

## **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 (P-4)
b. Does the state offer an Elementary Education credential (Kindergarten/Grade 1 to Grade 5/6)?	Yes	Elementary Education (Grades K-6)

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

a. Is an educational practice examination required for licensure?	Yes
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?	No

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

a. Is an educational practice examination required for licensure?	Yes
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>3</sup>
	Greater than 5 years	

b. Can in-service teachers receive certification credit for professional development courses/programs in Earth and Space Sciences?	Yes	X	Professional development must be approved through the state before credit can be given. It must connect to the science content.  Teachers can receive credit through the universities for course work in geosciences. <sup>4</sup>
	No		
	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?	No
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b. If yes, which of the following does the state provide?	1. Science frameworks		
	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		
	10. Model lesson plans		
	11. Assessment guidelines		

**2. Instructional Materials**

a. At what level does adoption of instructional materials occur?	State level		Recent legislation was passed that allows local districts to make their own decisions about how to spend their funding for materials of instruction. <sup>4</sup>
	Local level	X	

b. If the state is an adoption state, do adopted materials in science include those that address topics specific to the geosciences?	N/A
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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	X	The SEA has a strategic plan in place to support teachers with the implementation of the new standards. The plan involves providing PD to support the new standards (and assessments) over a 3 year period. <sup>4</sup>
	No		
	Local issue		
	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	<p>Geosciences PD is offered through SEA supported regional centers. Science implementation in AR public schools is supported by the Arkansas Science, Technology, Engineering and Math (STEM) Coalition. Services are provided through eleven Arkansas STEM Centers spread throughout the state. Centers provide PD workshops for curriculum planning, science instruction, assessment development, technology training, and laboratory safety.</p> <p>Note: on the Arkansas STEM Coalition website, a PD course is being advertised titled, "Project Learning Tree, Project WILD &amp; Project WET Workshop"</p> <p>PD is also offered through GLOBE.<sup>5</sup></p>
	Yes, but independent of SEA		
	No		
	Local issue		
	Unknown		

## II. Curriculum

### *A. Elementary School State Science Standards*

#### **1. Organization<sup>6</sup>**

a. What is the name of the state's elementary school science standards?	K-8 Science Curriculum Framework, Revised 2005
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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?	Content Standards
	Sub-standard statements that provide more detail to the overarching standards (level two)	X		Learning Expectations

#### **2. Content<sup>6</sup>**

a. Are the science standards subdivided according to scientific discipline (Physical Science, Life Science, and Earth and Space Science)?	Yes	
b. Are the Earth and Space Science standards identified by core ideas in the geosciences?	Yes	Earth Systems Earth's History: Changes in Earth and Sky Objects in the Universe
c. Do the state's standards include 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.	Yes	At the K-4 level, students examine natural resources, including land, water, rocks and minerals. In grade 4, students consider the impact of water pollution, and the impact on the environment from the use of natural resources. In grade 4, students consider weather related natural disasters.
d. Do the state's standards include career exploration in the geosciences?	Yes	At grade 5: ESS.8.5.10 Investigate careers, scientists, and historical breakthroughs related to minerals and rocks ESS.10.5.6 Investigate careers, scientists, and historical breakthroughs related to planets

### 3. Development

a. When were the standards adopted or last revised?	Within the last two years (2014-2015)		Adopted 2005 <sup>6</sup>
	Between 3-6 years ago (2010-2014)		
	Between 7-10 years ago (2006-2009)		
	More than 10 years ago (before 2006)	X	

b. Does the state have plans to review/revise its science standards?	Currently under review	X	The current standards, “2005 Arkansas Science Curriculum Frameworks” are being reviewed and recommendations for revisions are being made. The new standards will be titled, “Arkansas K-12 Science Standards” and are expected to be approved mid- 2015 and rolled out in stages, starting with elementary level (K-4) in 2016-2017, grades 5-8 in 2017-2018. <sup>7</sup>
	Within the next 5 years (2015-2020)		
	Between 5 and 10 years from now (2020-2025)		
	No plan or timeline exists		
	Unknown		

#### *B. Middle School State Science Standards*

##### 1. Content<sup>6</sup>

a. What is the name of the state’s middle school science standards?	K-8 Science Curriculum Framework, Revised 2005
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>6</sup>

a. What is the name of the state’s high school science standards?	K-8 Science Curriculum Framework, Revised 2005
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>8</sup>

a. What is the total number of credits required for graduation?	22
b. What is the number of science credits required for graduation?	3

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

a. Is Life Science required?	Yes
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b. Is Physical Science required?	Yes
c. Is Earth Science required?	No
d. Is Environmental Science required?	No
e. Is Earth Science accepted?	No
f. Does Earth Science have to be lab-based?	N/A

### **III. Instruction**

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

##### **1. State Science Standards<sup>6</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?	Characteristics and Processes of Science

c. Do the state's science standards provide a rationale for this approach?	No
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d. If so, what is the rationale?	N/A
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##### **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>4</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?	Varies widely depending on local resources.

## **IV. Learning Contexts**

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

#### **1. Class Size<sup>4</sup>**

a. What is the average number of students in an elementary classroom?	Unknown
b. What is the maximum allowable number of students in an elementary classroom?	Maximum size is 25.

#### **2. Instructional Time<sup>4</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		Science must be taught annually and the science framework must be taught.
	Local decision	X	
	Teachers must spend a certain amount of time teaching science.		

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

#### **1. Specialized Support<sup>4</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		Teachers must follow IEP plan for each student. Students with IEPs may receive alternative assessments or demonstrate mastery through a portfolio assessment.  ESL students are pulled in some schools for language instruction during science.
	Depends on the specifications of a student's IEP or ILP	X	
	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>4</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?	Yes
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b. If so, what are they?	<p>Students have opportunities to participate in geology and environmental clubs and GLOBE programs.</p> <p>Trainings are provided to other organizations on the science standards so that programs are aligned. More reaching out to other organizations to provide aligned programs continues to increase.</p> <p>Examples: State Parks, Museum at Discovery, Project learning Tree, Environmental organizations.</p>
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**2. Remedial Education<sup>4</sup>**

a. What remedial supports are in place for geosciences topics with which students are struggling?	Local level decision		Students are required to receive remediation services if they do not perform satisfactorily on the 5th grade assessment.
	Remediation services are being provided to students in science	X	
	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?	Grade 5 Augmented Benchmark Exam (ABE) <sup>9</sup>	
b. At what grade(s) is the assessment implemented?	5 <sup>9</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>10</sup>	
d. Is the content of the statewide science assessment sub-divided by discipline, namely Physical Science, Life Science, Earth and Space Science?	Yes <sup>11</sup>	
e. Are there any plans for revising or changing the current elementary level science assessment?	No plans for revision	X
	Revision is planned, but timeline is unknown	
	Revision is planned with implementation date set	
	Unknown	
		State's science standards are currently being reviewed for revision, with approval expected in 2015.
		Standards will be very similar to NGSS. Grade specific course outlines with clarifications will be added. Also AR specific content will be added. No assessment changes at this time. <sup>4</sup>

#### **2. Results<sup>12</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**

a. At the district level, are the percentages of students performing at each PLD reported to the public?	Yes <sup>13</sup>	The SEA develops reports of results for the Augmented Benchmark Examinations which are sent to districts to provide information about student performance. These include Class Roster Reports, School Roster Reports, School Summary Reports, School Profiles, and School Item-by-Item Selections of Correct Answers. These reports subdivide average results for at the class, school, district and state levels according to: - Nature of Science - Life Science - Physical Science - Earth and Space Science
b. At the district level, is student achievement reported according to scientific discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	Yes <sup>14</sup>	
c. If yes, is this data available to the public?	No <sup>14</sup>	

#### 4. State Level Reporting

a. At the state level, are the percentages of students performing at each PLD reported to the public?	Yes <sup>15</sup>	Web-based reports of test scores do not subdivide scores by science discipline.
b. At the state level, is student achievement reported according to scientific discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	Yes <sup>14</sup>	The SEA develops reports of results for the Augmented Benchmark Examinations which are sent to districts to provide information about student performance. These include Class Roster Reports, School Roster Reports, School Summary Reports, School Profiles, and School Item-by-Item Selections of Correct Answers. These reports subdivide average results for at the class, school, district and state levels according to: - Nature of Science - Life Science - Physical Science - Earth and Space Science
c. If yes, is this data available to the public?	No <sup>14</sup>	

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

##### 1. TIMSS<sup>16</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>17</sup>

a. What is the name of the statewide standardized test in science at the middle school level?	Augmented Benchmark Examinations for Science
b. At what grade(s) is the assessment implemented?	7
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>17</sup>

a. What is the name of the state's standardized science assessment(s)?	Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP)
b. At what grade level is the assessment implemented?	End-of-Course. The Spring Biology End-of-Course Examination should be administered to all students completing Biology by the end of the spring semester for high school graduation credit
c. Does the assessment address Life Science concepts?	Yes
d. Does the assessment address Physical Science concepts?	No
e. Does the assessment address Earth Science concepts?	No

**VII. Accountability**

***A. School Level***

**1. Individual Student<sup>14</sup>**

a. Does the state produce an Individual Student Report (ISR) that describes a student’s performance on the state’s science assessment?	Yes	Teachers are required to send home a copy of the Student Report on the Augmented Benchmark Exam (ABE). At grade 5, this includes the science assessment. The Student Report shows the number of points a student receives in each of the Science Skill areas: - Nature of Science - Life Science - Physical Science - Earth and Space Science
b. Is the ISR made available to a student’s parents or guardians?	Yes	
c. Is the ISR made available to a student’s teacher?	Yes	
d. Does the ISR report student’s performance in terms of scale score and achievement level?	Yes	
e. Does the ISR subdivide results by science discipline (Physical Science, Life Science, Earth and Space Science)?	Yes	

**2. Teacher Appraisal<sup>18</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>19</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	3 years (2011-2012 to 2013-2014)		5 years. 2009 to 2014.
	4-7 years (2007-2008 to 2013-2014)	X	

achievement data are available?	8 to 10 years (2004-2005 to 2013-2014)		
	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> Arkansas Department of Education, Educator Licensure Unit, Arkansas Department of Education Rules Governing Educator Licensure, PDF: <http://www.arkansased.org/divisions/human-resources-educator-effectiveness-and-licensure/educator-licensure-unit/educator-licensure-application>

<sup>2</sup> Educational Testing Service, The PRAXIS Series, State Testing Requirements: <http://www.ets.org/praxis>

<sup>3</sup> Arkansas Department of Education, Educator Licensure Unit, Renewing a Standard Educator License: <http://www.arkansased.org/divisions/human-resources-educator-effectiveness-and-licensure/educator-licensure-unit/renewing-a-standard-educator-license>

<sup>4</sup> Arkansas Department of Education (personal communication).

<sup>5</sup> Arkansas Stem Coalition: <http://www.arkansasstemcoalition.com/>

<sup>6</sup> Arkansas Department of Education, Curriculum and Instruction, Curriculum Frameworks, Science, Science Grades K-8, PDF: [http://www.arkansased.org/divisions/learning-services/curriculum-and-instruction/frameworks/curriculum\\_categories/science](http://www.arkansased.org/divisions/learning-services/curriculum-and-instruction/frameworks/curriculum_categories/science)

<sup>7</sup> Arkansas Department of Education, Curriculum and Instruction, Arkansas K-12 Science Standards, Arkansas K-12 Science Standards, Education for a New Generation, A Comprehensive Plan for the Development and Implementation of Arkansas's K-12 Science Standards, Updated August, 2014: <http://www.arkansased.org/divisions/learning-services/curriculum-and-instruction/arkansas-k-12-science-standards>

<sup>8</sup> Arkansas Department of Education, Rules Governing Standards for Accreditation of Arkansas, Public Schools and School Districts, PDF: [http://www.arkansased.gov/public/userfiles/Legal/Legal-Current%20Rules/ade\\_282\\_standards\\_0709\\_current.pdf](http://www.arkansased.gov/public/userfiles/Legal/Legal-Current%20Rules/ade_282_standards_0709_current.pdf)

<sup>9</sup> Arkansas Department of Education, Arkansas K-12 Science Standards, Arkansas Science Assessments: <http://www.arkansased.org/divisions/learning-services/curriculum-and-instruction/arkansas-k-12-science-standards/arkansas-science-assessments>

<sup>10</sup> Arkansas Department of Education, Learning Services, Student Assessment: <http://www.arkansased.org/divisions/learning-services/student-assessment>

<sup>11</sup> Arkansas Department of Education, Learning Services, Student Assessment, Archived Assessment Materials, 2014 Archived Benchmark Ancillary Materials, Spring 2014, Released Item Booklets, Grade 5: <http://www.arkansased.org/divisions/learning-services/student-assessment/archived-assessment-materials/augmented-benchmark-and-iowa/2014-archived-benchmark-ancillary-materials>

<sup>12</sup> Arkansas Department of Education, Learning Services, Student Assessment, Archived Assessment Materials, 2014 Archived Benchmark Ancillary Materials, Spring 2014, Guides and Tables, Raw to Scale Score Conversion Tables, PDF: <http://www.arkansased.org/divisions/learning-services/student-assessment/archived-assessment-materials/augmented-benchmark-and-iowa/2014-archived-benchmark-ancillary-materials>

<sup>13</sup> Arkansas Department of Education, ADE Data Center, Accountability Reports Center – School Performance Data Reports, District/School Reports: <https://adedata.arkansas.gov/arc/>

<sup>14</sup> Arkansas Department of Education, Learning Services, Student Assessment, Archived Assessment Materials, 2014 Archived Benchmark Ancillary Materials, Spring 2014, Guides and Tables, ACTAAP (Arkansas

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Comprehensive Testing, Assessment, and Accountability Program), Report Interpretation Guide, Augmented Benchmark Examinations, Grades 3-8, April 2014 Administration: <http://www.arkansased.org/divisions/learning-services/student-assessment/archived-assessment-materials/augmented-benchmark-and-iowa/2014-archived-benchmark-ancillary-materials>

<sup>15</sup> Arkansas Department of Education, Learning Services, Student Assessment, Test Scores:

<http://www.arkansased.org/divisions/learning-services/student-assessment/test-scores>

<sup>16</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>17</sup> Arkansas Department of Education, Science Assessments: <http://www.arkansased.gov/divisions/learning-services/assessment/science-assessments>

<sup>18</sup> Arkansas Department of Education, Office of Educator Effectiveness, Teacher Evaluation System, TESS Statute, PDF: <http://www.arkansased.org/divisions/human-resources-educator-effectiveness-and-licensure/office-of-educator-effectiveness/teacher-evaluation-system>

<sup>19</sup> Arkansas Department of Education, Learning Services, Student Assessment, Test Scores, Test Scores by Year, Statewide Performance Trends by Grade Level, June 30, 2014, Multi-year Patterns in Performance Trends for Arkansas Assessments: <http://www.arkansased.org/divisions/learning-services/student-assessment/test-scores/year?y=2014>