

Indiana Wesleyan University
Teacher Work Sample: Science

Assignment description. The premise behind this assignment is that teachers need to not only be deliberative and purposeful in designing instruction that enables students to meet learning standards and goals, but they also need to be able to document the degree to which that happens in their classrooms as a result of their teaching. Given that understanding, the purpose of this assignment is to provide pre-service teachers with a deliberate, step-by-step process by which they design a unit of instruction along with an assessment plan designed to measure the growth in student learning that results from the planned instruction.

NOTE: The science teacher work sample must address one or more of the following NSTA standards. Please indicate in your plans and materials which of these standards are being addressed:

Standard 1: Content. Teachers of science

- a. Understand and can successfully convey to students the major concepts, principles, theories, laws, and interrelationships of their fields of licensure and supporting fields as recommended by the National Science Teachers Association.

Standard 2: Nature of Science.

- c. Engage students successfully in studies of the nature of science including, when possible, the critical analysis of false or doubtful assertions made in the name of science.

Standard 3: Inquiry.

- b. Engage students successfully in developmentally appropriate inquiries that require them to develop concepts and relationships from their observations, data, and inferences in a scientific manner.

Standard 4: Issues.

- b. Engage students successfully in the analysis of problems, including considerations of risks, costs, and benefits of alternative solutions; relating these to the knowledge, goals and values of the students.

Tasks and procedures

1. Design an instructional sequence that includes a unit plan, an assessment plan, and a minimum of two lesson plans which must be part of the unit plan instructional sequence.
2. Design and administer a pre-assessment to students.
3. Aggregate and analyze data from the assessment.
4. Develop and/or adjust instructional plans based on pre-assessment data.
5. Deliver instruction.
6. Design and administer a post-assessment to students.
7. Aggregate and analyze data.
8. Construct a data display showing both pre- and post-assessment data.

9. Write a reflective commentary on the process, focusing how data were used to adapt and modify instruction to meet student learning deficiencies identified in the assessment process.

Instructional Plan. Considerations and required elements:

1. Student characteristics. Discuss the characteristics of students in your classroom that must be addressed in your instructional and assessment plans. Include factors such as age, gender, race/ethnicity, special needs, achievement/developmental levels, unusual cultural or community characteristics, languages other than English, or other factors that should be considered in the design of instruction and assessment.
2. Unit Plan.
3. Lesson Plans. A minimum of 2 lesson plans that include the elements described in the assessment plan instructions. The lessons may be spread over more than 2 class periods and/or days.
4. Reflection and self-evaluation. Use the lesson plan self-answer questions to guide your reflections and responses.
 - a. Provide examples of instructional decision making based on pre-assessment data and on students' learning or responses during the lessons. Describe what you did and clarify why these actions would improve student progress toward the learning objectives.
 - b. Describe the instructional strategies and activities that contributed most to student learning. Describe why you think these strategies and/or activities were effective in helping your students reach the learning objectives of the lesson(s).
 - c. Describe what you believe were the two greatest barriers to learning for your students in this unit. Focus only on factors you can affect as a teacher.

Assessment Plan

1. *Pre-test.* Considerations and required elements:
 - a. aligned with unit plan standards and learning objectives;
 - b. appropriate for the level and subject area;
 - c. clear criteria for assessment of student performance. If the assessment of student performance is subjective, a rubric must be developed that includes the essential elements of the performance, and descriptors of unacceptable, acceptable, and exemplary levels for each element.
 - d. Data analysis and description. The pre-test data must be aggregated and displayed in a form that can be readily analyzed and described, and from which conclusions can be drawn about student understanding and mastery of the learning outcomes.

NOTE: the pre-test must be included as part of the first lesson plan in the TWS instructional sequence.

2. *Formative Assessment.* Considerations and required elements:

- a. informal assessments designed to monitor student learning and mastery of knowledge and skill outcomes during instruction.
- b. formative assessments may include questions and answers (checking for understanding), games, guided and individual practice assignments, among others.

NOTE: The formative assessment element of the assessment plan must be included in the second lesson plan of the TWS instructional sequence.

3. *Post-test.* Considerations and required elements:
 - a. To ensure that accurate conclusions can be drawn about the degree to which student learning has increased as a result of the instructional intervention, the post-test must be either the same as or equivalent to the pre-test.
 - b. Data analysis and description. The post-test data must be aggregated and displayed in a form that can be compared to pre-test data, allowing for ready analysis and description of the differences.

NOTE: The post-test may be included in the second or a third lesson plan in the TWS instructional sequence.

4. *Quality control.* The last section of the assessment plan requires an analysis of the planned assessments to ensure that they are fair, accurate, consistent, and free from bias.
 - a. Fairness. Assessments are fair when they assess what students have been taught, and when the assessments and scoring criteria are accurately described and clearly understood. Respond to the following prompts:
 - 1.) Using alignment charts or curriculum maps, document how students have been taught the knowledge and/or skills upon which they will be tested.
 - 2.) Using assessment descriptions and scoring rubrics, document how students understand what is expected of them on the assessments in your assessment plan.
 - b. Accuracy. Assessments are accurate when they measure what they are designed to measure. Respond to the following prompts:
 - 1.) Using alignment charts or maps, document how assessments are aligned with unit goals and standards and learning objectives.
 - 2.) Demonstrate that the complexity of the assessment is similar to the standard(s) with which it is aligned, and that the cognitive demands and skill requirements are similar.
 - 3.) Demonstrate that the level of effort or degree of difficulty is consistent with the standard(s) and is reasonable for students at this age/developmental level.
 - c. Consistency. Assessments are consistent when they produce dependable results or results that would remain constant on repeated trials. Respond to the following prompt:
 - 1.) using your observations of students' performances in similar situations, and/or by using comparisons of results from assessments administered in

similar circumstances, document the degree to which the results from this assessment are consistent with these other findings.

- d. Freedom from bias. Assessments are free of bias when contextual distractions are removed from the testing situation and when they are free of racial and ethnic stereotypes, poorly conceived language and task situations, and other forms of insensitivity that might interfere with student performance. Respond to the following prompts:
 - 1.) Describe the conditions under which the assessment is administered, taking into consideration
 - a.) extraneous noise levels, lighting conditions, any condition that would cause student discomfort, and the functionality of any equipment necessary for the assessment situation.
 - b.) technical considerations, such as proper instructions, well-worded questions, and appropriate materials reproduction.
 - 2.) Document the review process that determined that the assessment is free of racial and ethnic bias, stereotypes, poorly written or ungrammatical test questions, unfair task situations, and other forms of bias.