

## **I. Teacher Preparation**

### ***A. Elementary School Licensure Requirements***

#### **1. Licensure Grade Levels<sup>1</sup>**

a. Does the state offer an Early Elementary Education credential (Preschool/Kindergarten to Grade 2/3)?	Yes	Early Childhood (K-Grade 3)
b. Does the state offer an Elementary Education credential (Kindergarten/Grade 1 to Grade 5/6)?	Yes	Elementary (1-8)

#### **2. Early Elementary<sup>2,3</sup>**

a. Is an educational practice examination required for licensure?	No
b. Is an examination in reading and writing or language arts required for licensure?	Yes
c. Is a mathematics examination required for licensure?	Yes
d. Is a science examination required for licensure?	Yes

#### **3. Elementary Education<sup>2,3</sup>**

a. Is an educational practice examination required for licensure?	No
b. Is an examination in reading and writing or language arts required for licensure?	Yes
c. Is a mathematics examination required for licensure?	Yes
d. Is a science examination required for licensure?	Yes

#### **4. Licensure Renewal**

a. What is the period of validity for an educator's license?	Less than 5 years	
	5 years	X <sup>4</sup>
	Greater than 5 years	

b. Can in-service teachers receive certification credit for professional development courses/programs in Earth and Space Sciences?	Yes		We do not offer specific coursework for elementary teachers specific to science certification or endorsement at this time. We are working on an elementary STEM endorsement which would include Earth/Space Science coursework. That endorsement should be available to the community in fall 2015. <sup>5</sup>
	No	X	
	Local issue		
	Unknown		

### ***B. Elementary School Curriculum Support***

#### **1. Guidelines for Curriculum Development**

a. Does the SEA provide guidelines for curriculum development, beyond the state's science standards?	Yes
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b. If yes, which	1. Science frameworks		
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of the following does the state provide?	2. Curriculum maps		
	3. Learning progressions		
	4. Benchmark maps		
	5. Templates for unit design		
	6. Curriculum development guides		
	7. Model units		
	8. Lesson plan templates/guides		
	9. Web-based lesson plan portals	X	Utah Education Network <sup>6</sup>
	10. Model lesson plans		
	11. Assessment guidelines		

## 2. Instructional Materials<sup>7</sup>

a. At what level does adoption of instructional materials occur?	State level	X
	Local level	

b. If the state is an adoption state, do adopted materials in science include those that address topics specific to the geosciences?	Yes	<p>The State does not provide any recommended instructional materials at the elementary level, i.e. there are no adopted textbooks or materials from publishers. Adopted textbooks and materials do exist at the high school level.</p> <p>The State does offer Science Textbooks through its Open Education Resource. Textbooks are compiled from open education resources, such as CK12.org and Siyavula's Thunderbolt Kids. They are available as PDF files through the State's website. Textbooks at the 3rd, 4th, and 5th grade levels are organized according to the State's standards in science.</p>
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## 3. Support for New Standards

a. Does that state provide resources to school systems to effectively implement the standards as they change?	Yes		Currently, the state is reviewing its science standards for adoption in 2016-2017.
	No	X	
	Local issue		We do not have a budget specific to support for developing resources for the new science standards articulated at this time. That budget won't be available until August 2015. <sup>5</sup>
	Unknown		

**4. Professional Development**

a. Does the SEA provide professional development that is, at least in part, specific to the geosciences?	Yes, provided by SEA	X	The State Office of Education partners with our informal science education institutions such as the Natural History Museum of Utah, Red Butte Gardens, Thanksgiving Point, and the Utah Society of Environmental Education to promote opportunities for teachers around geosciences. <sup>5</sup>
	Yes, but independent of SEA		
	No		
	Local issue		
	Unknown		

## II. Curriculum

### A. Elementary School State Science Standards

#### 1. Organization<sup>8</sup>

a. What is the name of the state's elementary school science standards?	Utah Core State Standards for Science  Core Standards for K-2 Science (adopted 2010) Core Standards for 3-6 Science (adopted 2002)		
b. What is the grade-level arrangement of the standards?	Grade specific		X
	Grade-level bands		
	Benchmark grade levels		
c. How are the standards outlined?	Overarching standard statements (level one)	X	d. What terms are used to identify each level?
	Sub-standard statements that provide more detail to the overarching standards (level two)	X	
			Science Benchmarks Objectives and Indicators

#### 2. Content<sup>8</sup>

a. Are the science standards subdivided according to scientific discipline (Physical Science, Life Science, and Earth and Space Science)?	Yes	<p>The Core Standards for K-2 Science (adopted 2010), are subdivided by:</p> <p>Standard 1: Intended Learning Outcomes Standard 2: Earth and Space Science Standard 3: Physical Science Standard 4: Life Science</p> <p>Yes, but not as overtly as the K-2 Science Standards. The Core Standards for 3-6 Science (adopted 2002) are subdivided by Science Benchmark. These describe the science content students should know. Each grade level has three to five Science Benchmarks. Each Benchmark has 1-2 Standards. Standards are discipline focused. This means that some benchmarks have standards from two different disciplines, e.g. Physical Science and Earth and Space Science.</p>
b. Are the Earth and Space Science standards identified by core ideas in the geosciences?	Yes	<p>The Core Standards for K-2 Science (adopted 2010) contains Standard 2: Earth and Space Science. The standard is subdivided by the following core ideas/topics:</p> <p>Earth Materials Celestial Movement Weather</p> <p>The Core Standards for 3-6 Science (adopted 2002) are not subdivided by core idea.</p>
c. Do the state's standards include	No	

current issues in the geosciences? Current issues in the geosciences can be described as Earth science processes altered by human activities or Earth science processes that affect human well-being.		
d. Do the state's standards include career exploration in the geosciences?	No	

### 3. Development

a. When were the standards adopted or last revised?	Within the last two years (2014-2015)		Core Standards for K-2 Science (adopted 2010)
	Between 3-6 years ago (2010-2013)	X	
	Between 7-10 years ago (2006-2009)		Core Standards for 3-6 Science (adopted 2002) <sup>8</sup>
	More than 10 years ago (before 2006)	X	

b. Does the state have plans to review/revise its science standards?	Currently under review		A Core Revision Timeline is in place. Steps for revision of the Elementary Science standards are:  2015-2016: Public review and revise standards 2016-2017: Adoption and Professional Development 2017-2018: Begin to implement and align assessment 2018-2019: new Assessment Fully Implement <sup>9</sup>
	Within the next 5 years (2015-2020)	X	
	Between 5 and 10 years from now (2020-2025)		
	No plan or timeline exists		
	Unknown		

### B. Middle School State Science Standards

#### 1. Content<sup>10</sup>

a. What is the name of the state's middle school science standards?	Utah Core State Standards for Science
b. Are Earth and Space Science topics included in the standards?	Yes
c. Is Life Science and Physical Science content included in the standards?	Yes

### ***C. High School State Science Standards***

#### **1. Content<sup>10</sup>**

a. What is the name of the state's high school science standards?	Utah Core State Standards for Science
b. Are Earth and Space Science topics included in the standards?	Yes
c. Is Life Science and Physical Science content included in the standards?	Yes

### ***D. High School Course Requirements***

#### **1. Credits Required for Graduation<sup>11</sup>**

a. What is the total number of credits required for graduation?	24
b. What is the number of science credits required for graduation?	3

#### **2. Course Content<sup>11</sup>**

a. Is Life Science required?	No
b. Is Physical Science required?	No
c. Is Earth Science required?	No
d. Is Environmental Science required?	No
e. Is Earth Science accepted?	Yes
f. Does Earth Science have to be lab-based?	Not Stated

### **III. Instruction**

#### ***A. Elementary School Approaches to Instruction***

##### **1. State Science Standards<sup>8</sup>**

a. Do the state's science standards provide guidelines regarding any specific approach to be used for science teaching?	Yes
b. If so, what is the term used to identify this approach?	Student Inquiry
c. Do the state's science standards provide a rationale for this approach?	Yes
d. If so, what is the rationale?	See the standards

##### **2. Guidelines for Curriculum Planning**

a. If the state offers guidelines for curriculum planning, do these advocate more specific strategies for science instruction?	No
b. If so, what are the strategies?	N/A

##### **3. Technology<sup>5</sup>**

a. Are decisions regarding the use of technology in elementary science classrooms made at the state level or local level?	Local level
b. What kinds of technology are being used by elementary school science teachers in the state?	It is going to vary from district to district.

## **IV. Learning Contexts**

### ***A. Elementary School Classrooms***

#### **1. Class Size<sup>5</sup>**

a. What is the average number of students in an elementary classroom?	Unknown (local data)
b. What is the maximum allowable number of students in an elementary classroom?	Unknown (local data)

#### **2. Instructional Time<sup>5</sup>**

a. At the elementary level, are teachers recommended or required to dedicate a certain amount of instructional time to science?	There is no time requirement		The state office of education does not set instructional times for each subject area. That is determined by local control.
	Local decision	X	
	Teachers must spend a certain amount of time teaching science.		
	Unknown		

### ***B. Elementary School Support Services***

#### **1. Specialized Support<sup>5</sup>**

a. Are there specific policies in place regarding English as a Second Language (ESL) and Special Education services that could impact science instruction (e.g. pull-out or push-in models)?	Local level decision	X	That is going to be specific to individual districts and their policies and discretion.
	Depends on the specifications of a student's IEP or ILP		
	Teachers must follow specific practices regarding science		
	Unknown		



**V. Extra-Curricular Programs**

***A. Elementary School Geosciences Enrichment Opportunities***

**1. After-School and Informal Education<sup>5</sup>**

a. Are opportunities to engage in geoscience-related topics outside of school (e.g. after-school programs and informal education programs) being offered to students in the state?	Local level data
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b. If so, what are they?	This is not information that available at the state level, as each district is going to offer different opportunities based on their availability and partnerships.
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**2. Remedial Education<sup>5</sup>**

a. What remedial supports are in place for geosciences topics with which students are struggling?	Local level decision	X	That is going to be specific to individual districts and their policies and discretion.
	Remediation services are being provided to students in science		
	No remediation support in science		
	Unknown		

## **VI. Monitoring Systems**

### ***A. Elementary School Statewide Science Assessment***

#### **1. Structure and Content**

a. What is the name of the statewide standardized test in science at the elementary level?	Student Assessment of Growth and Excellence (SAGE), Science <sup>12</sup>		
b. At what grade(s) is the assessment implemented?	4 and 5 <sup>12</sup>		
c. Does the statewide science assessment measure achievement of the state's standards, i.e. is the assessment aligned with state standards?	Yes <sup>13</sup>		
d. Is the content of the statewide science assessment subdivided by discipline, namely Physical Science, Life Science, Earth and Space Science?	Yes <sup>14</sup>		
e. Are there any plans for revising or changing the current elementary level science assessment?	No plans for revision	X	Assessment will change based on the changes to the science standards that are approved by the Utah State Board of Education. <sup>5</sup>
	Revision is planned, but timeline is unknown		
	Revision is planned with implementation date set		
	Unknown		

#### **2. Results<sup>14</sup>**

a. Is student achievement measured by Performance Level Descriptors?	Yes
b. If yes, how many performance levels are there?	4

#### **3. District Level Reporting<sup>15</sup>**

a. At the district level, are the percentages of students performing at each PLD reported to the public?	Yes	Utah's Educational Data Gateway is an on-line platform provided by the Utah State Office of Education (USOE) that allows the public and school personnel to access education-related data. Users can select a school year and district and view results on statewide assessments (SAGE), including science.
b. At the district level, is student achievement reported according to scientific discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	Yes	At the district level, results are aggregated and not subdivided by discipline.  Raw test results on the statewide assessments (SAGE) are available to teachers, schools, and districts through the Online Reporting System of the SAGE assessment system. Data can be viewed at the individual, class, school, district, and state levels.
c. If yes, is this data available to the public?	No	The Online Reporting System is a secure platform that requires a username and password.

#### **4. State Level Reporting<sup>16</sup>**

a. At the state level, are the percentages of	Yes	State level results, as provided to the public
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students performing at each PLD reported to the public?		through Utah’s Educational Data Gateway, which is an on-line platform provided by the Utah State Office of Education (USOE) that allows the public and school personnel to access education-related data. State level results on the statewide science assessment (SAGE) are aggregated and not subdivided by discipline.
b. At the state level, is student achievement reported according to scientific discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	No	
c. If yes, is this data available to the public?	No	

***B. Elementary School International Assessments in Science***

**1. TIMSS<sup>17</sup>**

a. Has the state participated in the Trends in International Mathematics and Science Study (TIMSS)?	No
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b. If yes, in which years did the state participate?	1995	
	2003	
	2007	
	2011	

***C. Middle School Statewide Science Assessment***

**1. Structure and Content<sup>18</sup>**

a. What is the name of the statewide standardized test in science at the middle school level?	Student Assessment of Growth and Excellence (SAGE), Science
b. At what grade(s) is the assessment implemented?	6, 7, and 8
c. Does the assessment address Life Science concepts?	Yes
d. Does the assessment address Life Science concepts?	Yes
e. Does the assessment address Earth Science concepts?	Yes

***C. High School Statewide Science Assessment(s)***

**1. Structure and Content<sup>18</sup>**

a. What is the name of the state's standardized science assessment(s)?	Student Assessment of Growth and Excellence (SAGE), End-of-Course exams in Biology, Chemistry, Physics, and Earth Science
b. At what grade level is the assessment implemented?	End-of-Course
c. Does the assessment address Life Science concepts?	Yes
d. Does the assessment address Physical Science concepts?	Yes
e. Does the assessment address Earth Science concepts?	Yes

## **VII. Accountability**

### ***A. School Level***

#### **1. Individual Student**

a. Does the state produce an Individual Student Report (ISR) that describes a student's performance on the state's science assessment?	Yes <sup>19</sup>	Schools provide an Individual Student Report to parents/guardians. This report describes an individual student's performance on statewide assessments in terms of scale score and proficiency level.
b. Is the ISR made available to a student's parents or guardians?	Yes <sup>19</sup>	Grade 4 and grade 5 reports include student performance on the science assessment in terms of scale score and proficiency level. In addition, results are subdivided according to Reporting Category.
c. Is the ISR made available to a student's teacher?	Yes <sup>20</sup>	The Reporting Categories for science are:
d. Does the ISR report student's performance in terms of scale score and achievement level?	Yes <sup>19</sup>	<u>Grade 4</u> Water Cycle; Weather; Rocks, Soils, and Plant Growth; Fossils; Utah Wetlands, Forests, and Deserts <u>Grade 5</u>
e. Does the ISR subdivide results by science discipline (Physical Science, Life Science, Earth and Space Science)?	Yes <sup>19</sup>	Chemical and Physical Changes; Processes that Reshape Earth's Surface; Magnetism; Electricity; Inherited Traits  Raw test results on the statewide assessments (SAGE) are available to teachers, schools, and districts through the Online Reporting System of the SAGE assessment system. Data can be viewed at the individual, class, school, district, and state levels. The Online Reporting System is a secure platform that requires a username and password.

#### **2. Teacher Appraisal<sup>5</sup>**

a. Are students' results on the statewide science assessment a component of teacher evaluation?	No
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### ***B. District Level***

#### **1. District Accreditation**

a. Are student outcomes in statewide science assessments at the elementary level part of accreditation of public schools at the district level?	Yes	
	No	
	At a future point	
	Local decision	
	Unknown	X

### ***C. State Level***

#### **1. Statewide Monitoring**

a. Are student outcomes in statewide science assessments at the elementary level used in monitoring the adequacy of state educational systems?	Unknown	
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## 2. Trends in Student Outcomes<sup>21</sup>

a. Does the SEA report to the public performance results on the state science assessment over time?	Yes
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b. If yes, how many years of achievement data are available?	3 years (2011-2012 to 2013-2014)		
	4-7 years (2007-2008 to 2013-2014)		
	8 to 10 years (2004-2005 to 2013-2014)	X	9 years of data (2004-2013)
	11 or more years (before 2004-2005)		

c. Are the results also subdivided by science discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	No
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<sup>1</sup> Utah State Office of Education, Licensing, Teaching and Learning Licensing, License Requirements, Initial Licensure: <http://www.schools.utah.gov/cert/License-Requirements/Initial-Licensure.aspx>

<sup>2</sup> Utah State Office of Education, Licensing, Teaching and Learning Licensing, Out-Of-State Educator License Application, Application Checklists, Praxis Test Chart: <http://www.schools.utah.gov/cert/Out-of-State-License.aspx>

<sup>3</sup> Educational Testing Service, Praxis, Utah Test Requirements, Utah Test Requirements: <http://www.ets.org/praxis/ut/requirements/>

<sup>4</sup> Utah State Office of Education, Licensing, Teaching and Learning Licensing, License Renewals: <http://www.schools.utah.gov/cert/License-Renewals/Renewal-Information/Level-2-3.aspx>

<sup>5</sup> Utah State Office of Education (personal communication).

<sup>6</sup> Utah Education Network, PreK-12 Educator Resources, Lesson Plan Library: <http://www.uen.org/k12educator/corelessonplans.shtml>

<sup>7</sup> Utah State Office of Education, Science, Open Education Resource (OER), 2014-2015 Science Textbooks for Grades 3-12 <http://www.schools.utah.gov/CURR/science/OER.aspx>

<sup>8</sup> Utah State Office of Education, Science, Utah Core Standards, K-2, 3-6, PDFs: <http://www.schools.utah.gov/CURR/science/Core.aspx>

<sup>9</sup> Utah State Office of Education, Science, SSECC, SSECC – 2014 Meetings/Workshops, Core Revised Timeline, PDF: <http://www.schools.utah.gov/CURR/science/SSECC/2014.aspx>

<sup>10</sup> Utah State Office of Education, Science, Utah Core Standards, 7and 8, 9-12: <http://www.schools.utah.gov/CURR/science/Core.aspx>

<sup>11</sup> Utah State Office of Education, Graduation Information, Education Requirements: <http://www.schools.utah.gov/CURR/gradinfo/Home/High-School-Requirements-by-Year.aspx>

<sup>12</sup> Utah State Office of Education, Assessment, Student Assessment of Growth and Excellence (SAGE): <http://www.schools.utah.gov/assessment/Adaptive-Assessment-System.aspx>

<sup>13</sup> Utah State Office of Education, Assessment, Student Assessment of Growth and Excellence (SAGE), Science, Science Blueprints, PDF: <http://www.schools.utah.gov/assessment/Adaptive-Assessment-System/Science.aspx>

<sup>14</sup> Utah State Office of Education, Assessment, Student Assessment of Growth and Excellence (SAGE), Science, Science PLDs (Proficiency Level Descriptors), 4<sup>th</sup> Grade Science PLD, 5<sup>th</sup> Grade Science PLD, PDFs: <http://www.schools.utah.gov/assessment/Adaptive-Assessment-System/Science.aspx>

<sup>15</sup> Utah State Office of Education, SAGE, SAGE Results, Viewing SAGE Results: <http://www.schools.utah.gov/sage/Results.aspx>

<sup>16</sup> Utah State Office of Education, Data Gateway, SAGE Results for State: <https://datagateway.schools.utah.gov/Assessment/SAGE>

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<sup>17</sup> U.S. Dept. of Education, Institute of Education Sciences, National Center for Education Statistics, Trends in International Mathematics and Science Study (TIMSS), State and District Participation in TIMSS:

<https://nces.ed.gov/TIMSS/benchmark.asp>

<sup>18</sup> Utah State Office of Education, Assessment, Student Assessment of Growth and Excellence (SAGE), Science:

<http://www.schools.utah.gov/assessment/Adaptive-Assessment-System/Science.aspx>

<sup>19</sup> Utah State Office of Education, Assessment, Student Assessment of Growth and Excellence (SAGE) – Communication Resources, Resources, SAGE Student Level Report Family Guide:

<http://www.schools.utah.gov/assessment/SAGE-Communication.aspx>

<sup>20</sup> Utah State Office of Education, SAGE, SAGE Results, Viewing SAGE Results:

<http://www.schools.utah.gov/sage/Results.aspx>

<sup>21</sup> Utah State Office of Education, Data and Statistics, Data Reports, Data Reports – Assessment, Criterion-Referenced Tests (CRT): <http://www.schools.utah.gov/data/Reports/Assessment.aspx>