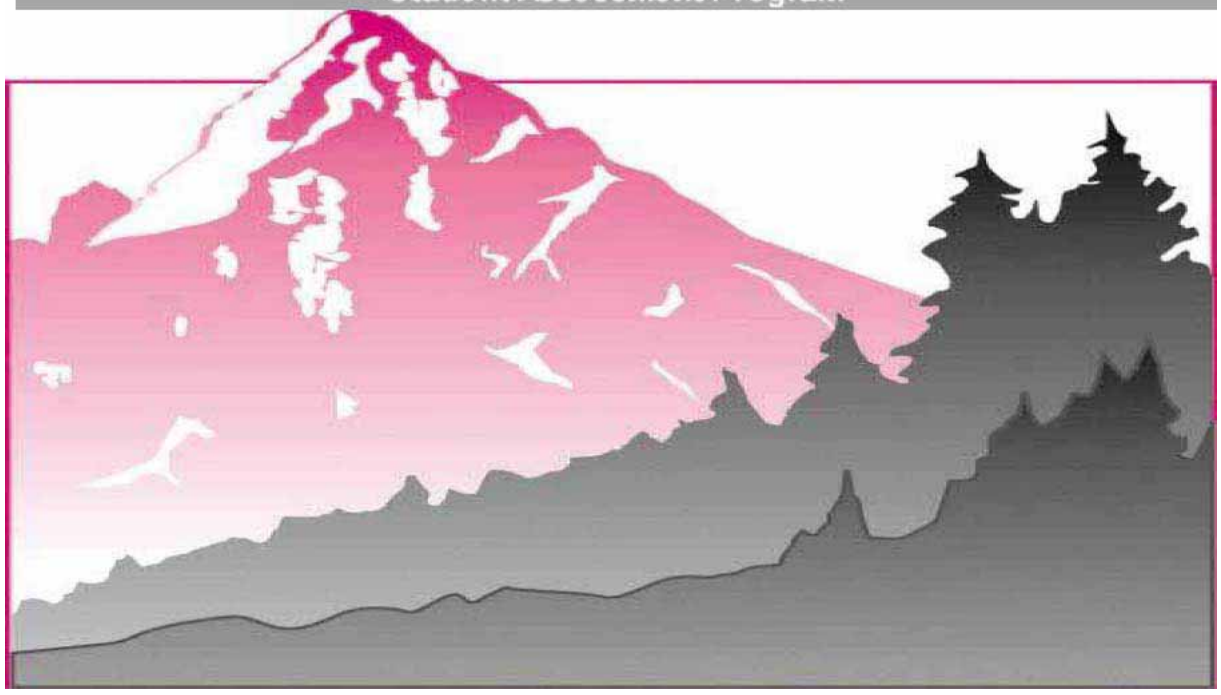
COLORADO

Student Assessment Program



2005-2006 CSAP DEMONSTRATION PACKET

Science Grade 10

CSAP

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Table of Contents

The purpose of this document is to inform Colorado teachers of the structure and focus of the new grades 5 and 10 Science CSAP tests and review the grade 8 Science CSAP test that has been administered since 2000. Examples of items that could be included on the 10th grade Science CSAP tests are provided in this document. The complete demo packet also contains examples from grades 5 and 8. The Unit of Student Assessment, Colorado Department of Education, prepared this packet.

A special thank you to the following science educators: Nancy Kellogg, Don Uhland and Linda Block-Gandy, for their assistance in developing the science demonstration packet, defining the necessary contents of this packet, and their continued dedication to all students in Colorado.

Jeanette Thompson: Science Consultant, Unit of Student Assessment
Elizabeth Celva: Director, Unit of Student Assessment
Colorado Department of Education

Colorado Model Content Standards - Science

Adopted 5-10-95; Amended 11-09-95

Standard 1 Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.

Standard 2 **Physical Science:**
Students know and understand common properties, forms, and changes in matter and energy.

Standard 3 **Life Science:**
Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

Standard 4 **Earth and Space Science:**
Students know and understand the processes and interactions of Earth's systems and structure and dynamics of Earth and other objects in space.

Standard 5 Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.

Standard 6 Students understand that science involves a particular way of knowing and understanding common connections among scientific disciplines.

The numerical order of the six science standards does not imply any particular judgment regarding their relative importance or teaching priorities. In fact, as the document emphasizes, Standards 1, 5 and 6 should be addressed through the subject matter in the content areas of physical, life and earth/space sciences (Standards 2, 3 and 4). Even though the six science content standards are identified separately, they represent interconnected understanding and knowledge of science.

Rationale statements and Benchmarks for Grades K-4, 5-8 and 9-12 may be found on the CDE website. www.cde.state.co.us

Explanation of Assessment Frameworks

Colorado Model Content Standards contain benchmark statements that define the knowledge and skills Colorado students should acquire in grade level ranges K-4, 5-8, and 9-12. These grade level ranges in science are measured in Colorado's schools using the Colorado Student Assessment Program (CSAP) at grades 5, 8 and 10.

Assessment Frameworks were developed by a group of experienced Colorado science educators to define what will be assessed on the state's paper and pencil, standardized, timed CSAP assessments.

On the CSAP Assessment Frameworks, each benchmark is further refined using example performance tasks and activities. These bulleted statements:

- help clarify the intent of the benchmark while building toward the important ideas and concepts encompassed in the standard.
- guide the development of appropriate questions for the CSAP:
  - ✓ multiple choice
  - ✓ constructed response
- demonstrate the application of varying depth of knowledge in performance tasks and activities reflected on the CSAP:

  Level 1 – Recall and Reproduction

  Level 2 – Skills and Concepts

  Level 3 – Strategic Thinking

  Level 4 – Extended Thinking (*This level requires extended time and is not included in a standardized assessment).*
- demonstrate growing sequential development of student understanding of science concepts from K-10th grade.
- support the development of school level classroom opportunities with multiple assessment options at appropriate levels of difficulty and in alignment with the expectations of the CSAP.
- compliment and encourage best practices in science education in the state of Colorado.

CSAP Frameworks for each grade and content area tested may be found on the CDE website. www.cde.state.co.us

Fact Sheet for Science CSAP – Grades 5, 8 and 10

Test Construction Information

July, 2005

Tests are designed to be given in three 55-minute sessions and each session has a similar composition of item types.

	Grade 5	Grades 8 and 10
Number of Items	70-75	80-83
Number of Points	88	98-100
▪ Number of multiple choice items *(multiple choice items value 1 point each)*	52	60
▪ Number of constructed response items *(constructed response items value from 1-4 points each)*	18	23
Total test score points	88	98-100

Weighting of Standards by Grade Level for Science CSAP

Notes: Standard 6 is combined with Standard 1 during test construction.
Standard 5 is combined with Standards 2, 3, and 4 during test construction.

	Grade 5	Grade 8	Grade 10
Standard	%ScrPts	%ScrPts	%ScrPts
1 *Scientific Inquiry and Investigations*	30	30	30
6 *Connections Between Scientific Disciplines*	4	4	4
2 *Physical Science*	20	20	20
3 *Life Science*	20	20	20
4 *Earth and Space Science*	20	20	20
5 *Science and Technology relating to Human Activity*	6	6	6

Test Scoring

- multiple choice are machine scored
- constructed response are scored by readers hired and trained by the test contractor under specific guidelines from CDE personnel and Colorado teachers
- performance category cut-points are set using the Bookmarking Process (description on CDE website)

Associated materials available on the CDE website www.cde.state.co.us

- Science CSAP Demonstration Packet (available September 2005)
- Assessment Frameworks
- CSAP Item Maps (Grade 8 available now, Grades 5 and 10 available fall 2006)
- Released Items (Grade 8 available now, Grades 5 and 10 available fall 2006)
- Technical Reports and Information

Subcontent Areas:

Standard	Grade 5	Grade 8	Grade 10
1	Experimental Design & Investigation Results and Data Analysis	Experimental Design & Investigation Results and Data Analysis	Experimental Design & Investigation Results and Data Analysis Applied Inquiry
2	*No subcontent area designated	Physics Concepts Chemistry Concepts	Physics Concepts Chemistry Concepts
3	*No subcontent area designated	Life Processes Organisms and their Interactions	Life Processes Organisms and their Interactions
4	*No subcontent area designated	Geology & Astronomy Meteorology & Hydrology	Geology & Astronomy Meteorology & Hydrology

*As a general science assessment, Grade 5 has items categorized within subcontent areas within Standard 1 only.

Points to Ponder about CSAP

or

Be Science Savvy with CSAP

Preparations for CSAP testing are ongoing throughout the school year. The following suggestions will assist you in integrating CSAP with classroom instruction.

1. The Colorado Content Science Standards and Assessment Frameworks are the road maps to success for your students taking the Science CSAP. http://cde.state.co.us/index_assess.htm
2. The vocabulary used in the assessment frameworks is what the teacher may expect the students to understand and verbalize at the appropriate grade levels (5^{th}, 8^{th} & 10^{th}).
3. Science should be taught in a deliberate way. Science standards represent high expectations for **all students** and science instruction should be provided in **all grades.**
4. The teacher is encouraged to:
   - utilize programs and resources that emphasize conceptual development and scientific inquiry
   - give students practice in being assessed using constructed response (CR) items and multiple choice (MC) items
   - include in your classroom standards-based assessment "Item Sets" which involve several items that relate to one standard and may include CR and MC items that incorporate graphs and tables around a topic
5. An on going variety of standards-based assessments should be embedded in the science program such as:
   - teacher observables
   - presentations on research/investigations
   - written explanations in journals/notebooks with teacher feedback
   - teacher prepared standard-based assessments
   - time limits set to give students practice working with time restrictions
6. An assessment objective may be assessed on the CSAP test even though it has not been previously assessed. The objectives are tested on a cyclical basis over time.
7. The Fact Sheet will help the teacher understand how CSAP was constructed. Constructed response items can be assigned more points than multiple choice items. It is important for students to answer both types of items to do well on the test. Encourage your students to answer all items and if time permits review their work.
8. To provide consistency throughout the 5^{th}, 8^{th} and 10^{th} grade CSAP testing:
   - metric units of measurement will be used
   - food webs and food chains should have arrows that describe the path of energy flow through the food web/chain (e.g. grass → cricket → frog)
   - students should always use titles and labels even when not told explicitly to do so when constructing graphs, tables and charts
9. The demonstration items can be modified for different grade levels and expanded to include hands-on inquiry-based investigations.

Hints for Students Taking the CSAP Science Test

The Science CSAP is a standardized test. That means the test is given to all students at your grade level in the entire state of Colorado. It is given to every student exactly the same way with the same amount of time.

- ✓ Learn how to answer each kind of question. CSAP Science tests have two types of questions: multiple choice and constructed response. A constructed response may be a short response, extended response, or a response using tables, graphs, or pictures.
- ✓ Read each question carefully.
- ✓ Check each of your answers to make sure it is the best answer for the question asked.
- ✓ Answer the questions you are sure about first. If a question seems too difficult, skip it and go back to it later.
- ✓ Write your response in the space provided and do not write in the margins.
- ✓ Be sure to fill in the answer bubbles correctly. Do not make any stray marks around answer spaces. Only use a # 2 pencil so the scanner can read your answer.
- ✓ Think positively. Some questions may seem hard to you, but you may be able to figure out what to do if you reread the question carefully and think about what you already know.
- ✓ When you finish the test with time to spare, review your answers to make sure they are reasonable.
- ✓ **RELAX**. Some people get *nervous* about tests. Do your best work.
- ✓ These strategies are not just for CSAP. They will help you do better in all your work.

How to Answer a Constructed Response Question

A constructed response question may require a short answer or an extended response. It has a value of 1 to 4 score points and you can receive full or partial credit. You should try to answer these questions even if you are not sure of the correct answer. If a part of the answer is correct, you may get a portion of the points.

Strategies to help you succeed on the test:

- ✓ Allow more time to answer the constructed response. You are expected to take time to read and think about the question before you write your answer. A short answer response may take you 5 minutes and an extended response may take you longer.
- ✓ When the clock starts on a timed test, glance through the assessment before you begin to see how many items are in the session, how many items are constructed responses, and how much time you have.
- ✓ Read each question carefully and determine what the question asks you to answer.
- ✓ If you do not understand the question, read it again and try to answer one part at a time.
- ✓ Be sure to answer every part of the question.
- ✓ Use the information provided to answer the question.
- ✓ Write your explanations in clear, concise language. Use the space provided for the answer.
- ✓ Do your best to spell words correctly; but if it is not the exact spelling, you may still get credit for your answer.
- ✓ Reread your explanation to make sure it says what you want it to say.
- ✓ Always strive to do your best on every assessment in school whether it is a CSAP test, classroom test, driving test, or a college entrance exam.

Resources from the Web
Released Items for Classroom Assessment

When you are planning your classroom assessments, work with your colleagues in developing assessments and/or choosing assessments aligned to your curriculum, instruction and grade level frameworks. It can be very helpful to find an item in the demonstration packet that is a good fit with your curriculum, instruction and lab investigations. If there is no item available in the demonstration packet, you may look at released items from other states, NAEP and TIMSS. By examining released items and sample items from many standardized assessments, you will be able to create a wide-range of formats that will enable you to choose:

- ✓ the level of difficulty,
- ✓ the level of content depth and knowledge, and
- ✓ the type of item (e.g., multiple choice or constructed response items that meet your needs for a classroom assessment).

Colorado Released Items and Assessment Frameworks
http://www.cde.state.co.us/index_assess.htm

National Assessment of Educational Progress (NAEP), grades 4, 8 & 12
http://nces.ed.gov/nationsreportcard/ITMRLS/NQT_Search.asp?NumSearchResults=1&SearchSubject=Science&SearchIndex=1&SearchStartIndex=1&QuestionsPerPage=20&SearchQuestionSet=0&

Trends in Mathematics and Science Study (TIMSS), grade 4 & 8
http://timss.bc.edu/timss2003i/released.html

Other states have sample or released items. Each state aligns the items to their state standards. It will be important to align your work with CSAP Assessment Frameworks. This is not a complete list but a few websites to get started.

Florida: grades 5, 8 & 10
http://firn.edu/doe/sas/fcat/fcatsmpl.htm

Washington: grades 5, 8 & 10
http://www.k12.wa.us/assessment/WASL/ScienceAssessment.aspx

Michigan: high school released items
http://www.michigan.gov/documents/2003SReleasedSciHST_94240_7.pdf

Michigan: Elementary, Middle and High School Items
http://www.michigan.gov/documents/science02-part2_96915_7.pdf

Massachusetts: released items grades 5, 8, 9 &10
http://www.doe.mass.edu/mcas/2005/release/

Depth-of-Knowledge-Levels – SCIENCE *

The four levels represent a hierarchy based on complexity (rather than difficulty). This difference takes some time to ponder and refine. The hierarchy is based on two main factors: 1) sophistication and complexity, and 2) the likelihood that students at the grade level tested would have received prior instruction or would have had an opportunity to learn the content. Some performance tasks have a low depth-of-knowledge level because the knowledge required is commonly known and student with normal instruction at a grade level should have had the opportunity to learn how to routinely perform what is being asked.

Please note that, in science, "knowledge" can refer both to content knowledge and knowledge of scientific processes. This meaning of knowledge is consistent with the *National Science Education Standards* (NSES), which terms "Science as Inquiry" as its first Content Standard.

Level 1 (Recall and Reproduction)	**Level 2 (Skills and Concepts)**	**Level 3 (Strategic Thinking)**	**Level 4 (Extended Thinking)**
Requires the recall of information, such as a fact, definition, term, or a simple procedure, as well as performance of a simple science process or procedure. Level 1 only requires students to demonstrate a rote response, use a well-known formula, follow a set procedure (like a recipe), or perform a clearly defined series of steps. A "simple" procedure is well defined and typically involves only one step. Verbs such as "identify," "recall," "recognize," "use," "calculate," and "measure" generally represent cognitive work at the recall and reproduction level. Simple word problems that can be directly translated into and solved by a formula are considered Level 1. Verbs such as "describe" and "explain" could be classified at different DOK levels, depending on the complexity of what is to be described and explained. A student answering a Level 1 item either knows the answer or does not: that is, the item does not need to be "figured out" or "solved." In other words, if the knowledge necessary to answer an item automatically provides the answer to it, then the item is at Level 1. If the knowledge needed to answer the item is not automatically provided in the stem, the item is at least at Level 2. Some examples that represent, but do not constitute all of, Level 1 performance are: ▪ Recall or recognize a fact, term, or property. ▪ Represent in words or diagrams a scientific concept or relationship. ▪ Provide or recognize a standard scientific representation for simple phenomenon. ▪ Perform a routine procedure, such as measuring length.	Includes the engagement of some mental processing beyond recalling or reproducing a response. The content knowledge or process involved is **more complex** than in Level 1. Items require students to make some decisions as to how to approach the question or problem. Keywords that generally distinguish a Level 2 item include "classify," "organize," "estimate," "make observations," "collect and display data," and "compare data." These actions imply **more than one step**. For example, to compare data requires first identifying characteristics of the objects or phenomena and then grouping or ordering the objects. Level 2 activities include making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts. Some action verbs, such as "explain," "describe," or "interpret," could be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, requiring reading information from the graph, is a Level 2. An item that requires interpretation from a complex graph, such as making decisions regarding features of the graph that need to be considered and how information from the graph can be aggregated, is at Level 3. Some examples that represent, but do not constitute all of, Level 2 performance, are: • Specify and explain the relationship between facts, terms, properties, or variables. • Describe and explain examples and non-examples of science concepts. • Select a procedure according to specified criteria and perform it. • Formulate a routine problem, given data and conditions. • Organize, represent, and interpret data.	Requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands at Level 3 are complex and abstract. The complexity does not result only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but because the multi-step task requires more demanding reasoning. In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3. Experimental designs in Level 3 typically involve more than one dependent variable. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems. Some examples that represent, but do not constitute all of Level 3 performance, are: • Identify research questions and design investigations for a scientific problem. • Solve non-routine problems. • Develop a scientific model for a complex situation. • Form conclusions from experimental data.	Involves high cognitive demands and complexity. Students are required to make several connections—relate ideas within the content area or among content areas—and have to select or devise one approach among many alternatives to solve the problem. Many on-demand assessment instruments will not include any assessment activities that could be classified as Level 4. However, standards, goals, and objectives can be stated in such a way as to expect students to perform extended thinking. "Develop generalizations of the results obtained and the strategies used and apply them to new problem situations," is an example of a grade 8 objective that is a Level 4. Many, but not all, performance assessments and open-ended assessment activities requiring significant thought will be Level 4. Level 4 requires complex reasoning, experimental design and planning, and probably will require an extended period of time either for the science investigation required by an objective, or for carrying out the multiple steps of an assessment item. However, the extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking. For example, if a student has to take the water temperature from a river each day for a month and then construct a graph, this would be classified as a Level 2 activity. However, if the student conducts a river study that requires taking into consideration a number of variables, this would be a Level 4. Some examples that represent, but do not constitute all of, a Level 4 performance are: • Based on data provided from a complex experiment that is novel to the student, deduct the fundamental relationship between several controlled variables. • Conduct an investigation, from specifying a problem to designing and carrying out an experiment, to analyzing its data and forming conclusions.

* *Webb, N. University of Wisconsin (2002; Revised 2005). Used with permission.*

CSAP
Science

10th Grade CSAP Demonstration Items

Helpful resources:

Science Assessment Frameworks, Grade 10
http://cde.state.co.us/index_assess.htm

Definition of Terms used in Item Description:

Depth of Knowledge Definitions*: Level of Complexity
Level 1 – Recall and Reproduction
Level 2 – Concepts
Level 3 – Strategic Thinking
Level 4 – Extended Thinking
**Refer to page 12 of this Demonstration Packet for complete definition.*

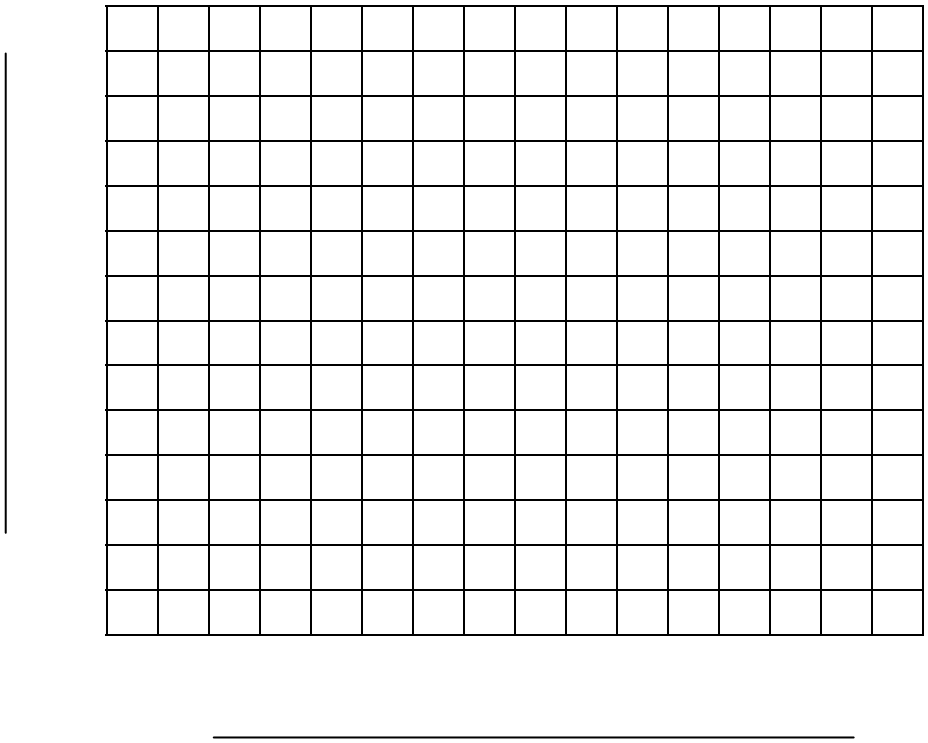
Level of Difficulty:
E – Easy
M – Moderate
H – Hard

1 **A tenth-grade class was interested in how the population of two types of plants had changed during the past eight years. The table below shows the estimated population size of these two types of plants in one county in Colorado.**

Estimated Population (by Year)

	1996	1997	1998	1999	2000	2001	2002	2003
Penstemon barbatus	21,000	16,500	15,000	12,000	10,000	16,000	20,000	22,000
Penstemon palmeri	5000	7500	8000	11,000	11,000	16,000	18,000	20,000

On the grid below, plot the information from the table as a line graph.



Standard 1 / Assessment Objective 1.3.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answer:

	Acceptable examples
Title	Title: Year vs. (Plant) Population Size
Length of Line	Line may extend beyond points in either direction.
Space Utilization	Year (*x*-axis) may start at lowest value (1996). Population (*y*-axis) should start at 0.
x-axis labeled with units	*x*-axis: Year (Each point should be a different year.)
y-axis labeled with units	*y*-axis: (Plant) Population Size (in thousands)
Data plotted	Two sets of 8 data points should be plotted.
Legend/Key	Each line should be identified by either labeling the line directly or by including a legend/key to the side of the graph so the lines can be distinguished – one *Penstemon barbatus*, and one *Penstemon palmeri.*

4-point Rubric

Graph Format

2 points six to seven correct key elements
1 point four to five correct key elements
0 points three or fewer key elements/irrelevant, unclear or inaccurate information

Graph Accuracy

2 points all sixteen data points plotted correctly with two lines connecting the points or line of best fit drawn through the points.
1 point fourteen or fifteen data points plotted correctly with two lines connecting the points **or** all 16 data points plotted correctly, but no lines
0 points thirteen or fewer data points plotted correctly but not connected with a line or three **or** fewer key elements/irrelevant, unclear or inaccurate information

Some of the students wanted to know if the increase in the population of *Penstemon palmeri* was due to the decreasing amount of water in the soil between 1996 and 2003.

2 Write a hypothesis for the study.

_____

_____

_____

Standard 1 / Assessment Objective 1.1.b
Depth of Knowledge: 3 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answer:
One of the following:

- The plants will survive better/reproduce more/produce more surviving offspring with less water.
- The plants will survive better/reproduce more/produce more surviving offspring with more water.
- Different amounts of water will make no difference in the number of plants that survive/reproduce/produce more surviving offspring.

Note: Credit should be given for responses phrased in the negative or as "If, Then" Statement (e.g.,The plants will not survive..., If there is a decrease in the amount of water, then there will be an increase in the plant population)

Two Point Rubric

1 point	one correct key element
0 points	incorrect or no response

3 Write two variables that must be kept constant in the students' experiment using the *Penstemon palmeri*.

1) _____

2) _____

Standard 1 / Assessment Objective 1.2.a
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answers:

- Condition/age/height/size of plants
- Location of plants
- Amount of sunlight/light each plant receives
- Temperature
- Soil conditions/pH/minerals/nutrients/rock type/rock size
- Time of watering/amount of watering/properties of water (including but not limited to pH, temperature, salinity, hardness)

Two Point Rubric

2 points	two correct key elements
1 point	one correct key element
0 points	incorrect or no response

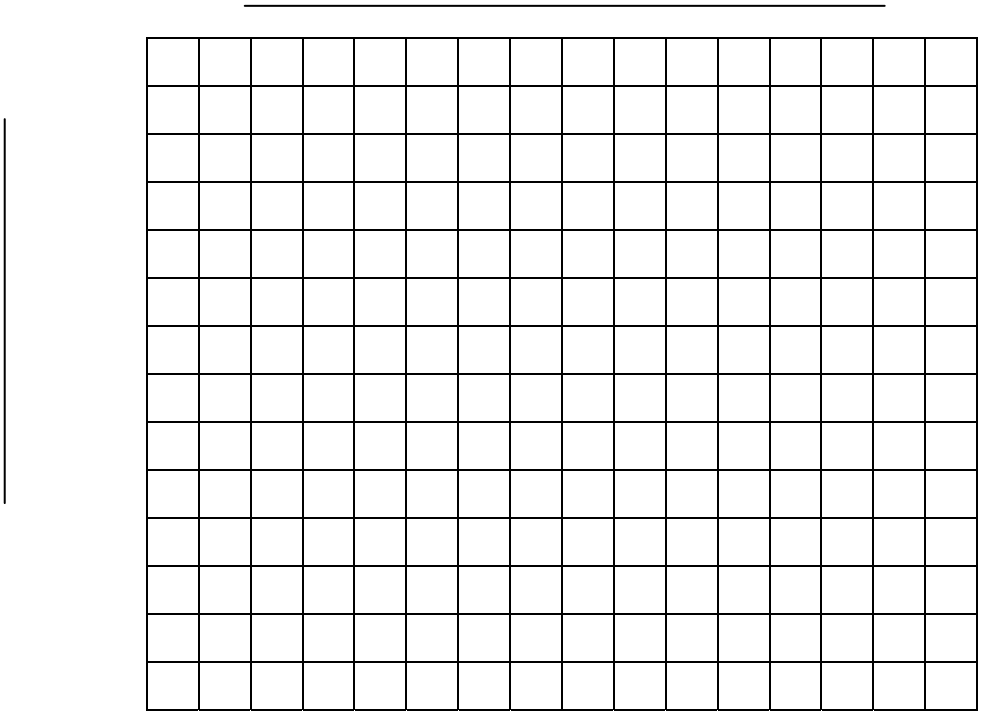
CSAP Science

1 **A tenth-grade class was interested in how the population of two types of plants had changed over the past eight years. The table below shows the estimated population size of these two types of plants in one county in Colorado.**

Estimated Population (by Year)

	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Penstemon barbatus	21,000	16,500	15,000	12,000	10,000	16,000	20,000	22,000
Penstemon palmeri	5000	7500	8000	11,000	11,000	16,000	18,000	20,000

On the grid below, plot the information from the table as a line graph.



Standard 1 / Assessment Objective 1.3.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

Some of the students wanted to know if the increase in the population of *Penstemon palmeri* was due to the decreasing amount of water in the soil between 1996 and 2003.

2 Write a hypothesis for the study.

_____

_____

_____

_____

3 Write two variables that must be kept constant in the students' experiment using the *Penstemon palmeri*.

1) _____

2) _____

Item 2

Standard 1 / Assessment Objective 1.1.b		
Depth of Knowledge: 3	**Difficulty Level:** M	**Type:** Constructed Response

Item 3

Standard 1 / Assessment Objective 1.2.a		
Depth of Knowledge: 2	**Difficulty Level:** M	**Type:** Constructed Response

4

A student wants to study the effect of temperature on plant growth. The student grows ten plants at room temperature and ten plants in a greenhouse where the temperatures are warmer.

What is the most likely reason the student grows ten plants at each of the temperatures?

- O to collect enough data to be able to plot a graph
- ● to increase the reliability of the results
- O to ensure that some plants would survive
- O to be able to publish the study in a science journal

Standard 1 / Assessment Objective 1.2.c
Depth of Knowledge: 2 **Difficulty Level:** E **Type:** Multiple Choice

CSAP

Science

4

A student wants to study the effect of temperature on plant growth. The student grows ten plants at room temperature and ten plants in a greenhouse where the temperatures are warmer.

What is the most likely reason the student grows ten plants at each of the temperatures?

- O to collect enough data to be able to plot a graph
- O to increase the reliability of her results
- O to ensure that some plants would survive
- O to be able to publish the study in a science journal

Standard 1 / Assessment Objective 1.2.c
Depth of Knowledge: 2 **Difficulty Level:** E **Type:** Multiple Choice

5 A gas becomes more soluble in liquid when

- O its particles are larger.
- ● pressure is greater.
- O the mixture is stirred.
- O the temperature is raised.

Standard 2 / Assessment Objective 2.1.1.a
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Multiple Choice

Student Name: _____ Date: _____

CSAP

Science

5 A gas becomes more soluble in liquid when

- O its particles are larger.
- O pressure is greater.
- O the mixture is stirred.
- O the temperature is raised.

Standard 2 / Assessment Objective 2.1.1.a
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Multiple Choice

6 **In an electrical circuit, the voltage (*V*) is 35 volts and the resistance (*R*) is 5 ohms.**

Ohm's law (*V* = *IR*)

What is the current (I) in the circuit?

- O 0.14 ampere
- ● 7.0 amperes
- O 175 amperes
- O 350 amperes

Standard 2 / Assessment Objective 2.2.2.d
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Multiple Choice

Student Name: _____ Date: _____

CSAP
Science

6 **In an electrical circuit, the voltage (*V*) is 35 volts and the resistance (*R*) is 5 ohms.**

Ohm's law (*V* = *IR*)

What is the current (I) in the circuit?

- O 0.14 amperes
- O 7.0 amperes
- O 175 amperes
- O 350 amperes

Standard 2 / Assessment Objective 2.2.2.d
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Multiple Choice

7

An aluminum pan containing soup is placed over a gas flame and heated until the soup is warm throughout.

Explain the role of conduction in this heating process.

Explain the role of convection in this heating process.

Standard 2 / Assessment Objective 2.2.2.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answers:

One of the following:

- The pot is heated by conduction.
- Heat is transferred from the pot to the soup by conduction.
- Heat is transferred by the collision of molecules in the soup with molecules in the pan.
- Heat is transferred from one part of the pot to another by conduction.

- Convection currents cause the cold/more dense soup to move down while the warmer/less dense soup rises.
- Any response that indicates warm soup moves up while cool soup moves down creating convection currents.

Two-point Rubric:

2 points	2 correct key elements
1 point	1 correct key elements
0 points	incorrect or no response

Student Name: _____ Date: _____

CSAP
Science

7

An aluminum pan containing soup is placed over a gas flame and heated until the soup is warm throughout.

Explain the role of conduction in this heating process.

Explain the role of convection in this heating process.

Standard 2 / Assessment Objective 2.2.2.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

8 Which of these describes the action of antibiotics?

- O Antibiotics replace the immune system.
- O Antibiotics lower body temperature.
- O Antibiotics destroy viruses.
- ● Antibiotics slow bacterial growth.

Standard 3 / Assessment Objective 3.3.4.b
Depth of Knowledge: 1 **Difficulty Level**: E **Type:** Multiple Choice

Student Name: _____ Date: _____

CSAP SCIENCE	Item 8	10th Grade

CSAP
Science

8 Which of these describes the action of antibiotics?

- O Antibiotics replace the immune system.
- O Antibiotics lower body temperature.
- O Antibiotics destroy viruses.
- O Antibiotics slow bacterial growth.

Standard 3 / Assessment Objective 3.3.4.b
Depth of Knowledge: 1 **Difficulty Level**: E **Type:** Multiple Choice

9

A biologist uses a light microscope to observe a cell. He concludes that the cell is from a plant.

What are two observations the biologist may have made?

1) _____

_____

2) _____

_____

Standard 3 / Assessment Objective 3.3.1.b
Depth of Knowledge: 1 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answer:

- Presence of chloroplasts or chlorophyll / other pigments
- Presence of a (primary or secondary) cell wall
- Presence of central vacuole/vacuoles
- Cell shape is often rectangular
- Any other reasonable response

Two-Point Rubric:

2 points	2 correct key elements
1 point	1 correct key element
0 points	incorrect or no response

Student Name: _____ Date: _____

CSAP

Science

9

A biologist uses a light microscope to observe a cell. He concludes that the cell is from a plant.

What are two observations the biologist may have made?

1) _____

_____

2) _____

_____

Standard 3 / Assessment Objective 3.3.1.b
Depth of Knowledge: 1 **Difficulty Level:** M **Type:** Constructed Response

10

In the reaction of solid zinc with hydrochloric acid (HCl), the products of hydrogen gas and aqueous zinc chloride are produced.

Which of these is the balanced equation from the reaction?

- O $Zn\ (s) + HCl\ (aq) \rightarrow ZnCl_2\ (aq) + H\ (g)$
- O $2\ Zn\ (s) + 4\ HCl\ (aq) \rightarrow Zn_2Cl_4\ (aq) + H_2\ (g)$
- ● $Zn\ (s) + 2\ HCl\ (aq) \rightarrow ZnCl_2\ (aq) + H_2\ (g)$
- O $Zn_2\ (s) + HCl\ (aq) \rightarrow 2\ ZnCl\ (aq) + H_2\ (g)$

Standard 2 / Assessment Objective 2.1.4.b
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

CSAP

Science

10 **In the reaction of solid zinc with hydrochloric acid (HCl), the products of hydrogen gas and aqueous zinc chloride are produced.**

Which of these is the balanced equation from the reaction?

- O $Zn\ (s) + HCl\ (aq) \rightarrow ZnCl_2\ (aq) + H\ (g)$
- O $2Zn\ (s) + 4HCl\ (aq) \rightarrow Zn_2Cl_4\ (aq) + H_2\ (g)$
- O $Zn\ (s) + 2HCl\ (aq) \rightarrow ZnCl_2\ (aq) + H_2\ (g)$
- O $Zn_2\ (s) + HCl\ (aq) \rightarrow 2ZnCl\ (aq) + H_2\ (g)$

Standard 2 / Assessment Objective 2.1.4.b
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

11 Identify one mechanism in which sexual reproduction leads to genetic variability.

Standard 3 / Assessment Objective 3.4.5.a
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

Elements of Correct Answer

- Mixing of genes/DNA from 2 individuals/parents
- Independent assortment
- Cross-over and recombination

One-point Rubric:

1 point	one correct key element
0 points	incorrect or no response

12 Explain how genetic variability may affect a species?

Standard 3 / Assessment Objective 3.4.3.c
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

Elements of Correct Answer

- Allows diversity upon which environment can act
- Other reasonable response

One-point Rubric:

1 point	one correct key element
0 points	incorrect or no response

Student Name: _____ Date: _____

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Science

11 Identify one mechanism in which sexual reproduction leads to genetic variability.

_____

_____

12 Explain how genetic variability may affect a species?

_____

_____

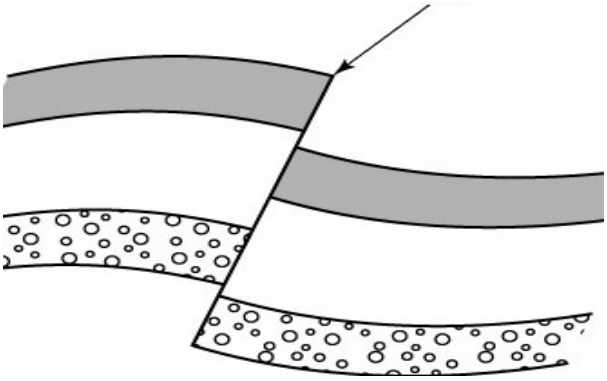
Item 11

Standard 3 / Assessment Objective 3.4.5.a
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

Item 12

Standard 3 / Assessment Objective 3.4.3.c
Depth of Knowledge: 2 **Difficulty Level:** H **Type:** Constructed Response

13 The diagram below shows a geologic cross-section.



Which of these does the arrow indicate?

- O a magma chamber
- ● a fault line
- O a tectonic plate
- O a volcanic vent

Standard 4 / Assessment Objective 4.1.3.a
Depth of Knowledge: 1 **Difficulty Level: M** **Type:** Multiple Choice

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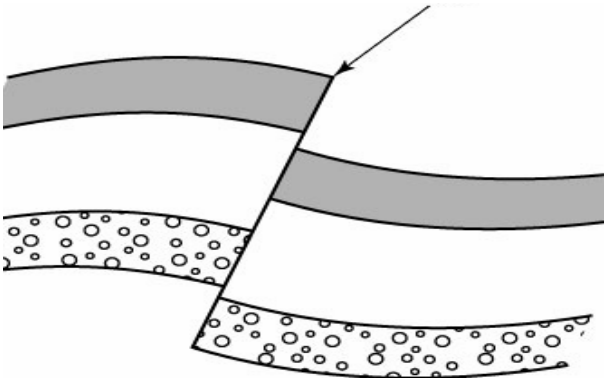
Science

13 The diagram below shows a geologic cross-section.



Which of these does the arrow indicate?

- O a magma chamber.
- O a fault line.
- O a tectonic plate.
- O a volcanic vent.

Standard 4 / Assessment Objective 4.1.3.a
Depth of Knowledge: 1 **Difficulty Level:** M **Type:** Multiple Choice

14 Where does seafloor spreading occur?

What leads to seafloor spreading?

Standard 4 / Assessment Objective 4.1.2.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

Elements of Correct Answers:

Seafloor spreading occurs along oceanic ridges/the oceanic ridge system.

- Magma is injected into newly developed fractures on the seafloor
- Convection within the mantle

Two-Point Rubric:

2 points	2 correct key elements
1 point	1 correct key element
0 points	incorrect or no answer

Student Name: _____ Date: _____

CSAP

Science

14 Where does seafloor spreading occur?

What leads to seafloor spreading?

Standard 4 / Assessment Objective 4.1.2.c
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

15 How does air pressure change with increasing altitude in the atmosphere? Explain why this change occurs.

Standard 4 / Assessment Objective 4.2.1.a
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Constructed Response

Elements of correct answers:

- Air pressure decreases with increasing altitude
  or
  Air pressure increases with decreasing altitude

- There are fewer molecular collisions at higher atmosphere/molecules are farther apart/atmospheric density decreases with increasing altitude/as you go higher in the atmosphere the amount of air pushing on you decreases
  or
  There are more molecular collisions at lower atmosphere/molecules are closer together/atmospheric density increases with decreasing altitude/as you go lower in the atmosphere amount of air pushing on you increases

- Any other reasonable response

One-point Rubric

1 point	two correct key elements
0 points	incorrect or no response

Student Name: _____ Date: _____

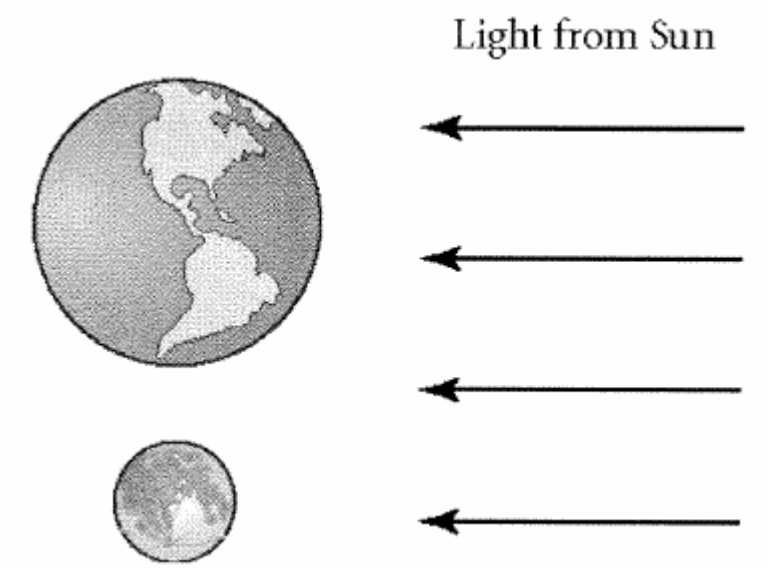
CSAP

Science

15 How does air pressure change with increasing altitude in the atmosphere? Explain why this change occurs.

Standard 4 / Assessment Objective 4.2.1.a
Depth of Knowledge: 1 **Difficulty Level:** E **Type:** Constructed Response

16 Study the diagram below.



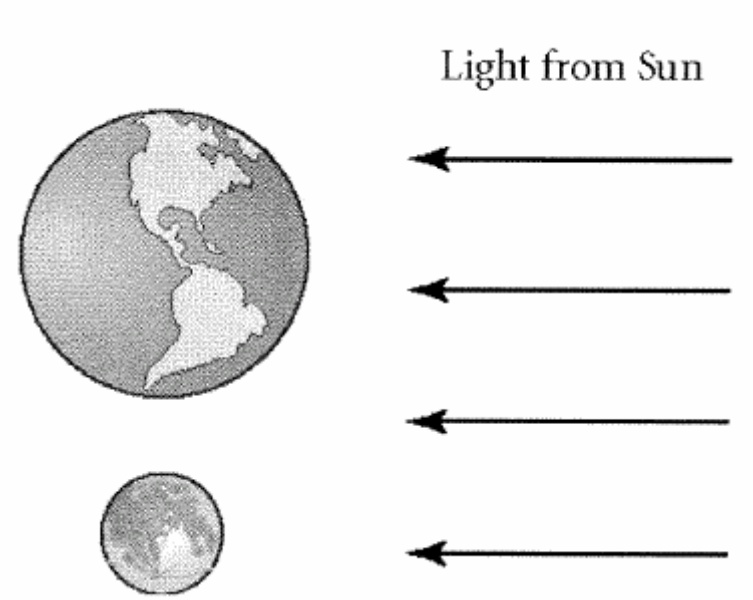
Which of these identifies what someone on Earth could see when the Earth and Moon are in the positions shown in the drawing?

- O a solar eclipse
- O a lunar eclipse
- ● a quarter moon
- O a full moon

Standard 4 / Assessment Objective 4.4.1.b		
Depth of Knowledge: 2	**Difficulty Level:** M	**Type:** Constructed Response

CSAP Science

16 Study the diagram below.



Which of these identifies what someone on Earth could see when the Earth and Moon are in the positions shown in the drawing?

- O a solar eclipse
- O a lunar eclipse
- O a quarter moon
- O a full moon

Standard 4 / Assessment Objective 4.4.1.b
Depth of Knowledge: 2 **Difficulty Level:** M **Type:** Constructed Response

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