

CHECKLIST OF CA SCIENCE STANDARDS FOR GRADE 4 SOLID EARTH

PURPOSE

The checklist is

- A sequential listing of instructional activities through each module.
- A place to document teaching and coverage of CA standards.
- A correlation tool showing where each CA standard is addressed.

Instructional sequence. The Checklist displays the sequence of instruction as the module progresses through 1) active investigation, 2) reading, and 3) assessment. The chart is broken out by investigation, part, and session number.

Most sessions start with active investigation, which may include teacher demonstration, hands-on activity, recording/writing in notebooks, class discussion, teacher explanation, and vocabulary reinforcement. Next students read, answer review questions, and discuss the reading. Finally, embedded assessments are completed, reviewed, and self-assessed. FOSS Teacher Guide and *Science Resources* book pages where CA standards are addressed are referenced through the instructional sequence.

Documentation of teaching and coverage. The Checklist helps teachers keep track of the class's progress through the module. Teachers can copy the Checklist and record the date of each instruction session. The completed Checklist can serve as a planning tool for teaching the module a second time.

Correlation with CA standards. The Checklist allows teachers to identify all the places in the teacher guide and *Science Resources* book where any specific CA standard is addressed. Teachers can quickly find the page references for any point in the instruction. The Checklist provides a table of evidence showing where the CA standards are addressed through multiple exposures and with a minimum of 20-25% hands-on activities integrated cohesively into the instruction.



FOSS AND CALIFORNIA STANDARDS

The **Solid Earth Module** supports the following Earth Sciences Content Standards for grade 4.*

EARTH SCIENCES

ES4 *The properties of rocks and minerals reflect the processes that formed them. As a basis for understanding this concept:*

ES4a *Students know* how to differentiate among igneous, sedimentary, and metamorphic rocks by referring to their properties and methods of formation (the rock cycle).

ES4b *Students know* how to identify common rock-forming minerals (including quartz, calcite, feldspar, mica, and hornblende) and ore minerals by using a table of diagnostic properties.

ES5 *Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:*

ES5a *Students know* some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

ES5b *Students know* natural processes, including freezing and thawing and the growth of roots, cause rocks to break down into smaller pieces.

ES5c *Students know* moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

The **Solid Earth Module** supports the following Investigation and Experimentation Content Standards for grade 4.*

INVESTIGATION AND EXPERIMENTATION

I&E6 *Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:*

I&E6a Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.

I&E6b Measure and estimate the weight, length, or volume of objects.

I&E6c Formulate and justify predictions based on cause-and-effect relationships.

I&E6d Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

I&E6f Follow a set of written instructions for a scientific investigation.

*Science Content Standards for California Public Schools: Kindergarten through Grade Twelve (Sacramento: California Department of Education, 2000).



Checklist of CA Science Standards for Solid Earth Investigation 1

Content Standard Focus	Investigation 1: Mock Rocks	Teacher Guide (Science Resources)
ES4b, I&E6b	Part 1: Observing Mock Rocks—2 sessions	49–64 (179–181)
DATE OF INSTRUCTION	SESSION 1 (PRETEST BEFORE SESSION 1 STARTS)	
	Teacher-led discussion	60
	Teacher presentation	61
	Hands-on with mock rocks	61
	Writing in notebook (Mock Rocks—Observe, Measure)	61
	Teacher-led class discussion	62
	Hands-on with mock rocks and data sheets	62
	Vocabulary instruction and content review	63
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	64 (179–181)
	Writing in notebook	64
ES4b, I&E6b	Part 2: Taking Rocks Apart—2 sessions	65–73 (182–185)
DATE OF INSTRUCTION	SESSION 1	
	Teacher-led class discussion	68
	Teacher presentation	68
	Hands-on with mock rocks	68
	Teacher-led class discussion	69
	Teacher presentation	70
	Hands-on with rock matrix	70
	Writing in notebook (Rocks in Water)	70
	Teacher-led class discussion	70
	Vocabulary instruction and content review	72
	Embedded assessment—Response Sheet	73
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	73 (182–185)
	Writing in notebook	73
ES4b, I&E6a	Part 3: Observing Crystals—5 sessions	74–81 (187–188)
DATE OF INSTRUCTION	SESSIONS 1–2	
	Hands-on with settled materials in vial	76
	Writing in science notebook (Rocks in Water)	76
	Teacher-led class discussion	76
	Hands on with evaporation investigation	76–77
	Teacher-led class discussion	77
	Hands-on with crystal identification	77–78
	Teacher-led class discussion (origin of salt crystals)	78
	Writing in notebook (Mock Rock Minerals)	78
	Teacher-led discussion (summary of mock rock minerals)	78
	Teacher presentation (rock and mineral definitions)	79
	Writing in notebook (Mock Rock Minerals)	79
	Vocabulary instruction, content review	80
DATE OF INSTRUCTION	SESSION 3	
	Student summary reading with questions	81 (187–188)
DATE OF INSTRUCTION	SESSIONS 4–5	
	Assess Progress—I-Check 1 and review	81



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Checklist of CA Science Standards for Solid Earth Investigation 2

Content Standard Focus	Investigation 2: Scratch Test	Teacher Guide (Science Resources) pages
ES4b	Part 1: Observing Minerals—2 sessions	92–97 (190–194)
DATE OF INSTRUCTION	SESSION 1	
	Teacher-led class discussion	94
	Teacher presentation	94
	Hands-on with mineral samples	94
	Writing in notebook (Scratch-Test Minerals)	94
	Teacher presentation	95
	Hands-on with mineral samples	95
	Teacher-led class discussion	95
	Vocabulary instruction and content review	96
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	97 (190–194)
	Writing in notebook	97
ES4b, I&E6f	Part 2: Testing for Hardness—6 sessions	100–108 (195–200)
DATE OF INSTRUCTION	SESSION 1	
	Hands-on with mineral samples	102
	Teacher-led class discussion	102
	Teacher presentation (hardness test)	102
	Hands-on with hardness test practice	103
	Teacher-led class discussion	104
	Teacher presentation	104
	Writing in notebook (Mineral Hardness)	104
	Hands-on with mineral samples	104–105
	Teacher-led class discussion (debate)	105
	Writing in notebook (Mineral Hardness)	105
	Vocabulary instruction and content review	106
DATE OF INSTRUCTION	SESSION 2	
	Embedded assessment—Response Sheet	107
DATE OF INSTRUCTION	SESSION 3	
	Student reading with discussion questions	107 (195–198)
	Writing in notebook	107
DATE OF INSTRUCTION	SESSION 4	
	Student summary reading with discussion questions	108 (199–200)
	Writing in notebook	108
DATE OF INSTRUCTION	SESSIONS 5–6	
	Assess Progress—I-Check 2 and review	108



Checklist of CA Science Standards for Solid Earth Investigation 3

Content Standard Focus	Investigation 3: Calcite Quest	Teacher Guide (Science Resources) pages
ES4b	Part 1: Detecting Calcite—2 sessions	118–124 (202–205)
DATE OF INSTRUCTION	SESSION 1	
	Teacher presentation	120
	Hands-on with rock samples	120
	Writing in notebook (Calcite-Quest Rocks)	120
	Teacher-led class discussion	120
	Teacher presentation	120–121
	Hands-on with calcite and rocks in vinegar	121–122
	Teacher-led class discussion	122
	Vocabulary instruction and content review	123
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	124 (202–205)
	Writing in notebook	124
ES4a, ES4b, I&E6a	Part 2: Looking for More Evidence—6 sessions	125–134 (206–212)
DATE OF INSTRUCTION	SESSION 1	
	Teacher-led class discussion	127
	Hands-on with rocks in vinegar	127
	Teacher-led class discussion	127
	Hands-on with evaporation of vinegar	128
	Embedded assessment—Response Sheet	128
DATE OF INSTRUCTION	SESSION 2	
	Teacher presentation	129
	Hands-on with evaporation results	129
	Teacher-led class discussion	129
	Teacher presentation	130
	Teacher-led class discussion	130
	Vocabulary instruction and content review	132
DATE OF INSTRUCTION	SESSION 3	
	Student reading with discussion questions	133 (206–210)
	Writing in notebook	133
DATE OF INSTRUCTION	SESSION 4	
	Student summary reading with discussion questions	134 (211–212)
	Writing in notebook	134
DATE OF INSTRUCTION	SESSIONS 5–6	
	Assess Progress—I-Check 3 and review	134



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Checklist of CA Science Standards for Solid Earth Investigation 4

Content Standard Focus	Investigation 4: Take It for Granite	Teacher Guide (Science Resources) pages
ES4b	Part 1: Other Mineral Properties—4 sessions	148–156 (214–219)
DATE OF INSTRUCTION	SESSIONS 1–2	
	Teacher-led class discussion	151
	Teacher presentation (streak)	151
	Hands-on with mineral samples	151–152
	Writing in notebook (Streak-Test Minerals)	152
	Teacher presentation (luster)	152
	Teacher-led class discussion	152
	Hands-on with mineral samples	153
	Writing in notebook (Mineral-Identification Table)	153
	Teacher presentation (cleavage and magnetism)	154
	Hands-on with mineral samples	154
	Vocabulary instruction and content review	155
DATE OF INSTRUCTION	SESSION 3	
	Student reading with discussion questions	156 (214–219)
	Writing in notebook	156
DATE OF INSTRUCTION	SESSION 4	
	Embedded Assessment—Response Sheet	156
ES4a, ES4b, I&E6a	Part 2: Minerals in Granite—5 sessions	157–165 (220–226)
DATE OF INSTRUCTION	SESSION 1	
	Teacher-led class discussion	159
	Hands-on with rocks and minerals	159
	Teacher-led class discussion	159
	Hands-on with mineral samples	160
	Teacher-led class discussion	160
	Writing in notebook (Granite Minerals)	161
	Teacher-led class discussion	161–162
	Vocabulary instruction and content review	163
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	164 (220–224)
	Writing in notebook	164
DATE OF INSTRUCTION	SESSION 3	
	Student summary reading with discussion questions	165 (225–226)
	Writing in notebook	165
DATE OF INSTRUCTION	SESSIONS 4–5	
	Assess Progress—I-Check 4 and review	165



Checklist of CA Science Standards for Solid Earth Investigation 5

Content Standard Focus	Investigation 5: Landforms	Teacher Guide (Science Resources) pages
ES5b, I&E6d, I&E6f	Part 1: Weathering—5 sessions	179–189 (228–231)
DATE OF INSTRUCTION	SESSIONS 1–4	
	Small-group discussion	181
	Teacher presentation	181
	Hands-on with physical weathering	181–182
	Writing in notebook (Weathering Granite)	182
	Hands-on with chemical weathering	183–184
	Writing in notebook (Rocks in Acid Rain)	183–184
	Teacher-led class discussion	184–185
	Hands-on with evaporation	185–186
	Teacher presentation (freezing water in jar)	185, 187
	Writing in notebook (Acid-Rain Evaporation)	186
	Teacher presentation (chemical weathering)	186
	Vocabulary instruction and content review	188
DATE OF INSTRUCTION	SESSION 5	
	Student reading with discussion questions	189 (228–231)
	Writing in notebook	189
ES5a, ES5c, I&E6f	Part 2: Erosion—1 session	190–198 (232)
DATE OF INSTRUCTION	SESSION 1	
	Teacher presentation	194–195
	Hands-on with stream tables	195
	Teacher-led class discussion	196–197
	Vocabulary instruction and content review	198
ES5c, I&E6d	Part 3: Deposition—2 sessions	199–205 (233–239)
DATE OF INSTRUCTION	SESSION 1	
	Teacher-led class discussion	201
	Hands-on with stream tables	201
	Teacher-led class discussion	201–202
	Hands-on with settling sediments in a vial	201–202
	Teacher-led class discussion	202–203
	Hands-on with stream tables	203
	Teacher-led class discussion	203
	Vocabulary instruction and content review	204
DATE OF INSTRUCTION	SESSION 2	
	Student reading with discussion questions	205 (233–239)
	Writing in notebook	205



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Checklist of CA Science Standards for Solid Earth Investigation 5 (cont.)

Content Standard Focus	Investigation 5: Landforms	Teacher Guide (<i>Science Resources</i>) pages
<i>ES5a, ES5c, I&E6d, I&E6f</i>	Part 4: <i>Rapid Changes</i>—6 sessions	206–215 (240–257)
DATE OF INSTRUCTION	SESSIONS 1–2	
	Teacher-led class discussion	208–209
	Hands-on with stream tables	209
	Teacher-led class discussion	210–211 (240–243)
	Teacher presentation	212
	Teacher-led class discussion	212
	Vocabulary instruction and content review	213
DATE OF INSTRUCTION	SESSION 3	
	Student reading with discussion questions	214–215 (244–255)
	Writing in notebook	214
DATE OF INSTRUCTION	SESSION 4	
	Embedded Assessment—Response Sheet	214
DATE OF INSTRUCTION	SESSION 5	
	Student summary reading with discussion questions	215 (256–257)
	Writing in notebook	215
DATE OF INSTRUCTION	SESSION 6	
	Assess Progress—I-Check 5 and review	215
<i>I&E6b, I&E6c, I&E6d</i>	Part 5: <i>Investigation and Experimentation</i>—3 sessions	216–220
DATE OF INSTRUCTION	SESSIONS 1–3	
	Teacher-led class discussion	218
	Writing in notebook (Stream-Table Plan)	218–219
	Hands-on with individual projects and presentations	218–219
	Assessment: Posttest	220