

PRACTICE

Activity 3: Mass and Open Systems

Name _____

Date _____

Class _____

Imagine that another class did the same experiments your teacher did with the baking soda and vinegar. Assume that their experiments were fair tests. The table shows the mass change recorded by each of the teams after they mixed the baking soda and vinegar, and let out the gas that was produced. The uncertainty of the mass scale used to make the measurements was 0.1 g.

The example shows how *How To Evaluate an Experiment Conclusion* was used to evaluate the conclusion of one of the students, Nguyen.

Nguyen wrote the following conclusion and reason:

Conclusion – We concluded that when air is released from the bag with the baking soda/vinegar mixture, the mass of the bag decreases.

Reason – I think air has mass. Therefore, letting gas out of the bag must decrease its mass.

Table: Baking Soda and Vinegar Mixture

Team	Mass Change
Team 1	–3.2 g
Team 2	–2.6 g
Team 3	–4.8 g
Team 4	–1.3 g
Team 5	0.0 g
Team 6	–3.2 g
Team 7	–2.8 g
Average	–2.6 g



Use the Criteria	Evaluate Nguyen's Conclusion
<p>Check all the criteria for a <i>valid</i> conclusion that you think apply.</p> <p><input checked="" type="radio"/> No The experiment is a fair test.</p> <p>Yes <input type="radio"/> No Each supporting reason is based on <i>evidence</i>, not opinion.</p> <p>Yes <input type="radio"/> No The supporting reasons use <i>all the available evidence</i> (data), not just part of the evidence.</p>	<p>Valid/Not Valid: Nguyen's conclusion is <i>not valid</i>.</p> <p>Reason: Nguyen only gives his opinion as a reason for his conclusion. This experiment was a fair test and produced lots of data that supports his conclusion, but he doesn't talk about the data at all.</p>

Use *How To Evaluate an Experiment Conclusion* to decide if the following conclusions are *valid* or *not valid*.

1. Jason wrote the following conclusion and reason:

Conclusion – When air is released from the bag with the baking soda/vinegar mixture, the mass of the bag does not change.

Reason – Our result (Team 5) was that the mass change (Start Mass – End Mass) was zero after we let gas out of the bag.

Use the Criteria	Evaluate Jason's Conclusion
<p>Check all the criteria for a <i>valid</i> conclusion that you think apply.</p> <p>Yes No The experiment is a fair test.</p> <p>Yes No Each supporting reason is based on <i>evidence</i>, not opinion.</p> <p>Yes No The supporting reasons use <i>all the available evidence</i> (data), not just part of the evidence.</p>	<p>Valid/Not Valid: Jason's conclusion is _____ .</p> <p>Reason:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

2. Isabel wrote the following conclusion and reason:

Conclusion – We concluded that when air is released from the bag with the baking soda/vinegar mixture, the mass of the bag decreases.

Reason – Air has mass. I know this because the mass of the soccer ball increased after the teacher pumped air into it.

Use the Criteria	Evaluate Isabel’s Conclusion
<p>Check all the criteria for a <i>valid</i> conclusion that you think apply.</p> <p>Yes No The experiment is a fair test.</p> <p>Yes No Each supporting reason is based on <i>evidence</i>, not opinion.</p> <p>Yes No The supporting reasons use <i>all the available evidence</i> (data), not just part of the evidence.</p>	<p>Valid/Not Valid: Isabel’s conclusion is _____.</p> <p>Reason:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>

3. Chantel wrote the following conclusion and reason:

Conclusion – We concluded that when air is released from the bag with the baking soda/vinegar mixture, the mass of the bag decreases.

Reason – In our experiment with the bag, the class average for the mass change (Start Mass – End Mass) was –2.6 grams. Since a decrease in mass of 2.6 grams is greater than the 0.1 gram uncertainty, the decrease in mass is significant.

Use the Criteria	Evaluate Chantel's Conclusion
<p>Check all the criteria for a <i>valid</i> conclusion that you think apply.</p> <p>Yes No The experiment is a fair test.</p> <p>Yes No Each supporting reason is based on <i>evidence</i>, not opinion.</p> <p>Yes No The supporting reasons use <i>all the available evidence</i> (data), not just part of the evidence.</p>	<p>Valid/Not Valid: Chantel's conclusion is _____ .</p> <p>Reason:</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>