

“Soils”
Grade 2 – Summative Assessment

Assessed Understandings

Students will understand:

1. Soil contains particles of different sizes.
2. Soil may contain animals, plants, and their remains.
3. Tools are used to analyze and observe soil samples.
4. Sand, clay, and humus are three of the basic components in soil.
5. Soil components have unique properties that can be identified by conducting simple tests.
6. Worms enhance the decomposition of plant material.

Teacher Notes for the “Soils” Assessment

Introduction

These items are designed to provide an assessment of what students know, understand, and can do at the completion of the Science & Technology for Children (STC) “Soils” module. This assessment is in lieu of **Lessons 14, 15, and 16** in the Science Kit. This document includes teacher directions, response sheets for the individual students, and analytical scoring rubrics for each question. A separate document contains the anchor papers for each question. **A close look at the rubrics prior to the administration of the assessment will be helpful to the teacher.**

Time and Preparation for the Assessment

Please allow one hour to complete this assessment. This can be done in one day or two, 30-minute sessions on two consecutive days. The assessment task requires students to test a soil sample not found in the kit. Therefore, the teacher will need to provide enough of a local soil sample for each student to test. Soil from the school grounds may be used. The soil sample needs to include all three components of soil (sand, clay, and humus). Be sure to include roots, leaves, twigs, etc., in the local soil sample.

Prior to the assessment, the teacher will need to have the following materials *from the kit* available for each student—students may share if needed:

- Soil samples for each student
- Cups
- Soil
- Hand lens
- Water

These materials could be on a tray in the middle of the room.

Directions for Administration

You may read each question aloud as students take the assessment. Please do not provide any assistance to students while they are performing their tests. This assessment should be done individually, not in cooperative groups.

The teacher will have one soil sample in the small cups for each student. Each student will pick up a soil sample and a hand lens. (These materials could be on a tray in the middle of the table. If your students are set up in cooperative groups you could use a “materials station” for the whole class.)

The teacher will say, **“Use your soil sample to answer Questions 1 and 2.”**

Question 1: Teacher needs to make the students aware that this question involves selecting **“Draw and label”** or **“write four things that you observed.”** The student is only asked to respond to one or the other.

1. Examine your local soil sample. Draw and label **or** write four things you observed.

Question 2: The teacher needs to **emphasize that the students are drawing conclusions about the composition of humus.**

2. Name at least **three** things in the soil sample that indicates there was humus.

Question 3: The teacher reads the question to the students **emphasizing the need to find a tool that helps them to see the soil more closely.**

3. Circle the tool that could help you to see the objects in your soil sample better.

Question 4: Students can refer to observations, journals, and charts to respond to this question. The teacher will say, **“To answer question 4, you are expected to use recording sheets, journals, and class charts. Make sure you explain how these components of soil help plants to grow.”**

4. What are the components of soil?

The teacher will have two soil samples, water, and equipment necessary to perform the tests. Please do not provide any assistance to students while they are performing their tests.

The teacher will say, **“In this part you will be conducting tests on your local soil samples. These tests are conducted to help you learn what materials are in your soil sample. On your desk you will find all of the materials you will need. You may start and complete your tests before you record the results.”**

Question 5a and 5b: The students are conducting a test on local soil. They will perform the test and record their results on the chart provided. Using the chart, they will name one component of the soil in their sample.

5a. Conduct the soils' tests. **Record** the results on the chart below.

5b. Use the chart for your answers.

Circle one component of soil in your sample?

Circle: sand clay humus

Explain your choice.

Question 6: Allows students to draw conclusions about the importance of living things in soil. Students may draw upon experiences with their compost bags and class discussion to respond. The teacher will say, **“For question 6, think back to the observations you made in your compost bag. Give two reasons why worms and other living things are important to soil.”**

6. What are **two reasons** that worms and other living things are important to the soil?

Scoring Rubrics “Soils” Summative Assessment

Question 1: Examine your local soil sample. Draw and label *or* write four things you observed.

This question measures a student’s ability to observe a soil sample and record their observations.

Criterion for a complete response:

1. Observes and records four items in the soil sample (e.g., sees roots or leaves, feels damp, smells like a garden or the woods, or looks like clay, etc.).

Code	Response
	<i>Complete Response</i>
20	Meets criterion above.
29	Any other scientifically correct response.
	<i>Partially Correct Response</i>
10	Includes only 2–3 items.
19	Any other partially correct response.
	<i>Incorrect Response</i>
70	Draws observations without labels.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 2: Name at least three things in the soil sample that indicates there was humus.

This question measures a student’s understanding of the nature of humus.

Criterion for a complete response:

- 1. Identifies three or more decomposed/decomposing materials that will become humus (e.g., leaves, nutshells, twigs, manure, etc.).

Code	Response
	<i>Complete Response</i>
20	Meets criterion above.
29	Any other scientifically correct response.
	<i>Partially Correct Response</i>
10	Identifies two decomposed/decomposing materials that will become humus.
19	Any other partially correct response.
	<i>Incorrect Response</i>
70	Identifies one source of humus.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 3: Circle the tool which could help you to see the objects better in your soil sample.

This question measures a student’s ability to select the appropriate tool to observe parts of their soil sample.

Criterion for a complete response:

1. Identifies hand lens or magnifying glass as a tool to closely observe a soil sample.

Code	Response
	<i>Complete Response</i>
10	Selects hand lens.
	<i>Incorrect Response</i>
70	Incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 4: What are the components of soil? Explain how each component of soil helps plants to grow.

This question measures a student’s ability to explain what soil components are conducive to plant growth.

Criteria for a complete response:

1. Lists all three components of “good” soil.
2. Cites evidence of why each component is necessary for plant growth.

Code	Response
	<i>Complete Response</i>
30	Response meets criteria above (e.g., soil needs to contain sand for drainage, humus for nutrients, and clay to absorb water.)
39	Any other scientifically correct response.
	<i>Partially Correct Response</i>
20	Identifies three soil components and gives two reasons.
29	Any other generally correct response.
	<i>Minimally Correct Response</i>
10	Identifies one or two soil components and gives one reason.
19	Any other minimally correct response.
	<i>Incorrect Response</i>
70	Identifies one or two components with incorrect or no reason.
71	Identifies other things that plants need but not found in soil (e.g., sunlight).
76	Repeats the substance or stem of the question.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 5a: Conduct the soils' tests. Record the results on the chart below.

This question measures a student's ability to conduct a test to determine what is in the local soil sample.

Criteria for a complete response:

- 1. Conducts two tests.
- 2. Makes at least one related observation for each test performed.
- 3. Records observations on chart.

Code	Response
	<i>Complete Response</i>
20	Meets criteria above (e.g., in the rolling test the ball held together; the smear test showed "brownish color").
29	Any other scientifically correct response.
	<i>Partially Correct Response</i>
10	Conducts a test with an error in the observation.
19	Any other partially correct response.
	<i>Incorrect Response</i>
70	Identifies characteristic that does not match chart or test performed.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 5b: Use the chart for your answers. Circle one component of soil in your sample. Explain your choice.

This question measures a student’s ability to draw conclusions based on a test.

Criteria for a complete response:

1. Identifies a component in the soil sample that matches the test results.
2. Uses the test results to support the conclusion.

Note: This rubric will be used for each of the tests.

Code	Response
	<i>Complete Response</i>
20	Meets criteria above.
29	Any other scientifically correct response.
	<i>Partially Correct Response</i>
10	Identifies correct component but for the wrong reason.
12	Identifies correct component but missing or flawed explanation.
19	Any other partially correct response.
	<i>Incorrect Response</i>
70	States reason but no component stated.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 6: What are two reasons that worms and other living things are important to the soil?

This question measures a student’s ability to explain how living organisms help in decomposing organic material.

Criteria for a complete response:

Provides **two** of the following reasons listed below or any other scientifically correct reasons:

1. Identifies that living organisms help break down materials (e.g., help break down leaves and twigs into humus).
2. Mentions aeration (worms dig holes so air can circulate).
3. Explains that living organisms die and decompose which helps plants to grow.
4. States that organisms loosen soil and allow roots to grow.

Code	Response
	<i>Complete Response</i>
20	Meets two of the criteria above.
29	Any other scientifically correct response.
	<i>Partially Correct Response</i>
10	Response meets one of the criteria above.
19	Any other partially correct response.
	<i>Incorrect Response</i>
70	States that organisms live in soil.
76	Repeats the substance or stem of the question.
79	Any other incorrect response.
	<i>Non-Response</i>
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.