ISTEP+: Grade 10

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 exemplary 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.

ISTEP+ Part 1: Science		
Question Type	**Score Reporting Categories**	**Scoring Method**
Constructed-Response (CR)	The Nature of Science	2-pt. CR Rubric (Grades 4 & 6)
Extended Response (ER)	The Nature of Science	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: The Nature of Science

Question 1

1. A student uses the property of density to determine whether a 2015 US penny is made of pure copper. The student knows from other peoples' research that the density of pure copper is 8.96 grams per cubic centimeter (g/cm^3).

The student measures the mass and volume of a copper block, a copper nugget, and a 2015 US penny. The data collected by the student are shown in the table below.

Object	Mass (g)	Volume (cm^3)	Density (g/cm^3)
Copper block	1896	213	8.90
Copper nugget	248	27.7	8.95
2015 US penny	2.5	0.422	5.92

Also shown are the densities of some other metals as determined by other investigators.

Metal	Density (g/cm^3)
Aluminum	2.72
Iron	7.85
Magnesium	1.74
Zinc	7.13

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

Key Element(s):

- The penny is not made of pure copper. The scientists determined that the density of copper is around 8.96 g/cm^3, and the student determined the penny has a density of around 5.92 g/cm^3. The penny is not made of pure copper but something that is less dense than pure copper.
- Other valid response

- Since the penny is not made of pure copper, the research of others could help the student find which other metals could be combined with copper to make the penny.
- Other valid response

Rubric:

2 points Two key elements
1 point One key element
0 points Other

Question 1, Sample A – Score Point 2

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

No, because the copper penny doesn't have the same density (g/cm^3) as pure copper. The student's data only shows $5.92 g/cm^3$ when it should be $8.96 cm^3$. The U.S. penny's density is closer to pure zinc, than copper.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

The student can use the data, found by others, to determine what is combined with copper to give the U.S. penny its density.

Scoring Notes: Part one of the response correctly explains why the penny is not made of pure copper. Part two of the response correctly describes how the research of others could be used to explain the composition of a penny. This response receives two points for two correct key elements.

Question 1, Sample B – Score Point 2

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

The penny based on the research appears to be not made of pure copper because it is not as dense as the copper block nor the copper nugget. The copper block has a density of 8.9 grams per cubic cm. and the the copper nugget has a density of 8.95 grams per cubic cm. while the U.S. penny has a density of 5.92 grams per cubic cm.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

They could see what other materials could be combined with copper to make up the penny. An example would be if they were to hypothesise 50% is copper and the other half is magnesium and because of mixing the two the new composition of the penny would come out to be about 5.92 because it would be the average of the two elements.

Scoring Notes: Part one of the response correctly explains why the penny is not made of pure copper. Part two of the response correctly describes how the research of others could be used to explain the composition of a penny. This response receives two points for two correct key elements.

Question 1, Sample C – Score Point 1

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

No it is not, the first student shows that the density is 8.96 to be full copper but in the data its only showing 5.92.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

One other way is if the student was to research the amont of mass copper is, or the volume.

Scoring Notes: Part one of the response correctly explains why the penny is not made of pure copper. Part two of the response describes an invalid way the research of others could be used to explain the composition of a penny. This response receives one point for one correct key element.

Question 1, Sample D – Score Point 1

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

The students data shows that the penny is not made of pure copper. We know this because the penny on the graph comes up 2.03 grams short of being pure copper. From the other investigators we see that it has to have some other materials.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

It can help by showing what else the penny is made out of.

Scoring Notes: Part one of the response incorrectly uses mass to compare the penny to pure copper. Part two of the response correctly describes how the research of others could be used to explain the composition of a penny. This response receives one point for one correct key element.

Question 1, Sample E – Score Point 0

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

I think that the 2015 US penny is not pure copper because the mass of the Copper block is 1896g and the nugget is 248g. The density of the nugget and block is very close.

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

He could compare to others and see if it matched up closely.

Scoring Notes: Part one of the response incorrectly uses mass to compare the penny to pure copper. Part two of the response describes an invalid way the research of others could be used to explain the composition of a penny. This response receives zero points for zero correct key elements.

Question 1, Sample F – Score Point 0

Explain whether the 2015 US penny is made of pure copper. Include both the student's data and the data of other investigators in your explanation.

The 2015 US penny is made of pure Copper
Ex. Mass (g) 2.5, Volume (cm^3) .422, Density 5.92

Describe one way the research of others could help the student explain the composition of the 2015 US penny in more detail.

All pennies are made of copper & is exactly 2.5 mass(g)

Scoring Notes: Part one of the response incorrectly identifies the penny as being made of pure copper. Part two of the response describes an invalid way the research of others could be used to explain the composition of a penny. This response receives zero points for zero correct key elements.

Item #2
Constructed-Response

Constructed-Response
Standard: The Nature of Science

Question 2

2. The table below shows the temperature, in degrees Celsius (ºC), at which water boils at different elevations. The highest point in Indiana is Hoosier Hill, with an elevation of 383 meters (m) above sea level.

Location	Altitude (m)	Boiling Point (°C)
Dead Sea	–400	101.7
Sea level	0	100.0
Chicago, Illinois	177	99.4
Denver, Colorado	1,609	94.4
Pike's Peak	4,301	86.1
Mount McKinley	6,194	80.0
Mount Everest	8,848	69.4

Using data from the table, explain the relationship between altitude and boiling point.

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3ºC. Explain whether the student's hypothesis is supported or not supported by the data in the table.

Key Element(s):

- The data show that as the altitude increases, the boiling point of water decreases. For example, Mt. Everest is at the highest altitude and has the lowest boiling point, and the Dead Sea has the lowest altitude but the highest boiling point.
- Other valid response

- The student's hypothesis for the boiling point of water on Hoosier Hill is too low. The boiling point should be between 99.4 and 94.4°C because the elevation of Chicago is closer to the elevation of Hoosier Hill than the elevation of Denver.
- Other valid response

Rubric:

2 points Two key elements
1 point One key element
0 points Other

Question 2, Sample A – Score Point 2

Using data from the table, explain the relationship between altitude and boiling point.

As the altitud increases the boiling point decreases

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

The hypothesis is not supported because the hoosier hill is taller than chicago but shorter than Denver, so the boiling point would have to be between 99.4 and 94.3

Scoring Notes: Part one of the response correctly describes the relationship between altitude and boiling point. Part two of the response correctly explains why the student's hypothesis is not supported by the given data. This response receives two points for two correct key elements.

Question 2, Sample B – Score Point 2

Using data from the table, explain the relationship between altitude and boiling point.

The lower the altitude the more the temepratues is, though when the altitude rises, the tempreature lowers. As when the altitude is at -400 the boiling point is 101.7 Celsius, then if the altitude gets to 8,848 then the boiling point is at 69.4.

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

The hypothesizes is not supported, as if we see in the data, 1,609 is 94.4 so how would 93.3 be the celsius be 383, as if we had to take a guess then it could be 96 or 97 celicus, since 117 is 99.4. So the anwswer is no the student hypothesizes is wrong, and not supported.

Scoring Notes: Part one of the response correctly describes the relationship between altitude and boiling point. Part two of the response correctly explains why the student's hypothesis is not supported by the given data. This response receives two points for two correct key elements.

Question 2, Sample C – Score Point 1

Using data from the table, explain the relationship between altitude and boiling point.

The higher you go up the mountain the tempeture (celsius) decreeses. When you ae at sea level the boiling tempature is 100.0 degrees celsius, and when you reach 8,848 meters above sea level the temp. will decrees to 69.4.

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

It will be suported because on a mountain or on a hill the tempature will decreese.

Scoring Notes: Part one of the response correctly describes the relationship between altitude and boiling point. Part two of the response incorrectly states that the student's hypothesis is supported by the given data. This response receives one point for one correct key element.

Question 2, Sample D – Score Point 1

Using data from the table, explain the relationship between altitude and boiling point.

Higher the Altitude the Lower the Boiling Point is.

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

The student hypothesis is not supported because he dose not say what his altitude is.

Scoring Notes: Part one of the response correctly describes the relationship between altitude and boiling point. Part two of the response does not provide a valid explanation for why the student's hypothesis is not supported. This response receives one point for one correct key element.

Question 2, Sample E – Score Point 0

Using data from the table, explain the relationship between altitude and boiling point.

altitude is covered by meters and boiling point is covered by celsius

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

its not supported

Scoring Notes: Part one of the response incorrectly describes the relationship between altitude and boiling point. Part two of the response does not provide a valid explanation for why the student's hypothesis is not supported. This response receives zero points for zero correct key elements.

Question 2, Sample F – Score Point 0

Using data from the table, explain the relationship between altitude and boiling point.

the relationship between altitude and boiling point need to be the same.

A student hypothesizes that the boiling point of water on Hoosier Hill will be 93.3°C. Explain whether the student's hypothesis is supported or not supported by the data in the table.

The student hypothesizes is not supported by the data in the table because its not on the table.

Scoring Notes: Part one of the response incorrectly describes the relationship between altitude and boiling point. Part two of the response does not provide a valid explanation for why the student's hypothesis is not supported. This response receives zero points for zero correct key elements.

Item #3
Constructed-Response

Constructed-Response
Standard: The Nature of Science

Question 3

3. Bats are an essential part of Indiana's ecosystem. This includes their role in regulating insect populations that destroy farm crops. Under normal conditions, the bat population remains fairly steady over time. This is because bats typically have only one pup, or offspring, per year. During the winter, large groups of bats hibernate together in caves. This practice helps the bats remain warm during the cold seasonal temperatures.

In recent years, many bats have been diagnosed with an infectious disease called white nose syndrome (WNS). Infected bats develop a white, fuzzy growth on their nose, ears, and wings that is caused by a fungus. The fungus irritates the bats and causes them to arouse from hibernation and burn off fat reserves, thus increasing the likelihood that the bats will starve. The fungus is spread from cave to cave by humans and contaminated caving equipment, as well as by the bats themselves. The table below shows the population changes from 2011 to 2014 for four species of Indiana bats.

Indiana Bat Populations, 2011–2014

Type of Bat	Starting Population	Ending Population	Percent Change
Little brown bat	8,760	1,710	–80%
Eastern pipistrelle	1,040	570	–45%
Indiana bat	117,600	98,400	–16%
Big brown bat	103	107	+4%

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

Key Element(s):

Any one of the following:

- The data show a large decline in population in three of the four types of bats. This could lead to the extinction of some of the bat species and disrupt the ecosystem.
- The economy could be affected by an increase in the number of insects that destroy crops because there are fewer bats to eat them. Crops could be harmed and there could be a shortage of food, causing an increase in food prices
- Other valid response

- Humans help spread the fungus that causes the disease. This could be prevented by closing the caves to humans or by inspecting and decontaminating any caving equipment before humans go into the caves where the bats live.
- Other valid response

Rubric:

2 points Two key elements
1 point One key element
0 points Other

Question 3, Sample A – Score Point 2

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

One reason people should try to reduce the impact of white nose syndrome is because the bats are important to the ecosystem by eating bugs that destroy crops. White nose syndrome is killing the bat population, so they won't be able to regulate the insect population.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

Humans could try to reduce the spread of white nose syndrome by properly cleaning their equipment before switching another caves in case that cave was contaminated.

Scoring Notes: Part one of the response correctly explains a reason why people should try to reduce the impact of white nose syndrome. Part two of the response correctly describes a way to reduce the spread of white nose syndrome. This response receives two points for two correct key elements.

Question 3, Sample B – Score Point 2

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

The bats regulate the insect populations that destroy farm crops. Without the bats the insect population would increase and more farm crops would be killed making a huge harmful impact on people. In order to prevent this people should try to reduce the impact of white nose syndrome.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

Humans could reduce the spread of White nose syndrome by stopping from going to the caves during bat hibernation and by regularly cleaning their equipment before coming to the cave, in order to stop the spreading of the infection through contaminated equipment.

Scoring Notes: Part one of the response correctly explains a reason why people should try to reduce the impact of white nose syndrome. Part two of the response correctly describes a way to reduce the spread of white nose syndrome. This response receives two points for two correct key elements.

Question 3, Sample C – Score Point 1

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

If people don't reduce the white nose syndrome the bats will die and they won't kill the insects from the crops.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

They could find a way to stop the white nose syndrome by putting something else in the crops to see if it did anything.

Scoring Notes: Part one of the response correctly explains a reason why people should try to reduce the impact of white nose syndrome. Part two of the response describes and invalid way to reduce the spread of white nose syndrome. This response receives one point for one correct key element.

Question 3, Sample D – Score Point 1

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

They should try to reduce the impact because most people do not realize what they are doing to all of these bats and all of the innicent animals living in the caves where there is white nose syndrome.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

Most humans could stop trying to go into caves when they do not need to so that the white nose syndrome is not spread to the bats so that now we can at least attempt to keep them safe from the disease.

Scoring Notes: Part one of the response describes an incorrect reason why people should try to reduce the impact of white nose syndrome. Part two of the response correctly describes a way to reduce the spread of white nose syndrome. This response receives one point for one correct key element.

Question 3, Sample E – Score Point 0

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

People should try to reduce the impact of a white nose syndrome because it could affect the bats.

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

Humans get white nose syndrome because they have to breathe.

Scoring Notes: Part one of the response describes an incorrect reason why people should try to reduce the impact of white nose syndrome. Part two of the response describes an invalid way to reduce the spread of white nose syndrome. This response receives zero points for zero correct key elements.

Question 3, Sample F – Score Point 0

Give and explain ONE reason why people should try to reduce the impact of white nose syndrome. Use the information provided in your explanation.

People should try to reduce white nose syndrome because to keep all the bats away and it helps us be more safe around the way

Using the information provided, propose a way humans could try to reduce the spread of white nose syndrome.

They can try to spread white nose syndrome by getting bit by a bat and giving it to someone els after.

Scoring Notes: Part one of the response describes an incorrect reason why people should try to reduce the impact of white nose syndrome. Part two of the response describes an invalid way to reduce the spread of white nose syndrome. This response receives zero points for zero correct key elements.

Item #4
Extended-Response

Extended-Response
Standard: The Nature of Science

Question 4

4. A student hypothesizes that a combination of salt and visible light is required in order to degrade the type of plastic used to make the rings that hold packs of beverages together. The student follows the procedure listed below.

1. Place 1 gram (g) of plastic in each of three small beakers.
2. Add 25 milliliters (mL) of either salt solution or distilled water.
3. Cover each beaker and place under either visible or infrared light.
4. After 5 days, rinse and dry the plastic and determine its mass.

The results are shown in the following table.

Photodegradation of Plastic Rings

Beaker	Solution Added (25 mL)	Type of Light	Mass of Plastic (g)	
			Initial	Final
A	Salt	Visible	1.0	0.83
B	Salt	Infrared	1.0	0.99
C	Distilled water	Infrared	1.0	1.03

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

Describe ONE additional way the student could improve the experimental setup.

Key Element(s):

- Beaker D should contain 1 g of plastic, 25 mL of distilled water, and be placed in regular light.
- Other valid response

- This is an important control because the student's hypothesis is that both NaCl and regular light are required for degradation of the plastic. This control will allow the student to determine whether regular light can degrade the plastic in the absence of NaCl.
- Other valid response

- The plastic in Beaker C appears to gain a very small amount of mass. This small amount could be due to the limits of accuracy of the method used to measure the mass.
- The plastic wasn't completely dried, so a small amount of water was accidently included in the mass of the plastic.
- Other valid response

- One way to improve the experiment would be to increase the number of trials for each of the experimental conditions.
- Other valid response

Rubric:

4 points Four key elements
3 points Three key elements
2 points Two key elements
1 point One key element
0 points Other

Question 1, Sample A – Score Point 4

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

There should be 1 gram of plastic in Beaker D, it shoud be filled with 25 ml of distilled water and placed under visible light.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

It is important because if the plastic in the salt solution under visble light could degrade just as fast as the plastic in distilled water under visible light. This would mean that the salt doesn't affect degradation.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

There may have been a little bit of water that was still on the plastic when the student weighed it.

Describe ONE additional way the student could improve the experimental setup.

The student could have made sure all of the beakers stayed the same temperature for the five days.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response correctly identifies a likely reason the mass of the plastic increased. Part four of the response correctly describes an additional improvement to the experimental setup. This response receives four points for four correct key elements.

Question 4, Sample B – Score Point 4

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

In the D beaker there should be a distilled water solution, visable light, and a 1.0 initial mass.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

Its important because he says you need visable light with salt, so you need to see if distilled and visable light mixed will also degrade the plastic.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

It could of absorbed the water during the time period.

Describe ONE additional way the student could improve the experimental setup.

He could leave the plastic in the solutions for a longer period of time to see if it breaks down more.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response correctly identifies a likely reason the mass of the plastic increased. Part four of the response correctly describes an additional improvement to the experimental setup. This response receives four points for four correct key elements.

Question 4, Sample C – Score Point 3

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

Visible light and distilled water, 1gram,

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

It wold show if salt was even neded for the degration process.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

The plastic absorbed the water causing it to gain weight

Describe ONE additional way the student could improve the experimental setup.

They could add a fourth test.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response correctly identifies a likely reason the mass of the plastic increased. Part four of the response provides an incomplete description of an additional improvement to the experimental setup. This response receives three points for three correct key elements.

Question 4, Sample D – Score Point 3

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

Distilled water with visible and 1 initial gram of plastic.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

you have two water and types of light, so you must test all the combinations of them.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

The water burned.

Describe ONE additional way the student could improve the experimental setup.

Do each experiment twice.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response correctly describes an additional improvement to the experimental setup. This response receives three points for three correct key elements.

Question 4, Sample E – Score Point 2

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

Distilled water, visible light and 1.0 plastic

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

So you can know if the results change.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

Water may have been on it.

Describe ONE additional way the student could improve the experimental setup.

Use the same variables for other points.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response describes an invalid reason why Beaker D is necessary in this experiment. Part three of the response correctly identifies a likely reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives two points for two correct key elements.

Question 4, Sample F – Score Point 2

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

The solution for the Beaker D should Distilled water. The type of light for the beaker should also be Visible light. The initial mass of the plastic should be the same, which is 1 gram.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

Having beaker D is important because according to his hypthesis, he wants to know is salt and visible light is required to degrade plastic. Beaker D is needed to test if it works without salt.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

The most likely reason why Beaker C has increase in mass is because its been stuck in infrared light the whole time.

Describe ONE additional way the student could improve the experimental setup.

I think the student's set up does not need improvement.

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives two points for two correct key elements.

Question 4, Sample G – Score Point 1

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

The solution that should go in beaker D is distilled water with a type of light infrared and with an initial mass of 1.0

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

The student wants to prove tha visible light and salt is required to degrade the type of plastic, but there is also the posibility that only visible light could reduce it, so to be the experiment credible the student needs to complete the table with the solution of distiled water with visible light so the student can prove to others the hypothesis coul be credible.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

Because it is in infrared light, the visible light appears to be the element that makes to reduce mass.

Describe ONE additional way the student could improve the experimental setup.

The student could add the missing information in the table to make the experiment complete.

Scoring Notes: Part one of the response incorrectly describes what type of light is necessary for Beaker D. Part two of the response correctly explains why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives one point for one correct key element.

Question 4, Sample H – Score Point 1

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

Beaker D mass would be the same as the rest and Solution Added will be distilled water and Type of light is Visible.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

Its important because theres is another way to conbine the stuff.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

I think it gained mass because it was the lat beacker and maybe someone put more water.

Describe ONE additional way the student could improve the experimental setup.

i dont know but they could change the water and lights

Scoring Notes: Part one of the response correctly describes the solution, light, and mass of plastic necessary for Beaker D. Part two of the response describes an invalid reason why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives one point for one correct key element.

Question 4, Sample I – Score Point 0

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

I think that it shuld be Distilled water with visible light.

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

because I gives another option on what the experiment Is and might be a better way of thinking

Describe ONE additional way the student could improve the experimental setup.

the student cauld improve by trying Something els instead of the same Stuff you been using the whole Time.

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

because of the change of salt, It helped It go up more. It must of been a good combe with light and the salt.

Scoring Notes: Part one of the response does not describe the mass of plastic necessary for Beaker D. Part two of the response describes an invalid reason why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives zero points for zero correct key elements.

Question 4, Sample J – Score Point 0

After analyzing the data, the student claims that the results support his hypothesis. However, one of his classmates correctly claims that one more control beaker (Beaker D) should have been tested.

Describe the solution, type of light, and initial mass of plastic that should go in Beaker D.

the mass of platic that should go in beaker D is initial is 1.0 and final is 1.13

Explain why knowing the results for Beaker D is important in determining whether the experiment supports the student's original hypothesis.

because if they didnt put the right tuff in beaker d then the whole science experiment would be messed up

Describe a LIKELY reason why it appears that the plastic in Beaker C gained mass during the experiment.

becaust a glass beakere is different then aplastic beaker

Describe ONE additional way the student could improve the experimental setup.

by putting more stuff together

Scoring Notes: Part one of the response does not describe the solution or type of light necessary for Beaker D. Part two of the response describes an invalid reason why Beaker D is necessary in this experiment. Part three of the response describes an invalid reason why the plastic gained mass. Part four of the response incorrectly describes an additional improvement to the experimental setup. This response receives zero points for zero correct key elements.