

Trial Data Detectives

Use repeated trials and means to make evidence-based decisions.

GRADE 8 • TEKS 8.1

8.1 "Scientific and engineering practices. The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions..."

NAME _____

DATE _____

FIND THE MEAN

To find the mean, add all trial results and divide by the number of trials. Repeated trials make an investigation more reliable because one unusual result has less effect on the evidence.

WORKED EXAMPLE

A student measures the length of a leaf in four trials: 12 cm, 14 cm, 13 cm, and 15 cm. Find the mean length.

1. Add the trial results: $12 + 14 + 13 + 15 = 54$.
2. Count the trials: 4.
3. Divide: $54 / 4 = 13.5$.

Answer: 13.5 cm

PRACTICE 6 problems

- 1** A student measures a rock's width three times: 8 cm, 10 cm, and 9 cm. What is the mean width?

ANSWER _____

- 2** A temperature probe records 21°C, 24°C, and 27°C for three trials. What is the mean temperature?

ANSWER _____

- 3** A timing device records 16.2 s, 16.4 s, and 16.3 s. What is the mean time?

ANSWER _____

- 4** Three water-volume trials are 28 mL, 31 mL, and 29 mL. A fourth trial is x mL. What must x be for the mean to equal 30 mL?

ANSWER _____

- 5** A spring scale gives these force readings. Group A records 18 N, 20 N, and 22 N. Group B records 19 N, 20 N, and 21 N. Find both means. Which group has the greater mean force?

ANSWER _____

- 6** A balance measures the mass of a sample as 46 g, 44 g, and 45 g. What is the mean mass?

ANSWER _____

APPLY IT Show your work

1

A student design team tests two reusable cup sleeves. Each sleeve covers the same cup filled with the same amount of hot water. The table shows how many degrees Celsius the water temperature drops after the same amount of time. Find each mean temperature drop. Which sleeve is the better design if the goal is to keep water warm?

WATER TEMPERATURE DROP

Trial	Sleeve X (°C)	Sleeve Y (°C)
1	6	4
2	8	5
3	7	6

ANSWER _____

2

A robotics club tests two phone-holder designs. For each trial, the team adds mass until the holder bends, then records the force in newtons. Find each mean force. Which design should the team choose if it needs the stronger holder, and by how many newtons is its mean greater?

PHONE HOLDER STRENGTH TEST

Trial	Design A (N)	Design B (N)
1	18	9
2	16	10
3	17	11

ANSWER _____

CHALLENGE One step up

A student measures the height of seedlings in five trials: 7 cm, 8 cm, 7 cm, 22 cm, and 8 cm. Find the mean using all five trials. Then find the mean without the 22 cm result. Should the student automatically remove the 22 cm result? Explain what the student should do instead.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A student measures a rock's width three times: 8 cm, 10 cm, and 9 cm. What is the mean width?	9 cm
2	A temperature probe records 21°C, 24°C, and 27°C for three trials. What is the mean temperature?	24°C
3	A timing device records 16.2 s, 16.4 s, and 16.3 s. What is the mean time?	16.3 s
4	Three water-volume trials are 28 mL, 31 mL, and 29 mL. A fourth trial is x mL. What must x be for the mean to equal 30 mL?	32 mL
5	A spring scale gives these force readings. Group A records 18 N, 20 N, and 22 N. Group B records 19 N, 20 N, and 21 N. Find both means. Which group has the greater mean force?	Group A mean: 20 N. Group B mean: 20 N. Neither group has a greater mean force.
6	A balance measures the mass of a sample as 46 g, 44 g, and 45 g. What is the mean mass?	45 g

PART 2 • APPLY IT

- Sleeve X mean drop: 7°C. Sleeve Y mean drop: 5°C. Sleeve Y is better because its water loses 2°C less on average.** Add each sleeve's three temperature drops and divide by 3. The sleeve with the smaller mean temperature drop keeps the water warmer.
- Design A mean force: 17 N. Design B mean force: 10 N. Choose Design A because its mean is 7 N greater.** Find the mean force for each design by adding its three trials and dividing by 3. The stronger design has the greater mean force before bending.

CHALLENGE

Mean using all five trials: 10.4 cm. Mean without 22 cm: 7.5 cm. No, the student should not automatically remove 22 cm. The student should check for a measurement or recording error and repeat the trial before deciding how to report the result.

Accept equivalent calculation work and correct units. For the challenge, accept explanations that say an unusual result should be investigated and repeated, not simply discarded.