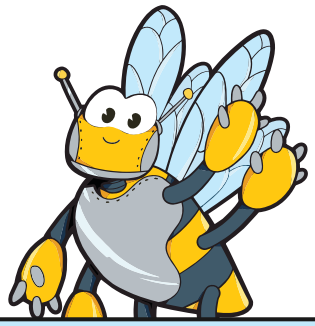
CircuitMess **ANSWER KEY**

Understanding Variation



1 Looking at Repeated Results

1 Mr. Bee ran the same test three times at **0.5 power.**

Recorded distances:

Test 1: **10.2**

Test 2: **10.0**

Test 3: **10.1**

1. **Circle the largest distance.**

   Correct answer: **10.2**

Explanation: 10.2 is the greatest value when comparing 10.0, 10.1, and 10.2.

2. **Underline the smallest distance.**

   Correct answer: **10.0**

Explanation: 10.0 is the smallest value of the three distances.

2 **Answer:**

Are the results exactly the same? NO

Explanation: Each test gives a slightly different number.

Are they close to each other? YES

Explanation: All three results are close to 10, even though they are not exactly the same.

2 Thinking About Why Results Change

1 **Choose two correct reasons:**

- **A.** The surface changed
- **B.** The starting position changed
- **C.** The robot forgot how to move
- **D.** Small movements can affect results

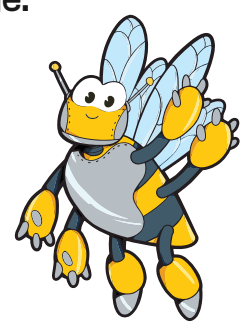
Incorrect choice:

C. The robot forgot how to move

Explanation: Small changes in the surface, position, or movement can cause slight differences in results. A robot does not forget how to move.

2 Explain your choice in one sentence:

Acceptable student responses include:
"Small changes can affect how far the robot goes."
"If the robot starts in a different place, the distance can change."
"The floor or surface can make a difference."



(**Mr. Bee note:** Small changes, like where the robot starts or how the surface feels, can affect the results.)

3 Explaining Variation

1 Finish the sentence:

Variation means that **results are not exactly the same each time.**

Acceptable alternatives:
"results can change a little"
"numbers can be slightly different"
"things are similar but not equal"

2 True or False:

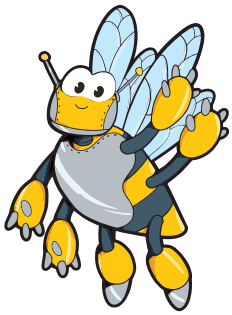
Variation means something went wrong. **False**

Explanation: Variation is normal in experiments and does not mean there is a mistake.

4 Reflection

1 Why is it helpful to repeat a test more than once?
Write one or two sentences.

Acceptable student responses include:
"It helps you see patterns."
"It shows if the results are close."
"You can check if the results make sense."
"Repeating helps make results more reliable."



(**Mr. Bee note:** Repeating a test helps us understand patterns and makes our results more reliable.)