

I. Teacher Preparation

A. Elementary School Licensure Requirements

1. Licensure Grade Levels¹

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

2. Early Elementary²

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 Education²

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	X (4 years) ¹
	5 years	
	Greater than 5 years	

b. Can in-service teachers receive certification credit for professional development courses/programs in Earth and Space Sciences?	Yes	X ³	Teachers can receive credit in many areas for certificate renewal.
	No		
	Local issue		
	Unknown		

B. Elementary School Curriculum Support

1. Guidelines for Curriculum Development⁴

a. Does the SEA provide guidelines for curriculum development, beyond the state’s science standards?	Yes
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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	X	Science Course Level Expectations
	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	X	Assessment Blueprints: http://dese.mo.gov/sites/default/files/asmt-gl-blueprint-1415.pdf http://dese.mo.gov/sites/default/files/asmt-eoc-blueprint-1415.pdf

2. Instructional Materials⁵

a. At what level does adoption of instructional materials occur?	State level	
	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		The legislature is currently taking action to update the standards. There is a possibility that HB 1490 would include supports and resources for the updated standards. ³
	No		
	Local issue		
	Unknown	X	

4. Professional Development³

a. Does the SEA provide professional development that is, at least in part, specific to the geosciences?	Yes, provided by SEA	X	The state education agency is not involved in teacher preparedness. The regional profession development centers and the science teachers organization work with WET, WILD, GLOBE, and Project Learning Tree. The regional centers receive a small amount of funding from the state. Local school systems contribute to the centers. The state would not have the staffing or funding to provide professional development. SEA hosts a professional development conference in February (Interface) http://dese.mo.gov/college-career-readiness/curriculum/interface-conference
	Yes, but independent of SEA		
	No		
	Local issue		
	Unknown		

II. Curriculum

A. Elementary School State Science Standards

1. Organization⁶

a. What is the name of the state's elementary school science standards?	Missouri Learning Standards
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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?	Standards
	Sub-standard statements that provide more detail to the overarching standards (level two)	X		Grade Level Expectations

2. Content⁶

a. Are the science standards subdivided according to scientific discipline (Physical Science, Life Science, and Earth and Space Science)?	Yes	<p>The Missouri Learning Standards are organized according to 8 strands:</p> <ol style="list-style-type: none"> 1) Matter and Energy 2) Force and Motion 3) Living Organisms 4) Ecology 5) Earth Systems 6) Universe 7) Scientific Inquiry 8) Science, Technology, and Human Activity <p>Physical Science – Strands 1 and 2 Life Science – Strands 3 and 4 Earth and Space Science – Strands 5 and 6</p> <p>Strands 7 and 8 should be integrated throughout every teaching unit in each of the other strands.</p>
b. Are the Earth and Space Science standards identified by core ideas in the geosciences?	No	
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	Yes	<p>2nd grade: students look at the ways humans use Earth's materials (e.g., soil, rocks).</p> <p>4th grade: students identify the ways humans affect the erosion and deposition of Earth's materials and propose ways to solve simple environmental problems that result</p>

human activities or Earth science processes that affect human well-being.		from human activity 5th grade: students consider how major bodies of water are important natural resources. They look at how human needs and activities have affected the quantity and quality of major bodies of fresh water and propose solutions to problems related to water quality and availability that result from human activity.
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)		Science Course Level Expectations document (11/24/08) is an updated version to the April, 2005 K-12 Science Grade Level Expectations. ⁶
	Between 3-6 years ago (2010-2014)		
	Between 7-10 years ago (2006-2009)	X	
	More than 10 years ago (before 2006)		

b. Does the state have plans to review/revise its science standards?	Currently under review		HB 1490 has been introduced to the legislation. It would update the standards and provide model curricula and resources for the change, if passed. The standards are reviewed and updated via a committee of stakeholders independent from the state department of education. The state department only provides support for the meetings. NGSS can be used as a guiding resource, but cannot be adopted to use. ³
	Within the next 5 years (2015-2020)		
	Between 5 and 10 years from now (2020-2025)		
	No plan or timeline exists	X	
	Unknown		

B. Middle School State Science Standards

1. Content⁶

a. What is the name of the state's middle school science standards?	Missouri Learning Standards
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. Content⁶

a. What is the name of the state's high school science standards?	Missouri Learning Standards
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 Graduation⁷

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 Content⁷

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

III. Instruction

A. Elementary School Approaches to Instruction

1. State Science Standards⁶

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?	Scientific Inquiry
c. Do the state's science standards provide a rationale for this approach?	No
d. If so, what is the rationale?	N/A

2. Guidelines for Curriculum Planning⁴

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. Technology³

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?	Technology varies widely from 1 to 1 in some schools to schools that are in dead zones and don't have access to the internet.

IV. Learning Contexts

A. Elementary School Classrooms

1. Class Size³

a. What is the average number of students in an elementary classroom?	Class size varies widely from 22 students in one K-8 district to approximately be 15 – 17 students for an average size elementary school.
b. What is the maximum allowable number of students in an elementary classroom?	Unknown

2. Instructional Time³

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 recommends 45 minutes per day.
	Local decision		
	Teachers must spend a certain amount of time teaching science.	X	
	Unknown		

B. Elementary School Support Services

1. Specialized Support³

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 are to differentiate instruction, follow the IEPs and provide accommodations.
	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 Education³

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>Many students participate in 4H programs. The high schools have opportunities through career education. (agriculture, forestry, and wind technology).</p> <p>The state partners with the Missouri Department of Conservation. They provide curriculum resources. Other partners are the Department of Natural Resources and some museums. All organizations in the partnership support each other.</p>
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2. Remedial Education³

a. What remedial supports are in place for geosciences topics with which students are struggling?	Local level decision	X	
	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?	Missouri Assessment Program (MAP) - Science ⁸		
b. At what grade(s) is the assessment implemented?	5 ⁸		
c. Does the statewide science assessment measure achievement of the state's standards, i.e. is the assessment aligned with state standards?	Yes ⁹		
d. Is the content of the statewide science assessment sub-divided by discipline, namely Physical Science, Life Science, Earth and Space Science?	Yes ⁹		
e. Are there any plans for revising or changing the current elementary level science assessment?	No plans for revision	X ³	Once revisions to the Missouri Learning Standards are approved by the State Board that are developed by the HB 1490 Work groups.
	Revision is planned, but timeline is unknown		
	Revision is planned with implementation date set		
	Unknown		

2. Results¹⁰

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

3. District Level Reporting¹¹

a. At the district level, are the percentages of students performing at each PLD reported to the public?	Yes	District level results on the MAP Science assessment are reported in the same way as on the state level; in terms of four performance (or achievement) levels.
b. At the district level, is student achievement reported according to scientific discipline (Life Sciences, Physical Sciences, Earth and Space Sciences)?	Yes	The district level results on the MAP Science assessment that are reported by the SEA on its website are not subdivided by scientific discipline.
c. If yes, is this data available to the public?	No	LEA's can pull reports to the content standard using the secure Missouri Comprehensive Data System

4. State Level Reporting¹¹

a. At the state level, are the percentages of students performing at each PLD reported to the public?	Yes	State level results on the MAP Science assessment are reported in terms of four performance (or achievement) levels. Scores are not subdivided by science 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?	N/A	

B. Elementary School International Assessments in Science

1. TIMSS¹²

a. Has the state participated in the Trends in International Mathematics and Science Study (TIMSS)?	Yes
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b. If yes, in which years did the state participate?	1995	X
	2003	
	2007	
	2011	

C. Middle School Statewide Science Assessment

1. Structure and Content¹³

a. What is the name of the statewide standardized test in science at the middle school level?	Missouri Assessment Program
b. At what grade(s) is the assessment implemented?	8
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

C. High School Statewide Science Assessment(s)

1. Structure and Content

a. What is the name of the state's standardized science assessment(s)?	End-of-Course assessments in Biology and Physical Science ¹⁴	ACT State Testing ¹⁵
b. At what grade level is the assessment implemented?	End-of-Course	11
c. Does the assessment address Life Science concepts?	Yes	Yes
d. Does the assessment address Physical Science concepts?	Yes	Yes
e. Does the assessment address Earth Science concepts?	No	Yes

VII. Accountability

A. School Level

1. Individual Student¹⁶

a. Does the state produce an Individual Student Report (ISR) that describes a student’s performance on the state’s science assessment?	Yes	Parents receive an Individual Student Report for their child. The Report provides describes results on the MAP Science assessment in terms of four levels of achievement.
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	The Individual Students Report does not subdivide scores on the state science assessment according to science discipline.
d. Does the ISR report student’s performance in terms of scale score and achievement level?	Yes	A teacher receives an Individual Student Report for each child in his/her class. The Report describes results on the MAP Science assessment in terms of four levels of achievement.
e. Does the ISR subdivide results by science discipline (Physical Science, Life Science, Earth and Space Science)?	No	The Individual Students Report does not subdivide scores on the state science assessment according to science discipline.

2. Teacher Appraisal¹⁷

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

1. District Accreditation³

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

C. State Level

1. Statewide Monitoring³

a. Are student outcomes in statewide science assessments at the elementary level used in monitoring the adequacy of state educational systems?	Yes	Data is used for growth modeling.
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2. Trends in Student Outcomes¹¹

a. Does the SEA report to the public performance results on the state science assessment over time?				Yes
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)	X		4 years of data (2010-2014)
	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)?				Yes

¹ Missouri Department of Elementary and Secondary Education, Educator Quality, Certification, Routes to Certification: <http://dese.mo.gov/educator-quality/certification/routes-certification>

² Missouri Educator Gateway Assessments, Tests, What Tests Do I Need to Take?, Candidates Seeking Educator Certification, Certification Requirements, PDF: http://www.mo.nesinc.com/PageView.aspx?f=GEN_WhatTestsDoINeedToTake.html

³ Missouri Department of Elementary and Secondary Education (personal communication).

⁴ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Curriculum, Missouri Learning Standards, Science, Science – Grades K-5: <http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards#Sci>

⁵ Education Commission of the States, State Textbook Adoption: <https://www.ecs.org/clearinghouse/57/75/5775.htm>

⁶ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Curriculum, Missouri Learning Standards, Science, Science – Grades K-5: <http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards#Sci>

⁷ Missouri Department of Elementary and Secondary Education, Graduation Requirements, Graduation Handbook: <http://dese.mo.gov/quality-schools/graduation-requirements>

⁸ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, Grade-Level, Grade-Level Assessment, Resources, 2014-2015 LEA Guide to The Missouri Assessment Program, PDF: <http://dese.mo.gov/college-career-readiness/assessment/grade-level>

⁹ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, Assessment Resources, 2014-2015 Grade-Level Assessment Blueprints, PDF: <http://dese.mo.gov/college-career-readiness/assessment>

¹⁰ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, Grade-Level, Grade-Level Assessment, Resources, Achievement Level Descriptors, Science, PDF: <http://dese.mo.gov/college-career-readiness/assessment/grade-level>

¹¹ Missouri Department of Elementary and Secondary Education, Missouri Comprehensive Data System, Quick Facts, State Assessment, MAP_District_Final, MSEXcel: <http://mcds.dese.mo.gov/quickfacts/Pages/State-Assessment.aspx>

¹² 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>

¹³ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, Grade-Level: <http://dese.mo.gov/college-career-readiness/assessment/grade-level>

¹⁴ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, End-of-Course: <http://dese.mo.gov/college-career-readiness/assessment/end-course>

¹⁵ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, ACT: <http://dese.mo.gov/college-career-readiness/assessment/act>

¹⁶ Missouri Department of Elementary and Secondary Education, College and Career Readiness, Assessment, Grade-Level, Grade-Level Assessment, Resources, 2013-2014 Guide To Interpreting Test Results, PDF:

<http://dese.mo.gov/college-career-readiness/assessment/grade-level>

¹⁷ Missouri Department of Elementary and Secondary Education, Educator Quality, Educator Effectiveness, Essential Principles of Effective Evaluation, Overview of Essential Principles of Effective Evaluation, PDF: <http://dese.mo.gov/educator-quality/educator-effectiveness/essential-principles-effective-evaluation>