

Guidelines and Template for Developing the Your Unit and Lessons for EDUC 395

The requirements for EDUC 395 include the submission of a fully developed original science curricular unit. This is also a required portfolio artifact. The unit should meet **all** of the following criteria:

1) **Addresses Essential Question(s), Big Idea(s) and core concepts** for a specific secondary grade level that are **aligned with the “New Framework for K-12 Science Education”**. ← This document is posted on the Moodle for your use.

2) **Employs reform based pedagogy**

This might include:

- *Inquiry
- *Learning cycles
- *Models, analogies or metaphors
- *Problem based or engineering design challenges
- *Metacognitive strategies
- *Predict, Observe, Explain
- *Discourse and argumentation
- * Social constructivist strategies
- *Literacy strategies like science journals
- *Use of data as evidence to draw conclusions
- *Conceptual Change Models
- *Demonstrations or discrepant events

3) **Is designed to develop conceptual understanding of core content** – The lessons in the unit should incorporate elements of learning theory, e.g., follow a sound conceptual sequence that connects to and expands on previously learned concepts and builds toward a Big Idea, is relevant to and builds on students’ experiences, addresses potential preconceptions and/or misconceptions, asks students to transfer knowledge to new situations, etc.

4) **Incorporates significant culturally congruent content, resources and pedagogy**

For example:

- Includes accurate, Tribally specific content, both historical and contemporary
- Addresses cultural issues and/or content that is important to students or that is relevant to students’ lives
- Employs Tribal community members as instructors
- Uses resources such as culturally relevant books, music, stories, photographs, data, primary documents, videos and so forth
- Utilizes cooperative learning strategies, observational learning, private practice
- Uses authentic learning tasks and real world contexts
- Employs alternative assessments such as performance tasks

5) **Includes a thorough description of the science concepts and cultural content addressed** – See more details on this on page three of this document in the Background Knowledge section.

6) **Includes formative and summative assessment tools** that are designed to specifically assess student achievement of specific learning objectives identified (in particular, assessment of content knowledge)

7) **Includes a minimum of four lessons** – More if needed, but at least four

- Please type the unit as a Word document, preferably using the **Lesson Template** provided on the third page of this document. Please use a **Times New Roman 12 point font**.
- Include all handouts, worksheets, assessment instruments and other supporting resources with the unit.
- Submit the final unit to the Moodle by 9:00 pm on Thursday, March 15th.

Required Elements for Your Final Unit for EDUC 395

The unit must include 1) a unit cover page, and 2) a lesson plan for each lesson, as described below.

1. Unit Cover Page

The unit cover page should include the following elements.

A) Unit overview

In the overview, provide a brief description (2 to 5 sentences) of the Big Idea, what students will be doing, and what you expect students to learn.

For example:

The purpose of this unit is to help students develop conceptual understanding of Earth's internal structure. Students will construct their understanding by engaging in a variety of activities in which they research facts, construct a model of Earth's internal structure, and apply their knowledge in developing hypotheses about how Earth's internal structure affects Earth's surface, its climate, and life on Earth.

B) Essential Question(s), Big Idea(s) and Conceptual Sequence

Write out the Essential Question(s) and Big Idea(s) that the unit addresses. Then write out the conceptual sequence that the unit will follow so that the reader can see the flow of the unit.

C) Unit Objectives aligned with Montana Benchmarks

List the unit's learning objectives, specifically stating what you expect students will be able to know and do through completing the unit in terms of content knowledge, skills and dispositions. Use descriptive verbs to help formulate precise and accurate statements of expectations for student learning. Indicate the Montana Science Content Benchmark each objective addresses.

For example:

- 1) Students will be able to model and describe Earth's internal structure. (MT Science 4, 8, 1)
- 2) Students will be able to explain the processes that interact to shape Earth's topography. (MT Science 4, 8, 1)
- 3) Students will be able to design fair experiments to test hypotheses. (MT Science 1, 8, 1)
- 4) Students will be able to describe and compare multiple perspectives on the management of natural resources. (MT Science 5, 8, 4)

D) Time/Scheduling

Indicate the time required to complete the entire unit and any special scheduling required (e.g., fieldtrip, seasonal considerations). Specific details about time should be included with each lesson plan as needed.

E) Materials/Resources

List all of the required materials for the unit. Quantities are not necessary here; that level of detail should be included with each lesson plan. Include Tribal member or other guest instructors, field trip needs, etc.

2. Lesson Plans

Each of the four (or more) lessons in the unit requires a lesson plan. **Lessons should be detailed enough so that any teacher could use them with confidence with minimal additional work.** A format for your lessons is found on the next page.

Lesson # and Lesson Title
Teacher candidate author(s)
School(s)

The Essential Question(s) and the Big Idea(s) – Write both the Essential Question(s) and the Big Idea(s) for the unit at the top of each lesson to help keep the focus on the Big Idea.

Summary of the lesson - Provide a one to two sentence description of the lesson activities and what the students will learn in the lesson. - e.g., “Students will engage in an inquiry based lesson in which they examine a soil pit and compare the properties of each soil horizon.”

Grade level - Indicate the specific grade the lesson is written for

Approximate time required/scheduling considerations - Estimate the amount of time that the lesson will take and any special considerations for scheduling like time of year or time of day – e.g., Two 45 minute class periods. Since the soil pit activity occurs outside, try to conduct this lesson during Autumn or Spring,

Lesson objectives - Write learning objectives that describe the major concepts, skills and dispositions that students are expected to achieve through the completion of the lesson. Use action verbs to formulate specific learning objectives that precisely and accurately describe expectations for student learning.

Resources/materials needed - Provide a bulleted list of the materials, equipment, and resources, including human resources such as guest speakers, that will be required to implement the lesson.

Safety Considerations – Describe any safety concerns relevant to the lesson and safety measures teachers and students should take.

Teacher preparation - List things that the teacher needs to attend to in advance in order to be prepared for the lesson. e.g., Send home field trip permission slips, create laminated vocabulary cards, contact an elder, etc.

Background information needed to teach the unit - Include important background information the teacher will need to teach the lesson with confidence and to effectively support student learning. Explain the science concepts thoroughly and how they connect to help students grasp the Big Idea. Describe the potential misconceptions that commonly arise and that should be addressed in the lessons. Thoroughly explain the cultural content in the lesson. If deemed necessary, you might also discuss cultural protocol and teaching strategies that will help a teacher in successfully implementing the lesson. Provide detailed explanations in this section and suggested references that a teacher could use to gain deeper knowledge, if appropriate.

Procedure - List the procedure for the lesson, step by step. Again, include enough information so a teacher could teach the lesson with confidence and readily support student learning. If you are teaching inquiry, include investigative questions that students may be investigating. Also, include potential questions that you the teacher could ask to scaffold learning.

Formative assessment - Describe the type of formative assessments the teacher will use to monitor and provide feedback on students’ progress in achieving the learning objectives throughout the lesson. Assessments should be embedded whenever possible and should be valuable learning experiences for the students. They should provide the teacher with a window into students’ attainment of the learning objectives and information that can be used to guide future instruction. Attach assessment tools to the lesson plan (e.g., rubrics, performance task instructions, checklist of skills, quiz, worksheet, journal prompts, probes, etc.).

Summative assessment - Describe the criteria and means that the teacher will use to summatively assess student learning, if appropriate for this lesson. Attach summative assessment tools to the lesson plan.