

Cristy Lambert-Smith
6020/6021 Term Assignment

Assignment: Develop a unit of study (equivalent to about two weeks duration) that applies Tyler's basic principles of selecting educational purposes, educational experiences, and organizing educational experiences. The unit should include the following:

1. A statement of major objectives that emerge from the three sources and are stated consistently with Tyler's form.
2. An outline of learning experiences appropriate to achieving the purposes that conform to Tyler's criteria.
3. An explanation of how the learning experiences are organized, including connections between this unit and other components (subjects) of the school curriculum.

10th Grade Environmental Science

Objective: Students will identify and investigate problems scientifically.

Unit Duration: 2 weeks

Purpose/Organization: This unit is designed to introduce and orientate students to the process of scientific research using selected topics in Environmental Science. The learning activities are organized in a way that aids understanding of the research process (vertical organization) while also providing experience with statistical analysis and other mathematical topics that are also discussed in other subject areas (horizontal organization).

Major Objectives:

- Students will successfully suggest reasonable hypotheses for identified problems.
- Students will develop procedures for solving scientific problems.
- Students will collect, organize and record appropriate data.
- Students will graphically compare and analyze data points and/or summary statistics.
- Students will develop reasonable conclusions based on data collected.
- Students will evaluate whether conclusions are reasonable by reviewing the process and checking against other available information.

Daily Activities and Assessment:

Day 1: What is a hypothesis?

- The term hypothesis will be introduced during opening lecture including the word's origin. Components of a good hypothesis statement will be discussed.
- Several research studies will be examined as a group to locate the hypothesis statement.
- Small groups will be formed and students will develop a hypothesis statement for a given topic/problem.
- Groups will present their topic and hypothesis statement for the class to critique.

ACTIVITY EVALUATION: Students will be evaluated on their ability to form a reasonable hypothesis statement as a group and present it to the class.

Day 2: Create your own hypothesis!

- Students will select a problem/topic related to concepts discussed in environmental science using their textbook and the internet.
- Students will propose three hypothesis statements that relate to their chosen topic and turn them into the teacher. The teacher will work with each student to select one of the three topics for the student to use during the long-term research project and return it to the student.

ACTIVITY EVALUATION: Students will be evaluated based on the clarity of their individual hypothesis statements.

Day 3: Research Methods/Problem Solving

- Students will visit the media center for an introduction to research research material/using the media center.
- Students will be paired in small groups; each group will be given a type of research to learn about using the materials available in the media center. Groups will create a short summary (about a paragraph) about their topic and one group member will present it to the class.

ACTIVITY EVALUATION: Students will be evaluated based on their ability to work collaboratively to locate and present information about types of research using the resources available through the media center.

Day 4: Research Methods/Problem Solving, continued...

- Teacher will provide an introduction to research methods and problem solving as outlined by the textbook. Examples of quantitative and qualitative research will be reviewed.
- Students will locate three sources of information about the problem/topic they have selected using the media center and the internet. These sources must be actual research studies published in peer-reviewed journals.
- Students will select the appropriate type of research that should be conducted to explore their hypothesis statement.

ACTIVITY EVALUATION: Students will be evaluated according to their ability to successfully locate and retrieve research studies on related topics.

Day 5: Data Collection

- Data collection methods will be introduced by the instructor. Emphasis will be placed on survey research and census data. Correctly organizing and recording data will be discussed.
- Students will locate and identify specific types of data in current environmental science research studies.
- Students will work in small groups to determine the type of data collection that is optimal for their research project.

ACTIVITY EVALUATION: Students will be evaluated on their ability to work collaboratively as small groups and on their ability to locate and identify specific types of data in current research studies.

Day 6: Data Collection, continued...

- Students will design their simple surveys and distribute to their target audience or research related census data needed for their research project during class-time. The teacher will be available for consultation or assistance as needed.

ACTIVITY EVALUATION: Students' individual survey design or retrieved census data will be assessed for clarity and understanding.

Day 7: Analyzing Data

- An explanation of how to analyze specific data types will be provided during an introduction to analyzing data. Students will also be oriented to SPSS and Microsoft Excel.
- Students will be placed in small groups to explore and practice the process of using statistical programs to analyze data sets.

ACTIVITY EVALUATION: Students will be evaluated on their ability to use the introduced statistical programs for simple data analysis functions.

Day 8: Analyzing Data, continued...

- LAB DAY-students will work independently during class time in the computer lab to organize and analyze their research data. The teacher will be available to assist as necessary.

ACTIVITY EVALUATION: Students are evaluated based on their individual involvement in the lab activity.

Day 9: Analyzing Data, continued...

- LAB DAY –students will work independently during class time in the computer lab to organize and analyze their research data. The teacher will be available to assist as necessary.

ACTIVITY EVALUATION: Students are evaluated based on their individual involvement in the lab activity.

Day 10: Drawing Conclusions/Review

- Students will draw conclusions about their research data and present their problem and findings to the class. The research reviewed will be presented and the class will determine if conclusions from each student's research seem reasonable/valid.

ACTIVITY EVALUATION: Students are evaluated on their individual research presentations. Evaluation points include clarity, validity of research topic and accuracy of data collection methods.