"Magnetism and Electricity"
Grade 4 – Summative Assessment

Assessed Understandings

Students will understand:

1. Construction of a simple circuit.
2. Scientific drawing of a complete circuit.
3. Key components of an electric circuit are identified.
4. Path of electricity through a complete circuit.
5. Materials such as wires, clips, a battery, and a bulb.
6. Functioning of a switch.
7. Difference of conductors and insulators.
8. Troubleshooting of an electric circuit.

Teacher Notes for the "Magnetism and Electricity" Assessment

Introduction

These items are designed to provide an assessment of what students know and understand at the completion of the *FOSS Magnetism and Electricity* module. This document includes teacher directions and analytic scoring rubrics for each question. The actual student test booklet and anchor papers are contained in other documents. **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

This assessment should take about **two, 40-minute class periods** to administer. Please help students understand the intent of each task or question without providing the desired response. This is not a test of reading, writing, or artistic ability; therefore, grammar, spelling, punctuation, and artistic quality should not be evaluated. Students may use classroom charts, journals, and other materials generally available during classroom instruction. Please use the terminology from the investigations within the kit.

Directions for Administration

There is no additional preparation for this assessment.

Question 1: This question measures student's ability to construct a complete circuit. The student is asked to complete a scientific drawing and to label the path of electricity. The student is asked to apply their knowledge of electrical pathways by tracing the flow of electricity.

1. **Draw** a complete circuit. **Label** all the parts. Use a crayon to **trace** the path electricity takes to light the bulb.

Question 2: After drawing, labeling, and tracing the path of electricity, the student is asked to describe in words the path of electricity.

2. Describe the path that the electricity follows to light the bulb in your complete circuit in sequence.

Question 3: The students are asked to draw on prior experience the nature of a conductor and insulator. By referring to the pictures and recalling investigations, students identify differences between conductors and insulators.

3. Three conductors: Three insulators:

Question 4: Troubleshooting is a process of the scientific method where students are given problems and are asked to solve them. Troubleshooting shows the students that there may be one or more areas of concern that need to be investigated.

4. A student sets up this circuit. The bulb will not light. The battery and the bulb are in working order. **Circle any problems** you can find in the circuit.

Question 5: In order to understand the relationship between electromagnets and magnets, the student responds to the question using their understanding of the magnetic property.

5. List three objects that can be picked up by an electromagnet.

Question 6: Physical properties of magnets (attract and repel) are dependent upon their positive and negative poles.

6. Two magnets are positioned 3 centimeters apart. Predict what will happen to the magnets. Explain why.

Question 7: This question allows the teacher to assess the student's knowledge of a parallel circuit versus a series circuit.

7. List **two** advantages of a string of lights wired as a parallel circuit.

Scoring Rubrics
"Magnetism and Electricity"
Summative Assessment

Question 1: Draw a complete circuit. Label all the parts. Use a crayon to trace the path electricity takes to the light bulb.

This question measures the student's ability to draw and label a complete circuit and to trace the path of electricity through the circuit.

Criteria for a complete response:

1. Draws a complete circuit with the bulb, battery, and two wires.
2. Traces a complete circuit from one end of the battery through one wire, through the bulb, through the other wire, and back through the battery.
3. Accurately labels: the battery, bulb, and two wires.

Code	Response
	Complete Response
20	Meets all criteria.
29	Any other scientifically correct response.
	Partially Correct Response
10	Draws a complete circuit but tracing omits path through the battery.
11	Draws a complete circuit but tracing omits path through the bulb.
12	Draws a complete circuit but tracing omits path through the bulb and battery.
19	Any other partially correct response.
	Incorrect Response
70	Fails to draw a complete circuit.
71	Draws a complete circuit but fails to trace the path.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 2: Describe the path that the electricity follows in sequence to light the bulb in your complete circuit.

This question measures the student's ability to describe the path electricity takes to complete the circuit.

Criterion for a complete response:

1. Describes the path of electricity from one end of the battery, through one wire, through the bulb, through the second wire, and back through the battery. The description can begin at any point in the circuit.

Code	Response
	Complete Response
30	Meets the criterion.
39	Any other scientifically complete response.
	Partially Correct Response
20	Describes pathway but does not include through the bulb.
21	Describes pathway but states that the electricity returns to the other end of the battery—not through the battery.
29	Any other partially correct response.
	Minimally Correct Response
10	Describes pathway going around in a circuit but does not include through the bulb AND battery.
19	Any other minimally correct response.
	Incorrect Response
70	Description of pathway details one direction and stops at the bulb.
71	Description of pathway states that the electricity travels from both ends of the battery to the bulb.
72	Describes how a circuit is constructed instead of the path of the electricity.
73	Lists equipment only.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 3: Use these pictures to list three conductors and three insulators.

This question measures the student's understanding of the nature of conductors and insulators.

Criteria for a complete response:

1. Includes 3 conductors.
2. Includes 3 insulators.

Code	Response
	Complete Response
20	Meets all criteria.
29	Any other scientifically correct response.
	Partially Correct Response
10	Includes a minimum of two conductors and two insulators. Other spaces are left blank. There are no errors.
19	Any other partially correct response.
	Incorrect Response
70	Lists only one conductor and/or one insulator.
71	Lists a conductor as an insulator or vice versa.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 4: A student set up this circuit. The bulb will not light. The battery and the bulb are in working order. Circle any problems you can find in the circuit. As a troubleshooter, how would you make the bulb light?

This question measures the student's ability to troubleshoot an electric circuit.

Criteria for a complete response:

1. Circles the two wires attached to the bulb holder and/or the empty clips and circles the paperclip and/or the paper fastener.
2. Explains that the switch needs to be closed by moving the paperclip down to the paper fastener to form a complete circuit.
3. Explains that one of the two wires attached to the clip on the bulb holder needs to be moved and attached to the empty clip on the bulb holder.

Code	Response
	Complete Response
30	Meets all criteria.
39	Any other scientifically correct response.
	Partially Correct Response
20	Meets criteria 1 and 2.
21	Meets criteria 1 and 3.
22	Meets criteria 2 and 3.
29	Any other partially correct response.
	Minimally Correct Response
10	Meets only criterion 1.
11	Meets only criterion 2.
12	Meets only criterion 3.
19	Any other minimally correct response.
	Incorrect Response
70	States that battery, bulb, or wires are not in good working order.
71	States that the circuit is complete.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 5: List three objects that can be picked up by an electromagnet.

This question measures the student's understanding of the magnetic property.

Criterion for a complete response

1. List three objects that are attracted to a magnet or electromagnet.

Code	Response
	Complete Response
10	Meets the criterion.
19	Any other scientifically correct response.
	Incorrect Response
70	Lists only one or two objects.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 6: Two magnets are positioned 3 centimeters apart. What could happen to the magnets? Explain why.

This question measures the student's understanding of the magnetic property—attracts or repels.

Criteria for a complete response:

1. States magnets attract or repel.
2. Explains that like poles repel and opposite poles attract.

Code	Response
	Complete Response
20	Meets all criteria.
29	Any other scientifically correct response.
	Partially Correct Response
10	States magnets repel or attract but explanation is flawed.
11	Gives an accurate explanation but prediction is inaccurate.
19	Any other partially correct response.
	Incorrect Response
76	Repeats the stem of the question.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.

Question 7: List two advantages of a string of lights wired as a parallel circuit.

This question measures the student's understanding of a parallel circuit.

Criteria for a complete response:

1. Lights are brighter.
2. If one bulb burns out, the remaining lights will stay lit.

Code	Response
	Complete Response
20	Meets all criteria.
29	Any other scientifically correct response.
	Partially Correct Response
10	Lists one advantage.
19	Any other partially correct response.
	Incorrect Response
70	Response indicates series circuit.
79	Any other incorrect response.
	Non-Response
90	Crossed out, erased, illegible, or impossible to interpret.
99	Blank.