

Scored Student Responses for *Polymer Investigation*

Score 3

the data shows that Plastic B stretched the most being 22 mm T1 and 23 mm T2. The students could have made the experiment better if they did one more trial also they could have been more specific in there procedure for example they should have told you the amount of weight you add to the plastic.

The student provides an acceptable conclusion based on the data: "...plastic B stretched the most..." Two correct ways to improve the experimental design and/or the validity of the results are given: "...if they did one more trial..." and "...they should have told you the amount of weight you add to the plastic."

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Score 3

Based on the students data, plastic type B stretched the most, plastic type D stretched the second most, plastic type C stretched the third most, and plastic type A stretched the least. Two ways that the students could have improved the experimental design/validity of the results are having a set weight of the weights added every 5 minutes, have a set length for the plastics at the start of the test

The student provides an acceptable conclusion based on the data: "...plastic type B stretched the most..." Two correct ways to improve the experimental design and/or validity of the results are given: "...having a set weight of the weights..." and "...have a set length for the plastics at the start of the test." Adding weights every 5 minutes is a minor error and does not affect the final score of the response.

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Score 2

A) Plastic type B is the most stretchable plastic of the four samples. In both trials it is stretched more than any of the other plastics.

B) The first way the experiment could have been improved was by more thoroughly explaining the procedures. Another way for improvement is by doing more trials. That will always give more accurate and more valid data.

The student provides an acceptable conclusion based on the data: "Plastic type B is the most stretchable plastic of the four samples." One correct way to improve the experimental design and/or the validity of the results is given: "...by doing more trials." Explaining the procedures more thoroughly is too vague to be considered an improvement to the experimental design and/or the validity of the results.

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Score 2

I can draw from the student's experiment that plastic type B was the strongest based upon the data. One way that the student could have improved his investigation would be to give a specific length to cut the plastic pieces into as well as to put into his procedure how much of the plastic should have been on the table where it was taped. These two changes could have made a more clear experimental procedure.

This student provides an incorrect conclusion based on the student's data: "...plastic type B was the strongest..." However, two correct ways to improve the experimental design and/or the validity of the results are given: "...give a specific length to cut the plastic pieces into as well as to put into his procedure how much of the plastic should have been on the table where it was taped."

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Score 1

The conclusion of this lab is that plastic B stretched the most.

The students could have improved the experiment by saying what type of plastic they used, and how high the table was that the plastic was hanging from.

The student provides an acceptable conclusion based on the data: "...plastic B stretched the most." Two ways to improve the experimental design and/or the validity of the results are given, but they are irrelevant and do not receive credit: "...saying what type of plastic they used, and how high the table was that the plastic was hanging from."

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Score 1

A) Based on the information, all of the polymers had similar or the same amount stretched in the first and second trials.

B) Two ways the student could have improved the experimental design would be by having a third trial, simply because it could have helped more for comparing results. Another way they could have improved it would be by using another amount of time for comparison.

The student fails to provide an acceptable conclusion based on the data. Only a general comparison between the two trials is given. One correct way to improve the experimental design and/or the validity of the results is provided: "...by having a third trial...." The second improvement given, "...by using another amount of time for comparison [sic]," is too vague to receive credit.

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Score 0

In trial 1,
a) The Plastic Type A wrap stretched 10mm, the Plastic type B wrap stretched 22 mm, the Plastic Type C wrap stretched 14 mm, and the Plastic Type D wrap stretched 20 mm. In trial 2, the A wrap stretched 12 mm, the B wrap stretched 23 mm, the C wrap stretched 13 mm, and the D wrap stretched 20 mm. b) The student could have improved the validity of the results by stretching the plastic wraps to see which one stretched the longest.

The student repeats data from the chart and does not provide a valid conclusion. One way to improve the experimental design and/or the validity of the results is provided ("The student could have improved the validity of the results by stretching the plastic wraps to see which one stretched the longest."), but it does not receive credit because it merely repeats part of the procedure for this investigation.

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Score 0

Test 1 was good. Test 2 for plastic type A and B stretched longer than Test 1. They could have had more different kinds of plastics and kept the weights on.

The student appears to be comparing trials rather than plastic types and does not provide a valid conclusion. "They could have had more different kinds of plastics and kept the weights on" are not valid ways to improve the experimental design and/or the validity of the results.