Unit 8, Lesson 17

Using Box Plots

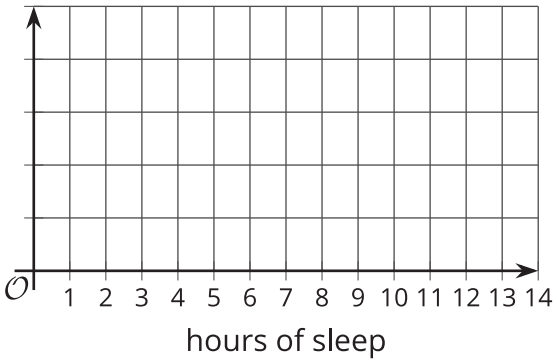
Let's use box plots to make comparisons.

17.1 Hours of Slumber

Ten sixth-grade students are asked how much sleep, in hours, they usually get on a school night. Here is the five-number summary of their responses.

- Minimum: 5 hours
- First quartile: 7 hours
- Median: 7.5 hours
- Third quartile: 8 hours
- Maximum: 9 hours

1. On the grid, draw a box plot for this five-number summary.



2. What questions could be answered by looking at this box plot?

17.2 Info Gap: Sea Turtles

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.



If your teacher gives you the problem card:

1. Silently read your card, and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need. "Can you tell me _____?"
3. Explain to your partner how you are using the information to solve the problem. "I need to know _____ because . . . ."

   Continue to ask questions until you have enough information to solve the problem.
4. When you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.

If your teacher gives you the data card:

1. Silently read your card. Wait for your partner to ask for information.
2. Before telling your partner any information, ask, "Why do you need to know _____?"
3. Listen to your partner's reasoning and ask clarifying questions. Only give information that is on your card. Do not figure out anything for your partner!

   These steps may be repeated.
4. When your partner says they have enough information to solve the problem, read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

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17.3 Paper Planes

Andre, Lin, and Noah each design and build a paper airplane. They launch each plane several times and record the distance of each flight in yards.

Andre

25 26 27 27 27 28 28 28 29 30 30

Lin

20 20 21 24 26 28 28 29 29 30 32

Noah

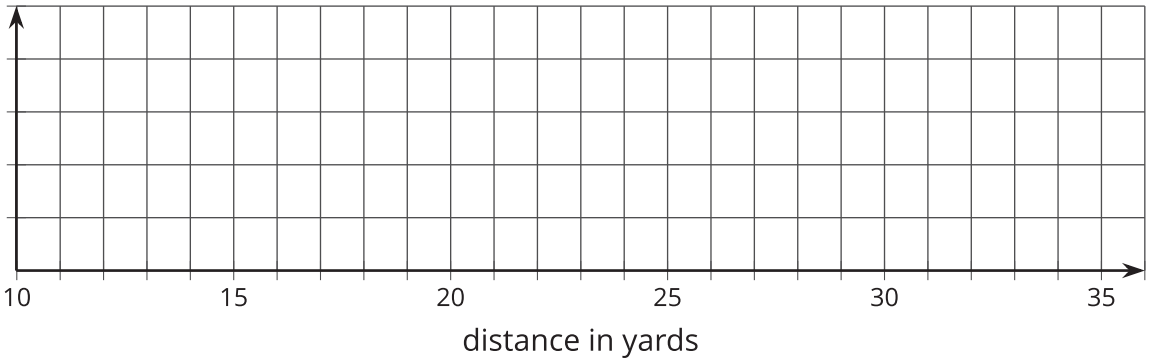
13 14 15 18 19 20 21 23 23 24 25

Work with your group to summarize the data sets with numbers and box plots.

1. Write the five-number summary for the data for each airplane. Then, calculate the interquartile range for each data set.

	min	Q1	median	Q3	max	IQR
Andre						
Lin						
Noah						

2. Draw three box plots, one for each paper airplane. Label the box plots clearly.



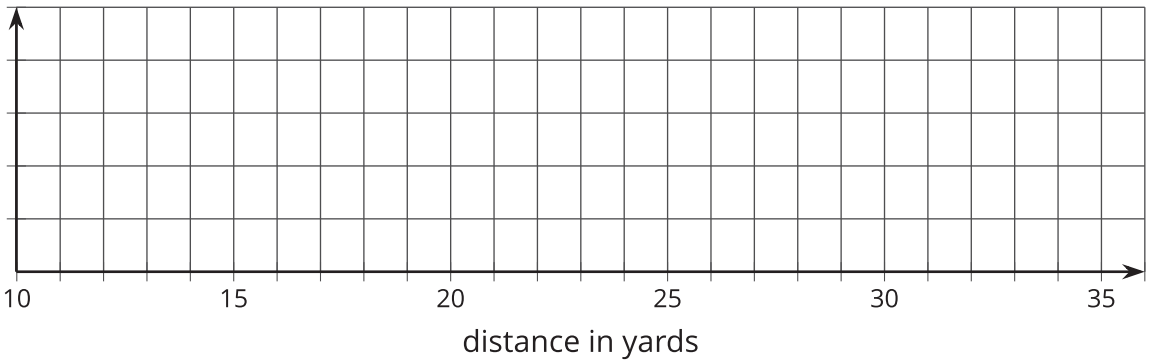
3. How are the results for Andre's and Lin's planes the same? How are they different?

4. How are the results for Lin's and Noah's planes the same? How are they different?

Are you ready for more?

Priya joined in the paper-plane experiments. She launched her plane eleven times and recorded the lengths of each flight. She found that her maximum and minimum were equal to Lin's. Her IQR was equal to Andre's.

Draw a box plot that could represent Priya's data.

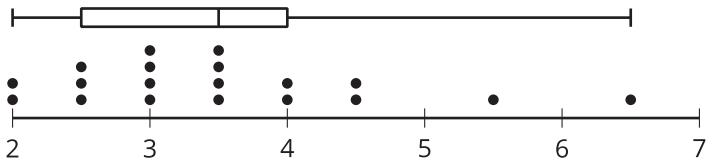


With the information given, can you estimate the median for Priya's data? Explain your reasoning.

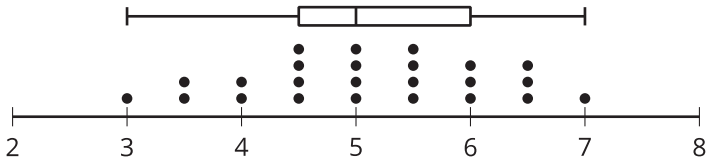
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Lesson 17 Summary

Box plots are useful for comparing different groups. Here are two sets of plots that show the weights of some berries and some grapes.



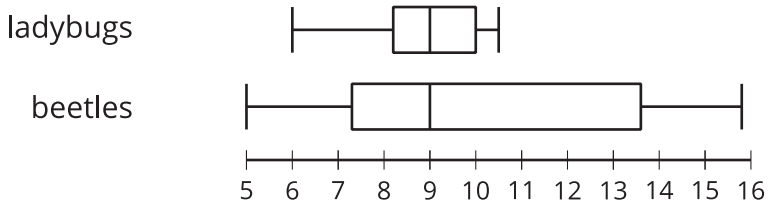
berry weights in grams



grape weights in grams

Notice that the median berry weight is 3.5 grams and the median grape weight is 5 grams. In both cases, the IQR is 1.5 grams. Because the grapes in this group have a higher median weight than the berries, we can say a grape in the group is typically heavier than a berry. Because both groups have the same IQR, we can say that they have a similar variability in their weights.

These box plots represent the length data for a collection of ladybugs and a collection of beetles.



lengths in millimeters

The medians of the two collections are the same, but the IQR of the ladybugs is much smaller. This tells us that a typical ladybug length is similar to a typical beetle length, but the ladybugs are more alike in their length than the beetles are in their length.

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