

A Flight Data Investigation

Represent the observations, then explain the evidence.

GRADE 5 • 5.PS.1

5.PS.1 "Excerpt: The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on line plots (dot plots) and stem-and-leaf plots."

NAME _____

DATE _____

Make every observation count

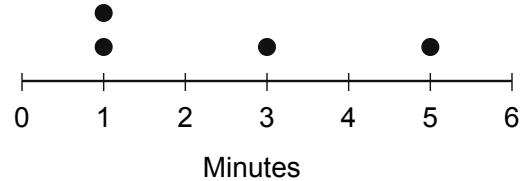
Begin with a question and observations that can answer it. A dot plot stacks repeated values; a stem-and-leaf plot preserves them as repeated leaves. A key explains what each mark or stem/leaf combination means.

Worked example

Plot the waits 1, 1, 3, 5 minutes.

Stack two dots at 1. Place one each at 3 and 5. Four separate dots preserve all four observations.

Practice waits



Key: one dot = one wait

Simulated data. Use a pencil and ruler. Show your reasoning.

1. Ask and acquire data

These are recorded distances from 12 simulated flights of the same paper-airplane design. Write a question these observations can answer. Explain what was measured, its unit, and one way to make future measurements consistent.

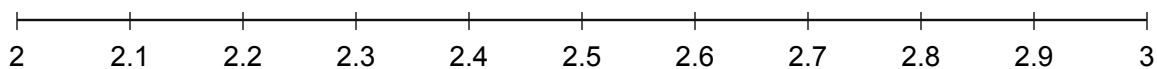
Recorded distances in metres

Trial	Distance	Trial	Distance
1	2.1	7	2.4
2	2.2	8	2.4
3	2.2	9	2.5
4	2.3	10	2.6
5	2.3	11	2.6
6	2.3	12	2.8

2. Construct a dot plot

Use all 12 flight distances from task 1. Add a title, complete the horizontal-axis label and dot key, and draw a separate dot for every flight. The scale increases by 0.1 m.

Plot title: _____



Horizontal axis: _____

Key: one dot = _____

3. Construct a stem-and-leaf plot

Represent the same flight distances. Use the supplied stem and write all leaves in increasing order. Add a title and complete the key so another reader can recover a distance.

Plot title: _____

Stem	Leaves
2	

Key: 2 | 1 = _____ metres

4. Describe the whole distribution

Describe where most distances lie. Give the least and greatest distances and their difference. Which distance occurs most often? Name the three distances that each occur twice.

5. Calculate from your plots

How many flights measured 2.2 m or 2.4 m altogether? Then find how many more flights measured 2.3 m or 2.6 m together than measured 2.8 m. Show the addition and subtraction.

6. Make a supported prediction

Predict a reasonable distance or interval for another flight under similar conditions. Use the plotted data as evidence and explain why the result is not certain.

7. Communicate and update

Tell a partner your question, the data source and one conclusion from both plots. Write that conclusion here. If a new flight measures 3.0 m, how would the greatest distance and the greatest-minus-least difference change?

TEACHER NOTES

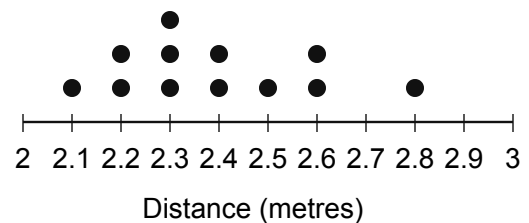
Accept equivalent titles and units. Check repeated observations, ordered leaves and the stated dataset. Predictions need evidence, not certainty. Keep completed plots in this key.

TASK 1

Example question: How far does this design fly in these trials? Measure flight distance in metres. Use the same launch point and measurement rule (for example, distance from launch line to first landing point) for each trial.

TASK 2

Dots: 2.1(1), 2.2(2), 2.3(3), 2.4(2), 2.5(1), 2.6(2), 2.8(1). Title: Paper-airplane distances; axis: Distance (metres); one dot = one flight.

Paper-airplane distances

Key: one dot = one flight

TASK 3

Stem 2 has leaves 1 2 2 3 3 3 4 4 5 6 6 8. Key: 2 | 1 = 2.1 metres. Each leaf is one flight; all 12 observations are retained.

Paper-airplane distances

STEM	LEAVES
2	1 2 2 3 3 3 4 4 5 6 6 8

Key: 2 | 1 = 2.1 metres

TASK 4

Ten of 12 distances lie from 2.2 to 2.6 m. Least 2.1, greatest 2.8; spread $2.8 - 2.1 = 0.7$ m. The most frequent is 2.3 m (three flights). 2.2, 2.4 and 2.6 m each occur twice.

TASK 5

$2 + 2 = 4$ flights measured 2.2 or 2.4 m. For the second question, $3 + 2 = 5$; $5 - 1 = 4$ more flights. Use the named data and scale.

TASK 6

A reasonable prediction is 2.2-2.6 m because 10 of the 12 observations lie there; 2.3 m is also a supported single-value prediction. Conditions and launches vary, so another flight could land elsewhere. Accept other reasonable evidence-based predictions. Show numerical evidence.

TASK 7

Example conclusion: For these 12 recorded flights, most distances were 2.2-2.6 m, and both plots preserve all 12 observations. A new 3.0 m flight makes the greatest 3.0 m and the difference $3.0 - 2.1 = 0.9$ m, increasing by 0.2 m.