



**Indiana**  
**Department of Education**

**Glenda Ritz, NBCT**  
Indiana Superintendent of Public Instruction

*ISTEP+: Grade 4*

Science

Released Part 1 Applied Skills (open-ended) Items  
and Scoring Notes

## Introduction

The *ISTEP+* Spring 2016 test was administered to Indiana students in Grades 3-8 and 10. The test included two parts: Part 1 was given in March, and Part 2 took place in late April and early May. Part 1 contained Applied Skills test questions (also referred to as open-ended items) that were hand scored by trained evaluators, and Part 2 was machine scored. Scores for Part 1 and Part 2 are combined to generate a student's total score.

Test results, as well as images of the Applied Skills student responses, are available online, and schools are expected to discuss results with parents and students. As a springboard for these conversations and to serve as a resource for teachers, the Indiana Department of Education has created this document, which consists of the following:

- a brief description of the types of questions on the test
- a short summary of scoring rules utilized by the trained evaluators
- a copy of the rubrics—or scoring guides—used by evaluators to score student responses
- a copy of the released Applied Skills questions (*“released” means the items are posted on the web and are no longer secure; therefore, the released test items can be discussed and used with students as future practice items*)
- anchor papers—or sample student responses—used by evaluators to distinguish between score points

### Notes:

- The Part 1 open-ended questions are released when test results are made available.
- It is important to keep in mind that the majority of a student's score is calculated from items in Part 2. Since Part 2 items are secure and are not released, they are not included in this document.

## Question Types

This document addresses questions from *ISTEP+ Part 1*. *Students* demonstrate their knowledge and understanding by responding to items that are open-ended, providing written responses in a short-answer or essay-type format.

Part 1 consists of the following test question types: Constructed-Response (CR), Extended-Response (ER), and a Writing Prompt (WP). Item types vary by subject area. Math, Science, and Social Studies include CR and ER items. English/Language Arts includes CR and WP test questions.

## Scoring

The questions on *ISTEP+ Part 1* are scored by evaluators who must have a four-year college degree and pass a series of qualifying tests. Prior to scoring student responses, evaluators receive extensive training to ensure that student responses are scored accurately and consistently.

For Part 1 of *ISTEP+*, each question is scored according to a rubric, or scoring guide. Rubrics clearly define the requirements for each score point. A set of student responses representing all of the score points on a rubric are selected as anchor papers (exemplars) and are used as clear examples of specific score points. Samples of anchor papers are presented within this document.

<b>ISTEP+ Part 1: Science</b>		
<b>Question Type</b>	<b>Score Reporting Categories</b>	<b>Scoring Method</b>
Constructed-Response (CR)	Physical Science Earth Science Life Science Science, Engineering and Technology The Nature of Science The Design Process	2-pt. CR Rubric (Grades 4 & 6)
Extended Response (ER)	Physical Science Earth Science Life Science Science, Engineering and Technology The Nature of Science The Design Process	4-pt. ER Rubric (Grades 4 & 6)

If a student's response is unable to be scored, it is assigned one of the following condition codes:

- A** Blank/No Response/Refusal
- B** Illegible
- C** Written predominantly in a language other than English
- D** Insufficient response/Copied from text
- E** Response not related to test questions or scoring rule (not applied to Mathematics questions)

More information is available regarding assessment topics on the Office of Student Assessment homepage at <http://www.doe.in.gov/assessment>.

Item #1  
Constructed-Response

**Constructed-Response  
Standard 2: Earth Science**

**Question 1**

<p><b>1.</b> Landslides can occur in the mountains after heavy rain from a storm.</p> <p>What happens during a landslide?</p> <hr/> <hr/>
<p>Why are landslides a concern for farmers living at the bottom of a mountain?</p> <hr/> <hr/>

**Key Element(s):**

---

Any response indicating that large amounts of earth (soil, dirt, rocks, etc.) move quickly down the mountain.

---

Any response indicating that the current farmland could be covered up by the dirt from the mountain and/or change of soil type and/or loss of farming equipment under the landslide.

---

**Rubric:**

<b>2 points</b>	Two key elements
<b>1 point</b>	One key element
<b>0 points</b>	Other

**Question 1, Sample A – Score Point 2**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

Trees, mud, rocks, and plants fall down a hill or mountains.

Why are landslides a concern for farmers living at the bottom of a mountain?

The stuff that falls down can hurt these animals and buy things.

*Scoring Notes: Part one of the response correctly describes what occurs during a landslide. Part two of the response correctly describes a concern for farmers living at the bottom of a mountain. This response receives two points for two correct key elements.*

**Question 2, Sample B – Score Point 2**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

When a landslide occurs the rock from the mountain slide down the mountain

Why are landslides a concern for farmers living at the bottom of a mountain?

landslides are a concern to farmer at the end of the mountain because it could ruin their farm

*Scoring Notes: Part one of the response correctly describes what occurs during a landslide. Part two of the response correctly describes a concern for farmers living at the bottom of a mountain. This response receives two points for two correct key elements.*

**Question 1, Sample C – Score Point 1**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

There is a storm with heavy rain

---

Why are landslides a concern for farmers living at the bottom of a mountain?

Because pieces of mountain can tumble off the mountain and can damage the farm.

*Scoring Notes: Part one of the response describes what may cause a landslide but incorrectly describes what happens during a landslide. Part two of the response correctly describes a concern for farmers living at the bottom of a mountain. This response receives one point for one correct key element.*

**Question 1 Sample D – Score Point 1**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

rocks slide down a mountain

Why are landslides a concern for farmers living at the bottom of a mountain?

because, sometimes big boulders come down

*Scoring Notes: Part one of the response correctly describes what occurs during a landslide. Part two of the response does not identify a concern for farmers living at the bottom of a mountain. This response receives one point for one correct key element.*

**Question 1, Sample E – Score Point 0**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

I + rain really hard,

Why are landslides a concern for farmers living at the bottom of a mountain?

Because all the really heavy rain.

*Scoring Notes: Part one of the response describes a possible cause of a landslide but does not describe what happens during a landslide. Part two of the response does not identify a concern for farmers living at the bottom of a mountain. This response receives zero points for zero correct key elements.*

**Question 1, Sample F – Score Point 0**

Landslides can occur in the mountains after heavy rain from a storm.

What happens during a landslide?

Heavy rain storms come in.

---

Why are landslides a concern for farmers living at the bottom of a mountain?

It is at the bottom of the mountain  
because you have to watch out for a rain storm.

*Scoring Notes: Part one of the response describes a possible cause of a landslide but does not describe what happens during a landslide. Part two of the response does not identify a concern for farmers living at the bottom of a mountain. This response receives zero points for zero correct key elements.*

Item #2  
Constructed-Response

**Constructed-Response**  
**Standard 1: Physical Science**

**Question 2**

**2.** Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

---

---

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

---

---

**Key Element(s):**

---

Any response indicating that the student's hands are not touching the fire so heat waves radiate/move through the air from the fire to the person's hands, warming them.

---

Any response indicating that heat is transferred directly/by touch from the hot chocolate to the mug and then to the person's hands.

---

**Rubric:**

<b>2 points</b>	Two key elements
<b>1 point</b>	One key element
<b>0 points</b>	Other

## Question 2, Sample A – Score Point 2

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

The heat is in the air around the fire, so you can just put your hands in the warm air.

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

The hot chocolate warms what's touching it so it warms the cup, and if your touching the cup it warms your hands.

*Scoring Notes: Part one of the response correctly explains how the heat from a fire warms a person's hands without touching the fire. Part two of the response correctly explains how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives two points for two correct key elements.*

**Question 2, Sample B – Score Point 2**

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

Heat will always rise up. If the man was putting his hands over the fire, heat will rise to his hands.

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

If the hot chocolate has heat buildup the cup will get very hot. If you touch it it will warm your hands.

*Scoring Notes: Part one of the response correctly explains how the heat from a fire warms a person's hands without touching the fire. Part two of the response correctly explains how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives two points for two correct key elements.*

**Question 2, Sample C – Score Point 1**

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

The heat from the fire makes  
the person's hands warm.

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

The heat travels from the hot chocolate  
to the cup to the hands.

*Scoring Notes: Part one of the response does not explain how the heat from a fire warms a person's hands without touching the fire. Part two of the response correctly explains how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives one point for one correct key element.*

**Question 2, Sample D – Score Point 1**

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

Heat warms up your hands without touching  
by heating the air around you.

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

The heat warms up the cup so when you touch  
it its going to be hot.

*Scoring Notes: Part one of the response correctly explains how the heat from a fire warms a person's hands without touching the fire. Part two of the response does not explain how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives one point for one correct key element.*

**Question 2, Sample E – Score Point 0**

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

The heat is close enough to reach the person.

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

Warm heat will rush to the hand.

*Scoring Notes: Part one of the response does not explain how the heat from a fire warms a person's hands without touching the fire. Part two of the response does not explain how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives zero points for zero correct key elements.*

## Question 2, Sample F – Score Point 0

Heat can move from one place to another in many different ways.

Explain how heat moves when a person warms his hands by holding them near a fire without touching the fire.

It travels by heat getting closer and closer until it reaches the persons palms and warms their hands

Explain how heat moves from hot chocolate in a cup to warm a person's hands as the person holds on to the bottom of the cup.

It warms a persons hand because the heat can travel threw the bottom of the cup and warm the hands

*Scoring Notes: Part one of the response does not explain how the heat from a fire warms a person's hands without touching the fire. Part two of the response does not explain how hot chocolate in a cup can warm a person's hands as the person holds the bottom of the cup. This response receives zero points for zero correct key elements.*

Item #3  
Constructed-Response

**Constructed-Response**  
**Standard 4: Science, Engineering, and Technology**

**Question 3**

**3.** A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

---

Explain why your answer is the BEST simple machine to use. Explain how it works.

---

---

---

**Key Element(s):**

---

Any response indicating a wedge or similar

---

Any response that discusses the shape of the wedge and how it functions, largely because of the friction generated between the wedge and the floor (or other surface)

---

**Rubric:**

<b>2 points</b>	Two key elements
<b>1 point</b>	One key element
<b>0 points</b>	Other

**Question 3, Sample A – Score Point 2**

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

a wedge

Explain why your answer is the BEST simple machine to use. Explain how it works.

a wedge fits underneath the door and the wider the wedge gets the more friction until it stops

*Scoring Notes: Part one of the response correctly identifies a wedge. Part two of the response correctly explains how the wedge slides under the door causing friction. This response receives two points for two correct key elements.*

**Question 3, Sample B – Score Point 2**

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

A wedge.

Explain why your answer is the BEST simple machine to use. Explain how it works.

The simple machine that is best is a wedge because it can stop the door by getting stuck under it.

*Scoring Notes: Part one of the response correctly identifies a wedge. Part two of the response correctly explains how the wedge slides under the door causing friction. This response receives two points for two correct key elements.*

**Question 3, Sample C – Score Point 1**

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

A wedge.

Explain why your answer is the BEST simple machine to use. Explain how it works.

A wedge is the best answer  
because the wedge will keep the  
door in one place.

*Scoring Notes: Part one of the response correctly identifies a wedge. Part two of the response does not explain how or why a wedge works to keep the door open. This response receives one point for one correct key element.*

### Question 3, Sample D – Score Point 1

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

A wege could keep the open like a door stopper

Explain why your answer is the BEST simple machine to use. Explain how it works.

It could keep the door open by if you put it on the ground to stop the door from shutting.

*Scoring Notes: Part one of the response correctly identifies a wedge. Part two of the response does not explain how or why a wedge works to keep the door open. This response receives one point for one correct key element.*

**Question 3, Sample E – Score Point 0**

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

a door stopper

Explain why your answer is the BEST simple machine to use. Explain how it works.

the door stopper you  
just have to slide it  
in.

*Scoring Notes: Part one of the response does not identify a simple machine. Part two of the response does not explain how or why a door stopper (or appropriate simple machine) works to keep the door open. This response receives zero points for zero correct key elements.*

**Question 3, Sample F – Score Point 0**

A teacher would like to have the classroom door open to let in fresh air. She asks Henry to open the door, but it will not stay open without the help of a simple machine.

What simple machine would BEST perform the task?

A pulley

Explain why your answer is the BEST simple machine to use. Explain how it works.

If you put a string on the door you grab the string you pull it the door will open.

*Scoring Notes: Part one of the response does not identify a valid simple machine for the scenario. Part two of the response does not adequately explain how or why the simple machine works to keep the door open. This response receives zero points for zero correct key elements.*

Item #4  
Extended-Response

**Extended-Response**  
**Standard 5: The Nature of Science**

**Question 4**

4. Theo likes to blow across the tops of bottles to hear the sounds they make. He did an investigation to find out if the amount of liquid in a bottle affects the pitch of the sound that is produced when he blows across the top of the bottle. He used the two glass bottles and two plastic bottles shown below for his investigation.



Glass Bottle W



Glass Bottle X



Plastic Bottle Y



Plastic Bottle Z

The steps Theo followed during his investigation are listed below.

1. Pour 100 milliliters (mL) of water into bottle W.
2. Pour 200 mL of water into bottle X.
3. Pour 300 mL of water into bottle Y.
4. Pour 400 mL of water into bottle Z.
5. Blow across the top of each bottle.
6. Record a description of the pitch of the sound produced when blowing across each bottle.
7. Create a table to show the results of the investigation.

Theo recorded his results in the table below.

**Pitches Produced by Different Amounts of Water**

<b>Bottle</b>	<b>Amount of Water (mL)</b>	<b>Pitch</b>
W	100	low
X	200	medium
Y	300	high
Z	400	very high

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

---

---

Describe ONE way Theo could improve his investigation to make the test more fair.

---

---

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

---

---

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

---

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

---

---

---

## Key Element(s):

---

Any one of the following:

- Graduated cylinder
- Measuring cup
- Beaker
- Any other valid scientific tool that could be used to measure volume

---

Any one of the following:

- Use bottles that are the same size
- Use bottles that are the same shape
- Use bottles made out of the same material
- Any other valid way to make the investigation more fair

---

Any one of the following:

- The pitch gets higher as the amount of water increases.
- The pitch gets lower as the amount of water decreases.

- 
- Any response indicating that the pitch would be lower than the pitch of Bottle W.
  - Since there would be less water in the bottle than in Bottle W, the pitch should be lower than that of Bottle W.
- 

## Rubric:

<b>4 points</b>	Four key elements
<b>3 points</b>	Three key elements
<b>2 points</b>	Two key elements
<b>1 point</b>	One key element
<b>0 points</b>	Other

Question 1, Sample A – Score Point 4

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

He could have used a measuring cup.

Describe ONE way Theo could improve his investigation to make the test more fair.

He could use the same size bottles.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

The more liquid you put in, the higher the sound.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

It will sound a lot deeper or lower than bottle W.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

I know because the less liquid in it the lower the tone is.

*Scoring Notes: Part one of the response correctly identifies a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response describes a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives four points for four correct key elements.*

Question 4, Sample B – Score Point 4

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

graduated cylinder

Describe ONE way Theo could improve his investigation to make the test more fair.

He could put the same amount of water in the bottles

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

The more water... the higher pitch.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

the pitch will be lower

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

On the data more water made the pitch higher.

*Scoring Notes: Part one of the response correctly identifies a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response describes a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives four points for four correct key elements.*

Question 4, Sample C – Score Point 3

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

100 mL each and then added more.

Describe ONE way Theo could improve his investigation to make the test more fair.

Theo could improve by using all the same size bottles.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

The more water the higher the pitch.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

It will be lower than bottle W.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

If the more water the higher the pitch, bottle W had 100 mL and was low, then half of 100 mL would be 50 mL so 50 mL would be lower.

*Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response describes a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives three points for three correct key elements.*

Question 4, Sample D – Score Point 3

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

milliliters stick

Describe ONE way Theo could improve his investigation to make the test more fair.

Have each bottle the same bottle and have the same amount of water in it.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

The more water in the bottle the more higher it gets.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

The sound would be lower way lower than glass bottle W.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

Because Glass bottle W is low and only has 100 mL of water so it would be lower.

*Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response describes a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives three points for three correct key elements.*

Question 4, Sample E – Score Point 2

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

A cup

Describe ONE way Theo could improve his investigation to make the test more fair.

make the bottles the same size

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

There is more water in some bottles

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

It will sound lower

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

It says theo Put 100ml of water and it said it was low so if you put 50ml of water it would be lower

*Scoring Notes: Part one of the response fails to identify a valid scientific tool (“cup” is too vague). Part two of the response describes a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives two points for two correct key elements.*

Question 4, Sample F – Score Point 2

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

He probably used a measuring cup with mL on it.

Describe ONE way Theo could improve his investigation to make the test more fair.

He could put the same amount of mL in the bottles.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

The more water he puts in the more sound it is going to make.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

The pitch sound would be very low.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

I know because it said the bottle is the same as bottle W and bottle W he put in 100 mL and if he just put 50 mL in the bottle it is going to be low.

*Scoring Notes: Part one of the response identifies a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water but provides an invalid explanation as to why the pitch will be lower than the 100 mL bottle. This response receives two points for two correct key elements.*

Question 4, Sample G – Score Point 1

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

milliliters is what he used

Describe ONE way Theo could improve his investigation to make the test more fair.

use something different for measuring the water.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

They keep going higher like low, medium, high, and very high.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

Maybe a <sup>very</sup> low ~~pitch~~ = v p i y - ~~pitch~~.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

on W they have the pitch low and the amount of water was one hundred so if they put fifty it would go down more. so I see very low.

*Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response fails to describe a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water and provides a valid explanation as to why the pitch will be lower. This response receives one point for one correct key element.*

Question 5, Sample H – Score Point 1

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

He most likely used milliliters.

Describe ONE way Theo could improve his investigation to make the test more fair.

He could use the same amount of water into each bottle.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

If you were to shake a glass bottle with water it would make a low and medium pitch like a guitar.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

It would make a very low pitch.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

I know it is right because 50 is half of 100 so I tried to division problem of low divided by two so I got my answer that way.

*Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response describes a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water but provides an invalid explanation as to why the pitch will be lower. This response receives one point for one correct key element.*

Question 4, Sample I – Score Point 0

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

Cups

Describe ONE way Theo could improve his investigation to make the test more fair.

To put more liquid  
in the cups.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

It's the liquid

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

It will make a lower  
pitch

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

Because the more liquid  
in the bottle the lower  
the pitch

*Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response fails to describe a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water but provides an invalid explanation as to why the pitch will be lower. This response receives zero points for zero correct key elements.*

Question 4, Sample J – Score Point 0

Identify the scientific tool Theo MOST LIKELY used to measure the amount of water poured into each bottle.

milliliters is what he used

Describe ONE way Theo could improve his investigation to make the test more fair.

use something different for measuring the water.

Describe ONE conclusion that could be made about how the amount of water in the bottle relates to the pitch of the sound produced.

They keep going higher like low, medium, high, and very high.

Theo has another bottle just like bottle W. He will put 50 mL of water in it and blow across the top.

Describe how the pitch produced by the bottle with 50 mL of water in it will compare with the pitch produced by bottle W.

Maybe <sup>very</sup> low ~~at very high~~.

Use data from the table to EXPLAIN how you know your description of the pitch produced by the bottle with 50 mL of water is correct.

on W they have the pitch low and the amount of water was one hundred so if they put fifty it would go down more. so I see very low.

Scoring Notes: Part one of the response fails to identify a valid scientific tool. Part two of the response fails to describe a valid way to improve the investigation. Part three of the response fails to identify a valid conclusion about how the amount of water affects pitch. Part four of the response correctly describes the pitch of a bottle with 50 mL of water but provides an invalid explanation as to why the pitch will be lower. This response receives zero points for zero correct key elements.