

A Collection of Alternative Assessment Tasks
for
Earth Science

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University at Buffalo
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Introduction

This collection of tasks was produced as part of the New York State Alternative Assessment project (NSF Grant ESI 9154506). Separate collections were assembled for use at grade 4, grade 8, Earth science, and biology. Some of the tasks are in a manipulative skills format (where students manipulate objects, and/or equipment), and some are in a paper and pencil format (often including diagrams, graphs and/or data tables).

Another product of this assessment grant was the Alternative Assessment in Science: A Teacher's Guide (Reynolds, Doran, Allers, & Agruso, 1996). This guide was designed to provide teachers and supervisors with background information, procedures, and examples in developing alternative assessment tasks in science.

These resources were produced by the staff of the project and hundreds of New York State teachers who wrote, trial tested, and revised the tasks included in the Task Collections and the Teacher's Guide. The Teacher's Guide was intended to provide the general background and skills appropriate for elementary, middle, and high school teachers of science, while the Task Collections provide a set of examples for teachers to try and to modify as best fit their teaching situations.

Recommended Use

These two documents can be used in professional development workshops at the school building, district, regional, and/or state levels. The Teacher's Guide and the Task Collections were designed to be used together. The former provides general background and procedures for developing and trial testing tasks; while the latter provides a sample of tasks, designed for a particular grade or subject, that have been developed and trial tested with students.

We have found that everything takes longer than one initially thinks. This is especially true when teachers are expected to try some tasks with their students between separate sessions of the professional development activity. Be sure to allow enough time for each stage of the planned workshop and enough time between the stages.

While the Guide and the Collections were designed to be read and used by individual teachers, some sections could be presented via overheads of key visuals or sections of text and guided practice on applying some small set of skills (e.g. writing rubrics).

Structure of Task Packets

On the following pages you will find the tasks that have been developed for Earth science. Each task includes several parts that may be used by teachers, students, or scorers.

The structure of each task collection is as follows:

- A. Task Information Sheet (blue - for teachers)
- B. Student Task Sheets (white - directions, questions, and space for student's written responses)
- C. Scoring Rubric and Scoring Form (yellow)
- D. Samples of scored student booklets (white)

Each part will be described briefly in the following section.

Task Information Sheet

The Task Information sheet includes descriptions of the task in terms of **grade level/subject** of recommended use, **content** reference from the relevant syllabus or learning standards, **format** and **purpose** of the task, as well as **skills** assessed in the task. To help a teacher plan and prepare to use a task, this sheet also includes **time** for administration, **materials** needed to perform and prepare the task for administration, as well as detailed directions for the **preparation** of the task materials. If there are any potential **safety** issues they are noted, as well as possible **extensions** or **modifications** of a task. Lastly, when appropriate the **credit / source** of the assessment task is listed.

A more detailed description of each of the parts of the task information is presented in the following section. It is presented in the same format as it will appear in each of the task packets.

Task Title Task Information

Grade/Subject: The **grade level** or **subject** for which the task was designed to be used.

Content: The **Content** listing specifies the subject matter or the particular knowledge area that is covered by the task., with detailed references to the related section of the relevant state syllabus.

Format: The **Format** of the task describes the general method of assessment. The task may be paper and pencil, or it may be a manipulative task in which students work with objects or equipment.

Purpose: The statement of **Purpose** indicates the detailed outcome the author(s) intends to be assessed by the task.

Skills: Identifies the **skills** students need to use in order to complete the task. These skills have been taken from lists included in the related syllabus.

Primary: The skills which are the predominant ones used by the students.

Secondary: Other skills required for successful performance in the task

Time: The approximate **Time** required for student completion of the task

Materials: **Materials** needed for **per student** to complete the task. In addition are a list of materials used by the **teacher** in preparing for the task.

Preparation: Some of the tasks have detailed teacher directions which give information on assembly and set up of materials and further **Preparation** instructions.

Safety: Any potential **Safety** issues which may arise about the task or the use of the equipment and materials are noted here.

Extensions/Modifications: Suggestions for minor changes to directions and/or materials that shift the focus of the task or provide a different amount of help or support for the student completing the task are included here.

Credit/Source: Some tasks may have been modified from different **sources**. In this section appropriate **credit** is given.

Student Task Sheet

The student instructions and answer sheet provide detailed directions on what the student is to do in order to perform the task and respond appropriately. Some task sheets are quite open ended and require much insight, interpretation, and creativity on the part of the student. Others are more structured and clearly describe the procedures which the student is expected to follow. By looking at the statement of purpose from the task information sheet, and knowing one's students, a teacher can decide which style would be most appropriate. The student answer sheet is part of the task sheet. The structure of the answer sheet is determined by the style of student directions. Some of the tasks have integrated directions and answer sheets, (all in one package), while other tasks have separate student directions and answer sheets (and are so labeled). Considerable space is provided for student's written responses. This is what is rated or scored by the teacher.

Scoring Rubric and Scoring Form

The next section of the task collection includes the Scoring Rubric and Scoring Form. The development of these is described in detail in Chapter 4 of the Teacher's Guide. The scoring rubric provides detailed information on how to rate each student's responses. The rubric includes the performance standards, criteria for awarding points, and sample acceptable answers. For each task a sample scoring form is provided to facilitate the rating of individual student's performance. This scoring form briefly identifies each question and provides numbers to circle (corresponding to the points possible for that question) and space to indicate the total score earned by that student.

Scored Student Responses

For most tasks we have selected three student's work as part of the task packet. We selected tasks that illustrate excellent, adequate, and minimal levels of performance. Each student response sheet has an accompanying scoring form, with the points earned. One can see which responses earned the low, medium, and high scores.

Task Collections

Listed below are the titles and a brief description of each task included in this task collection. The tasks are assembled in two sections; manipulative tasks, and paper and pencil tasks. More information about each task is included on the Task Information Sheet (blue pages) at the beginning of each collection.

Earth Science

Manipulative Tasks:

Air and Soil:

Students plan and carry out an experiment to determine the amount of pore space in a soil sample.

Changing Rocks:

Students observe and record the effects of abrasion on rock materials and make generalizations and predictions based on those observations.

Chemical Weathering:

Students use a model to gather data on the effects of chemical weathering and apply the information to natural phenomenon.

Creeping:

Students observe, measure, and graph a model of downslope movement and relate that model to the natural world.

Crustal Sinking:

Students observe and analyze a model of interaction between the Earth's crust and upper mantle.

Density of Minerals:

Students determine the mass, volume, and density of two (2) mineral samples.

Earthquake Epicenter:

Students locate the epicenter of the earthquake on a map given lapse times between the arrival of P & S waves at three (3) locations.

Peat Pots:

Students measure and interpret the rate of capillary action in a peat pot.

Probing Under the Surface:

Students use a measuring stick to infer the shape of the inside bottom of a box.

Puddles and Soil:

Students observe and analyze the permeability of different soils.

Soap, Wood and Water:

Students determine the density of common objects and predict their behavior in water.

Paper and Pencil Tasks:

Blizzard of 1993:

Students interpret information from a barograph about a major winter storm and infer the storms' positions.

Formation of Rain:

Students determine the sequence of events in the formation of rain.

Formation of Wind:

Students determine the sequence of events in the formation of wind.

Ocean Bottom Profile:

Students interpret a graph of ocean depths and infer topographic features.