



# California Subject Examinations for Teachers®

## TEST GUIDE

### SCIENCE

## General Examination Information

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CS-TG-SCIXGI-05

## Test Structure for CSET: Science

CSET: Science consists of three separate subtests, each composed of both multiple-choice and constructed-response questions. Each subtest is scored separately.

The structure of the examination is shown in the table below.

<b>CSET: Science*</b>			
<b>Subtest**</b>	<b>Domains</b>	<b>Number of Multiple-Choice Questions</b>	<b>Number of Constructed-Response Questions (short [focused] responses)</b>
I	Astronomy	7	none
	Dynamic Processes of the Earth	15	1
	Earth Resources	7	none
	Waves	8	none
	Forces and Motion	15	1
	Electricity and Magnetism	6	none
	Subtest Total	58	2
II	Ecology	8	none
	Genetics and Evolution	14	none
	Molecular Biology and Biochemistry	7	1
	Cell and Organismal Biology	7	1
	Heat Transfer and Thermodynamics	7	none
	Structure and Properties of Matter	15	none
	Subtest Total	58	2
III	One of the following concentration areas, each with the designated number of questions:		
	• Biology/Life Science	50	3
	• Chemistry	50	3
	• Earth and Planetary Science	50	3
	• Physics	50	3

\*Candidates verifying subject matter competence by examination for a credential in Foundational-Level General Science are required to take and pass Subtests I and II only.

\*\*Subtests I and II cover general science content while Subtest III covers the examinee's area of concentration.

## Science (Specialized) Information

Effective spring 2003, the Commission on Teacher Credentialing authorized the addition of four Science (Specialized) areas for Single Subject Teaching Credentials: Biological Sciences (Specialized), Chemistry (Specialized), Physics (Specialized), and Geoscience (Specialized). A Science (Specialized) credential authorization permits the holder to teach in the specific science area listed on the Single Subject Teaching Credential and does not authorize teaching general or integrated science.

To verify subject matter competence for this credential by examination, candidates must pass CSET: Science Subtests III and IV in their specific Science area. The test structure for the examination is shown in the table below.

<b>CSET: Science (Specialized)</b>			
<b>Subtest</b>	<b>Domains</b>	<b>Total Number of Multiple-Choice Questions</b>	<b>Number of Constructed-Response Questions (short [focused] responses)</b>
III	One of the following concentration areas, each with the designated number of questions:		
	<ul style="list-style-type: none"> <li>• Biology/Life Science*</li> </ul>	50	3
	<ul style="list-style-type: none"> <li>• Chemistry*</li> </ul>	50	3
	<ul style="list-style-type: none"> <li>• Earth and Planetary Science*</li> </ul>	50	3
	<ul style="list-style-type: none"> <li>• Physics*</li> </ul>	50	3
IV	One of the following concentration areas, each with the designated number of questions:		
	Biology/Life Science (Specialized) <ul style="list-style-type: none"> <li>• Ecology</li> <li>• Genetics and Evolution</li> <li>• Molecular Biology and Biochemistry</li> <li>• Cell and Organismal Biology</li> </ul>	40	1
	Chemistry (Specialized) <ul style="list-style-type: none"> <li>• Heat Transfer and Thermodynamics</li> <li>• Structures and Properties of Matter</li> </ul>	40	1
	Earth and Planetary Science (Specialized) <ul style="list-style-type: none"> <li>• Astronomy</li> <li>• Dynamic Processes of the Earth</li> <li>• Earth Resources</li> </ul>	40	1
	Physics (Specialized) <ul style="list-style-type: none"> <li>• Waves</li> <li>• Forces and Motion</li> <li>• Electricity and Magnetism</li> </ul>	40	1

\*For a description of these domains, please refer to the corresponding section of the subject matter requirements for General Science.

**IMPORTANT NOTE:** At its August 14–15, 2014, meeting, the Commission on Teacher Credentialing (CTC) took action to align the science content area authorization structure with the California Next Generation Science Standards (NGSS). As a result of this action, the option to earn a specialized science content area on a Single Subject Teaching Credential will be discontinued as of August 1, 2020, and the last administration of a CSET: Science (Specialized) was July 11, 2015.

As test results are valid for five years, the authorizations for specialized science content areas will continue to be issued through August 1, 2020, for individuals who verified subject matter equivalency on or before July 11, 2015.

For more information, [see CTC Coded Correspondence #14–09](#).

## Calculators for CSET: Science

Scientific calculators **will be provided** for examinees taking any CSET: Science subtest. Refer to the California Educator Credentialing Examinations website for a list of the calculator models that may be provided. Directions for the use of the calculator will not be provided at the test administration. You will not be allowed to use your own calculator for CSET: Science subtests.

## Annotated List of Resources for CSET: Science

This list identifies some resources that may help candidates prepare to take CSET: Science. While not a substitute for coursework or other types of teacher preparation, these resources may enhance a candidate's knowledge of the content covered on the examination. The references listed are not intended to represent a comprehensive listing of all potential resources. Candidates are not expected to read all of the materials listed below, and passage of the examination will not require familiarity with these specific resources. A brief summary is provided for each reference cited. Resources are organized alphabetically and by content area (General Science, Biology/Life Science, Chemistry, Earth and Planetary Science, and Physics).

### General Science

Hewitt, Paul G.; Suchocki, John; and Hewitt, Leslie A. (1996). *Conceptual Physical Science* (2nd edition). New York, NY: Longman.

This is an introductory text covering physics, chemistry, earth science, and astronomy. The content emphasizes basic concepts.

*Science Content Standards for California Public Schools, Kindergarten Through Grade Twelve*. (1998). Sacramento, CA: California Department of Education.

Frameworks are developed by the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the State Board. Can be found at <http://www.cde.ca.gov/cfir/index.aspl>.

## **Biology/Life Science**

Campbell, Neil A., and Reece, Jane B. (1999). *Biology* (6th edition). Menlo Park, CA: Benjamin/Cummings, an imprint of Addison Wesley Longman, Inc.

This text presents biology at levels ranging from molecules to ecosystems.

Starr, Cecie, and Taggart, Ralph. (2001). *Biology: The Unity and Diversity of Life*. New York, NY: Wadsworth Publishing Company.

Basic concepts of biology, including the definition of life and organismal functions and construction.

## **Chemistry**

Brown, Theodore L.; LeMay, Jr., H. Eugene; and Bursten, Bruce Edward. (2002). *Chemistry: The Central Science* (9th edition). Upper Saddle River, NJ: Prentice Hall.

A standard in general chemistry, this text provides a broad introduction to all areas of chemistry. A useful CD-ROM is available with the student text.

Zumdahl, Steven S., and Zumdahl, Susan. (2000). *Chemistry* (5th edition). Boston, MA: Houghton Mifflin College Division.

This introductory text covers a wide range of topics in general chemistry.

## **Earth and Planetary Science**

Dolgoff, Anatole. (1998). *Physical Geology*. Boston, MA: Houghton Mifflin College Division.

This book provides an introduction to the study of geology.

Press, Frank, and Siever, Raymond. (1985). *Earth* (4th edition). New York, NY: W. H. Freeman & Co.

An excellent introductory book on earth and planetary science. The text covers the earth as a planetary object and its place in the solar system through geological time.

Tarbuck, Edward J., and Lutgens, Frederick, K. (2000). *Earth Science* (9th edition). Upper Saddle River, NJ: Prentice Hall.

This text provides an excellent survey of the major content areas in earth science, including geology, oceanography, meteorology, and astronomy.

## Physics

Feynman, Richard. (1970). *The Feynman Lectures on Physics (Volume I, II, and III)*. Boston, MA: Addison-Wesley.

A classic introduction to the study of physics. Feynman provides excellent explanations of concepts ranging from the basic principles of Newtonian physics to theories such as Einstein's general relativity, superconductivity, and quantum mechanics.

Halliday, David; Resnick, Robert; and Krane, Kenneth S. (2001). *Physics, Volumes 1 and 2* (5th edition). New York, NY: John Wiley & Sons.

This book is a classic college introductory physics text that is written at the level of calculus.

Halliday, David; Resnick, Robert; and Walker, Jearl. (2002). *Fundamentals of Physics* (6th edition). New York, NY: John Wiley & Sons.

An introductory college-level text.

Hewitt, Paul. (2001). *Conceptual Physics* (9th edition). Upper Saddle River, NJ: Prentice Hall.

An introductory-level physics text with little emphasis on mathematics, this book provides easy-to-understand explanations of basic physics concepts. Many examples of applications to daily life are included. This text provides an excellent reference for the "physics phobic."

Serway, Raymond A., and Faughn, Jerry S. (1999). *Holt Physics* (9th edition). Boston, MA: Harcourt Brace Jovanovich.

This elementary physics text provides broad coverage of basic physics concepts.

Young, Hugh D.; Freedman, Roger A.; Sandin, T. R.; and Ford, A. Lewis. (1999). *Sears and Zemansky's University Physics* (10th edition). San Francisco, CA: Benjamin Cummings.

A calculus-based physics text that includes sections on mechanics, thermodynamics, electromagnetism, optics, and modern physics.