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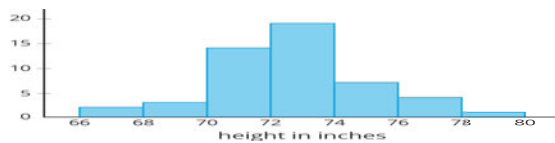
# Unit 8, Lesson 15: Estimating Population Measures of Center

Let's use samples to estimate measures of center for the population.

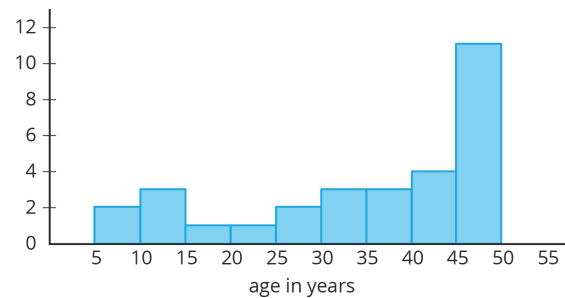
## 15.1: Describing the Center

Would you use the median or mean to describe the center of each data set? Explain your reasoning.

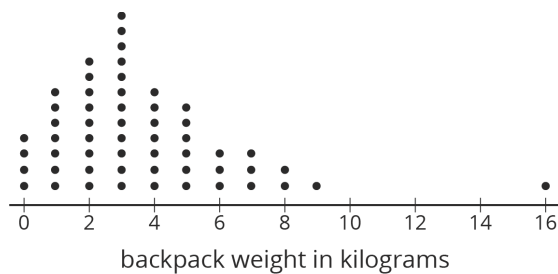
Heights of 50 basketball players



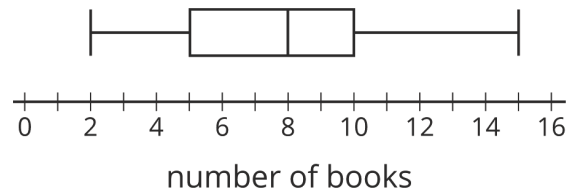
Ages of 30 people at a family dinner party



Backpack weights of sixth-grade students



How many books students read over summer break



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## 15.2: Three Different TV Shows

Here are the ages (in years) of a random sample of 10 viewers for 3 different television shows. The shows are titled, "Science Experiments YOU Can Do," "Learning to Read," and "Trivia the Game Show."

<b>sample 1</b>	6	6	5	4	8	5	7	8	6	6
<b>sample 2</b>	15	14	12	13	12	10	12	11	10	8
<b>sample 3</b>	43	60	50	36	58	50	73	59	69	51

1. Calculate the mean for *one* of the samples. Make sure each person in your group works with a different sample. Record the answers for all three samples.
  
2. Which show do you think each sample represents? Explain your reasoning.

## 15.3: Who's Watching What?

Here are three more samples of viewer ages collected for these same 3 television shows.

<b>sample 4</b>	57	71	5	54	52	13	59	65	10	71
<b>sample 5</b>	15	5	4	5	4	3	25	2	8	3
<b>sample 6</b>	6	11	9	56	1	3	11	10	11	2

1. Calculate the mean for *one* of these samples. Record all three answers.

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2. Which show do you think each of these samples represents? Explain your reasoning.

3. For each show, estimate the mean age for all the show's viewers.

4. Calculate the mean absolute deviation for *one* of the shows' samples. Make sure each person in your group works with a different sample. Record all three answers.

	<b>Learning to Read</b>	<b>Science Experiments YOU Can Do</b>	<b>Trivia the Game Show</b>
<b>Which sample number?</b>			
<b>MAD</b>			

5. What do the different values for the MAD tell you about each group?

6. An advertiser has a commercial that appeals to 15- to 16-year-olds. Based on these samples, are any of these shows a good fit for this commercial? Explain or show your reasoning.

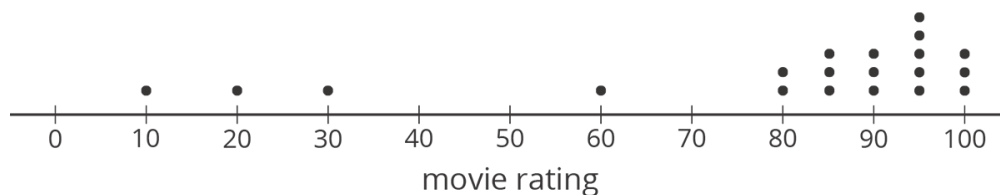
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## 15.4: Movie Reviews

A movie rating website has many people rate a new movie on a scale of 0 to 100. Here is a dot plot showing a random sample of 20 of these reviews.



1. Would the mean or median be a better measure for the center of this data? Explain your reasoning.
2. Use the sample to estimate the measure of center that you chose for *all* the reviews.
3. For this sample, the mean absolute deviation is 19.6, and the interquartile range is 15. Which of these values is associated with the measure of center that you chose?
4. Movies must have an average rating of 75 or more from all the reviews on the website to be considered for an award. Do you think this movie will be considered for the award? Use the measure of center and measure of variability that you chose to justify your answer.

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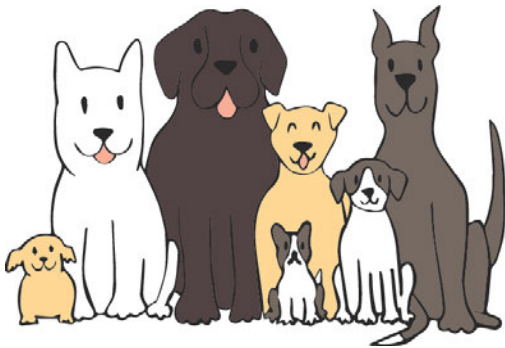
### Are you ready for more?

Estimate typical temperatures in the United States today by looking up current temperatures in several places across the country. Use the data you collect to decide on the appropriate measure of center for the country, and calculate the related measure of variation for your sample.

### Lesson 15 Summary

Some populations have greater variability than others. For example, we would expect greater variability in the weights of dogs at a dog park than at a beagle meetup.

Dog park:



Mean weight: 12.8 kg      MAD: 2.3 kg

Beagle meetup:



Mean weight: 10.1 kg      MAD: 0.8 kg

The lower MAD indicates there is less variability in the weights of the beagles. We would expect that the mean weight from a sample that is randomly selected from a group of beagles will provide a more accurate estimate of the mean weight of all the beagles than a sample of the same size from the dogs at the dog park.

In general, a sample of a similar size from a population with *less variability* is *more likely* to have a mean that is close to the population mean.

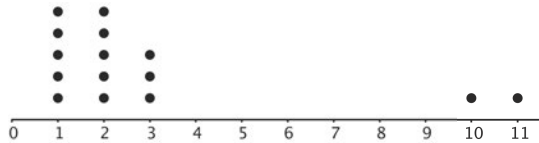
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## Unit 8, Lesson 15: Estimating Population Measures of Center

1. A random sample of 15 items were selected.



For this data set, is the mean or median a better measure of center? Explain your reasoning.

2. A video game developer wants to know how long it takes people to finish playing their new game. They surveyed a random sample of 13 players and asked how long it took them (in minutes).

1,235	952	457	1,486	1,759	1,148	548	1,037	1,864	1,245	976	866	1,431
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a. Estimate the median time it will take *all* players to finish this game.

b. Find the interquartile range for this sample.

3. Han and Priya want to know the mean height of the 30 students in their dance class. They each select a random sample of 5 students.

- The mean height for Han's sample is 59 inches.
- The mean height for Priya's sample is 61 inches.

Does it surprise you that the two sample means are different? Are the population means different? Explain your reasoning.

4. Clare and Priya each took a random sample of 25 students at their school.

- Clare asked each student in her sample how much time they spend doing homework each night.

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The sample mean was 1.2 hours and the MAD was 0.6 hours.

- Priya asked each student in her sample how much time they spend watching TV each night. The sample mean was 2 hours and the MAD was 1.3 hours.
- a. At their school, do you think there is more variability in how much time students spend doing homework or watching TV? Explain your reasoning.
- b. Clare estimates the students at her school spend an average of 1.2 hours each night doing homework. Priya estimates the students at her school spend an average of 2 hours each night watching TV. Which of these two estimates is likely to be closer to the actual mean value for all the students at their school? Explain your reasoning.