
KEY CHARACTERISTIC #5 INSTRUCTIONAL SOUNDNESS



Environmental education materials should rely on instructional techniques that create an effective learning environment.

5.1) Learner-centered instruction. When appropriate, learning should be based on learner interest and on the learner’s ability to construct knowledge to gain conceptual understanding.

What to look for:

- Activities allow learners to build from previous knowledge and lead toward further learning.
- Learners gain understanding through research, discussion, application, and practical experiences.
- Instruction assists learners in undertaking their own inquiry.
- Where appropriate, activities and projects use learner questions and concerns as a starting point.
- Materials facilitate learner participation in planning and assessing learning. Materials promote learner reflection on the process and content of learning.

5.2) Different ways of learning. Materials should offer opportunities for different modes of teaching and learning.

What to look for:

- Materials encourage educators to experiment with a range of instructional methods to reach learners with a variety of learning styles. These techniques may include research, experimentation, observation, lecture, discussion, creative expression, field studies, role playing, independent work, cooperative learning, cross-age teaching, etc.
- Important concepts are conveyed in several ways (visual, auditory, tactile, etc.) so that all students can understand them.
- Materials and activities are developmentally appropriate for the designated grade, yet sensitive to individual differences in educational experience and learning mode.

- Opportunities are provided for students to learn from expression and experience—for example, using music, art, poetry, and drama, or involving parents, families, and the community in learning activities.

- Diverse sensory involvement is a criterion for selecting learning activities.

- Learners are challenged to develop their multiple intelligences.

- Learning is accessible to students with limited English proficiency.

5.3) Connection to learners’ everyday lives.

Materials should present information and ideas in a way that is relevant to learners.

What to look for:

- Concepts to be taught are related directly to students’ experiences.

- Case studies and examples are relevant to the learner. If the material is designed for use in a specific area of the country, the content and illustrations are appropriate for that area.

- Instructional materials are easy for students to use and understand. Materials reflect cultural, gender, and age differences.

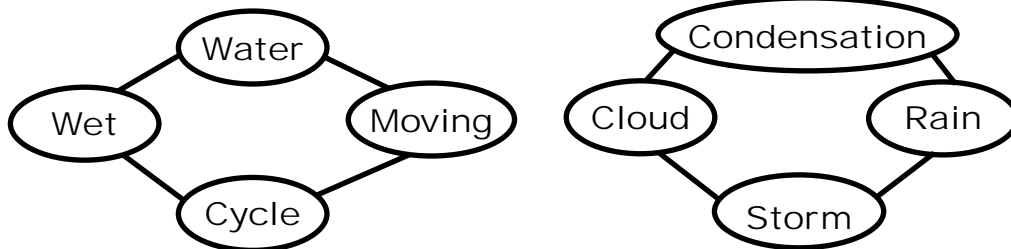
- Materials provide for continuing involvement throughout the year by the learner, both at home and at school. Means for involving learners’ families or care givers are suggested.

Example: 5.2
Aqua Words

This activity, intended for use with primary and intermediate grade levels, illustrates how concepts can be conveyed in more than one way within one activity. Its objective is to enable students to describe a variety of ways and reasons why water is important to people and wildlife.

Procedure

1. Have the students bring in photographs from magazines that show water. Ask them to look especially for pictures that show how living things depend on water. Display these photographs and use them as a basis for discussion.
2. Ask students to think about some of the ways they have used water that day. Emphasize how all living things are ultimately connected to water.
3. Using a long strip of butcher paper or spacious empty chalkboard for recording, ask the students to list at least 100 words that have something to do with water. *Note: For younger students, use pictures or a combination of words and pictures.*
4. Using the list of words that were recorded, ask the students to create word trees of water-related words. Begin with a simple word tree [and move to] more complex ones.



5. When students have finished several word trees, have them look at what they have done and create one or two poetic definitions of water or water-related concepts. These could begin: "Water . . ." or "Water is . . ." If not definitions, the students could create sentences or even paragraphs about water.
6. Have students write their poetic statements onto various shades of blue, aqua, gray, white, and green construction paper cut to graphically fit the feeling of their idea.

Aquatic Project WILD, Council for Environmental Education. Reprinted with permission from Project WILD, © 1987, 1992, 2001.



5.4) Expanded learning environment.

Students should learn in environments that extend beyond the boundaries of the classroom.

What to look for:

- Students learn in a diverse environment which includes the school yard, laboratory, field settings, community, and other settings beyond the classroom.
- Learners share their knowledge and their work with others.
- Materials use examples that reflect real-world experiences.
- Materials suggest partnerships with local civic organizations, businesses, religious communities, or governments to explore a local issue.
- Partnerships with local universities, colleges, or technical schools to allow learners to participate in research, environmental monitoring, creative projects, etc.
- Materials suggest experiential learning activities in which students immerse themselves in an activity outside the classroom.
- Materials suggest linkages to informal, experiential, and service learning opportunities in the community.
- Lists of written materials and other resources for further study are included.

5.5) Interdisciplinary. The materials should recognize the interdisciplinary nature of environmental education.

What to look for:

- Materials clearly list the subject disciplines integrated into each lesson or lessons, suggest ties with other subject areas, such as the science disciplines, social studies, math, geography, English, arts, physical education, occupational education, etc.
- The material helps develop skills useful in other subject areas, such as reading comprehension, math, writing, and map reading and analysis.
 - Where appropriate, materials are keyed to national standards for other disciplines or standards adopted by the school district or state.

Example: 5.4 Streams

Studying a local stream can include activities that immerse learners in experiences outside of the classroom and encourage them to share their knowledge.

Study a Stream

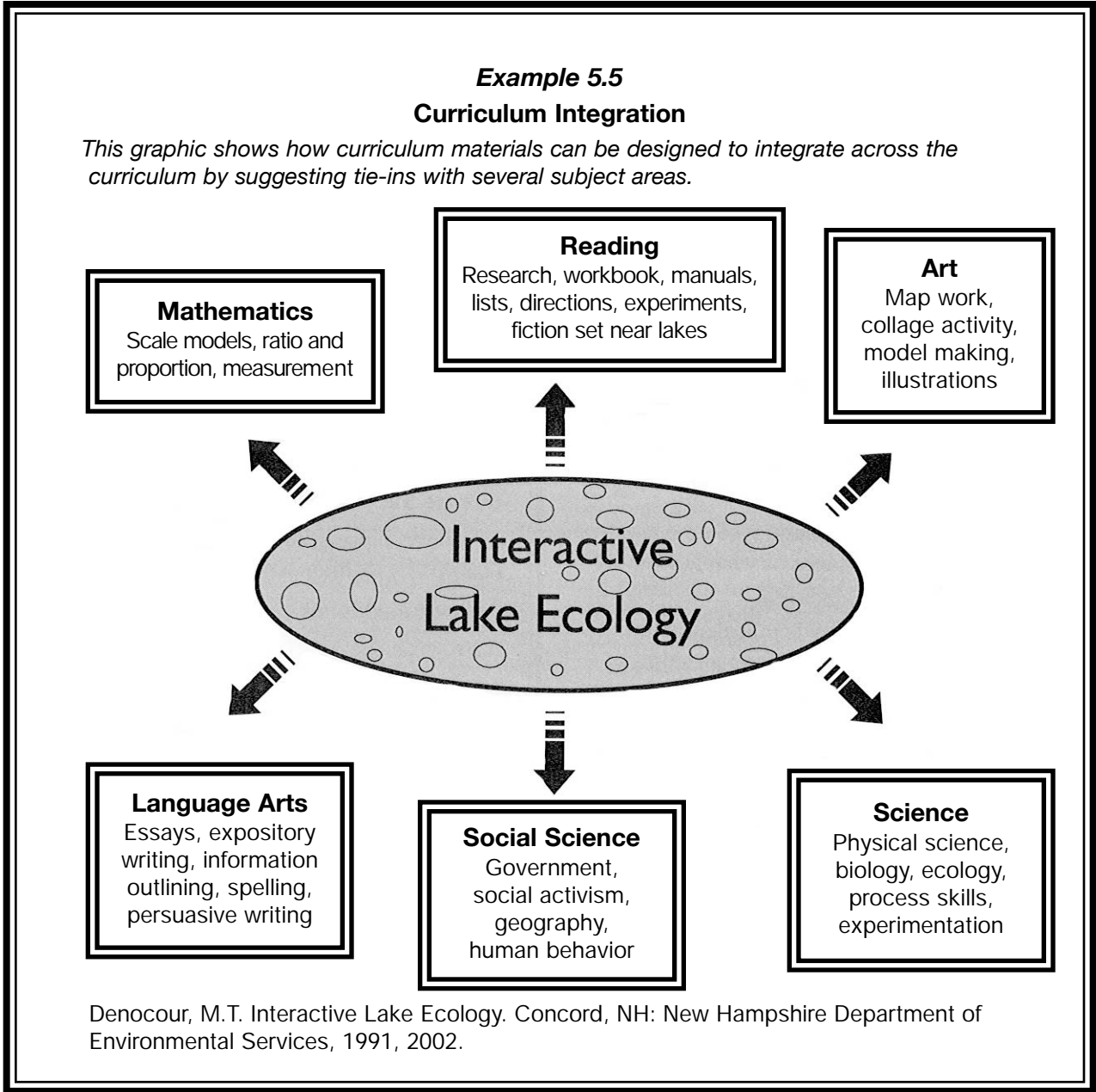
Divide the children into small groups and give each group a Stream Studies sheet to complete during their explorations. Put needed equipment in a central spot. Send half the groups to a slow part of the stream and half to a fast-moving section. When Stream Study sheets are complete, compare results:

- What is the bottom like where the water is moving fast? slow?
- Where were the most animals found?
- How are animals different in fast and slow sections of the stream?

Follow-up Activity

History of a Local Stream Have the children interview local residents or read in old newspapers about the history of a local stream (uses, floods, bridges, pollution) and write an article for the newspaper.

Lingelbach J., ed. Hands On Nature. Woodstock, VT: Vermont Institute of Natural Science, 1986, 2000.



5.6) Goals and objectives. Goals and objectives for the materials should be clearly spelled out.

What to look for:

- Goals and objectives for learner outcomes are clearly stated.
- The content is appropriate for achieving the objectives, and steps for accomplishing the objectives are identified in written lesson or activity plans.

- Instructional methods are appropriate to the guide’s goals.
- Objectives should be in keeping with goals and objectives of general education.

5.7) Appropriateness for specific learning

settings. Claims about the material's appropriateness for the targeted grade level(s) and the implementation of the activity should be consistent with the experience of educators.

What to look for:

- The content is appropriate (level and language) for the target grade levels. The examples, terminology, and comparisons used are within the probable vocabulary and experience of students.
- Lesson-related activities can be accomplished in the time specified, with resources provided or easily available.
- Experiments and activities are relevant, accurate, predictable, and suitable for the target grade levels. Materials include suggestions for appropriate variations and extensions.
- Activities are efficient. The amount of time required is consistent with the importance of what is to be learned.
- Environmental responsibility is modeled in the design, underlying philosophy, and suggested activities of the lessons and materials.

5.8) Assessment. A variety of means for assessing learner progress should be included in the materials.

What to look for:

- Materials state expected learner outcomes and provide examples of how to use specific performance-based assessments such as portfolios, open-ended questions, group or independent research, or other appropriate projects to indicate mastery.
- Learner outcomes are tied to the goals and objectives of the materials.
- Means of assessing learners' baseline understandings, skills, and concepts at the beginning of each lesson are included.
- Materials use current and appropriate educational assessment techniques.
- Suggested assessment techniques are practical and efficient.
- Assessment is on-going and tied to student learning.
- Expectations are made clear to students at the onset of an activity.
- Students assess their own and other students' work.

Example: 5.8

Irrigation Interpretation

This activity, designed for upper elementary and middle school, states learner objectives in measurable terms and provides specific performance-based assessments to indicate mastery.

Objectives

Students will:

- identify reasons people irrigate.
- construct a classroom irrigation system and monitor crop growth.
- describe different irrigation methods and evaluate the costs and benefits of each.
- propose explanations for an ancient culture abandoning its homeland.

Assessment

Have students:

- demonstrate and identify irrigation systems (Part I, steps 3-6).
- construct classroom irrigation models, demonstrating and comparing different irrigation systems (Part II, steps 1 and 2).
- develop a questioning strategy to determine why a culture could abandon its homeland (Part III).
- create a chart summarizing irrigation techniques and assessing ecological and economic benefits and costs (Wrap Up).
Upon completing the activity, for further assessment, have students:
- research and identify on a world map locations with salinization problems.
- investigate and report on what is being done to overcome salinization problems.

Project WET *Curriculum and Activity Guide*.
Bozeman, MT: The Watercourse and
Houston, TX: Western Regional
Environmental Education Council. 1995, 2001

Example: 5.8
Sample Rubric

This rubric was developed by an Earth Systems teacher for use in evaluating individual student research projects.

Research Time Utilization	The student needed continual reminders to get back to work. Work may be inappropriate to the project.	The student was usually on task, but needed an occasional reminder to get back to work. All work is appropriate.	The student was always on task and did not need reminders to get back to work.
Participation In Project	The student does not add an equitable amount of work to the project and does not meet all requirements for the length of presentation.	The student adds an equitable amount of work to the project, but may not meet all requirements for the length of the presentation.	The student adds an equitable amount of work to the project and meets all requirements for the length of the project.
Accuracy of Information During Presentation	The student's information is lacking in content and is not factually correct in many places. Information may not be pertinent to the presentation.	The student's information is for the most part factually correct. Information may not be pertinent to the presentation.	The student's information is factually correct and pertinent to the presentation.
Clarity of Presentation	The student's work is not well planned. The student was confused by much of the information presented. The student was not clear in explaining topics.	The student's work is well planned. There seemed to be some confusion or misinterpretation of information.	The student's work is well planned and clearly explained. The student showed a clear command of the information presented.
Visual Aid Worksheet, or Simple Demonstration	The device used by the student was not used at a timely place in the presentation, had little bearing on the presentation, or was absent from the presentation.	The device used by the student was appropriate for the presentation. It may have been used in a more appropriate manner. The design of the device may not have maximized the learning.	The use of the device was timely and appropriate. The design of the device was constructed to maximize learning.

Mayer, V.J. and Fortner, R. W. eds. Science is a Study of Earth, Columbus, OH: Ohio State University, 1995.