Weighing the Evidence

Compare fruit types through a fair investigation.

BOT.3.7 "Plan, conduct, and communicate the results of a comparative laboratory investigation of differing fruit types."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the steps Maya uses to keep her measurements consistent, circle the nine mass readings, and number the question, method, and results in her report in the order they appear.

Three Fruits on a Scale

1. At a school market, Maya wondered whether three botanical fruit types differ in mass. She chose apples, which are pomes, plums, which are drupes, and oranges, which are a kind of berry. Her question was, "How does the mass of a whole fruit compare across these types?" She planned to weigh three fruits of each type on the same digital scale. She would record mass in grams, leave each fruit unpeeled, and zero the scale before every reading. She chose fruits without visible damage, but could not make their varieties or ripeness exactly alike.

2. Maya placed each dry fruit at the center of the scale and waited for a steady reading. Her three apples measured 142, 156, and 152 grams. The plums measured 60, 64, and 68 grams, while the oranges measured 126, 132, and 138 grams. She wrote down each value immediately rather than relying on memory. When one orange first rolled against the scale's rim, she moved it to the center and took a new reading. Her notes included that correction, so another student could see why a reading had changed.

3. To communicate her findings, Maya wrote a short report that stated her question, described her measuring method, and listed all nine readings. She compared the groups using their mean masses, found by adding each group's three readings and dividing by three. She also noted that every apple was heavier than every orange, and every orange was heavier than every plum in this small sample. She did not claim that fruit type alone caused the differences. Different varieties, growing conditions, and ripeness might also affect mass. More fruits from several batches would make a broader conclusion more trustworthy.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why did Maya move the orange away from the scale's rim and record the correction?

2. Calculate the mean mass of the apples and the mean mass of the oranges. Which mean is greater, and by how much?

3. Which two measurements provide the clearest evidence that every orange Maya weighed was heavier than every plum she weighed?

4. Why would Maya's readings not support a claim that fruit type alone determines mass?

3 YOUR TURN

Your own words

Design a follow-up that compares how much individual masses vary within these three fruit types. Explain how you would gather more fair measurements, calculate each type's mass range from Maya's readings, and write a two-sentence report of what the ranges show and what they cannot prove.

ANSWER KEY

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PART 1 · READ AND MARK

Underline the steps Maya uses to keep her measurements consistent, circle the nine mass readings, and number the question, method, and results in her report in the order they appear. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why did Maya move the orange away from the scale's rim and record the correction?	**She needed a steady reading taken with the fruit centered on the scale. Recording the correction lets others understand why the reading changed.**
2	Calculate the mean mass of the apples and the mean mass of the oranges. Which mean is greater, and by how much?	**The apple mean is 150 grams, and the orange mean is 132 grams. The apple mean is 18 grams greater.**
3	Which two measurements provide the clearest evidence that every orange Maya weighed was heavier than every plum she weighed?	**The lightest orange was 126 grams, and the heaviest plum was 68 grams. Even the lightest orange was heavier.**
4	Why would Maya's readings not support a claim that fruit type alone determines mass?	**Variety, growing conditions, and ripeness might also affect mass. Maya measured only three fruits of each type.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would weigh ten more fruits of each type from several batches on the same zeroed scale, recording each whole, dry fruit's mass. I would calculate the new ranges and compare them with Maya's ranges. In Maya's sample, apple masses span 14 grams, orange masses span 12 grams, and plum masses span 8 grams, so apples show the widest spread. Three fruits per type cannot establish that apples generally vary the most.

Accept a follow-up that measures additional whole fruits consistently and identifies the ranges as 14 grams for apples, 8 grams for plums, and 12 grams for oranges. The two-sentence report should distinguish this sample's pattern from a general claim.