

**2002 California Commission on Teacher Credentialing (CCTC)
Earth and Space Science Subject Matter Requirements**

Multiple Subject Credential in Science

**Parts I & II: Content Domains for Subject Matter Understanding and Skill
In Earth and Space Science**

Please rate your level of confidence in each of the areas below:

A = very confident B = confident C = uncertain D = not confident E = not confident at all

Domain 3. Earth and Space Science

3.1 The Solar System		A	B	C	D	E
1	Identify and describe the planets and other planetary bodies (e.g. comets and asteroids) and their motion around the sun.					
2	Explain Time zones in terms of longitude and the rotation of the Earth					
3	Understand reasons for changes in the observed position of the sun and moon in the sky during the course of a day and from season to season					
4	Name and describe bodies of the universe including the sun, stars, and galaxies					

3.2 The Structure and Composition of the Earth (Geology)		A	B	C	D	E
5	Describe formation and observable physical characteristics of minerals (e.g. quartz, calcite, hornblende, mica, and common ore minerals)					
6	Describe formation and observable physical characteristics of different types of rocks (e.g. sedimentary, igneous, and metamorphic)					
7	Identify characteristics of landforms such as mountains, rivers, deserts, and oceans					
8	Explain chemical and physical weathering, erosion, and other rock-forming and soil changing processes					
9	Explain formation and properties of different types of soils and rocks					
10	Describe layers of the Earth (e.g. crust, lithosphere, mantle, core)					
11	Describe plate tectonics including its convective source					
12	Explain how mountains are created					
13	Explain why volcanoes and earthquakes occur and describe their mechanisms and effects					
14	Know the commonly cited evidence supporting the theory of plate tectonics					
15	Identify the factors influencing the location and intensity of earthquakes					
16	Describe the effects of plate tectonic motion over time on climate, geography, and distribution of organisms					
17	Describe the general changes on the Earth over geologic time as evidenced in landforms and the rock and fossil records, including plant and animal extinction.					

3.3 The Earth's Atmosphere (Meteorology)		A	B	C	D	E
18	Explain the influence and role of the sun and oceans in weather and climate and the role of the sun and oceans in weather and climate					
19	Explain the water cycle					
20	Describe the causes and effects of air movements and ocean currents (based on convection of air and water) on daily and seasonal weather and climate					

3.4 The Earth's Water (Oceanography)		A	B	C	D	E
21	Compare characteristics of bodies of water, such as rivers, lakes, oceans, and estuaries.					
22	Describe tides and explain the mechanisms causing and modifying them, such as gravitational attraction of the moon and sun, and coastal topography.					

PART II: SUBJECT MATTER SKILLS AND ABILITIES APPLICABLE TO THE CONTENT DOMAINS IN SCIENCE		A	B	C	D	E
23	Know how to plan and conduct a scientific investigation to test a hypothesis					
24	Apply principles of experimental Design, including formulation of testable questions and hypotheses.					
25	Evaluation of accuracy and reproducibility of data					
26	Distinguish between dependent and independent variables and controlled parameters					
27	Distinguish between linear and nonlinear relationships on a graph of data					
28	Use scientific vocabulary appropriately (e.g. observation, organization, experimentation, inference, prediction, evidence, opinion, hypothesis, theory, and law).					
29	Select and use a variety of scientific tools (e.g. microscopes)					
30	Know how to record length, mass, and volume measurements using the metric system.					
31	Interpret results of experiments and interpret events by sequence and time (e.g. relative ages of rocks, phases of the moon) from evidence of natural phenomena					
32	Communicate the steps in an investigation and record data					
33	Interpret and analyze numerical and non numerical results using charts, maps, tables, models, graphs, and labeled diagrams					
34	Make appropriate use of print and electronic resources, including the World Wide Web, in preparing for an investigative activity					
35	Communicate the steps and results of a scientific investigation in both verbal and written formats					

