Utah Elementary Science Endorsement Overview

This document explains the components of the Utah Elementary Science Endorsement and is intended to support Institutions of Higher Education (IHEs), Local Education Agencies (LEAs), course instructors, and participants in understanding the endorsement.

Purpose of Endorsement:

The courses of the Elementary Science Endorsement (ESE) are centered around the idea that in order for teachers to understand scientific ways of thinking and support this in students they must experience science learning in authentic and experiential ways. Without this immersive learning experience, teachers can be limited in their ability to transfer research knowledge into instructional classroom practice. In other words, the ESE is meant to provide an educative learning journey for participating teachers that provides new ways and new contexts to experience science. To accomplish this, the ESE begins with the *Nature of Science and Engineering* Requirement Area, where teachers engage in experiences that support learning with and about scientific literacy. This includes deepening content knowledge, experiencing authentic science sensemaking, integrating science conceptual ideas with classroom practice, and engaging in explicit and reflective discourse about science learning and science instruction. Through the next four ESE Requirement Areas, teachers delve more deeply into scientific ideas and how they are holistically developed as core ideas, crosscutting concepts, and practices. Simultaneously, teachers develop ways to co-construct these science experiences with their own learners. The ESE culminates with the *Classroom Practices* Requirement Area in which participating teachers experience the process of supporting student sensemaking about scientific ideas and adjusting instruction based on student understanding.

Who May Earn the Endorsement:

The Utah Elementary Science Endorsement is intended for K-6 educators and may be added to a Utah Educator License that contains an Elementary or Special Education area of concentration.

Requirement Areas for Completing an Elementary Science Endorsement
1. Nature of Science and Engineering
2. Systems in Science
3. Matter and Energy in Science
4. Cause and Effect in Science
5. Stability and Change in Science
6. Classroom Practice in Science

Note:

The requirement areas may be completed through either a college/university course credit pathway or a microcredential stack pathway. Earning the endorsement may entail a combination of the two options as the six requirement areas are completed (See Below).

Requirements to earn the Elementary Science Endorsement:

Requirement Area #1: Nature of Science and Engineering	**Evidence of Competencies:**
	❏ 3 credit college/university course ([Nature of Science and Engineering](#))
	    or
	❏ Stack of Microcredentials (Nature of Science and Engineering)
	    ❏ Developing conceptual understandings of the Nature of Science ([Competencies 1, 4, 6](#))
	    ❏ Developing conceptual understandings of the Nature of Engineering and its relationship to the Nature of Science ([Competencies 2, 3](#))
	    ❏ Planning, implementing, and reflecting on science instruction that includes Nature of Science components ([Competencies 5, 7](#))
	    ❏ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 1 ([Competency 8](#))

Requirement Area #2: Systems in Science	**Evidence of Competencies:**
	❏ 3 credit college/university course ([Systems in Science](#))
	    or
	❏ Stack of Microcredentials (Systems in Science)
	    ❏ Obtaining, evaluating, and communicating information about systems in science ([Competency 1](#))
	    ❏ Developing and using models to represent systems in science ([Competency 2](#))
	    ❏ Planning, implementing, and reflecting on science instruction related to systems ([Competency 3](#))
	    ❏ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 2 ([Competency 4](#))

Requirement Area #3: Matter and Energy in Science	**Evidence of Competencies:**
	❏ 3 credit college/university course ([Matter and Energy in Science](#))
	    or
	❏ Stack of Microcredentials (Matter and Energy in Science)
	    ❏ Developing and using models about energy and matter ([Competency 1](#))
	    ❏ Participating in science discourse by critiquing and revising models of matter and energy ([Competency 2](#))
	    ❏ Planning, implementing, and reflecting on science instruction related to matter and energy ([Competency 3](#))
	    ❏ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 2 ([Competency 4](#))

Requirement Area #4: Cause and Effect in Science	**Evidence of Competencies:**
	❑ 3 credit college/university course (Cause and Effect in Science)
	    or
	❑ Stack of Microcredentials (Cause and Effect in Science)
	    ❑ Planning and carrying out investigations to identify causal relationships (Competency 1)
	    ❑ Asking and refining scientific questions about causal relationships (Competency 2)
	    ❑ Planning, implementing, and reflecting on science instruction related to cause and effect (Competency 3)
	    ❑ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 2 (Competency 4)

Requirement Area #5: Stability and Change in Science	**Evidence of Competencies:**
	❑ 3 credit college/university course (Stability and Change in Science)
	    or
	❑ Stack of Microcredentials (Stability and Change in Science)
	    ❑ Constructing models and explanations related to stability and change in systems (Competencies 1 & 3)
	    ❑ Analyzing and interpreting data related to stability and change in systems (Competency 2)
	    ❑ Planning, implementing, and reflecting on science instruction related to stability and change(Competency 4)
	    ❑ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 2 (Competency 5)

Requirement Area #6: Classroom Practice in Science	**Evidence of Competencies:**
	❑ 3 credit college/university course (Classroom Practice in Science)
	    or
	❑ Stack of Microcredentials (Classroom Practice in Science)
	    ❑ Using the crosscutting concepts and disciplinary core ideas to support sense-making (Competency 1)
	    ❑ Planning, implementing, and reflecting on three-dimensional, phenomena-based science instruction units (Competency 2)
	    ❑ Promoting effective and equitable science instruction both in personal practice and in the science education community: Level 3 (Competency 3)

Course Frameworks and Suggested Sequence:

Frameworks for required courses/microcredentials were designed by teams of educators from Higher Education and Local Educational Authorities (Districts and Charter Schools). They are based on the Utah Science with Engineering Education (SEEd) Standards and its supporting research documents. Course syllabi should be developed by facilitators to address the course objectives and topics delineated in the frameworks as well as the competencies and evidence of competencies for each requirement area. Additionally, these syllabi and accompanying applications need to be approved by the USBE Elementary Science/STEM Specialist before the courses are implemented. Please contact Melissa Mendenhall: melissa.mendenhall@schools.utah.gov for applications and to submit syllabi and applications. Also, there is a required sequence starting with Requirement Area #1 and progressing through Requirement Area #6.

For questions about this endorsement contact Melissa P Mendenhall:
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