



A L T E R N A T E

***Alabama Comprehensive Assessment
Program (ACAP) Alternate***

Item Specifications

**Science
Grade 11**

***Alabama Comprehensive Assessment Program
(ACAP) Alternate***

Item Specifications

Science

The *Alabama Comprehensive Assessment Program (ACAP) Alternate* item specifications are based on the development of alternate assessments that measure the 2018 *Alabama Alternate Achievement Standards: Science*. The item specifications define the purpose of the *ACAP Alternate* and provide important information regarding the content to be measured. The item specifications also serve as a road map to guide Alabama educators in the development and subsequent review of items that best measure the 2018 *Alabama Alternate Achievement Standards* for a given grade and subject area. Each item specification is aligned to the given Alabama content area, domain, and standard and includes the following key information:

- Course of Study Standard
- Alternate Achievement Standard
- Content limits/constraints
- Recommended depth of knowledge (DOK) or cognitive levels
- Sample item stem information

The appendix to this document includes sample test items, along with information about each item, including item type, page reference, alignment, depth of knowledge, and answer key. These sample items are provided to be an additional resource for educators to help guide instruction and assessment-building in the classroom. Teachers can use the sample items as models when leading classroom discussion and when creating items for classroom tests or quizzes. In each sample item, the level of rigor needed in the item to align with the content standard is evident.

Definitions

Course of Study Standards: The Course of Study Standards are a set of content curriculum statements that define what general education students should know and be able to do at a given grade level.

Alternate Achievement Standards: The 2018 *Alabama Alternate Achievement Standards: Science* are directly aligned to the Alabama Course of Study Standards. The 2018 *Alabama Alternate Achievement Standards: Science* define what students with the most significant support needs should understand (know) and be able to do at the conclusion of a course or grade.

Alabama Content Areas: Alabama content areas are large groups of related clusters and content standards. Because science is a connected subject, standards from different Alabama content areas may sometimes be closely related.

Standards: Standards define what students should understand (know) and be able to do at the conclusion of a course or grade.

Assessment Limits/Content Constraints: Assessment limits and/or content constraints define the range of content knowledge and the degree of difficulty allowable when items are written to measure a given standard.

Depth of Knowledge (DOK): Depth of knowledge involves the cognitive complexity or the nature of thinking required for a given item. Depth of knowledge levels are used in the development of items for cognitive demand. Therefore, when developing items for depth of knowledge, each item should be as demanding cognitively as what the actual standard expects. The depth of knowledge includes three levels, from the lowest (basic recall) to the highest (strategic thinking).

The *ACAP Alternate* assessment items are written to one of three levels of cognitive complexity:

- Level 1: Recall
- Level 2: Application of a Skill/Concept
- Level 3: Strategic Thinking

Item Types: The *ACAP Alternate* assessments are composed of various item types. These item types are described in the following section.

Context: Context provides information regarding the types of stimulus materials that can be used in items. If context is allowable, it means that the item may have context. If context is required, then the item measuring the given standard must have context. If no context is noted, then the item measuring the given standard should not have context.

Item Types

The *Alabama Comprehensive Assessment Program (ACAP) Alternate* assessments are composed of various item types. These item types are described below.

Multiple-Choice (MC) Items: MC items have three answer choices, including two distractors and one correct answer. Distractors for science represent common misconceptions, incorrect logic, incorrect application of an algorithm, computational errors, etc. A correct response to an MC item is worth one score point in the science *ACAP Alternate*.

Performance Task Items:

Multiple-Select (MS) Items: MS items are similar in structure to MC items. However, unlike an MC item, an MS item has four options and more than one correct answer. In other words, multiple responses are required for a given item. A correct response to an MS item is worth two score points in the science *ACAP Alternate*.

Two-Part Multiple-Choice Items: Two-part multiple-choice items have two questions. The questions may require students to identify parts of the water cycle, parts of the solar system, interpret information from a graph or chart, etc. A correct response to a two-part MC item is worth two score points in the science *ACAP Alternate* when both parts are correct.

Item Specifications

Item specifications are one of the key requirements for a high-quality, legally defensible, standards-based assessment. Item specifications help define important characteristics of the items (i.e., test questions) developed for each Alternate Achievement Standard. These item specifications provide guidelines to help clarify the focus of what is to be assessed, what items may include, and what items may not include (i.e., assessment limits). Item specifications are used by item writers, item editors, and item reviewers as a common reference throughout the item-development process, from initial writing to final approval. These science item specifications are based on the 2018 *Alabama Alternate Achievement Standards: Science*.

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth's Place in the Universe
Standard	SCI.ESS.HS.1- Develop and use models to illustrate the lifespan of the sun, including energy released during nuclear fusion that eventually reaches Earth through radiation.
Alternate Achievement Standard	SCI.AAS.ESS.HS.1- Describe observable effects of the sun on Earth, such as changes in light and temperature.
Assessment Limits/Content Constraints	Use visual representation as needed. Limit to simple processes of the sun. Limit composition to hydrogen and helium. Limited to simple explanation of nuclear fusion.
DOK(s)	1 or 2
Sample Item Stem(s)	Here is a metal chair. What happens to the chair when it is in the sunlight for three hours?

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth's Place in the Universe
Standard	SCI.ESS.HS.4- Apply mathematics and computational thinking in reference to Kepler's laws, Newton's laws of motion, and Newton's gravitational laws to predict the orbital motion of natural and man-made objects in the solar system.
Alternate Achievement Standard	SCI.AAS.ESS.HS.4- Identify the main components of the solar system; recognize that planets move in orbits.
Assessment Limits/Content Constraints	Use visual representation of the solar system and planets. Limit components of the solar system to sun, planets, moons, asteroids, comets, and meteors. Limit planetary movement to orbits.
DOK(s)	1 or 2
Sample Item Stem(s)	Here is a drawing of our solar system. Which statement describes how the sun and planets in our solar system move?

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth's Place in the Universe
Standard	SCI.ESS.HS.5- Use mathematics to explain the relationship of the seasons to the tilt of Earth's axis (e.g., zenith angle, solar angle, surface area) and its revolution about the sun, addressing intensity and distribution of sunlight on Earth's surface.
Alternate Achievement Standard	SCI.AAS.ESS.HS.5- Use a model of the Earth and the sun to recognize how Earth's tilt and orbit around the sun corresponds with the four seasons.
Assessment Limits/Content Constraints	Use visual representation for location on Earth in addition to the description.
DOK(s)	1 or 2
Sample Item Stem(s)	Here is a drawing that shows the seasons of the year. (Show Earth's axis and use shading, label Earth, Sun, and four positions for the seasons). At what position in Earth's orbit is fall occurring in the Northern Hemisphere?

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth Systems
Standard	SCI.ESS.HS.11- Obtain and communicate information about significant geologic characteristics (e.g., types of rocks and geologic ages, earthquake zones, sinkholes, caves, abundant fossil fauna, mineral and energy resources) that impact life in Alabama and the southeastern United States.
Alternate Achievement Standard	SCI.AAS.ESS.HS.11- Identify significant geologic characteristics of Alabama and the southeastern United States (e.g., types of rocks, mineral and energy resources).
Assessment Limits/Content Constraints	Use visual representation as needed. Limit to types of rocks, lowlands, mountains, caves, fossil beds, bodies of water, beaches, and sinkholes.
DOK(s)	1 or 2
Sample Item Stem(s)	Limestone deposits are abundant in Alabama. Which geologic formation shows a result of limestone eroding over time?

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth Systems
Standard	SCI.ESS.HS.12- Develop a model of Earth’s layers using available evidence to explain the role of thermal convection in the movement of Earth’s materials (e.g., seismic waves, movement of tectonic plates).
Alternate Achievement Standard	SCI.AAS.ESS.HS.12- Using a model, identify Earth’s layers.
Assessment Limits/Content Constraints	Use visual representation. Limit to crust, mantle, outer core, and inner core.
DOK(s)	1 or 2
Sample Item Stem(s)	Here is a model of the layers of Earth. What is the name of the layer labeled S?

Grade	11
Content Area	Science
Strand	EARTH AND SPACE SCIENCE Earth Systems
Standard	<p>SCI.ESS.HS.15- Obtain, evaluate, and communicate information to verify that weather (e.g., temperature, relative humidity, air pressure, dew point, adiabatic cooling, condensation, precipitation, winds, ocean currents, barometric pressure, wind velocity) is influenced by energy transfer within and among the atmosphere, lithosphere, biosphere, and hydrosphere.</p> <ul style="list-style-type: none"> a. Analyze patterns in weather data to predict various systems, including fronts and severe storms. b. Use maps and other visualizations to analyze large data sets that illustrate the frequency, magnitude, and resulting damage from severe weather events in order to predict the likelihood and severity of future events.
Alternate Achievement Standard	SCI.AAS.ESS.HS.15- Identify weather conditions, including temperature, wind speed, humidity, and severe weather events (e.g., tornadoes, hurricanes, floods).
Assessment Limits/Content Constraints	<p>Use a key on all weather maps.</p> <p>Use visual representation in the stem/answer choices.</p> <p>Use no more than four different weather symbols on the weather map.</p>
DOK(s)	1 or 2
Sample Item Stem(s)	Here is a weather map with weather symbols. Here is the key for the weather symbols. Which area will <u>most likely</u> have rain the next day?

Appendix: Released Items: Grade 11

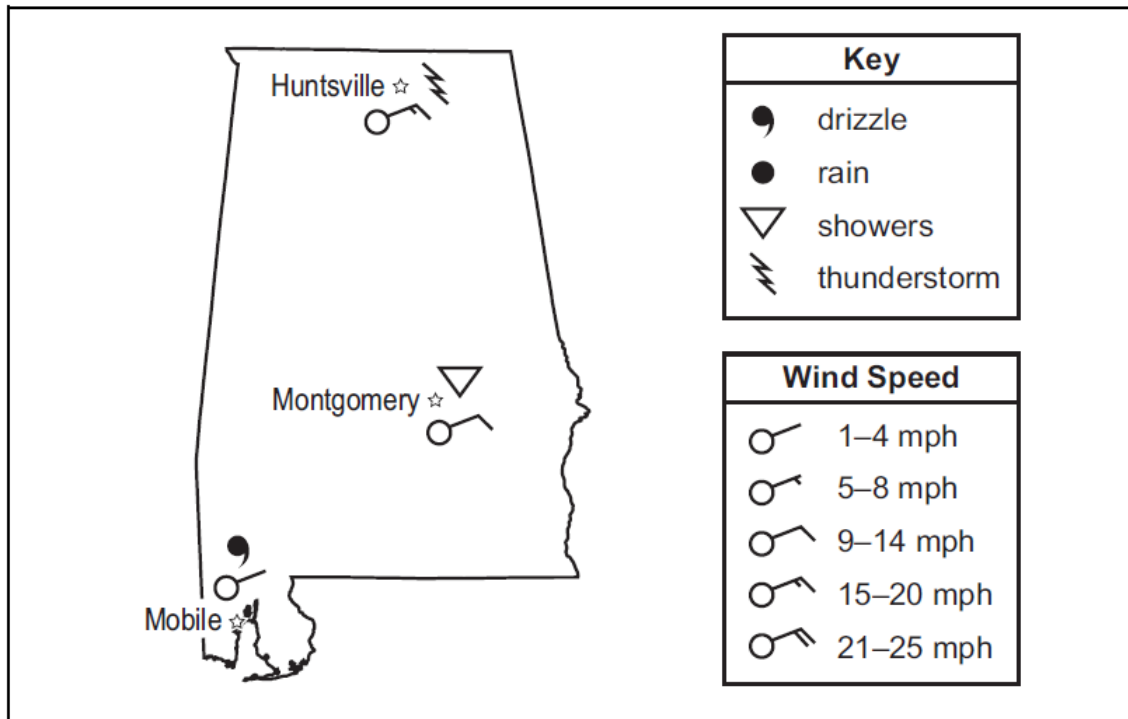
Released Items

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a weather map of Alabama. Point to the map. Here is the key for the weather map. Point to and read the key and wind speed chart. What is the weather like in Montgomery? Point to and read the answer choices.</p> <p>A. showers and wind speeds of one to four miles per hour B. showers and wind speeds of nine to fourteen miles per hour C. a thunderstorm and wind speeds of fifteen to twenty miles per hour D. no response</p>

Item Information	
Item Type	MC
Page Reference	11
Alignment	SCI.AAS.ESS.HS.15
Point Value	1
Depth of Knowledge	2
Answer Key	B

Appendix: Released Items: Grade 11



showers and wind speeds of 1–4 mph

showers and wind speeds of 9–14 mph

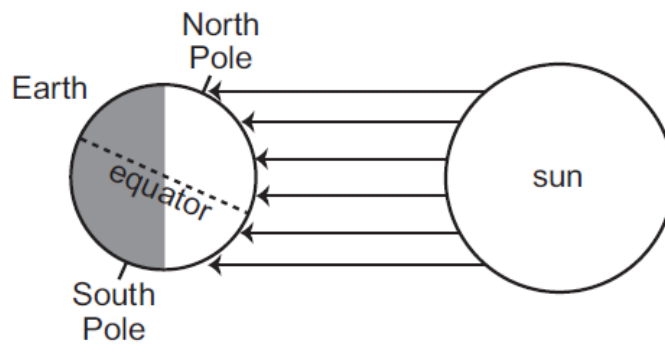
a thunderstorm and wind speeds of 15–20 mph

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>This is a diagram of Earth and the sun during the summer season in the Northern Hemisphere. <i>Point to the picture. Which sentence best describes why it is summer? Point to and read the answer choices.</i></p> <p>A. The Northern Hemisphere is oriented toward the sun, so the sun's rays are not striking that part of Earth directly.</p> <p>B. The Northern Hemisphere is oriented toward the sun, so the sun's rays are striking that part of Earth at a more direct angle.</p> <p>C. The Northern Hemisphere is oriented away from the sun, so the sun's rays are less direct.</p> <p>D. no response</p>

Item Information	
Item Type	MC
Page Reference	8
Alignment	SCI.AAS.ESS.HS.5
Point Value	1
Depth of Knowledge	3
Answer Key	B

Appendix: Released Items: Grade 11



The Northern Hemisphere is oriented toward the sun, so the sun's rays are not striking that part of Earth directly.

The Northern Hemisphere is oriented toward the sun, so the sun's rays are striking that part of Earth at a more direct angle.

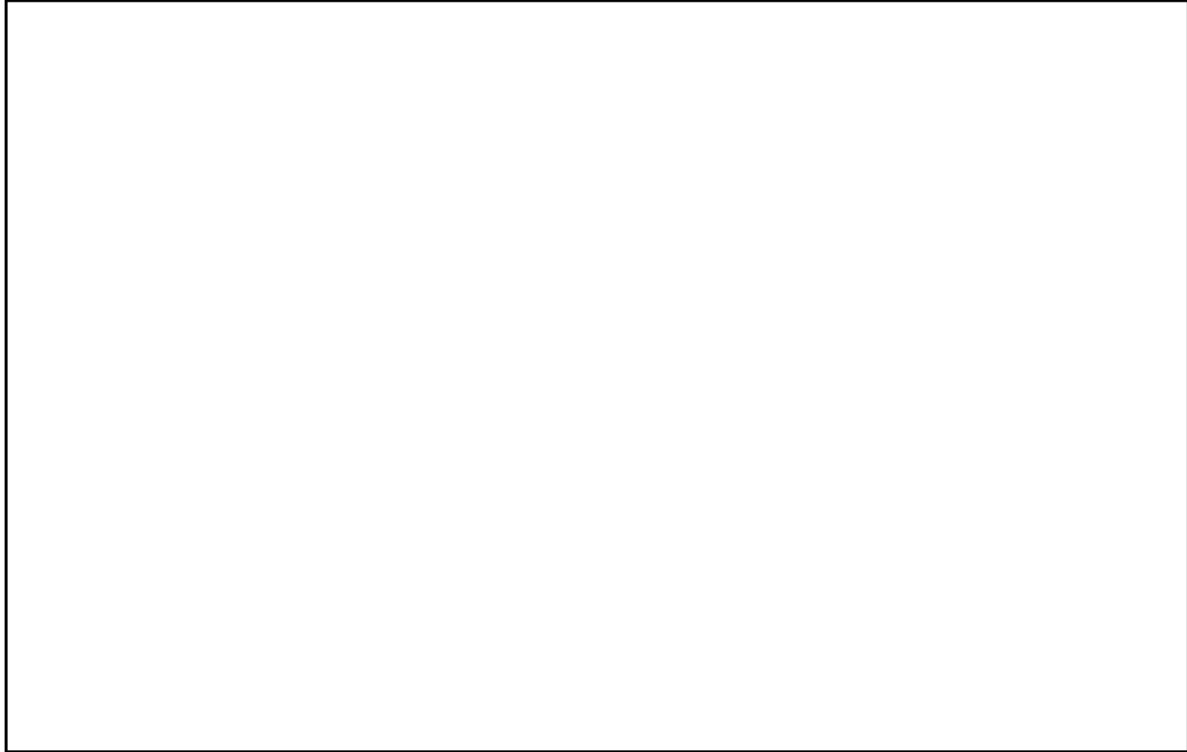
The Northern Hemisphere is oriented away from the sun, so the sun's rays are less direct.

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Alabama was once covered by ancient oceans and swamps. The sediment left behind makes up most of the state's bedrock. Which list identifies the sedimentary rocks that are most common in Alabama? <i>Point to and read the answer choices.</i></p> <p>A. lead, zinc, mica, and talc B. marble, quartz, and granite C. limestone, sandstone, shale, and chalk D. no response</p>

Item Information	
Item Type	MC
Page Reference	9
Alignment	SCI.AAS.ESS.HS.11
Point Value	1
Depth of Knowledge	3
Answer Key	B

Appendix: Released Items: Grade 11



lead, zinc, mica, and talc

marble, quartz, and granite

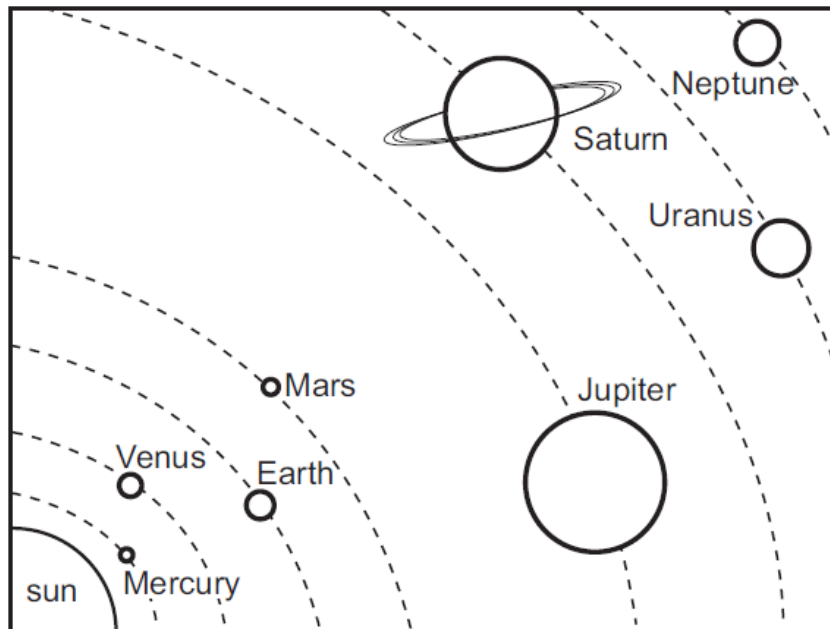
limestone, sandstone, shale, and chalk

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a picture of our solar system. <i>Point to the picture.</i> Each planet moves around the sun in an orbit. What keeps the planets in their orbits? <i>Point to and read the answer choices.</i></p> <p>A. the sun's gravity B. Earth's magnetic field C. the balance of thermal energy D. no response</p>

Item Information	
Item Type	MC
Page Reference	7
Alignment	SCI.AAS.ESS.HS.4
Point Value	1
Depth of Knowledge	1
Answer Key	A

Appendix: Released Items: Grade 11



the sun's gravity

Earth's magnetic field

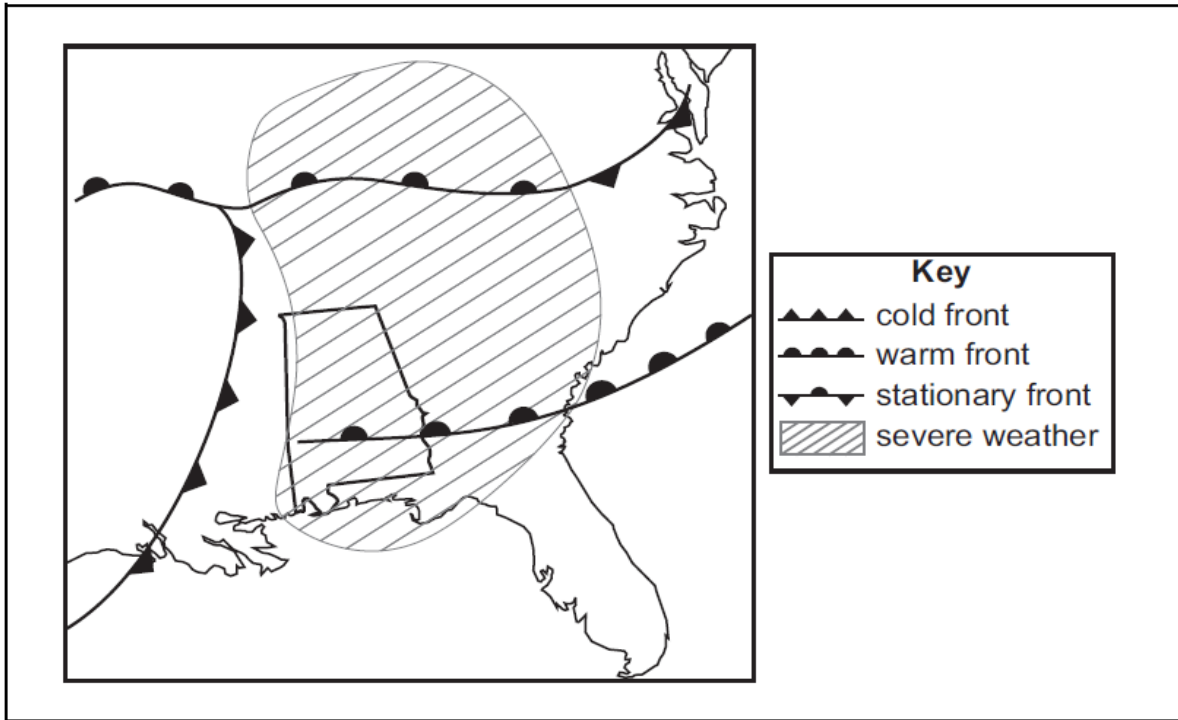
the balance of thermal energy

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a weather map of the southeastern part of the United States on a summer day. <i>Point to the picture. What type of weather is most likely to happen in Alabama? Point to and read the answer choices.</i></p> <p>A. severe thunderstorms B. clear and sunny C. cloudy and dry D. no response</p>

Item Information	
Item Type	MC
Page Reference	11
Alignment	SCI.AAS.ESS.HS.15
Point Value	1
Depth of Knowledge	2
Answer Key	A

Appendix: Released Items: Grade 11



Which two types of weather may occur.

severe thunderstorms

clear and sunny

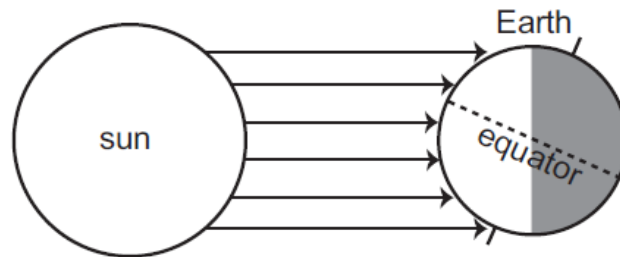
cloudy and dry

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a picture of Earth and the sun. Point to the picture. Which season is it in the Northern Hemisphere? Point to and read the answer choices.</p> <p>A. fall B. winter C. summer D. no response</p>

Item Information	
Item Type	MC
Page Reference	8
Alignment	SCI.AAS.ESS.HS.5
Point Value	1
Depth of Knowledge	2
Answer Key	B

Appendix: Released Items: Grade 11



fall

winter

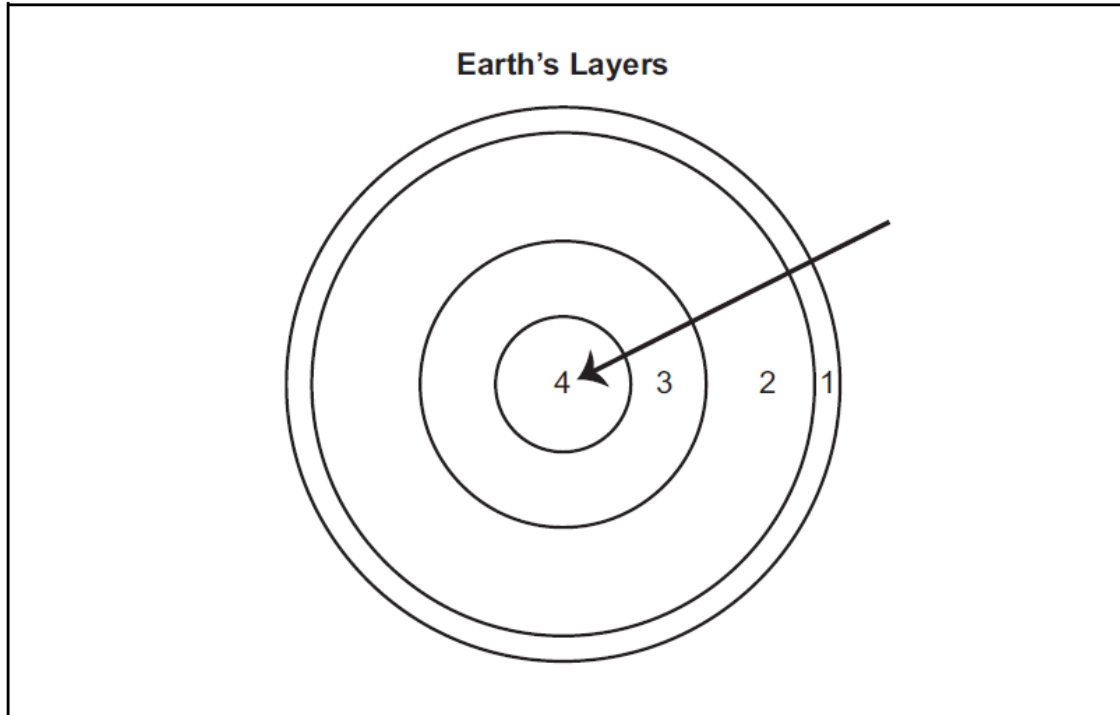
summer

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a picture of the layers of Earth. Point to the picture. Which layer is labeled four? Point to the number four in the picture. Point to and read the answer choices.</p> <p>A. crust B. inner core C. mantle D. no response</p>

Item Information	
Item Type	MC
Page Reference	10
Alignment	SCI.AAS.ESS.HS.12
Point Value	1
Depth of Knowledge	1
Answer Key	B

Appendix: Released Items: Grade 11



crust

inner core

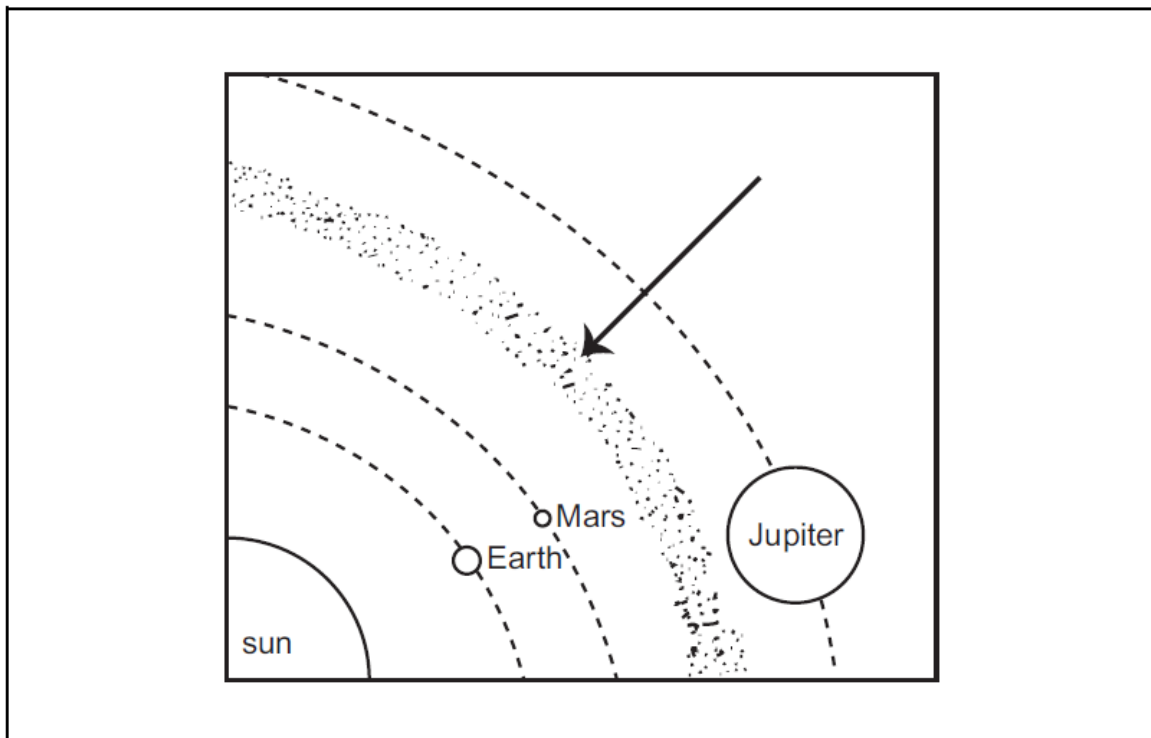
mantle

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>In a region around the sun, between the orbits of Mars and Jupiter, there are billions of space rocks that are thought to be left over from the formation of the solar system. <i>Point to the picture and the arrow.</i> This group of rocks orbits the sun just like the planets orbit the sun. What are these billions of rocks called? <i>Point to and read the answer choices.</i></p> <p>A. comet shell B. asteroid belt C. meteor shower D. no response</p>

Item Information	
Item Type	MC
Page Reference	7
Alignment	SCI.AAS.ESS.HS.4
Point Value	1
Depth of Knowledge	1
Answer Key	B

Appendix: Released Items: Grade 11



comet shell

asteroid belt

meteor shower

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Quartz is a mineral that is found in large deposits in Montgomery County, Alabama. Most of these deposits are along the Alabama, Coosa, and Tallapoosa Rivers. What is one reason these deposits of quartz are very important to the Alabama economy? Point to and read the answer choices.</p> <p>A. Quartz in soil helps corn to grow. B. Quartz is a source of sand and gravel used in construction. C. Quartz is the main component of cotton fabric. D. no response</p>

Item Information	
Item Type	MC
Page Reference	9
Alignment	SCI.AAS.ESS.HS.11
Point Value	1
Depth of Knowledge	2
Answer Key	B

Appendix: Released Items: Grade 11

Quartz in soil helps corn to grow.

Quartz is a source of sand and gravel used in construction.

Quartz is the main component of cotton fabric.

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a table that shows the average number of hours of sunlight per day for two months in three cities. <i>Point to and read the table.</i> Which city would <u>most likely</u> be the warmest city in July? <i>Point to and read the answer choices.</i></p> <p>A. Los Angeles B. Sydney C. London D. no response</p>

Item Information	
Item Type	MC
Page Reference	6
Alignment	SCI.AAS.ESS.HS.1
Point Value	1
Depth of Knowledge	2
Answer Key	A

Appendix: Released Items: Grade 11

City	Average Hours of Sunshine in January	Average Hours of Sunshine in July
Los Angeles	7.3	11.7
Sydney	7.6	6.6
London	2.0	6.8

Los Angeles

Sydney

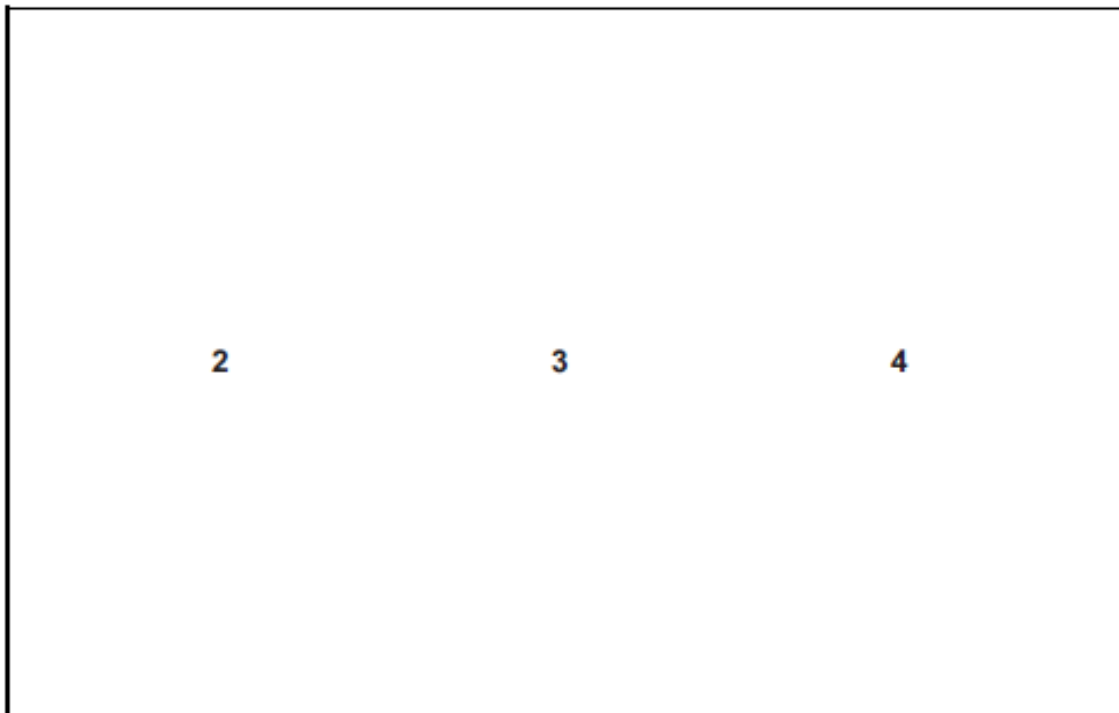
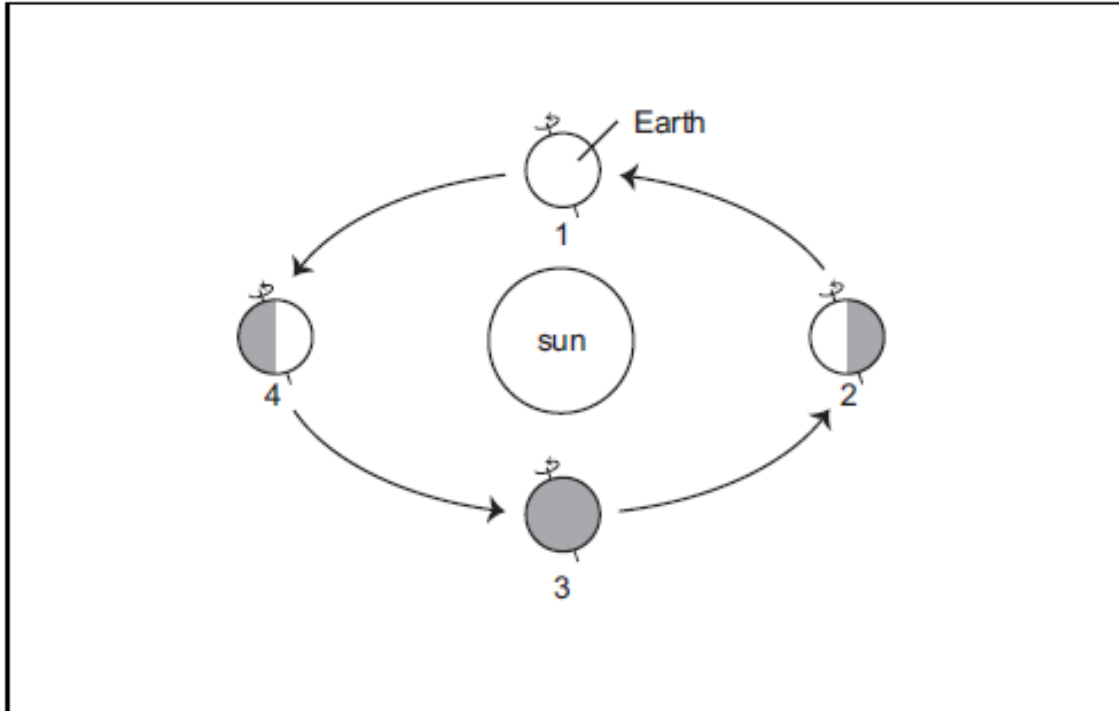
London

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a diagram of Earth rotating on its axis and orbiting the sun. Point to the picture. Earth is shown in four positions that indicate each of the four seasons during one year. Each position is numbered. Point to each of the four Earths and its number. Which number indicates the position of Earth when it is summer in Alabama? Point to and read the answer choices.</p> <p>A. two B. three C. four D. no response</p>

Item Information	
Item Type	MC
Page Reference	8
Alignment	SCI.AAS.ESS.HS.5
Point Value	1
Depth of Knowledge	2
Answer Key	A

Appendix: Released Items: Grade 11



Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Some weather conditions produce severe weather events with high-speed winds. Which <u>two</u> weather events have high-speed winds? Choose two. Point to and read the answer choices.</p> <p>A. flood B. hurricane C. tornado D. light rain E. no response</p>

Item Information	
Item Type	MS
Page Reference	11
Alignment	SCI.AAS.ESS.HS.15
Point Value	1
Depth of Knowledge	1
Answer Key	B, C

Appendix: Released Items: Grade 11



flood

hurricane

tornado

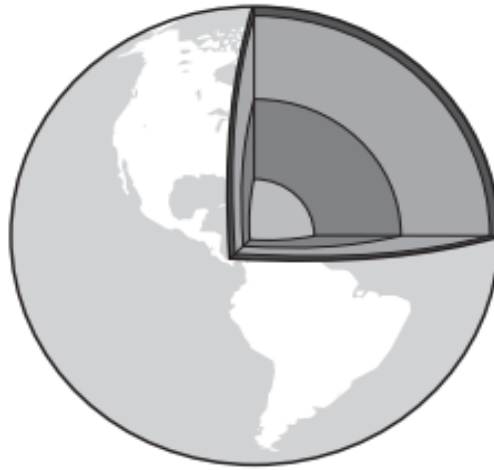
light rain

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>This picture shows three layers of Earth: the crust, mantle, and core. Point to the picture. Which layer of Earth is where plants grow? Point to and read the answer choices.</p> <p>A. core B. crust C. mantle D. no response</p>

Item Information	
Item Type	MC
Page Reference	10
Alignment	SCI.AAS.ESS.HS.12
Point Value	1
Depth of Knowledge	1
Answer Key	B

Appendix: Released Items: Grade 11



core

crust

mantle

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>The Talladega Mountains are located in east-central Alabama. Point to the arrow on the map. They contain the highest mountain peak in Alabama, Cheaha Mountain. These mountains are part of a larger mountain range that stretches from Alabama to Canada. Point to the mountain range on the map. Which answer choice is the name of this larger mountain range? Point to and read the answer choices.</p> <p>A. Appalachian Mountains B. Blue Ridge Mountains C. Rocky Mountains D. no response</p>

Item Information	
Item Type	MC
Page Reference	9
Alignment	SCI.AAS.ESS.HS.11
Point Value	1
Depth of Knowledge	1
Answer Key	A

Appendix: Released Items: Grade 11



Appalachian Mountains

Blue Ridge Mountains

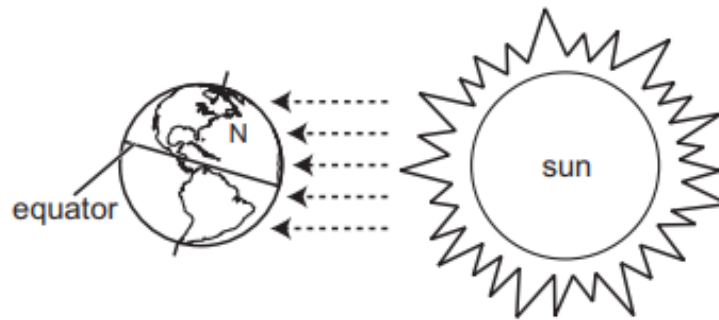
Rocky Mountains

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>Here is a picture that shows the sun's rays striking Earth. Point to the picture. The letter N shows a location in the Northern Hemisphere. Point to the letter N. Which answer choice <u>best</u> describes why it is summer at this location? Point to and read the answer choices.</p> <p>A. The Northern Hemisphere is farther from the sun. B. The Northern Hemisphere is getting less direct sunlight from the sun. C. The Northern Hemisphere is getting more direct sunlight from the sun. D. no response</p>

Item Information	
Item Type	MC
Page Reference	8
Alignment	SCI.AAS.ESS.HS.5
Point Value	1
Depth of Knowledge	2
Answer Key	C

Appendix: Released Items: Grade 11



The Northern Hemisphere is farther from the sun.

The Northern Hemisphere is getting less direct sunlight from the sun.

The Northern Hemisphere is getting more direct sunlight from the sun.

Appendix: Released Items: Grade 11

Teacher Book	
Prepare	<ul style="list-style-type: none"> Place student test page in front of the student. Call student's attention to the page.
SAY	<p>There are many sources of electricity in Alabama. Electrical generating power plants convert natural resources into electrical energy. Which <u>two</u> natural resources are used most in Alabama to generate electricity? Choose two. Point to and read the answer choices.</p> <p>A. wood B. coal C. water D. natural gas E. no response</p>

Item Information	
Item Type	MS
Page Reference	9
Alignment	SCI.AAS.ESS.HS.11
Point Value	2
Depth of Knowledge	1
Answer Key	B, D

Appendix: Released Items: Grade 11



wood

coal

water

natural gas