

STATISTICAL QUESTIONS & DISTRIBUTIONS DISCOVERY

"What Makes a Question Statistical?"

Grade 6 | CCSS 6.SP.A.1, 6.SP.A.2, 6.SP.A.3

UM Printables



4 Activities • 13 Vocabulary Terms • 4 Exit Tickets • 12-Question Quiz

Question Sort • Distribution Shapes • Measures of Center & Variation • Dot Plot Lab

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Vocabulary	Foldable — 13 Key Terms	
Exit Tickets	4 Exit Tickets (one per standard)	
Quiz	12-Question Assessment with Answer Key	
CCSS Alignment	Standards Correlation Chart	

CCSS ALIGNMENT CHART

Standard	Description	Activities	Components
6.SP.A.1	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	Activity 1 Exit Ticket 1	Question Sort (30 cards) Recording Sheet Quiz Q1–Q4
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.	Activity 2 Activity 4 Exit Tickets 2, 4	6 Dot Plots Distribution Analysis Shape Anchor Chart Quiz Q5–Q8
6.SP.A.3	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	Activity 3 Exit Ticket 3	Calculation Table MAD Worked Example Discovery Activity Anchor Chart Quiz Q9–Q12

Cluster 6.SP.A — Develop understanding of statistical variability. This cluster is the foundation for all future work in statistics and probability. Students must understand what makes a question statistical before they can analyze data, and they must understand distributions before they can compare groups or make inferences. These three standards work together as a cohesive unit that builds from question identification through distribution description to the critical distinction between measures of center and measures of variation.

HOW TO USE THIS RESOURCE

Overview

This resource is designed as a **discovery-based** unit. Rather than telling students definitions and rules, each activity invites them to explore data, identify patterns, and construct their own understanding. The teacher's role is to facilitate discussion, ask probing questions, and help students articulate the mathematical ideas they are uncovering. This approach leads to deeper, more durable understanding than direct instruction alone.

Suggested Pacing

- **Day 1:** Activity 1 — Statistical vs. Non-Statistical Question Sort (45–60 min)
- **Day 2:** Activity 2 — Distribution Shape Discovery, Part 1 (Datasets 1–3) (45–60 min)
- **Day 3:** Activity 2 — Distribution Shape Discovery, Part 2 (Datasets 4–6 + Anchor Chart) (45–60 min)
- **Day 4:** Activity 3 — Measure of Center vs. Variation (60–75 min)
- **Day 5:** Activity 4 — Dot Plot Builder Lab (45–60 min)
- **Day 6:** Review + Quiz (45 min)

Differentiation Tips

- **For struggling learners:** Reduce the number of datasets in Activities 2 and 3 from 6 to 3. Provide partially completed dot plots. Allow calculators for all computation. Pair with a strong peer for discussion activities.
- **For advanced learners:** Have them create their own datasets and compute all measures. Challenge them to construct datasets with a specified mean and MAD. Ask them to explain why MAD is always less than or equal to the range/2.

Differentiation tips in the full resource

For struggling learners | Advanced learners | ELL students

ACTIVITY 1: Statistical vs. Non-Statistical Question Sort

CCSS 6.SP.A.1

Objective: Students will distinguish between statistical questions (those that anticipate variability in data) and non-statistical questions (those with a single, fixed answer).

Materials: Question Cards (1–30), Student Recording Sheet, scissors, glue/tape, poster paper

Time: 45–55 minutes

TEACHER LESSON SCRIPT

Launch (5–7 minutes):

Display two questions on the board: “How tall is the Statue of Liberty?” and “How tall are the students in our class?” Ask students to discuss with a partner: *What is different about these two questions?* Guide the discussion so students notice that the first question has one specific answer (305 feet), while the second question will produce many different answers because students have different heights. Introduce the term **statistical question**—a question that anticipates variability in the data. Explain that variability means the data values are expected to differ. A non-statistical question has a single, definitive answer with no variability.

Explore (15–20 minutes):

Distribute the set of 30 Question Cards to each pair of students. Students read each card and sort them into two categories: Statistical and Non-Statistical. Encourage students to ask themselves: *“Will the answers to this question vary from person to person or case to case?”* If yes, it is statistical; if there is only one fixed answer, it is non-statistical. Remind students that a question about a single individual (e.g., “How old am I?”) is non-statistical because it produces a single answer, even though different people have different ages. The question must address a **group** to anticipate variability.

Discuss (10–12 minutes):

Complete lesson script in the full resource

Explore | Discuss | Consolidate | Extend | Question examples

7 What are the heights of the players on the basketball team? STATISTICAL	8 How many books did students in our class read this month? STATISTICAL	9 What is the average number of siblings students have? STATISTICAL
10 How many hours per week do sixth-graders spend on homework? STATISTICAL	11 What are the math test scores for all sixth-graders? STATISTICAL	12 How many glasses of water do students drink each day? STATISTICAL
13 What is the typical screen time on weekends for students? STATISTICAL	14 How many languages can students in our school speak? STATISTICAL	15 What are the weekly allowance amounts for students in our class? STATISTICAL
16 How old am I? NON-STATISTICAL	17 How many pets does my friend have? NON-STATISTICAL	18 What is the capital of Texas? NON-STATISTICAL
19 How many sides does a triangle have? NON-STATISTICAL	20 What is 7 multiplied by 8? NON-STATISTICAL	21 What is my shoe size? NON-STATISTICAL
22 Who is the principal of our school? NON-STATISTICAL	23 How many days are in December? NON-STATISTICAL	24 What is the freezing point of water in Celsius? NON-STATISTICAL
25 How tall is the tallest building in our city?	26 What is my math test score?	27 How many minutes are in one hour?

All 30 printable cards in the full resource

15 Statistical + 15 Non-Statistical question cards

ACTIVITY 2: Distribution Shape Discovery

CCSS 6.SP.A.2

TEACHER LESSON SCRIPT

Launch (5–7 minutes):

Ask students: “If we collected data about how many hours of sleep sixth-graders get, would everyone give the same answer?” Guide students to see that data varies. Then ask: “When we plot all those different answers, what might the picture look like?” Introduce the word **distribution**—the way data values are spread out. Explain that every distribution can be described using three words: **center**, **spread**, and **shape**.

Explore (20–25 minutes):

Present the six datasets one at a time. For each dataset, students: (1) Read the data description and values; (2) Examine the dot plot; (3) Calculate or identify the mean, median, and range; (4) Describe the shape of the distribution. Guide students to notice that Test Scores cluster on the right (skewed left), Text Messages per Day cluster on the left (skewed right), and Heights and Sleep Hours are roughly balanced (symmetric). Emphasize that “skewed left” means the *tail* stretches to the left—most data is on the high side.

Discuss (10–12 minutes):

Create a class anchor chart of distribution shapes. Ask: “What does a symmetric distribution tell you about the data? What does a skewed distribution tell you?” Students should recognize that symmetric distributions have mean and median close together, while skewed distributions have mean and median that differ. Reinforce that shape, center, and spread together give a complete picture of the data.

Full lesson script + 6 datasets with dot plots in the full resource

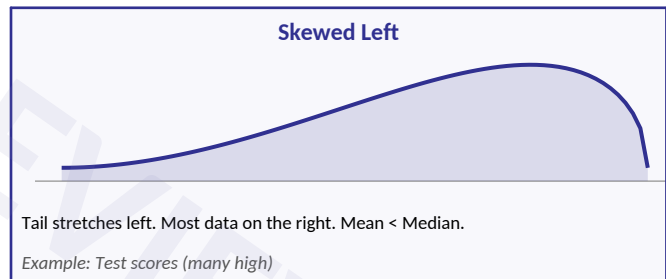
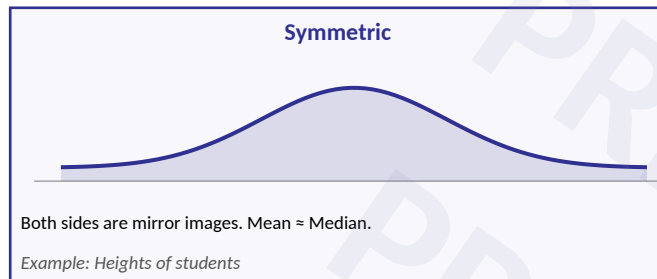
Test Scores | Heights | Shoe Sizes | Text Msg | Sleep | Screen Time

DISTRIBUTION ANALYSIS WORKSHEET

Name: _____ Date: _____

Dataset	Center (Mean / Median)	Spread (Range)	Shape	Reasoning
Test Scores	17.1 / 17	8	Skewed Left	
Heights (in)	60.85 / 61	10	Symmetric	
Shoe Sizes	7.22 / 7	4.5	Symmetric	
Text Msg/Day	24.75 / 16.5	80	Skewed Right	
Sleep Hours	8.6 / 9	5	Symmetric	
Screen Time	103.25 / 100	180	Skewed Right	

DISTRIBUTION SHAPE ANCHOR CHART



Distribution shape anchor chart in the full resource

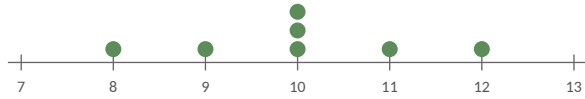
Symmetric | Skewed Left | Skewed Right | Uniform | Bimodal | Clustered

DISCOVERY ACTIVITY: Same Mean, Different Variability

Dataset A: 8, 9, 10, 10, 10, 11, 12

Dataset B: 0, 2, 6, 10, 14, 18, 20

Dataset A



Dataset B



Measure	Dataset A	Dataset B	Comparison
Mean	10	10	Same
Median	10	10	Same
Range	4	20	B is 5× larger
IQR	2	16	B is 8× larger
MAD	0.86	6.29	B is 7.33× larger

DISCOVERY

Key Insight: Both datasets have the *same mean* (10), but Dataset B is far more spread out. The mean alone does not tell the whole story—you also need a measure of variation (Range, IQR, or MAD) to understand how data is distributed.

CENTER vs. VARIATION ANCHOR CHART

Comparison table & anchor chart in the full resource

Same Mean, Different Variability | Center vs. Variation | Outlier Sensitivity

VOCABULARY FOLDABLE

Cut out each card and fold along the dotted line. Write the definition on the inside.

Statistical Question

A question that anticipates variability in the data and accounts for it in the answers. Data collected to answer it will vary.

Non-Statistical Question

A question that has a single, fixed answer with no variability in the data. The answer does not change across individuals.

Distribution

The way data values are arranged or spread out. Can be described by its center, spread, and shape.

Center

A measure that summarizes all data values with a single representative number (mean, median, or mode).

Spread

A measure that describes how much the data values vary or are dispersed (range, IQR, MAD).

Shape

The overall form of the distribution when plotted: symmetric, skewed left, skewed right, uniform, bimodal, or unimodal.

Mean

The arithmetic average of a dataset. Found by adding all values and dividing by the number of values. Sensitive to outliers.

Median

The middle value of an ordered dataset. If there is an even number of values, it is the average of the two middle values. Resistant to outliers.

Mode

The value(s) that occur most frequently in a dataset. A dataset can have one mode, more than one mode, or no mode.

Range

The difference between the maximum and minimum values in a dataset. Simplest measure of spread. Very sensitive to outliers.

All 13 vocabulary terms in the full resource

Distribution | Mean | Median | Mode | MAD | IQR | Range | Outlier | ...

WHAT'S INSIDE THE FULL RESOURCE?

Statistical Questions & Distributions Discovery | Grade 6



23-PAGE COMPLETE RESOURCE

Aligned to CCSS 6.SP.A.1, 6.SP.A.2, and 6.SP.A.3

A discovery-based Grade 6 unit that moves from identifying statistical questions to describing distributions and comparing center and variation.

1 Activity 1 - Question Sort

Teacher lesson script, 30 question cards (15 statistical + 15 non-statistical), student recording sheet, and answer key.

5 Vocabulary Foldable

13 key terms including statistical question, distribution, center, spread, shape, mean, median, mode, range, IQR, MAD, and outlier.

2 Activity 2 - Distribution Shape Discovery

Teacher lesson script plus 6 sample datasets with dot plots, a distribution analysis worksheet, and a shape anchor chart.

6 Exit Tickets

4 exit tickets covering the unit concepts, with answer keys included for each ticket.

3 Activity 3 - Center vs. Variation

Calculation table for mean, median, mode, range, Q1, Q3, IQR, and MAD; a MAD worked example; comparison/discovery activity; anchor chart.

7 Study Guide & Review

A review page organized by 6.SP.A.1, 6.SP.A.2, and 6.SP.A.3 to prepare students for the assessment.

4 Activity 4 - Dot Plot Builder Lab

Teacher lesson script, data collection sheet, two student dot-plot templates, sample class data, and summary statistics.

8 Assessment + Alignment

12-question quiz with answer key, plus a CCSS alignment/standards correlation chart.

ALSO INCLUDED

Suggested pacing, differentiation tips, real-world connections, teacher guidance, and printable student-facing components.