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## Information

### *Professional Services Committee*

#### **Proposal to Establish a Single Subject Teaching Credential in General Science (Foundational)**

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**Executive Summary:** This agenda item presents a proposal for an additional subject area science credential: General Science (Foundational).

**Recommended Action:** For information only

**Presenter:** Teri Clark, Administrator,  
Professional Services Division

**Strategic Plan Goal: 1**

**Promote educational excellence through the preparation and certification of professional educators.**

- ◆ Sustain high quality standards for the preparation and performance of professional educators and for the accreditation of credential programs.

December 2007



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# Proposal to Establish a Single Subject Teaching Credential in General Science (Foundational)

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## Introduction

This agenda item presents a proposal for an additional subject area science credential: General Science (Foundational). A General Science (Foundational) credential may allow additional individuals to earn an authorization to teach science and reduce the number of individuals on waivers and teaching permits. The General Science (Foundational) credential would be a limited authorization. The General Science (Foundational) credential would authorize the holder to teach general, introductory, and integrated science up through grade 8.

## Background

In California, preparing a teacher involves three separate phases: subject matter preparation, preliminary preparation, and induction into the profession. An individual must meet the prerequisite subject matter requirement prior to student teaching and earning the preliminary teaching credential. For the single subject teaching credentials, there are usually two routes an individual may select among to satisfy the subject matter requirement: an approved subject matter program or examination. No matter which route is selected by an individual to satisfy the subject matter requirement, the individual must also complete the preliminary preparation program.

The teaching of K-12 science is divided into four major areas: Biological Science, Chemistry, Geoscience, and Physics. Each of these areas has a specific science credential that an individual may earn. Within each area of science, the appropriate science credential allows an individual to teach introductory science across all four areas, integrated science grades 7-12, and departmentalized classes in the specified area at the high school level. For example, with a Science: Biological Science credential, the individual may teach general science, introductory science, integrated science, and Biology. For more information on the classes authorized by the science credential, see Table 4 on page 5.

To satisfy the subject matter requirement for Biological Science, Chemistry, Geoscience, or Physics, an individual may choose to complete an approved subject matter program or pass the three required California Subject Examination for Teachers (CSET) subtests (see Table 1). For all four areas of science, two general science subtests of the CSET must be passed and, in addition, an individual must pass the area specific subtest. One of the general science subtests addresses Astronomy, Dynamic Processes of the Earth, Earth Resources, Waves, Forces and Motion, Electricity and Magnetism (Subtest 118) and the second subtest addresses Ecology, Genetics and Evolution, Molecular Biology and Biochemistry, Cell and Organismal Biology, Heat Transfer and Thermodynamics, and Structure and Properties of Matter (Subtest 119).

**Table 1: CSET Examinations Required by Science Credentials**

<b>Credential</b>	<b>CSET Subtest</b>	<b>Title(s) of Required Examination(s)</b>	<b>Passing Score</b>
Science: Biological Science	118	CSET General Science	220
	119	CSET General Science	220
	120	Concentrations: Biology	220
Science: Chemistry	118	CSET General Science	220
	119	CSET General Science	220
	121	Concentrations: Chemistry	220
Science: Geosciences	118	CSET General Science	220
	119	CSET General Science	220
	122	Concentrations: Earth and Planetary Science	220
Science: Physics	118	CSET General Science	220
	119	CSET General Science	220
	123	Concentrations: Physics	220

In 2003, the Commission added four new credential options for science teachers; one in each of the above mentioned areas of science. These credentials are called specialized science credentials and the requirements and authorizations are defined in Coded Correspondence 03-0010, <http://www.ctc.ca.gov/notices/coded/030010/030010.html>. The authorization provided by each of the specialized credentials is more limited than the science credentials discussed above. For more information on the classes authorized by the specialized science credential, see Table 4 on page 5. The authorization statement for the specialized science credentials is as follows:

The Single Subject Teaching Credential in Science (Specialized) authorizes instruction in the specific science area listed on the credential (Biological Sciences, Chemistry, Geosciences, or Physics) in California public schools, grades twelve and below, including preschool, and in classes organized primarily for adult learners. This credential does not, however, permit instruction of general, introductory, or integrated science.

An individual may satisfy the subject matter requirement for the specialized science credential through examination or coursework. Unlike the full science credential, there are no approved programs for the specialized science credentials. Instead an individual must hold a graduate degree in the subject or a minimum of 30 semester (or 45 quarter) post graduate units. To satisfy the subject matter requirement by examination, an individual would need to pass two subtests of the CSET as shown in Table 2.

**Table 2: CSET Examinations Required by the Science (Specialized) Credentials**

Credential	CSET Subtest	Title(s) of Required Examination(s)	Passing Score
Biological Sciences (Specialized)	120	Concentrations: Biology	220
	124	Biology/Life Science (Specialized)	220
Chemistry (Specialized)	121	Concentrations: Chemistry	220
	125	Chemistry (Specialized)	220
Geoscience (Specialized)	122	Concentrations: Earth and Planetary Science	220
	126	Earth and Planetary Science (Specialized)	220
Physics (Specialized)	123	Concentrations: Physics	220
	127	Physics (Specialized)	220

Currently, there are 8 separate single subject science teaching authorizations available. Each of the authorizations requires the individual to satisfy a specific subject matter requirement and complete a preliminary preparation program. Each credential authorizes teaching specific science classes.

**Proposed New Science Credential: General Science (Foundational)**

When the specialized science credential was developed in 2003, a Foundational Mathematics credential was also developed. The Foundational Mathematics credential authorizes an individual to teach mathematics courses up through Algebra and Geometry.

The implementation of the Foundational Mathematics credential has led to discussion of an additional science credential and raised a number of questions.

- Would a foundational science credential be a possibility?
- Which science courses would an individual with a General Science (Foundational) be authorized to teach?
- Would a foundational science credential allow additional individuals to earn a science authorization?
- With the narrow authorization of the foundational science credential, would employers still find this credential to be helpful?

A General Science (Foundational) credential could be developed and awarded to an individual who has passed the two CSET General Science subtests (see Table 3) and completed an approved preparation program. This level of knowledge would allow an individual to teach general science, introductory science, and integrated science up to grade 8 but not Biology, Chemistry, Geology, or Physics courses (see Table 5 on page 5).

Teachers who are credentialed via this route and who teach courses within this authorization would be considered “Highly Qualified” for the purpose of No Child Left Behind as they would have been required to demonstrate subject matter competence through examination.

**Table 3: Proposed Examinations Required for a General Science (Foundational) Credential**

<b>CSET Subtest</b>	<b>Title(s) of Required Examination(s)</b>	<b>Passing Score</b>
118 Subtest I	CSET General Science: Astronomy; Dynamic Processes, of the Earth; Earth Resources; Waves; Forces and Motion; Electricity and Magnetism (58 multiple-choice and 2 constructed-response items)	220
119 Subtest II	CSET General Science: Ecology; Genetics and Evolution; Molecular Biology and Biochemistry; Cell and Organismal Biology; Heat Transfer and Thermodynamics; Structure and Properties of Matter (58 multiple-choice and 2 constructed-response items)	220

**Next Steps**

In a meeting with the Association of California School Administrators (ACSA) the administrators present provided positive feedback about the usefulness of a General Science (Foundational) credential and believed that there would be individuals who would earn this authorization. If the Commission supports the concept of a General Science (Foundational) credential, the Certification, Assignments and Waivers division could begin the Title 5 regulatory process.

**Table 4: Current Single Subject Science Teaching Credentials and Authorized Classes**

(service in grades preschool, K - 12, and adults)

<b>Authorized Classes → Type of Credential ↓</b>	<b>Biological Science</b>	<b>Chemistry</b>	<b>Physics</b>	<b>Earth/ Geosciences</b>	<b>Integrated Science</b>	<b>Intro/General Science</b>	<b>Intro Life Science</b>	<b>Intro Physical Science</b>
Science: Biological Science	X				7-12	X	X	X
Science: Chemistry		X			7-12	X	X	X
Science: Physics			X		7-12	X	X	X
Science: Geoscience				X	7-12	X	X	X
Biological Sci (Specialized)	X							
Chemistry (Specialized)		X						
Physics (Specialized)			X					
Geoscience (Specialized)				X				

**Table 5: Proposed General Science (Foundational) Single Subject Teaching Credential and Authorized Classes**

(service in grades preschool, K - 12, and adults)

<b>Authorized Classes → Type of Credential ↓</b>	<b>Biological Science</b>	<b>Chemistry</b>	<b>Physics</b>	<b>Earth/ Geosciences</b>	<b>Integrated Science</b>	<b>Intro/General Science</b>	<b>Intro Life Science</b>	<b>Intro Physical Science</b>
General Science (Foundational)					7-8	X	X	X