are more likely to spend 2 to 5 hours on homework than students who play 1 sport because the relative frequency of 4 sports and 2 to 5 hours of homework is greater than the relative frequency of 1 sport and 2 to 5 hours on homework. The relative frequency of 4 sports in this category is $(6 \div 15) \times 100 = 40\%$ and the relative frequency of 1 sport in this category is $(6 \div 27) \times 100 = 22\%$. Choice (B) is not correct because the relative frequency of 4 sports and 5 to 10 hours of homework is 33% and the relative frequency of 3 sports and 5 to 10 hours of homework is 30%. Choice (C) is not correct because the relative frequency of 1 sport and less than 2 hours of homework rounds to 3.7% and the relative frequency of 3 sports and less than 2 hours of homework is 5%. Choice (D) is not correct because the relative frequency of 2 sports and 10 or more hours of homework is 25% and the relative frequency of 1 sport and 10 or more hours of homework rounds to 30%.</p>



Science

Students in Grade 8 work conceptually on the laws of physical science: conservation of matter and energy, motion, and forces. They use their observations to explain the difference between physical and chemical changes, to investigate relationships between force, mass, and the motion of objects, and to explore the wave nature of sound and electromagnetic radiation. Students at this grade level identify gravity, electricity, and magnetism as major forces acting in nature.

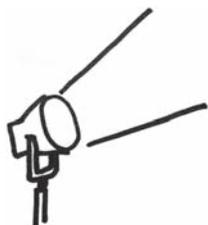
The Science activities focus on some of the concepts that are assessed on the Grade 8 CRCT Science domains. These domains are as follows:

- ❶ **Structure of Matter**
- ❷ **Force and Motion**
- ❸ **Energy and Its Transformations**

The *Characteristics of Science* skills are integrated throughout the domains. These skills are corequisites 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. Grade 8 students should be able to replicate investigations and compare results to find similarities and differences. At this grade level, the students should understand the importance of working safely.

Activities



1 Structure of Matter

Georgia Performance Standard S8P1

Within the Structure of Matter domain, students are expected to identify and demonstrate the Law of Conservation of Matter, use the Periodic Table of Elements, and distinguish between physical and chemical properties. Students are expected to recognize physical and chemical changes and understand the difference between atoms and molecules. Students should identify the signs of a chemical reaction and be able to differentiate between density and mass and pure substances and mixtures.

The following activities develop skills in this domain:

- To help students differentiate between physical and chemical properties, students will complete a number of experiments. Observations and data should be recorded in a chart like the example below:

Trial	Initial Observations	Final Observations	Type of Reaction	Result of the Experiment
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Experiment 1: Cut an apple and expose it to air for ten minutes.

Experiment 2: Mix $\frac{1}{2}$ cup of vinegar and a teaspoon of baking soda.

Experiment 3: Mix food coloring with a cup of water.

Experiment 4: Mix food coloring with a cup of water and add thirty drops of bleach to the solution.

Experiment 5: Put hydrogen peroxide (H_2O_2) on a cut apple.

Experiment 6: Mix salt and water together.

Students should be able to label each experiment as resulting in a physical or chemical change. They should also understand that color changes and the dissolving of a solute are not clear indicators of a chemical change.

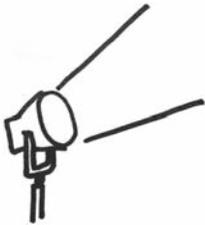
- To help students recognize the similarities and differences in elements, students will follow in the footsteps of Dmitri Mendeleev and create their own periodic table. Students will begin by using household items like fruits, vegetables, clothes, shoes, cleaning materials, and books to create a household periodic table. Students should create a way to arrange the items in groups and then as a whole with their classmates. After a class discussion on the methods used to create the household periodic table, students will consider the elements iron, aluminum, copper, neon, carbon, oxygen, gold, silver, fluorine, sodium, chlorine, calcium, nitrogen, and cobalt. On separate index cards, students should list each element, a description of its physical



and chemical properties, and the element's atomic number, all of which can be found on a periodic table. Students will then arrange the elements in a basic periodic table. Students should be methodical and group elements based on similarities and differences to create their own periodic table. After completion, students will compare their table to the standardized version and answer the following questions:

- *Are there any major differences between the two charts?*
 - *What characteristics did you use to create your table, and what characteristics did Mendeleev use to create the early standardized table?*
 - *Which characteristics seem the most important in grouping the elements? Why?*
- To explore the concept of conservation of matter, students will perform an experiment, paying close attention to mass before and after the experiment. Students will need a reliable scale, one balloon, water, a 2-liter soda bottle, and four antacid tablets. Students should separately measure the mass of the balloon, the 2-liter bottle $\frac{3}{4}$ full of water, and the four antacid tablets. Before performing the experiments, students should weigh the entire apparatus and record the data, and then students should predict the mass of the apparatus after the reaction. During the experiment, students should pay close attention to making clear and accurate records of the experiment. Students should then drop the antacid tablets into the bottle of water, quickly place the balloon over the top of the bottle, and hold it in place with tape. When the reaction has ended, students should immediately weigh the entire apparatus. After conducting the experiment, students will answer the questions below based on their observations:
- *What type of reaction occurred? What observations support your answer?*
 - *What types of products were made (color, phase, etc.)?*
 - *Did the mass change? What law does this result support?*
 - *If there was a change, what can account for this change?*
 - *Would the results be the same in an open system (i.e., repeating the experiment without the balloon)?*

Activities



② Force and Motion

Georgia Performance Standards S8P3 and S8P5

Within the Force and Motion domain, students are expected to investigate the relationship between force, mass, and motion. Terms like velocity and acceleration, gravity, inertia, and friction gain new meaning. The effect of simple machines upon work is examined. Forces acting in nature such as gravity, electricity, and magnetism are explored.

The following activities develop skills in this domain:

- To show how graphs can help students determine the relationship between velocity and acceleration, students will create graphs for the following scenarios. For each scenario, students should graph the scenarios with velocity (m/s) on the y-axis and time (s) on the x-axis. All movement is in a straight line.
 - You move a distance of 5 meters to the kitchen at a velocity of 3 m/s, pause for 3 seconds to retrieve a soda, and then walk back to the couch at a velocity of 1 m/s.
 - A bus driver drives 2 kilometers at a velocity of 30 km/hr to the first bus stop, pauses for 4 minutes to pick up passengers, and then drives 4 kilometers to the next stop at 40 km/hr.
 - A group runs 500 meters at a velocity of 8 km/hr and then stops for 3 minutes while getting their bikes ready. The group then bikes 6 km at a velocity of 14 km/hr to the finish line.

For each graph, students should circle any acceleration and box any deceleration during these activities. Students should then create their own scenarios and make their own graphs.

- To help students understand gravity, students will weigh themselves as if they were on other planets or celestial bodies. Students will complete the following chart by multiplying the students' mass by gravity, which will give the weight for each row. Students should use their weight on Earth as a baseline for mass, because scales on Earth convert weight to mass by using the average value of gravity on Earth which is 1.



Location	Mass	Average Acceleration of Gravity	Weight
Earth		1	
Earth's Moon		0.17	
Venus		0.91	
Mars		0.38	
Mercury		0.38	
Jupiter		2.54	
Saturn		1.08	
Uranus		0.91	
Neptune		1.19	
Pluto		0.06	
Sun		27.9	

After completion, students should answer the following questions:

- *How does gravity affect weight?*
 - *On which planets will you weigh the most and the least?*
 - *On which planet is gravity the strongest? Why?*
- To show how series and parallel circuits are created and work, students will use two D batteries, pieces of copper wire, two flashlight bulbs that work, and one flashlight bulb that does not work. Students will complete the following three tasks using only the starting materials. After each task, students should draw a diagram of each and label the circuit as series or parallel. In a series circuit, current moves in a loop without splitting, while in a parallel circuit the current splits when it reaches a point at which two or more wires connect.

Task 1: Using one battery, pieces of wire, and a working light bulb, make the light bulb light up.

Task 2: Using two batteries, pieces of wire, and a working light bulb, make the bulb shine brighter than in the first task.

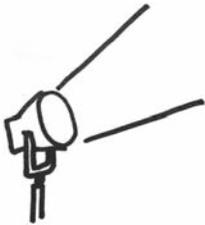
Task 3: Using two batteries, pieces of wire, and a working light bulb, make the bulb shine with the same brightness as in the first task.

Task 4: Using two batteries, pieces of wire, and two working light bulbs, make both the bulbs light up.

Task 5: Repeat the third task with one light bulb that does not work. What happens to the circuit?

After completion of the activity, students will create posters that include information on both circuit types. This information should include the circuit type, a diagram, and a brief description of how current runs through a circuit.

Activities



3 Energy and Its Transformations

Georgia Performance Standards S8P2 and S8P4

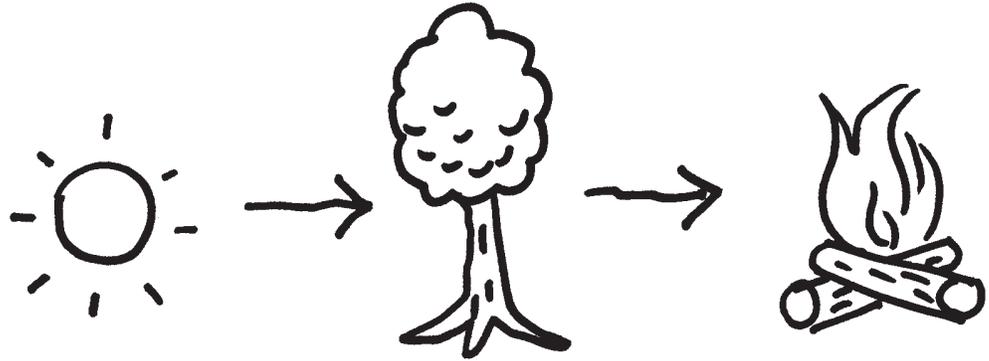
By the end of Grade 8, students should be able to identify the kinds of energy involved in common scenarios, explain energy transformations in terms of the Law of Conservation of Energy, trace different forms of energy through a given system, and distinguish between kinetic and potential energy. Heat flow is understood in terms of conduction, convection, and radiation. Mechanical and electromagnetic waves are defined, and properties of light and sound energy are explored.

The following activities develop skills in this domain:

- To help students understand the different types of energy, students will label the following scenarios with the correct type of energy.
 - Riding a bike
 - A light bulb
 - A gas fire
 - Computer speakers
 - A rosebush
 - A diver standing still at the edge of a diving board
 - A stretched spring

After completion of the list, students should pick two scenarios from the list above to compare and contrast. Students should create a Venn diagram with two circles, one circle labeled with the first scenario and the other circle labeled with the second scenario. Students will fill in the corresponding circles with information about each type of energy. The space shared by both circles (the intersection) should include information common to both scenarios. After completion of the Venn diagram, students should create posters with illustrations that sum up the differences and similarities between the two types of energy.

- To help students understand energy transformation in terms of the Law of Conservation of Energy, students will create energy chains for basic transformations. An energy chain is an illustrated step-by-step accounting of energy transformation for a process, like a cartoon strip. An example of an energy chain is the burning of biomass, such as wood:



Heat and light energy from the Sun is transferred to trees during photosynthesis and stored as chemical energy. The chemical energy is released during burning of the wood, and it is transformed into heat and light energy.

Students will create energy chains for the following scenarios:

- Fossil fuels
 - Biomass in the form of dung
 - Wind power
 - Wave power
 - Solar power
- To help students visualize the electromagnetic spectrum, students should conduct research and create poster board replicas of the electromagnetic spectrum. Students should use white poster board, the Internet or a textbook, and markers to create the spectrum. During their research, students may also use the chart below to record data about the parts of the electromagnetic spectrum.

Types of Radiation	Frequency Range	Wavelength Range	Sources of the Waves	Energy Levels of Radiation	Application of Waves
Radio					
Microwaves					
Infrared					
Visible					
Ultraviolet					
X-ray					

After completion of the chart, students should combine research to create the electromagnetic spectrum. They should make sure that the chart is aligned to both the frequency and wavelength ranges of the types of



radiation, as well as the application of the types of waves. Students should answer the following questions after completion of the entire activity:

- *In what part of the spectrum can you see colors?*
- *What type of radiation gives humans a suntan?*
- *What types of electromagnetic radiation have the highest and lowest energy?*
- *What types of radiation are used to diagnose human health problems?*
- *What is the relationship between wavelength and frequency?*



Practice Quiz



- 1 **A student lights a candle and the wax begins to melt.**

Which statement describes the movement of the particles as the solid candle melts to a liquid?

- A The particles move faster and farther apart.
- B The particles move slower and farther apart.
- C The particles move faster and closer together.
- D The particles move slower and closer together.

- 2 **A student adds 5 grams of vinegar to 7 grams of baking soda in a sealed container. Then he watches the chemical reaction that occurs.**

Which of these predicts the mass of the materials in the container after the reaction is complete?

- A 0 grams
- B 2 grams
- C 12 grams
- D 35 grams

- 3 **A student is riding a roller coaster. The roller coaster moves up a hill slowly and then starts to move faster as it goes toward the bottom of the hill.**

Where on the hill will the student have the MOST kinetic energy?

- A halfway up the hill
- B at the top of the hill
- C halfway down the hill
- D at the bottom of the hill

- 4 **A teacher demonstrates a chemical reaction for the class.**

Which of these would NOT show evidence that a chemical reaction has occurred?

- A change in color
- B change in shape
- C formation of a gas
- D formation of a precipitate

- 5 **Which of these sets of objects will have the GREATEST gravitational attraction between them?**

- A two 1-kilogram objects 1 meter apart
- B two 1000-kilogram objects 1 meter apart
- C two 1-kilogram objects 1000 meters apart
- D two 1000-kilogram objects 1000 meters apart



6 **Which of these statements is NOT true about both mechanical and electromagnetic waves?**

- A Both types of waves carry energy.
- B Both types of waves need a medium to travel.
- C Both types of waves can have a variety of frequencies.
- D Both types of waves can be described by their wavelengths.

7 **Which of these describes an object with the LARGEST acceleration?**

- A an object with a small change in velocity over a small change in time
- B an object with a small change in velocity over a large change in time
- C an object with a large change in velocity over a small change in time
- D an object with a large change in velocity over a large change in time

8 **Ms. Lee heats a pot of water on her stove. Water heated at the bottom of the pot flows to the top of the pot. The cooler water at the top sinks. As the water moves, heat flows from the hotter water to the cooler water.**

Which of these terms describes this method of heat transfer?

- A conduction
- B convection
- C emission
- D radiation

9 **A student has an aquarium filled with water. Light shines through the window and into the aquarium.**

Which of these describes how the light wave will MOST LIKELY change as it moves from air into water?

- A The light wave will be absorbed.
- B The light wave will be diffracted.
- C The light wave will be reflected.
- D The light wave will be refracted.

10 **A student is investigating a substance to determine what it is made of. He studies the physical and chemical properties of the substance.**

Which of these properties of the substance is a chemical property?

- A the melting point of the substance
- B how easily the substance bends
- C how well the substance burns
- D the density of the substance

Solutions

Number	Correct Answer	Explanation
1	A	<p><i>Describe the movement of particles in solids, liquids, gases, and plasma states. (S8P1c)</i></p> <p>The correct answer is Choice (A) The particles move faster and farther apart. As the candle melts, particles gain in kinetic energy, move faster, and collide more frequently, which moves particles away from each other. Choice (B) is incorrect because it states that the particles move slower. Choice (C) is incorrect because it states that the particles move closer together. Choice (D) is incorrect because it is the opposite of the correct answer.</p>
2	C	<p><i>Identify and demonstrate the Law of Conservation of Matter. (S8P1g)</i></p> <p>The correct answer is Choice (C) 12 grams. The sum of the mass of the vinegar and baking soda (12 grams) will not change after the reaction is complete because there is no loss or gain of mass in a closed chemical reaction, in accordance with the Law of Conservation of Matter. Choices (A) and (B) are incorrect because mass decreases, and Choice (D) is incorrect because mass increases.</p>
3	D	<p><i>Explain the relationship between potential and kinetic energy. (S8P2b)</i></p> <p>The correct answer is Choice (D) at the bottom of the hill. The kinetic energy of the cars will be the greatest at the bottom of the hill, when the cars have used up their potential energy and reached their greatest speed. Choices (A) and (C) are incorrect because the roller coaster cars will not have the greatest amount of kinetic energy at the halfway point. Choice (B) is incorrect because the roller coaster cars have the least kinetic energy at the top of the hill.</p>

Number	Correct Answer	Explanation
4	B	<p><i>Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color). (S8P1e)</i></p> <p>The correct answer is Choice (B) change in shape. Change in shape is a physical change, so it does not alter chemical composition. Choices (A), (C), and (D) are incorrect because they are all examples of chemical change.</p>
5	B	<p><i>Recognize that every object exerts gravitational force on every other object, and that the force exerted depends on how much mass the objects have and how far apart they are. (S8P5a)</i></p> <p>The correct answer is Choice (B) two 1000-kilogram objects 1 meter apart. Gravitational attraction increases directly with the increase in mass and decreases with the increase in distance. Choice (A) is incorrect because the objects have less mass at the same distance. Choice (C) is incorrect because the objects have less mass at the greater distance, so this is the choice with the least gravitational attraction. Choice (D) is incorrect because the distance is greater.</p>
6	B	<p><i>Identify the characteristics of electromagnetic and mechanical waves. (S8P4a)</i></p> <p>The correct answer is Choice (B) Both types of waves need a medium to travel. Mechanical waves require a material medium to transfer energy, but electromagnetic waves travel through space and do not require a medium. Choices (A), (C), and (D) are incorrect because both types of waves carry energy, have a variety of frequencies, and can be described by their wavelengths.</p>



Number	Correct Answer	Explanation
7	C	<p><i>Determine the relationship between velocity and acceleration. (S8P3a)</i></p> <p>The correct answer is Choice (C) an object with a large change in velocity over a small change in time. Acceleration is dependent on how quickly there is a change in velocity [$a = (v - v_0)/t$]. A large change in velocity over a small period of time will have the highest acceleration. Choices (A), (B), and (D) are incorrect because they represent slower rates of acceleration.</p>
8	B	<p><i>Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection). (S8P2d)</i></p> <p>The correct answer is Choice (B) convection. When part of a fluid expands due to heating, its density is reduced relative to the rest of the water in the pot, so the heated water rises. Heat is transferred between the heated water and the cooler water through this movement. Choices (A), (C), and (D) are incorrect because they refer to different methods of transfer.</p>
9	D	<p><i>Describe how the behavior of light waves is manipulated, causing reflection, refraction, diffraction, and absorption. (S8P4b)</i></p> <p>The correct answer is Choice (D) The light wave will be refracted. Since water is denser than air, light waves slow down as they enter water, causing light waves to bend or refract. Choices (A), (B), and (C) are incorrect because they represent how light waves interact in different situations.</p>
10	C	<p><i>Distinguish between physical and chemical properties of matter as physical (i.e. density, melting point, boiling point) or chemical (i.e., reactivity, combustibility). (S8P1d)</i></p> <p>The correct answer is Choice (C) how well the substance burns. Combustion is a chemical property because it indicates a chemical change that a substance can undergo. Choices (A), (B), and (D) are incorrect because they represent physical properties.</p>



Social Studies

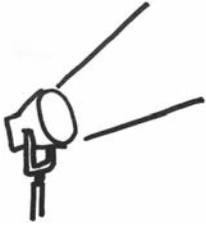
In Grade 8, students study Georgia history, geography, government, and economics. While the four state domains are interwoven, ample opportunity is also provided for in-depth study of Georgia history and the government of Georgia. While U.S. historical events are included to help students understand the impact of those events on Georgia and to help students understand Georgia's role in the history of the United States, the focus is on Georgia.

The Social Studies activities focus on some of the topics assessed on the Grade 8 CRCT Social Studies domains. These domains are as follows:

- ❶ **History**
- ❷ **Geography**
- ❸ **Government/Civics**
- ❹ **Economics**



Activities



1 History

Georgia Performance Standards SS8H1, SS8H2, SS8H3, SS8H4, SS8H5, SS8H6, SS8H7, SS8H8, SS8H9, SS8H10, SS8H11, and SS8H12

In order for students to fully appreciate Georgia's place in modern United States history, it is necessary for them to gain an understanding of Georgia's role in and contributions to American history. The main focus of this domain is the history of the state of Georgia. Although students will examine past culture and heritage, it is important that they demonstrate an ability to analyze and evaluate the impact of historical figures and events and how they shape and define contemporary economic, political, and social conditions in Georgia. While the History domain traces people and events from the development of Native American cultures to modern times, the primary emphasis is on the period from the Civil War to the present.

The following activities develop skills in this domain:

- To better understand the colonial period of Georgia's history, students should organize an illustrated and annotated timeline. Students will use a large sheet of poster board to organize the elements chronologically, providing an illustration to highlight each element included in the timeline. Students will divide the timeline into four sections and label them *European Exploration*, *The Founding of Georgia*, *The Trustee Period*, and *Georgia as a Royal Colony*. For each time period, two events which help to define Georgia's development should be chosen. Students should attach a short paragraph describing the impact of those events on the specific time period. Finally, students should write a paragraph in which they analyze the events depicted on the timeline and explain their consequences on the overall development of Georgia during this time period.
- To ensure they understand the important developments in Georgia between 1789 and 1840, students should use a series of graphic organizers to illustrate the significance of key developments and practices in Georgia during this time period.
 - Graphic Organizer #1. Compare and contrast the effect on Georgia of the establishment, growth, and development of the Baptist and Methodist churches.
 - Graphic Organizer #2. Compare and contrast the method and results of the headright system and the land lotteries in the growth of Georgia.
 - Graphic Organizer #3. Compare and contrast similarities and differences between the effects of the cotton gin and railroads on the growth of Georgia separately, and then analyze the two developments when considered together.



- Graphic Organizer #4. Identify key individuals and events that led to the removal of the Creeks and Cherokees from Georgia. Analyze the importance of each individual or event included in your organizer.

- To better understand the key political, social, and economic changes that occurred in Georgia between the years of 1877 and 1918, students should create a series of informational flyers or foldables. Each flyer or foldable will have three parts. Part 1 will define a particular issue and identify key people related to that issue. Part 2 will describe how the issue affected Georgia and the nation at the time, as well as the role played by the people identified in Part 1. Part 3 will analyze the long-term impact on Georgia and the world. Students will choose four topics from among the following: *the Bourbon Triumvirate, the International Cotton Expositions, the Populist movement, the 1906 Atlanta riot, the Leo Frank Case, the county unit system, disenfranchisement, racial violence, Jim Crow laws, and Plessy v. Ferguson*. Once students have completed all four flyers or foldables, students will choose one of the issues and write a two-page essay that evaluates and explains the issue's immediate impact as well as the lasting influence on Georgia.

- Students will better understand important events in Georgia that occurred after World War I by writing investigative newspaper articles dealing with the four issues listed below from this era. Students should take on the role of a period journalist, using the Internet or library resources to research the topics. Keeping in mind the audience of newspaper readers of the period, students should write articles that address the elements of each issue that would have been most important to their audience. After writing the four articles, the students will then write a short essay analyzing the effect the four topics had on Georgia separately as well as collectively.
 - *The effect of the boll weevil and the drought on Georgia agriculture*
 - *Economic factors that helped lead to the Great Depression*
 - *The impact of the political career of Eugene Talmadge*
 - *New Deal programs (e.g., Civilian Conservation Corps, Agricultural Adjustment Act, rural electrification, Social Security) and their effects on Georgia*



Activities



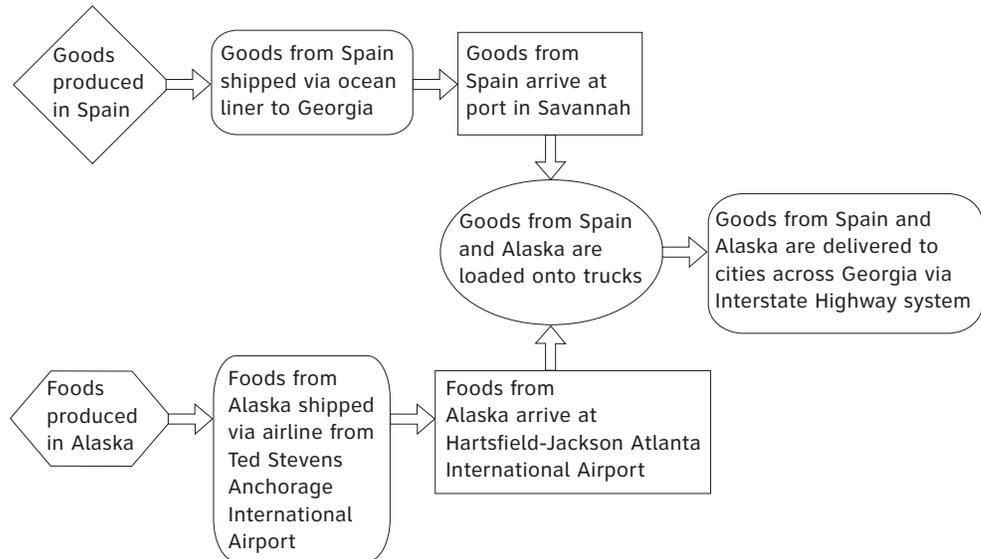
2 Geography

Georgia Performance Standards SS8G1 and SS8G2

The focus of the Grade 8 Geography domain is to examine the influence of location and physical features as they relate to economic growth and development in the state of Georgia. By the end of Grade 8, students should be able to demonstrate knowledge and understanding of Georgia's location relative to the nation, continent, and Western Hemisphere. They should also be able to demonstrate knowledge and understanding of important physical features of Georgia, including climate, and the effect these features have on transportation, trade, and jobs.

The following activities develop skills in this domain:

- To help students understand the physical features and location of Georgia, students will create a map of the state and investigate its five geographic regions. Students will draw the map on poster board and call attention to the different areas covered by each of the five regions with highlighters or colored pencils. In each region, students will identify distinctive geographical features that distinguish it from the other regions. Students will attach information to the map indicating how each region extends beyond the borders of Georgia. They should describe the impact of each region on the development of the state and surrounding areas. The students should include important agricultural and industrial features whose origins can be traced to the physical features of the region. Cities whose establishment can be credited to the physical characteristics of the region should also be identified on the map. Finally, students should choose one region and present their findings using the map as a visual resource.
- To help students explain how transportation systems interact to contribute to Georgia's economy, students will develop a flow chart. Students should highlight the connections among the state's four major transportation systems: Interstate Highway System, Hartsfield-Jackson Atlanta International Airport, Georgia's deepwater ports, and the railroads. They will track the route of a product created in a state other than Georgia, as well as the route of a product created outside the United States (see sample flow chart on the next page). To help reinforce the importance of these transportation systems to Georgia's economy, students will then add additional shapes to the flow chart at appropriate points to identify and describe jobs created as a response to the growing needs of the four transportation systems.



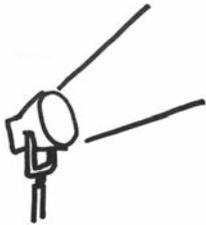
- To help students understand the impact of climate on Georgia’s development, students will write a speech to persuade a target audience that Georgia has favorable climate conditions for tourism and business. The speech should define the appropriate target audience—either tourists or business owners—and address one of the following question sets in detail. Students should also create a visual display to which they will refer while presenting the speech in front of the class, highlighting the locations of major industrial areas, farming regions, or major tourist attractions.
 - What climate conditions make Georgia a suitable location for crop and livestock production, and what effects have these conditions had on the state’s economic and social development? Briefly trace the history of crop and livestock production in Georgia with an emphasis on how the climate of Georgia affected the choices early producers made about what to produce and how the climate affects production choices today as well.
 - How does the climate of Georgia affect tourism in the state, and what is the impact of tourism on the state’s economy? The focus of the speech should be on the impact of climate-related tourism in the state and how this impact has made Georgia a more desirable location to visit. The growth of small business and the economic impact on the state and local communities should be discussed in the speech.
 - What impact does the climate of Georgia have on the state’s ability to attract and keep businesses of all sizes? The focus of the speech should be on the advantages that climate offers Georgia when it comes to attracting companies to the state. Discuss not only the initial advantages but the overall advantages of locating to and remaining in Georgia.



-
- What impact has climate had on the development of Georgia’s primary industries (raising crops and livestock, forestry, mining, and fishing) and the subsequent growth of manufacturing and service industries in the state? The focus of this speech should be on the interdependence and interrelationships between the primary, manufacturing, and service industries, and the role of Georgia’s climate in the growth and development of each.



Activities



3 Government/Civics

Georgia Performance Standards SS8CG1, SS8CG2, SS8CG3, SS8CG4, SS8CG5, and SS8CG6

The focus of the Grade 8 Government/Civics domain is the process of government in the state of Georgia and the political role of citizens under its constitution. For citizens to participate in the political process and fulfill their civic responsibilities, it is important that they acquire knowledge and understanding of the political and legal structures and institutions that govern their state. By the end of Grade 8, students should be able to demonstrate knowledge and understanding of their civic rights and responsibility to participate in the political process (voting, joining political parties, running for public office, etc.). They must also be able to demonstrate knowledge and understanding of the legislative, executive, and judicial structures and processes of state government, the role of local government, and the justice system as it relates to juvenile offenders.

The following activities develop skills in this domain:

- After learning how Georgia’s constitution provides for political participation by its citizens, students will create an album reflecting this process at work. Students will be divided into three groups. The first group will focus on current events, the second group will concentrate on the revolutionary era, and the third group will focus on the civil rights movement of the 1950s and 1960s. Each group should collect newspaper articles, magazine articles, or photographs that demonstrate five different ways citizens of Georgia participate in the political process, such as voting, peaceful protests, participating in political parties, campaigning, running for public office, etc. Students in each group will write a short essay describing the activity in each source example, explaining the rights at play, and defending the importance of this type of political participation. After reading the essays to the class, students will then compare and contrast the examples of political participation throughout history and analyze the impact of this participation on the development of Georgia.
- To help the students analyze the role of the legislative branch in Georgia’s state government, students will research the process a bill follows to become a law and form a mock General Assembly to carry out the process. First, students should study the organization and role of the state legislature. Next, students should create a flow chart to illustrate the steps a bill must take to become a law. At each step in the process, students should include in the flow chart events that could halt the bill’s progress, as well as what is required to keep the bill moving forward. As students work, ask guiding questions such as, *What are the qualifications and duties of the members of the General Assembly?* and *Who leads the General Assembly and how does the committee system work?* After students have completed their research,

they should create a bill for consideration in the legislature. Using the flow chart they created earlier, the students should then describe the steps their bill would take, including specific committees it would have to pass through. Students will then plan and execute a mock General Assembly to carry out the process a bill would follow through the legislative branch in Georgia’s state government in order to become a law.

- Students will analyze the distinct functions and purposes of the three basic forms of municipal government in Georgia by using a chart to compare and contrast their characteristics. Students will create a chart following the sample below. The columns distinguish the three municipal government forms, and the rows direct student research into the specific roles and characteristics within each type of government. Students should use the results of their research to fill in each box on the chart. They will then split into three groups for a debate. Each group will select one of the three municipal governments and argue the advantages of this form of government, analyzing why their chosen government is best suited to serve the needs of a city of a particular size.

	Strong Mayor-Council	Weak Mayor-Council	Council-Manager
Role of Mayor			
Role of City Council			
Special features of this government			
Strength(s) of this government			
Weakness(es) of this government			

- To help students understand the juvenile justice system, students will perform a skit **under careful guidance** from a teacher or parent, demonstrating how the legal process works in the case of juvenile offenders. Students will choose an act that would have them tried either as a delinquent juvenile or as an unruly juvenile or status offender. Students will then be paired up with a classmate or a family member. In this activity, a teacher or parent will play the role of the police officer or authority figure, while the students assume the role of the juvenile offenders. The process should reflect all steps from the time juvenile is taken into custody through the adjudication and disposition of the case. The skit should address one of the following important issues:



- Delinquent behaviors vs. unruly behaviors and possible consequences of each
- Rights of juveniles when taken into custody
- Steps in the juvenile justice process



Activities



4 Economics

Georgia Performance Standards SS8E1, SS8E2, SS8E3, SS8E4, and SS8E5

The Grade 8 Economics domain focuses on the various factors that have influenced and shaped Georgia's economic growth and development. While the focus is on the modern time period, consideration will be given to past developments. After tracing previous economic trends and developments, connections and links to the modern era can be better understood. By the end of Grade 8, students should be able to demonstrate knowledge and understanding of the importance of both domestic and international trade to Georgia's economic growth and development. Students should also know and understand the role of the entrepreneur through the investment of resources, and the risks associated with these investments, to generate economic growth and productivity. Finally, students will be expected to know and understand revenue sources available to both state and local governments to finance various public services (for example, sales taxes, federal grants, personal income taxes, and property taxes).

The following activities develop skills in this domain:

- Students will better understand personal money management by tracking projected income, spending, and savings over a one-month period. First, students will choose a familiar profession they are interested in, such as a teacher, accountant, radiologist, welder, researcher, or programmer. Then students should do research to determine the average salary for this profession in their area using Internet resources or reference books. Based on the salary, students should calculate a projected monthly income before and after taxes. Provide scenarios for each student so they can estimate their monthly expenses. For instance, some students will have new cars, others older cars; some will live in small apartments, some will live in larger (more expensive) homes; some will live alone, others may have (a) roommate(s) to share expenses; some students will live within a few miles of their jobs, others will have to travel long distances (30 miles or more). Once each scenario has been assigned, students will do research using the Internet and newspapers to determine their monthly expenses. Students should project savings and expenditures based on this research and use a spreadsheet or chart to track the following items:
 - Salary
 - Other income
 - Rent or mortgage payments
 - Property taxes and insurance
 - Utilities (electric, gas/heating oil, telephone, cell phone, cable TV, Internet service, etc.)
 - Health insurance (medical, dental, vision) and medications
 - Auto payments, fuel, maintenance, parking/tolls, and insurance



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- Public transportation
 - Groceries and eating out
 - Student loans
 - Childcare
 - Entertainment

Students should answer the following questions as a follow-up to their money management experiment:

- *Looking at your money management record, how much money will you have that can be saved at the end of each month?*
 - *Does your projected income allow you to live the way you want? If not, what changes might you have to make?*
 - *Can you think of ways to save money for something you really want to buy?*
 - *Did you identify expenses you did not expect? How might you be able to handle such expenses?*
- To help students understand how the four transportation systems (the Interstate Highway System, Hartsfield-Jackson Atlanta International Airport, Georgia's deepwater ports, and the railroads) contribute to Georgia's role in trade, split students up into four groups and assign each group of students one system of transportation. Students will research how the system they were assigned affects trade in the state. Students should conduct this research using grade-appropriate materials and websites (.edu, .gov, or .org).

They should be able to answer the following questions:

- *What type of trade is conducted using this system of transportation?*
- *How does this transportation system affect Georgia's role in trade within the United States and within the world?*
- *How has this transportation system helped to promote free trade?*

Using their findings, each student group will produce a poster or advertisement describing the benefits of their transportation system on trade in Georgia and will present their findings to the class. Conclude the activity with a discussion about how Georgia's role in trade has changed over time.

- To help students understand the importance of entrepreneurship to Georgia's economic growth and development, students will interview local entrepreneurs who have founded both large and small businesses. Students' questions should focus on gaining insight into the decision-making process necessary for starting a business, as well as risks, costs, and contributions made by new businesses in local and surrounding communities. After interviewing the entrepreneurs and researching the economic impact of the various businesses on their communities, students should analyze the information and report back to their classmates. Students should include



a description of how both large and small businesses each impact the community.

Students should ask questions during the interview including, but not limited to, the following:

- What was the main reason you decided to start your own business?
- What need in the community did your business meet?
- How is your business affected by the community in which it is located? How might it be different if it were in a different community?
- Can you explain the process of getting a business started, including permits, buying property, and hiring employees?
- What difficulties did you encounter during this process?
- How did the community respond to your business?
- What, if any, changes have you made to adapt to the changing demands of the community?
- How do you compete with other businesses, especially larger ones, that provide the same service?
- What costs, financial or otherwise, were involved?
- What risks did you have to take, and what rewards have you reaped?
- How does your business contribute to the community's economic growth?

Finally, students should create a business plan for a fictional business of their choice. Students should use a chart to analyze the costs of starting a new business, list possible risks they would face as entrepreneurs, and explain how their business would affect the surrounding community.

- To help students understand the types of goods and services produced and traded by Georgians during different historical time periods, students will work together in small groups researching the Internet (.edu, .gov, or .org websites), encyclopedias, textbooks, and other grade-level appropriate materials on this topic. Each group will be assigned one time period and will need to complete all columns of the applicable row of the chart on the next page.



What goods and services were produced in Georgia?	Why were these particular goods and services produced at this time?	Who did Georgians trade these goods and services with?	What kinds of things did Georgians need to import during this time period?	Why did Georgians need to import these particular things?
Colonial Era, 1733–1775				
Revolution and Early Republic, 1775–1800				
Antebellum Era, 1800–1860				
Civil War and Reconstruction, 1861–1877				
Late Nineteenth Century, 1877–1900				
Progressive Era to World War II, 1900–1945				
Civil Rights and Sunbelt Georgia, 1945–1990				

After the groups complete their research, students will write a group report about each particular time period using all of the information they gathered in the chart. Then the groups will present their reports to the rest of the class. As the reports are given, the other students will complete their individual charts for each time period. When completed, these charts will help them review the economic history for all time periods in the state of Georgia. As a follow-up activity, students will spend time in pairs quizzing each other on the information contained in the charts.



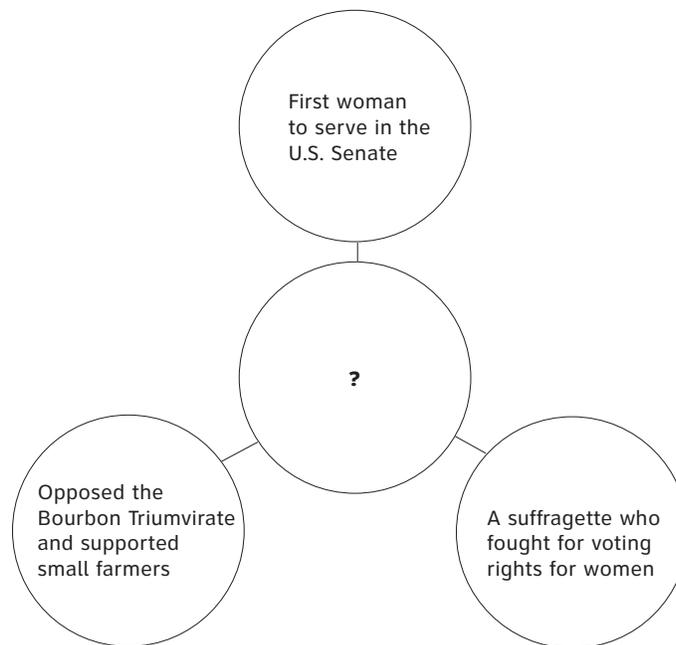
Practice Quiz



- 1 Which condition in England inspired James Oglethorpe to plan a colony in Georgia?**
 - A The government was too strict in England.
 - B There was a large number of debtors in England.
 - C There was very little available farmland in England.
 - D The black plague was claiming many lives in England.

- 2 What was the purpose of the land lotteries?**
 - A to provide land for the Native Americans to settle
 - B to set aside acreage for national parks and wildlife
 - C to allow wealthy families to purchase large tracts of land
 - D to encourage a large number of families to settle the Georgia frontier

- 3 Which name goes in the center circle of this graphic organizer?**



- A Nancy Hart
- B Mary Musgrove
- C Lugenia Burns Hope
- D Rebecca Latimer Felton



- 4 **Which of these factors played a major role in Georgia's farming crisis during the 1920s?**
- A cold weather
 - B the cotton gin
 - C the gray locust
 - D the boll weevil

- 5 **Which number marks the location of the Savannah River?**

Some Rivers of Georgia



- A 1
- B 2
- C 3
- D 4

- 6 **How did Georgia's Fall Line encourage industrial growth in the 1800s?**
- A Its forests provided trees for the timber industry.
 - B Its rapid rivers provided water power for industrial plants.
 - C Its deep-sea ports made it easy for industries to ship goods.
 - D Its high mountains and scenic beauty promoted the tourism industry.
- 7 **In the Georgia General Assembly, who presides over the Senate?**
- A Governor
 - B Majority Whip
 - C Minority Leader
 - D Lieutenant Governor



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- 8 **Which of these occurs after a bill is approved by both houses of the Georgia General Assembly?**
- A The president of the United States reviews the bill.
 - B The governor either signs the bill into law or vetoes it.
 - C The judicial branch sends the bill to the Supreme Court.
 - D The citizens of the state vote on the bill in the next primary.
- 9 **Which of these is a function of a special-purpose government in Georgia?**
- A conducting trials
 - B appointing a mayor
 - C enforcing state laws
 - D operating an airport
- 10 **A student is organizing his finances. He has drawn a chart with four columns labeled *income*, *spending*, *credit*, and *saving*.**

Which of these belongs in the *credit* column?

- A interest earned
- B loan from a bank
- C wages from a job
- D purchase of stocks



Solutions

Number	Correct Answer	Explanation
1	B	<p><i>Explain the importance of James Oglethorpe, the Charter of 1732, reasons for settlement (charity, economics, and defense), Tomochichi, Mary Musgrove, and the city of Savannah. (SS8H2a)</i></p> <p>The correct answer is Choice (B) There was a large number of debtors in England. The primary purpose behind the settlement of Georgia was James Oglethorpe’s interest in establishing a colony for English debtors. Choices (A), (C), and (D) are incorrect because they all list reasons unrelated to the settlement of Georgia, though they do list reasons for the settlement of other areas in the United States.</p>
2	D	<p><i>Evaluate the impact of land policies pursued by Georgia; include the headright system, land lotteries, and the Yazoo land fraud. (SS8H5b)</i></p> <p>The correct answer is Choice (D) to encourage a large number of families to settle the Georgia frontier. Throughout the late 17th and early 18th centuries, the state of Georgia sponsored several land lotteries to make its western lands more economically viable. These lotteries helped facilitate the removal of eastern tribes from the interior and southeast, thereby extending state jurisdiction over these lands. This was done to meet the demand for arable land and to promote economic growth. Choice (A) is incorrect because land was actually taken away from Native Americans. Choice (B) is incorrect because the land was used for people to settle, not for creating parks. Choice (C) is incorrect because the land was utilized by common citizens of Georgia as well as the wealthy.</p>



Number	Correct Answer	Explanation
3	D	<p><i>Evaluate the impact the Bourbon Triumvirate, Henry Grady, International Cotton Exposition, Tom Watson and the Populists, Rebecca Latimer Felton, the 1906 Atlanta Riot, the Leo Frank Case, and the county unit system had on Georgia during this period. (SSH8H7a)</i></p> <p>The correct answer is Choice (D) Rebecca Latimer Felton. She was the first woman to serve in the U.S. Senate. Her greatest impact was her influence in promoting women’s right to vote. Choices (A), (B), and (C) are incorrect because they were a woman in the militia, an interpreter for James Oglethorpe, and an African-American social reformer, respectively.</p>
4	D	<p><i>Describe the impact of the boll weevil and drought on Georgia. (SS8H8a)</i></p> <p>The correct answer is Choice (D) the boll weevil. It is a well-documented fact that boll weevil infestation devastated cotton production throughout the South during the 1920s. Choices (A), (B), and (C) did not play major roles in the farming crisis in Georgia during the 1920s.</p>
5	D	<p><i>Locate and evaluate the importance of key physical features on the development of Georgia; include the Fall Line, Okefenokee Swamp, Appalachian Mountains, Chattahoochee and Savannah Rivers, and barrier islands. (SS8G1c)</i></p> <p>The correct answer is Choice (D) 4. The Savannah River makes up the majority of the boundary between Georgia and South Carolina. Choices (A), (B), and (C) are incorrect because they label the Flint, Satilla, and the Altamaha Rivers, respectively.</p>



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6	B	<p><i>Locate and evaluate the importance of key physical features on the development of Georgia; include the Fall Line, Okefenokee Swamp, Appalachian Mountains, Chattahoochee and Savannah Rivers, and barrier islands. (SS8G1c)</i></p> <p>The correct answer is Choice (B) Its rapid rivers provided water power for industrial plants. The Fall Line is a region in Georgia where rivers and streams run across resistant rock formations that create waterfalls. The water pressure from the waterfalls is used to provide power for nearby industrial plants. Choice (A) is incorrect because the Fall Line did not help the lumber industry. Choice (C) is incorrect because the Fall Line is not located near the coast of Georgia and did not affect the shipment of goods. Choice (D) is incorrect because, although high mountains and scenic beauty may have encouraged tourism, growth in the tourism industry did not encourage industrial growth.</p>
7	D	<p><i>Describe the organization of the General Assembly, with emphasis on leadership and the committee system. (SS8CG2b)</i></p> <p>The correct answer is Choice (D) Lieutenant Governor. The responsibility of presiding over the state Senate was one of the roles of the Lieutenant Governor when the office was created in the 1945 revision of the Georgia Constitution. Choices (A), (B), and (C) are incorrect because all play different roles in Georgia's government that are not directly related to the authority of the Senate.</p>

Number	Correct Answer	Explanation
8	B	<p><i>Evaluate how the legislative branch fulfills its role as the lawmaking body for the state of Georgia. (SS8CG2c)</i></p> <p>The correct answer is Choice (B) The governor either signs the bill into law or vetoes it. According to Article III, section V, paragraph XIII of the Georgia State Constitution, once a bill has been approved by both houses of the General Assembly, the governor has the option to sign it into law or veto the bill. Choice (A) is incorrect because the president of the United States is not involved in approval of state laws. Choice (C) is incorrect because the judicial branch has nothing to do with passing laws. Choice (D) is incorrect because the citizens are not involved in this step of proposing or making laws.</p>
9	D	<p><i>Describe the functions of special-purpose governments. (SS8CG5c)</i></p> <p>The correct answer is Choice (D) operating an airport. Operating an airport is the function of a special-purpose government because most airports are owned by state or local governments and are leased to private corporations. Choices (A), (B), and (C) list functions of other government branches. Conducting trials, appointing individuals to office, and enforcing state laws are all standard functions of state, county, and city governments in Georgia.</p>
10	B	<p><i>The student will explain personal money management choices in terms of income, spending, credit, saving, and investing. (SS8E5)</i></p> <p>The correct answer is Choice (B) loan from a bank. The money obtained through a bank loan becomes a credit in the account of the person who secured the loan. Choice (A) is incorrect because interest is earned on an account such as savings or an investment. Choice (C) is incorrect because wages from a job is money earned and has nothing to do with credit. Choice (D) is incorrect because purchasing stocks is an investment.</p>

