



New Jersey Assessment of Skills and Knowledge

**A Science Manual
Open-Ended Questions**

Grade 4

**Guide to Criterion-Based Holistic Scoring:
Science**

PTM #1506.46

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New Jersey Assessment of Skills and Knowledge (NJ ASK)

Grade 4

A SCIENCE MANUAL
OPEN-ENDED QUESTIONS

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TABLE OF CONTENTS

NEW JERSEY ASSESSMENT OF SKILLS AND KNOWLEDGE (NJ ASK)	1
NJ ASK 4 SCIENCE AND OPEN-ENDED QUESTIONS	2
SCORING GUIDE FOR SCIENCE OPEN-ENDED (OE) QUESTIONS (GENERIC RUBRIC).....	3
DESCRIPTION OF THIS MANUAL	4
GRADE 4 SCIENCE OPEN-ENDED ITEMS, RUBRICS AND RESPONSES SAMPLE	5
STANDARD 5.10: ENVIRONMENTAL STUDIES	9
SCORE POINT 3	
SCORE POINT 2	
SCORE POINT 1	
SCORE POINT 0	
STANDARD 5.8: EARTH SCIENCE	37
SCORE POINT 3	
SCORE POINT 2	
SCORE POINT 1	
SCORE POINT 0	
STANDARD 5.6: PHYSICAL/CHEMISTRY	65
SCORE POINT 3	
SCORE POINT 2	
SCORE POINT 1	
SCORE POINT 0	

NEW JERSEY ASSESSMENT OF SKILLS AND KNOWLEDGE (NJ ASK)

In spring of 2003, the NJDOE replaced the Elementary School Proficiency Assessment (ESPA) with the New Jersey Assessment of Skills and Knowledge (NJ ASK), a comprehensive, multi-grade assessment program. Along with other indicators of student progress, the results of the elementary-level assessments are intended to be used to identify students who need additional instructional support in order to reach the skills identified in the Core Curriculum Content Standards (CCCS).

With the enactment of the NCLB Act, New Jersey's statewide assessment of elementary students has undergone change. Under the provisions of this federal legislation, every state is required to administer annual standards-based assessments of all children grade 3 through 8. Federal expectation is that each state will provide tests that are grounded in that state's content standards and that assess students' critical thinking skills in three content areas: language arts literacy, mathematics, and science.

All New Jersey third- and fourth-grade students took the New Jersey Assessment of Skills and Knowledge for the first time in May 2003. Since the New Jersey ASK3 was a field test in 2003, the first operational third-grade assessment occurred in the spring of 2004. The statewide science assessment, which is not required at every grade level, was field tested at the fourth-grade level in 2004. The first operational fourth-grade science assessment occurred in the spring of 2005.

NJ ASK 4 SCIENCE AND OPEN-ENDED QUESTIONS

Science is not merely a collection of facts and theories but a process, a way of thinking about and investigating the world in which we live. The practice of science requires the use of skills and inquiry in order to carry out the scientific process. The science section of the New Jersey ASK4 measures a student's ability to solve problems by applying science concepts. Assessment items relate to three science clusters: Life Science, Physical Science, and Earth Science.

The science section of the NJASK4 consists of four parts containing multiple-choice questions and open-ended questions. Each section contains 10 multiple choice questions and 1 open-ended question for a total of 40 multiple-choice and 4 open-ended questions. It is expected that the students will allot approximately 1 minute to answer each multiple choice question and approximately 5 minutes to answer each open-ended question.

The open-ended questions are responded to in a designated area within the test booklet. For each open-ended response a student must provide enough explanation so that the scorer can understand the solution. Appropriate diagrams and charts can be used even when the question does not specifically request their use. It is important to remember that if diagrams or drawings are used in a student's answer, the diagram or drawing must be supplemented with a written explanation. The student's response will be scored on the correctness of the method as well as the accuracy of the answer. Responses need to be in English in order to be scored.

Open-ended science questions are hand scored on a scale from 0–3. A generic scoring guide was created to help train readers to consistently score open-ended questions. One has been provided for your use with this document. In addition to the generic guide, each open-ended ASK4 science question has its own item-specific scoring rubric, which is based upon the generic scoring guide.

Scoring Guide for Science Open-Ended (OE) Questions (Generic Rubric)

The zero-to-three-point generic rubric below was created to help readers score open-ended responses consistently. In scoring, a reader should accept the use of appropriately labeled diagrams, charts, formulas, and/or symbols that are part of the correct answer even when the question does not specifically request their use.

3-Point Response

The student response is reasonably correct, clear, and satisfactory.

2-Point Response

The student response has minor omissions and/or some incorrect or irrelevant information.

1-Point Response

The student response includes some correct information, but most of the information included in the response is either incorrect or irrelevant.

0-Point Response

The student attempts the task, but the response is incorrect, irrelevant, or inappropriate.

The above generic rubric is used as a guide to develop item-specific scoring guides or rubrics for each of the open-ended (OE) questions that appear on the New Jersey statewide assessments in science. These scoring rubrics provide the criteria for evaluating and scoring student performance and are developed by a committee of scientists and teachers. Rubrics ensure that there is consistency, fairness, and accuracy in scoring all open-ended questions.

DESCRIPTION OF THIS MANUAL

This manual contains three open-ended items, one from each science cluster. The question, sample solution, and item-specific scoring guide are provided for each item. Three exemplar papers for each score point are represented for each of the three open-ended items.

Samples are included for each score point of the Generic Scoring Guide for Science (a 3-point scale). The sample responses, which are grouped by score point, represent the range of approaches that a fourth-grade science student takes with this open-ended item. Each response is annotated according to score-point criteria.

The responses selected to appear in this handbook were written by fourth-grade students. The responses appear as the students wrote them; no corrections have been made other than the deletion of specific names that may have appeared to identify the student or the student's school district.

GRADE 4
OPEN-ENDED ITEMS

NJ ASK RELEASED SAMPLE • GRADE 4

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood _____

Metal _____

Plastic _____

NJ ASK RELEASED SAMPLE • GRADE 4

- **Describe one way to conserve nonrenewable resources**

**New Jersey ASK4 Science
Rubric/Sample Responses
Renewable Resources**

STANDARD:

5.10: Environmental Studies

4A. Natural Systems and Interactions

1. Differentiate between natural resources that are renewable and those that are not. (p. E-26).

RUBRIC:

VP = Value Points

3 Points

The response demonstrates a clear understanding of renewable and nonrenewable resources.

- The response classifies the three resources in the table and explains whether each is a renewable or nonrenewable resource.
 - A. **Wood:** Renewable because it comes from trees and it is easily replaceable. (2 VP)
 - B. **Metal:** Nonrenewable because it is in limited supply in Earth's crust. (2 VP)
 - C. **Plastics:** Nonrenewable because it is made from petrochemicals and it is not easily replaced. (2VP)

OR

Renewable because it comes from plants (corn and soy beans) and these resources are replaceable.

AND

- The response correctly describes one way that metals and plastics can be conserved. (1VP)
Responses may include but are not limited to:
Recycling containers: returning for deposit or taking to a recycling center.
Reusing items: refilling water bottles rather than bringing new ones each day.
Using fewer/less/use with care

2 Points:

- The responses demonstrate an understanding of renewable and nonrenewable resources but may include some minor errors or omissions. The response earned 5–6 VP.

1 Point:

- The response demonstrates a limited understanding of renewable and nonrenewable resources and may include some major errors or omissions. The response earned 3–4 VP.

0 Points:

- The response is incomplete or inaccurate and contains major errors, or no response was given. The response earned < 2 VP.

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood is renewable because
you can plant seeds
which grow into trees.

Metal is not a renewable source
because nature makes
metal and we can run ^{out of} it.

Plastic is ~~not~~ a nonrenewable source
because petroleum makes
plastic and it can run ^{out}.

- Describe one way to conserve nonrenewable resources.

One way to conserve nonrenewable sources is by using only what we need and not wasting it.

Score Points: 3

This student has correctly classified the three resources and explained whether each material is either renewable or nonrenewable. In addition it was suggested that “one way to conserve nonrenewable resources is by using only what we need and not wasting it.” (7 VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood Wood is a renewable resource because when you plant a tree you have more wood.

Metal Metal is a nonrenewable resource because once you use it up it's gone.

Plastic Plastic is a nonrenewable resource because we can't get more after it's gone.

- Describe one way to conserve nonrenewable resources.

One way to conserve nonrenewable resources is to use more renewable resources. By using them we can save the nonrenewable resources for when we need them.

Score Points: 3

This student has correctly classified the three resources and explained whether each material is either renewable or nonrenewable. In addition it was suggested that “one way to conserve nonrenewable resources is to use more renewable resources.” (7 VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood Renewable

People can grow more trees
wood is in trees

Metal Nonrenewable

A limited supply is found
in earth

Plastic Renewable

Different chemicals can be
put together creating plastic

- Describe one way to conserve nonrenewable resources.

Don't use as much and invent new things that can replace this resource. For example gas is nonrenewable but if we start using solar power instead of it there will still be some left.

Score Points: 3

This student has correctly classified the three resources and explained whether each material is either renewable or nonrenewable. In addition it was suggested “not using much” or “invent new things” would be ways to conserve nonrenewable resources. (7 VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood Renewable because trees
always grow back with
the help of nature.

Metal Nonrenewable because
there is only so much
metal in the earth.

Plastic Nonrenewable because
the earth only holds
so much of it.

- Describe one way to conserve nonrenewable resources.

You can conserve them by not making so much stuff out of them.

Score Points: 2

This student correctly classified wood and metal and accurately explained whether each of the materials was either renewable or nonrenewable. Partial credit was given for identifying “plastic” as a nonrenewable resource. The explanation that “the earth only holds so much of **it**” received no credit because of the student’s subjective reference to “it.” “You can conserve them by not making so much of them” accurately described a way of preserving a nonrenewable resource. (6VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood It's renewable because

it comes from trees and
trees can be replanted.

Metal It's nonrenewable because

there's a certain amount
of it and it can't grow back.

Plastic It's nonrenewable because

there's a certain amount of
it and it can't grow back.

- Describe one way to conserve nonrenewable resources.

You can discover new ways to make things that take nonrenewable resources and show these ways to everybody so everybody will make and use them and not use the old ways.

Score Points: 2

This student correctly classified wood and metal and accurately explained whether each of the materials was either renewable or nonrenewable. Partial credit was given for identifying “plastic” as a nonrenewable resource but the explanation of “there is a certain amount of it and it can’t **grow** back” was not given any credit. “You can discover new ways to make things that take nonrenewable resources” accurately described a way of conserving nonrenewable resources. (6VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood Wood is renewable because
it is made from trees
and you can plant lots of trees.

Metal metal is not renewable and
it is found in only
certain kind of rocks.

Plastic Plastic is not renewable
because you can make
it in certain places only.

- Describe one way to conserve nonrenewable resources.

One way to conserve nonrenewable resources is to make other fuels that are renewable.

Score Points: 2

This student has correctly classified wood and metal and accurately explained whether each of the materials was either renewable or nonrenewable. Partial credit was given for identifying “plastic” as renewable but the explanation of “you can make it in certain places only” was not accepted. “One way to conserve nonrenewable resources is to make other fuels that are renewable” received credit as an acceptable response. (6VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood wood is renewable

Metal Metal is renewable

Plastic Plastic is renewable

- Describe one way to conserve nonrenewable resources.

keep recycling and make new
stuff out of old stuff.

Score Point: 1

This student correctly classifies both wood and plastic but fails to provide an explanation on whether each of the materials was either renewable or nonrenewable. No credit was given for metal. “Recycling” and “make new stuff” were acceptable responses for conserving nonrenewable resources. (3VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood is renewable because when you use a pencil you can use it again to keep more of it

Metal Nonrenewable because when you use metal once it gets rusty. So it could break

Plastic Nonrenewable because plastic things can break very easily.

- Describe one way to conserve nonrenewable resources.

One way to conserve nonrenewable resources is to use it as much as possible.

Score Points: 1

This student accurately classified all three of the resources but failed to correctly explain whether each of the materials was either renewable or nonrenewable. “One way to conserve nonrenewable resources is to use it as much as possible” was not an accepted response to the second bullet. (3VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood Yes, it is a renewable resource
because the wood comes
from trees and we can plant trees Also
 nature makes trees

Metal Metal is both renewable
and nonrenewable. That is because
iron is mined which is nonrenewable where Steel is man-made

Plastic Yes, it is renewable because
if people recycle their plastic
than we can reuse it over
and over

- Describe one way to conserve nonrenewable resources.

There is one way you can help conserve nonrenewable resources. That way is don't leave TVs, Radios, VCR's, Computers on when no one is in the room. All you're doing is wasting ELECTRICITY and COAL which is nonrenewable. There are many ways to conserve and we need to use them all.

Score Points: 1

This student correctly classified wood and accurately explained “the wood comes from trees and we can plant trees.” Unfortunately only partial credit was received for properly classifying plastic as renewable. No credit was given for the explanation on plastic as it appears this student has confused the terms “recycle” and “renewable.” “There are many ways to conserve” accurately answers the last bullet on conservation of nonrenewable resources. (4VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood is

Metal is not

Plastic is

- Describe one way to conserve nonrenewable resources.

don't use it

Score Point: 0

This student failed to identify or explain whether any of the natural resources mentioned were either renewable or nonrenewable. 1 point was awarded for “don’t use it” as a way to conserve nonrenewable resources. (1VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood - is a nonrenewable resource
because the number of
trees are decreasing

Metal - is a renewable resource
because you can recycle
it to make new objects

Plastic - is a renewable resource
because you can recycle
it to make other objects

- Describe one way to conserve nonrenewable resources.

You can conserve wood by only cutting down a certain amount of trees each year. Also we can plant new trees!

Score Point: 0

This student received partial credit for only identifying plastic as a renewable resource. No credit was given for any of the information provided for wood and metal. It seemed obvious from the student's responses that there were some difficulties discriminating between the terms "recycle" and "renewable." No credit was awarded for the final response, "You can conserve wood by cutting down a certain amount of trees each year," because trees are renewable resources. (1VP)

Material	Items Made with the Material
Wood	paper, pencils, tables
Metal	cans, chairs, staples
Plastic	markers, pens, bottles

- Identify and explain whether each material is either a renewable or nonrenewable resource.

Wood it can be cut up
into different things
renewable

Metal can be melted
down and reformed
renewable

Plastic can be melted down
into new shapes
renewable

- Describe one way to conserve nonrenewable resources.

Use them purpasfully

Score Point: 0

This student received credit for correctly identifying both wood and plastic as being renewable resources. Unfortunately, the response failed to provide an explanation for the classification of each of the resources. Credit was not awarded for the last bullet since the student failed to explain how “purposefully” provided a way of conserving nonrenewable resources. (2VP)

NJ ASK RELEASED SAMPLE • GRADE 4

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- **Explain how the Girl Scout troop collected the data for temperature.**

NJ ASK RELEASED SAMPLE • GRADE 4

- **Explain how the Girl Scout troop collected the data for precipitation.**

- **Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.**

**New Jersey ASK4 Science
Rubric/Sample Responses
Temperature and Precipitation Investigation**

STANDARD:

5.8: Earth Science

B. Atmosphere and Weather

3. Observe weather changes and patterns by measurable quantities such as temperature, wind direction and speed, and amounts of precipitation. (p.E-22)

RUBRIC:

VP = Value Points

3 Points

The response correctly answers all three bullets of the question for **4 VP**.

- The response explains the data for temperature was collected by reading a **thermometer (1VP)**.
- The response explains that the data for precipitation was collected by using a **rain gauge or jar and ruler (1VP)**.
- The response identifies another meteorological condition (**1 VP**), such as: **wind speed or direction, type of cloud cover, or humidity**.

AND

gives an appropriate explanation of how information on this condition could be collected (**1 VP**), such as: an **anemometer, wind sock, weather vane, observe the clouds, or use a hygrometer**.

2 Points:

- The response demonstrates an understanding of weather changes but may include some minor errors or omissions. The response earns: (**3 VP**).

1 Point:

- The response demonstrates a limited understanding of weather changes and may include some major errors or omissions. The response earns: **2 VP**.

0 Points:

- The response is incomplete or inaccurate, contains major errors, or no response was given. The response earns: **0–1 VP**.

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

They went outside and pulled out a thermometer and measured it to the nearest (degrees °C) for each day of the week and then recorded their data.

- Explain how the Girl Scout troop collected the data for precipitation.

They went outside and used a rain gauge to measure the precipitation to the nearest centimeter for each day of the week.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

Another condition that the Girl Scout troop might include in describing the weather is the air pressure. They can gather information on the air pressure by measuring it with a barometer.

Score Point: 3

This student correctly explains that the data for temperature was collected by using a thermometer and “measured it to the nearest (degrees °C).” (1 VP) The response also notes that data for precipitation was collected “using a rain gauge and measured to the nearest centimeter.” (1 VP) Finally the student identifies that another weather condition the Girl Scout troop might have identified is air pressure (1VP). “They can gather information on the air pressure by measuring it with a barometer.” (1VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The Girl Scout troop collected data for temperature by using a thermometer and measuring the temperature each day they were there.

- Explain how the Girl Scout troop collected the data for precipitation.

The Girl Scout troop collected data for precipitation by using a rain gauge and measuring how much rain fell throughout the days that they were there.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

The Girl Scout troop also might include how fast the wind was blowing throughout the days that they were there by using a windsock or another instrument that measures wind speed.

Score Point: 3

This student correctly explains the data for temperature was collected “using a thermometer and measuring it each day they were there.” (1VP) The response also notes the Girl Scout troop collected data on precipitation by using a rain gauge and “measuring how much rain fell throughout the days that they were there.” (1VP) Finally the student identifies that another weather condition the Girl Scout troop might have identified was “how fast the wind was blowing throughout the days that they were there by using a windsock or another instrument that measures wind speed.” (2 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

They collected the temperature probably by using a thermometer. The thermometer measures the temperature. After reading the thermometer all day they can write down the highest temperature there was all day.

- Explain how the Girl Scout troop collected the data for precipitation.

To collect the data for precipitation they probably used a rain gauge. A rain gauge can collect how much precipitation falls. At the end of the day they can check the gauge and ~~see~~ measure how much fell.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

They could include wind speed as another condition. They could use an anemometer to measure the windspeed. Anemometers can tell how fast the wind is blowing by how many times it spins in a minute. The amount of times it spins is the miles per hour of the wind.

Score Point: 3

This student correctly explains the data for temperature was collected “probably by using a thermometer.” (1VP) The response also notes “to collect the data for precipitation they probably used a rain gauge. At the end of the day they can check the gauge and measure how much fell.” (1VP) Finally the student identifies that another condition the Girl Scout troop might have identified “could include wind speed. Anemometers can tell how fast the wind is blowing by how many times it spins in a minute.” (2 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

Girl Scout troop collected the data for temperature with a thermometer.

- Explain how the Girl Scout troop collected the data for precipitation.

Girl scout troop collected the data for precipitation by using a cup with a ruler next to it.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

You can gather information about it; it's going to be sunny or cloudy or how much wind and you can figure that out by looking outside.

Score Point: 2

This student correctly explains that “the Girl Scout troop collected data for temperature with a **thernomater**.” (1 VP) The response also notes the data for precipitation was collected “by using a cup with a ruler next to it.” (1 VP) The student only received partial credit for the third bullet because although two meteorological conditions were mentioned, “by looking outside” was not an accepted procedure. (1VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

They could have used tools like a tool that collects precipitation. Then put a thermometer on the side. Keep these til you go back and repeat these steps.

- Explain how the Girl Scout troop collected the data for precipitation.

The could use a tool that collects precipitation. When it falls then keep it there til you go back. Then check it and repeat.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

They could collect air pressure in a barometer. They could collect wind speed and rain.

Score Point: 2

This student correctly explains “the Girl Scout troop collected the data for temperature by using a thermometer in °C.” (1VP) The second bullet received no credit because the student failed to identify the tool used to collect data on precipitation. (0 VP) Finally the student correctly identified air pressure as an additional meteorological condition and a barometer as the tool used to collect the data. (2 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The girl Scout troop collected the data for the temperature by using a thermometer in °C. I know this information because under High Temperature there are labels with °C in between it. This is how the Girl Scout troop collected the data for the temp.

- Explain how the Girl Scout troop collected the data for precipitation.

The Girl Scout troop properly collected their data by collecting precipitation and measuring it with a centimeter ruler when it rained. I know they used a centimeter ruler because in brackets it says centimeters per day.)

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

They could add what kind of skies were there that day like clear skies, partly cloudy, or cloudy. I think this is a good addition you can tell if it might rain that day or not. This is another good condition the Girl Scout troop can add.

Score Point: 2

This student correctly explains the Girl Scout troop “collected the data for temperature by using a **thermonatour** in °C.” (1VP) The response also notes “the Girl Scout troop properly collected their data by collecting precipitation and measuring it with a centimeter ruler when it rained.” (1 VP) This student received partial credit for the third bullet by only identifying “what kind of skies were there that day” as their additional weather condition. They failed to provide an acceptable procedure for collecting this data. (1 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature. ,

The Girl Scout troop collected the data for temperature by using a thermometer. A thermometer is a tool that people use to find the temperature outside. They collected the data by putting the thermometer outside and seeing what the temperature was.

- Explain how the Girl Scout troop collected the data for precipitation.

They got that information by taking a measuring cup. Then they put the measuring cup outside and when it rained it filled up the measuring cup and told them how much precipitation there was.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

Another condition could be how much grass grew after a month. They could gather the information by take a ruler and measure the grass.

Score Point: 1

This student correctly identifies the Girl Scout troop collected “data for temperature by using a thermometer.” (1 VP) The second response on precipitation correctly notes “they got that information by taking a measuring cup. Then they put the measuring cup outside.” (1 VP) No credit was awarded for the third bullet. The student failed to identify an additional weather condition and explain how data on this condition could be gathered. (0 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

They probably used a thermometer.

- Explain how the Girl Scout troop collected the data for precipitation.

They used a tool that measures how much rain falls.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

Another condition would be wind speed. They would measure it with a barometer.

Score Point: 1

This student correctly identifies the Girl Scout troop “probably used a thermometer” to collect data on temperature. (1 VP) The second response on precipitation, “They used a tool that measures how much rain falls,” did not receive any credit because the student failed to identify the tool being used. (0 VP) The third response only received partial credit for identifying “wind speed” as an additional weather condition but no credit was given for incorrectly saying “they would measure it with a barometer.” (1VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The Girl Scout troop collected the data by recording the temperature in °C by using a thermometer.

- Explain how the Girl Scout troop collected the data for precipitation.

The Girl Scout troop collected data for precipitation by getting a bag of water and measuring the amount of water in centimeters, then they let it over night and measure it again to see how much was gone.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

Another condition the Girl Scout troop might include in describing the weather is what the weather is is it windy, cold, rainy. They can gather this information by looking outside to what the weather is.

Score Point: 1

This student correctly identifies “the Girl Scout troop collected data recording the temperature in °C by using a thermometer.” (1 VP) No credit was given for the second response for collecting data on precipitation. (0 VP) The third response only received partial credit for identifying “windy, cold, rainy” as additional weather conditions. No credit was given for how the information on these weather conditions could be gathered. (1 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The Girl Scout troop collected the data for temperature by recording what °C it was each day.

- Explain how the Girl Scout troop collected the data for precipitation.

The Girl Scout troop collected data for precipitation by recording how many centimeters of precipitation they got for each day.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

The Girl Scout troop could also include if the weather was windy, foggy, or humid. You could get this information by simply going outside and seeing and feeling the weather.

Score Point: 0

This student attempts the task of answering the first and second bullets relating to temperature and precipitation data but both responses are incorrect. (0 VP) The third response received partial credit for identifying “windy, foggy, and humid” conditions as additional weather observations. (1 VP) No credit was given for the method used to gather this information. (0 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The girl scout troop collected the data for the temperature by using a weather station, and they used celcius degrees (C).

- Explain how the Girl Scout troop collected the data for precipitation.

The Girl Scout troop collected the data for precipitation by using inches centimeters per day.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

Another condition that the Girl Scout troop might include in describing the weather is the humidity level. They could measure that by ~~of~~ of humidity that is in air.

Score Point: 0

This student attempts the task of answering the first and second bullets relating to temperature and precipitation but both responses are incorrect. (0 VP) The third response received partial credit for identifying “humidity” as an additional weather related condition. (1 VP) The student did not receive any credit for identifying a method that could be used to gather data on humidity. (0 VP)

Gina and her Girl Scout troop constructed a weather station at Stokes State Forest in New Jersey. They recorded the temperatures and amounts of precipitation during the days they were there.

Weather Observations

Day	High Temperature (°C)	Precipitation (centimeters per day)
Monday	27	0
Tuesday	22	3
Wednesday	24	0
Thursday	28	0
Friday	21	5
Saturday	25	2

- Explain how the Girl Scout troop collected the data for temperature.

The girl scout troop collected the high temperature in celcius from Monday to Saturday.

- Explain how the Girl Scout troop collected the data for precipitation.

The girl scout troop collected the data in precipitation in centimeters each day from Monday to Saturday.

- Identify another condition that the Girl Scout troop might include in describing the weather, and explain how information about this condition could be gathered.

The girl scout troops could get the pressure by watching the weather Channel. And this information should be gathered so you know what the weather is going to be like

Score Point: 0

This student has attempted to identify the weather-related activities of the Girl Scout troop but unfortunately all three responses are either incomplete, inaccurate, or incorrect. (0 VP)

NJ ASK RELEASED SAMPLE • GRADE 4

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar		
Ice Cube Melting		

**New Jersey ASK4 Science
Rubric/Sample Responses
Physical and Chemical Changes**

STANDARD:

5.6: Physical/Chemistry

B. Chemical Reactions

1. Combine two or more materials and show that the new material may have properties that are different from the original material.

RUBRIC:

VP = Value Points

3 Points

The student understands the nature of chemical reactions. The response correctly answers and/or appropriately explains at least 7 of the 8 parts of the question.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	New substances have been formed
Ice Cube Melting	Physical	Matter may look or behave differently but no new substance is formed.

- The response correctly states that the vinegar and baking soda underwent a **chemical change** because **new substances have been formed**.
- The response correctly states that the ice cube (water) underwent a **physical change** (change of state) in changing from a solid to a liquid. Water has the ability to **change back into a solid**.
- The response contains a valid physical change, such as **cutting, mashing, folding**. The appearance changes but the substance remains the same.
- The response names a valid chemical change, such as **rotting or burning**, and appropriately explains how he or she knows it's a chemical change, such as: the change produces heat and a new substance is formed, bubbles or a gas may be produced.

2 Points:

The response correctly answers 5 or 6 of the 8 parts of the question with some minor errors or omissions.

1 Point:

The response correctly answers 3 or 4 of the 8 parts of the question with some major errors or omissions.

0 Points:

The student responds correctly to 2 or fewer of the eight parts of the question. The student does not fully understand the difference between physical and chemical changes.

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	They combine together and make a new substance. The matter is changed.
Ice Cube Melting	physical	The ice cube melts because of heat, but the matter is the same.

Finally, Mr. Alves took a potato out of a bag.

- **Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.**

A physical change can be a potato getting cut or mashed. I know that's a physical change because the potato was mashed, but the matter is still the same.

- **Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.**

A chemical change can be where a potato gets boiled and mixed with something else. I know that's a chemical change because the matter is being changed, it's not the same.

Score Point: 3

This student received full credit for successfully completing the table on the identification of a chemical and physical change. In addition, full credit was also awarded for explaining “how you know” when a potato is affected by both a chemical and physical change. (8VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	When Baking Soda and Vinegar are combined, they form a different substance.
Ice Cube Melting	Physical	The ice cube turns to water.

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

A potato can be peeled. It is a physical change because it looks different.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

A potato can be mashed. It is a chemical change because it is baked and mashed.

Score Point: 3

This student received partial credit for attempting to complete the table on the identification of a chemical and physical change. The student's "explanation" for an ice cube melting merely described what might happen when an ice cube melts but it failed to give an explanation for the process. Full credit was given for "how you know" when a potato is affected by both a chemical and physical change. (7VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	It is Chemical because you're combining 2 substances together, making them one, therefore giving them new and different properties.
Ice Cube Melting	Physical	It is physical because it is not being broken down or combined with another substance, it is being put into a different state.

Finally, Mr. Alves took a potato out of a bag.

- **Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.**

The potato could be chopped. It is physical because it is changing shape, not being broken down or combined with another substance.

- **Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.**

The potato could be eaten. It is chemical because it not being put into a different state, it is being broken down.

Score Point: 3

This student received full credit for successfully completing the table on the identification of a chemical and physical change. In addition, full credit was also awarded for explaining “how you know” when a potato is affected by both a chemical and physical change. (8VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	The 2 materials made a chemical reaction.
Ice Cube Melting	Physical	The matter changed

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

Mr. Alves could drop the potato and make a dent in the potato. I know it's a physical change because it's a change in appearance.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

If Mr. Alves leaves the potato to rot, it would become mold. I know it's a chemical change because it's not a potato anymore.

Score Point: 2

This student received credit for completing the chemical and physical change table. Both reactions were properly identified and received credit. The explanations for each reaction were not correct and therefore they did not receive any credit. (2VP) Full credit was awarded for both responses relating to Mr. Alves' potato experiments. "Dropping the potato and making a dent in it and knowing that it's a change in appearance" were acceptable responses for a physical change. The "potato rotting" and "it's not a potato anymore" were acceptable responses for a chemical change. (4VP) (6VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	When you combine Baking Soda and Vinegar you are making something different.
Ice Cube Melting	Physical	An ice cube is water but it is frozen. So when it melts it turns back into water.

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

A physical change that can happen to a potato is when you cut it. It is a physical change because nothing is change from the potato except its size and shape.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

A chemical change that can happen to the potato is when you mash it. When you mash it the properties change.

Score Point: 2

This student received credit for completing the chemical and physical change table. The “action” section of the table was correctly labeled, but the explanations for the changes were only partially correct. A more substantive response than “it turns back into water” is needed for the explanation relating to the ice cube. (3VP) Partial credit was awarded for explaining Mr. Alves’ potato experiments. The student’s explanation of a “physical change that could happen to a potato” is correct. Explaining that mashing a potato is an example of a chemical change is incorrect. No credit was given. (2VP) (5VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	because there mixed now, they are a different substance with combined properties
Ice Cube Melting	Physical	because the solid is now turning into a liquid, so it is a physical change but it is still the same on the inside but not on how it looks.

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

A physical change that can happen to the potato is it getting cut in half or getting smashed and why this is a physical change because it is still a potato it just looks different.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

A chemical change that can happen to the potato is mixing tomato juice in it and that is a chemical change because the potato has changed in many different ways now.

Score Point: 2

This student received credit for completing the chemical and physical change table. The “action” section of the table was correctly labeled, but the explanations for the changes were only partially correct. Full credit was given for “because there mixed now, they are a **different** substance with **combined** properties.” (3VP) The statement, “because the solid is now turning into a liquid,” received no credit. Partial credit was awarded for explaining Mr. Alves’ potato experiments. The student’s explanation of a “physical change that could happen to a potato” is correct. Explaining that mashing a potato is an example of a chemical change is incorrect. No credit was given. (2VP) (5VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	chemical	starts to bubble
Ice Cube Melting	physical	starts to melt

Finally, Mr. Alves took a potato out of a bag.

- **Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.**

Mr. Alves can cut it.

- **Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.**

Mr. Alves can fry it.

Score Point: 1

This student received partial credit for attempting to complete the chemical and physical change table. No credit was given for the “explanation” portion of the table since the response consisted of a description of both processes rather than an explanation. Partial credit was awarded for attempting to explain Mr. Alves’ activities with a potato. The student correctly provided an activity that could be performed but failed to include an explanation for each activity. (4VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	When you combine Baking Soda and Vinegar you get lava
Ice Cube Melting	Physical	It's physical because the cube changes its shape

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

A physical change that can happen to the potato is the you can cut the skin,

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

A chemical change that can happen to the potato is to the potato and Fry it to make French Fries

Score Point: 1

This student received partial credit for attempting to complete the chemical and physical change table. No credit was given for the “explanation” portion of the table since it consisted of a description of both processes rather than an explanation. Partial credit was awarded for only naming a chemical and physical change that “could happen” to a potato. The student failed to provide an explanation for each change. (4VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	<i>Chemical</i>	<i>because it's making bubbles</i>
Ice Cube Melting	<i>Physical</i>	<i>because it's just melting.</i>

Finally, Mr. Alves took a potato out of a bag.

- **Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.**

A physical change that can happen to a potato is cutting it into different pieces. I know this

- **Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.**

Score Point: 1

This student received only partial credit for attempting to complete the chemical and physical change table. His/her response for the “explanation” portion of the table merely consisted of descriptions of what might have occurred, rather than an explanation for both changes. Partial credit was given for naming a physical change “you know” could happen to a potato. An example of a physical change was provided but without an explanation. (3VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	liquid to gas	Bubbles are chemicals,
Ice Cube Melting	liquid to solid	The ice is melting into a liquid. The ice was a solid.

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

The potato is now out of the bag, so the potato is somewhere else.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

The potato has more grems on it, the grems are chemicals.

Score Point: 0

This student has failed to provide any accurate information on chemical and physical changes and has displayed a limited knowledge and understanding of the content matter. (0 VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	It starts to bubble so it is chemical
Ice Cube Melting	Physical	It is changing from solid to liquid

Finally, Mr. Alves took a potato out of a bag.

- Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.

Changing from regular to mashed. It changes shape because you need more than one potatoe and it now has different mass.

- Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.

It starts to steam if it gets too hot because there is some water in it and water steams.

Score Point: 0

This student received partial credit for attempting to complete the chemical and physical change table. Credit was only awarded for correctly identifying each action as either chemical or physical. No credit was awarded for the student's explanation of Mr. Alves' activities with a potato. (2VP)

Mr. Alves was testing for physical and chemical changes. First, he combined baking soda with vinegar and observed bubbles forming. Next, Mr. Alves put an ice cube in an empty glass and watched it melt.

Complete the table below by identifying each change as physical or chemical, and give an explanation for each change.

Action	Physical/ Chemical	Explanation
Combining Baking Soda and Vinegar	Chemical	The explanation for this is the combined Baking Soda and vinegar is forming bubbles.
Ice Cube Melting	Physical	I think it was a physical change because the ice cube melted and formed water.

Finally, Mr. Alves took a potato out of a bag.

- **Name a physical change that can happen to the potato.
Explain how you know that it is a physical change.**

When Mr. Alves took the potato out of the bag, I don't think there would be any physical change.

- **Name a chemical change that can happen to the potato.
Explain how you know that it is a chemical change.**

I think when the potato was taken out of the bag, it started to rot and leak.

Score Point: 0

This student received partial credit for attempting to complete the chemical and physical change table. Credit was only given for correctly identifying each action as either chemical or physical. The student was awarded partial credit for stating that rotting was an example of a chemical change that “could happen” to a potato. (3VP)

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