

## Data Set #1

Type of response:	Source Dependent Response
Grade level:	10
Subject:	Science
Training set size:	1672
Final evaluation set size:	558
Average length of responses:	50 words
Scoring:	Score1, Score2
Final score:	Final score is score 1. Score 2 is for inter-rater reliability purposes.
Rubric range:	0-3

### *Prompt—Acid Rain*

A group of students wrote the following procedure for their investigation.

Procedure:

1. Determine the mass of four different samples.
2. Pour vinegar in each of four separate, but identical, containers.
3. Place a sample of one material into one container and label. Repeat with remaining samples, placing a single sample into a single container.
4. After 24 hours, remove the samples from the containers and rinse each sample with distilled water.
5. Allow the samples to sit and dry for 30 minutes.
6. Determine the mass of each sample.

The students' data are recorded in the table below.

Sample	Starting Mass (g)	Ending Mass (g)	Difference in Mass (g)
Marble	9.8	9.4	-0.4
Limestone	10.4	9.1	-1.3
Wood	11.2	11.2	0.0
Plastic	7.2	7.1	-0.1

After reading the group's procedure, describe what additional information you would need in order to replicate the experiment. Make sure to include at least three pieces of information.

### *Scoring Rubric for Science Open-Ended Items*

Open-ended items are scored on a four-point scale (0–3) using a holistic scoring method. This method involves judging the overall quality of the student response. The general scoring rubric for the science open-ended items (see following page) describes the characteristics of a response at each score point. Included with each item is the content guide (description of a good response to the question), the specific scoring rubric for the item (description of each score point), and the classification of the item based on the Science Framework. This is followed by two scored student responses at each score point along with a brief discussion of why the response received a particular score.

Keep in mind that the scoring criteria are based on reasonable expectations of grade ten students responding under testing conditions. Students are given approximately five minutes to respond to each open-ended item. The responses are therefore less polished than they might be if students were given more time to revise their answers. In addition, students are asked to respond to a wide variety of scientific topics, many of which they may not have studied for some time. All of this is taken into consideration when scoring the responses.

Each score category contains a range of student responses which reflect the descriptions given below.

### Score 3

The response is an excellent answer to the question. It is correct, complete, and appropriate and contains elaboration, extension, and/or evidence of higher-order thinking and relevant prior knowledge. There is no evidence of misconceptions. Minor errors will not necessarily lower the score.

### Score 2

The response is a proficient answer to the question. It is generally correct, complete, and appropriate, although minor inaccuracies may appear. There may be limited evidence of elaboration, extension, higher-order thinking, and relevant prior knowledge, or there may be significant evidence of these traits but other flaws (e.g., inaccuracies, omissions, inappropriateness) may be more than minor.

### Score 1

The response is a marginal answer to the question. While it may contain some elements of a proficient response, it is inaccurate, incomplete, and/or inappropriate. There is little evidence, if any, of elaboration, extension, higher-order thinking, or relevant prior knowledge. There may be evidence of significant misconceptions.

### Score 0

The response, though possibly on topic, is an unsatisfactory answer to the question. It may fail to address the question, or it may address the question in a very limited way. There may be no evidence of elaboration, extension, higher-order thinking, or relevant prior knowledge. There may be evidence of serious misconceptions.

## *Rubric for Acid Rain*

### Possible Correct Responses:

#### Needed Information:

- You need to know how much vinegar was used in each container.
- You need to know what type of vinegar was used in each container.
- You need to know what materials to test.
- You need to know what size/surface area of materials should be used.
- You need to know how long each sample was rinsed in distilled water.
- You need to know what drying method to use.
- You need to know what size/type of container to use.
- Other acceptable responses.

### 3-Point Rubric:

#### Score 3

The response describes three additional pieces of information that would be needed to accurately replicate the experiment.

#### Score 2

The response describes two additional pieces of information that would be needed to accurately replicate the experiment.

#### Score 1

The response describes one additional piece of information that would be needed to accurately replicate the experiment.

#### Score 0

The response describes little or no accurate or relevant information from the acid rain investigation.