Eureka Acceleration Tool: Algebra I
Module 2, Topic A

To become mathematically proficient, students **must** access on-grade-level content. This document aims to help teachers who use the Eureka curriculum to ensure readiness for students before and during on-grade-level work, creating opportunities for timely support directly connected to the new learning.

About this Topic

Focus Standards:

A1: S-ID.A.2: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.★

A1: S-ID.A.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).★

Topic Overview per the Eureka Curriculum

In Topic A, students observe and describe data distributions. They reconnect with their earlier study of distributions in Grade 6 by calculating measures of center and describing overall patterns or shapes. Students deepen their understanding of data distributions, recognizing that the value of the mean and median are different for skewed distributions and similar for symmetrical distributions. Students select a measure of center based on the distribution shape to appropriately describe a typical value for the data distribution. Topic A moves from the general descriptions used in Grade 6 to more specific descriptions of the shape and the center of a data distribution.

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Overview

Eureka Acceleration Tools include:

1. a diagnostic assessment to help teachers determine the misunderstandings or gaps in mathematical knowledge related to a specific Topic in the Eureka curriculum
2. guidance for teachers to analyze student work on the diagnostic assessment
3. suggested materials for targeted remedial instruction

Note: The use of this guidance is not intended to delay students' engagement with on-grade-level learning. On-grade-level learning should be the focus of instructional time and be treated as an opportunity for students to "finish" learning previous skills and deepen conceptual understanding.

Diagnostic Assessment

The diagnostic assessment is designed to be administered to targeted students prior to beginning instruction on the given Topic. When appropriate, it is broken into parts (Part A, Part B, and so on); each part addresses a different prerequisite standard and contains three problems. If a student correctly answers at least 2 out of the 3 problems, it can be assumed that he/she is ready to engage with the new content of the Topic with little to no support needed prior to engaging with the Topic. The diagnostic assessment is designed in this way so that teachers can determine the "entry point" to remedial instruction and/or opportunities for unfinished learning within the context of the new learning. The entry points and opportunities for unfinished learning will vary between students.

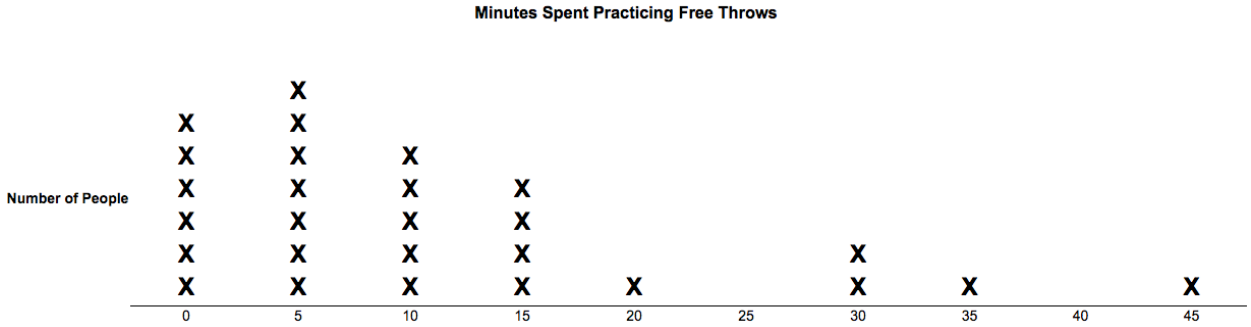
Guidance for Acceleration

The Acceleration Guidance is designed for teacher use. It is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

1. **The focus standard**: The focus standards are strategically chosen to address prerequisite skills and are purposefully arranged in the order that students typically master the skills and knowledge.
2. **Why this is important for current grade level work**: This section describes how the work of the prerequisite standard relates to the standard(s) addressed in the Topic of instruction.
3. **Using the diagnostic assessment to identify gaps**: This section identifies common errors students make on the diagnostic assessment items.
4. **Acceleration Resources for Targeted Instruction**: The resources pinpoint specific Eureka lessons and parts of lessons for teachers to use to address gaps in mathematical knowledge. Using Eureka materials to address acceleration ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.

Part A: 6.SP.A.2

1. Use the data in the graph to answer the questions.

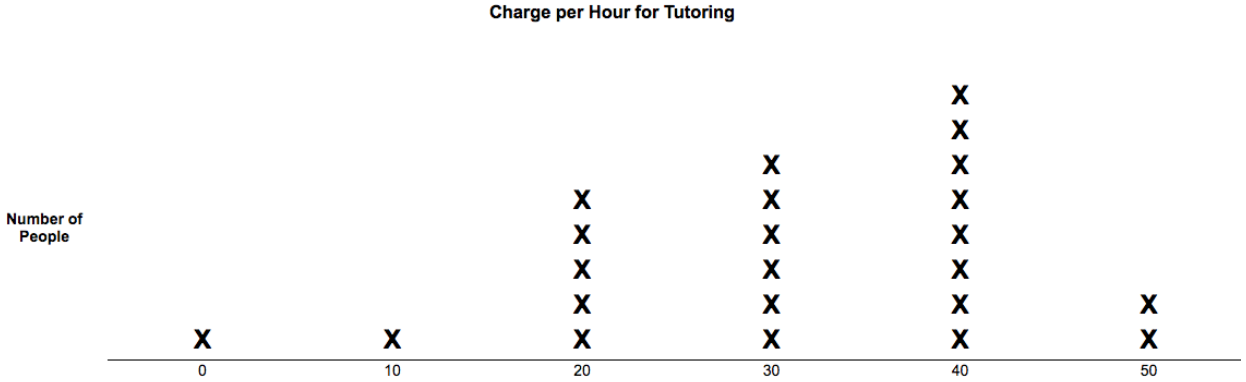


Is the data distribution skewed? If so, in which direction?

What is the range of the data?

Which is greater, the median or the mean? Explain your choice without calculating either measure.

2. Use the data in the graph to answer the questions.

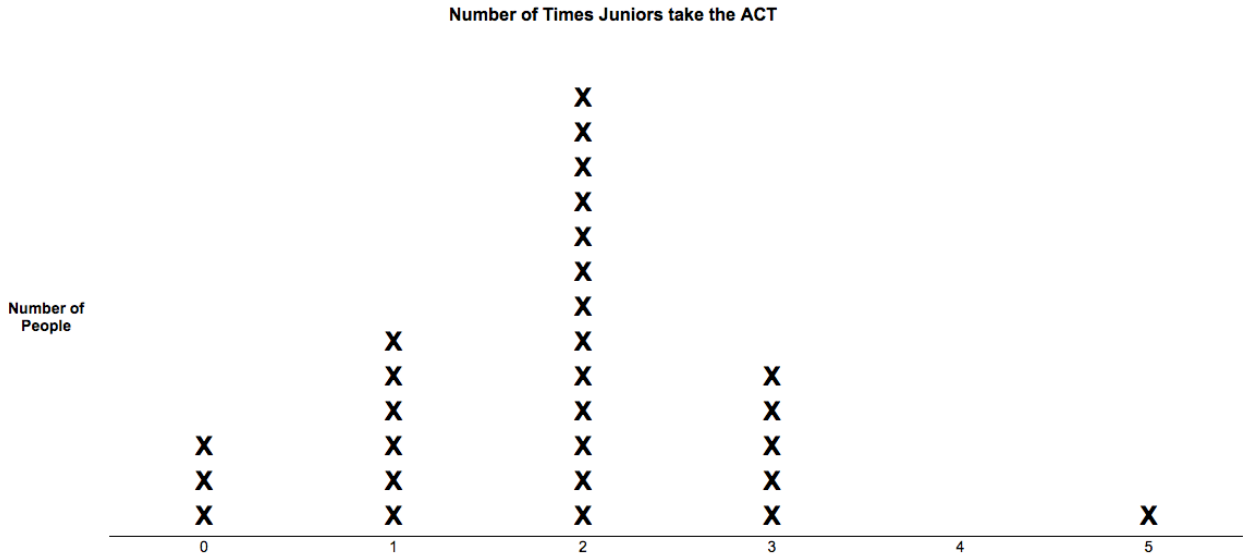


Is the data distribution skewed? If so, in which direction?

What is the range of the data?

Which is greater, the median or the mean? Explain your choice without calculating either measure.

3. Use the data in the graph to answer the questions.



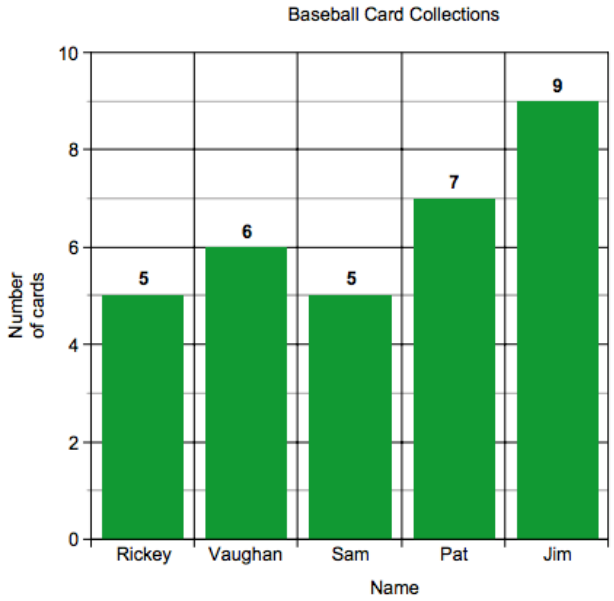
Is the data distribution skewed? If so, in which direction?

What is the range of the data?

Which is greater, the median or the mean? Explain your choice without calculating either measure.

Part B: 6.SP.B.5

4. Use the data in the graph to answer the questions.



What is the total number of people surveyed?

What is being measured?

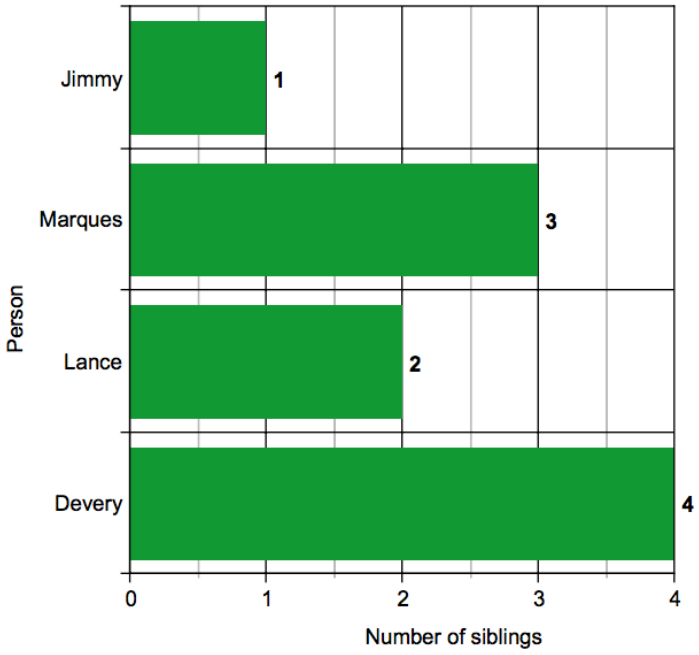
What is the mean number of baseball cards in a person's collection? Show your work.

What is the greatest number of cards a person has?

5. Calculate the mean and the median of the following set of data. Which is more appropriate to use to describe the center? Explain.

Scores on an Algebra I Midterm									
75	82	93	92	78	78	85	89	55	98

6. Calculate the mean and median of the following set of data. Which is more appropriate to use to describe the center? Explain.



1. The data distribution is skewed right. The range is 45. Since the data is skewed right, the mean should be greater than the median as it is affected more by extreme values.
2. The data distribution is skewed left. The range is 50. Since the data is skewed left, the median should be greater than the mean as it is not affected by extreme values.
3. The data does not have skew. The range is 5. Since the data is mostly symmetrical, the mean and median should be fairly close in value.
4. 5 people were surveyed. The graph is measuring how many baseball cards a person has. Mean = 6.4. Greatest number is 9.
5. Mean = 82.5, Median = 83.5; (sample) We should use the median, since there is an extreme value of 55.
6. Mean = 2.5, Median = 2.5; (sample) Since both measures are equal, we can use either.

Part A Focus: 6.SP.A.2: Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

Why this is important for current grade level work:
In the target Topic, students will deepen their understanding of statistical measures, building on the work they last did in 6th grade. In 6th grade students used measures of center as well as spread and overall shape to describe a set of data. To be successful with the target Topic, students must be able to accurately calculate the mean and median of a set of data, particularly when the data is displayed visually not simply listed as a set of numbers. Students lacking these skills or the ability to pull data from a display will struggle to use measures of center to discuss data sets and make decisions. Module 2 Topic A begins with students discussing data displayed in several ways and focusing on the meaning behind the data, as well as interpreting or agreeing with claims about the data. Students return to using measures of center and once again consider how skew, shape and/or an extreme value or outlier may make one or the other more appropriate as a measure of center. Therefore, students must already be proficient with calculating and discussing these measures using math vocabulary. Students also need to be able to find the mean and median in order to create box plots to display and analyze sets of data. Students will also deepen their use of vocabulary to describe the overall picture of a set of data, building on their understandings from their previous work with data.

Using the Diagnostic Assessment to identify gaps:

Problems 1 – 3:
Look for students who think the skew follows the "hump" instead of the "tail" as this shows a misunderstanding of a skewed distribution. Also look for students who select the incorrect measure of center to best represent a skewed distribution. Students need a solid understanding of the effects of extreme data points to be successful with the new learning of the target Topic.

Acceleration Resources for Targeted Instruction:

6th Grade, Module 6, Topics A/B, Lesson(s) 5 – 8

Use the Classwork portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding.

Part B Focus: 6.SP.B.5 Summarize numerical data sets in relation to their context.

Why this is important for current grade level work:
Students look more deeply at sets of data both as lists and displayed in bar graphs, histograms, line or dot plots and box-and-whisker plots. Based on their work in middle school, students should be able to extract information from a graph and know what the data is describing. For example, based on the number of Xs in a line plot, they should know how many respondents were included in a survey, or they should be able to calculate the mean and median using data given in a graph and not just a list of values. These are the pre-requisite skills that support students' deeper work with sets of data in Algebra I. Again, students must begin Module 2 already able to calculate and discuss skew, measures of center and range. Students will analyze spread and consider which measure of center makes the most sense considering the skew of a set of data but will move very quickly through Topic A and on to more sophisticated measures such as standard deviation. Therefore, it is important that students begin Topic A with a firm grasp on the relationship between skew and measures of center.

Using the Diagnostic Assessment to identify gaps:

Problem 4:
Look for students who struggle to interpret the graph, using the height of each bar to determine the number of people surveyed instead of using the number of bars.

Problems 5 – 6:
Look for students who neglect to first put the numbers in numerical order before finding the median and/or who struggle to find the median of a set with an even number of data points. Furthermore, similar to problems 1-3, look for students who, in problem 5, do not recognize that the extreme value of 55 will have a greater effect on the mean, making the median the most appropriate measure of center.

Acceleration Resources for Targeted Instruction:

6th Grade, Module 6, Topic D, Lesson(s) 20 – 21

Use the Classwork portion of each Lesson and a sampling of problems from the Problem Set focused on conceptual understanding.