Data Investigation | Classroom Sound Levels

When is our classroom the loudest?

Investigate by using the four steps of the statistical investigative process.

1. Ask a Statistical Question
2. Collect Data
3. Analyze Data
4. Interpret Results

Sound level meter

Pacing Suggestion

First Day

Facilitate **Step 1** and begin **Step 2** by having students plan and discuss.

30 minutes

Data Collection Days

Continue **Step 2** by measuring sound levels at designated times throughout the day for 5 days.

5 minutes per day

Last Day

Facilitate **Steps 3** and **4** to close the investigation.

40 minutes

Content Connections

Math

- Measurement
- Represent multivariable data

Reading and Writing

- Discussion questions

Science

- Sound and energy

Materials

- Data Talk: How Loud Is Too Loud?
- Technology to access a sound level meter that reads in decibels

  1 per class
- Data Investigation student handout

  1 per student

Step 1 Ask a Statistical Question

Facilitate the How Loud Is Too Loud? Data Talk to prepare students for the investigation.

Display the sound level meter. Ask students to notice what happens to the meter display when students are as quiet as possible, when they talk to peers, and when they cheer loudly for a few seconds. Tell students that the sound level meter measures sound levels using decibels, the same unit of measure used in the Data Talk. Use a selection of discussion questions to draw out students' background knowledge of sound levels in the classroom.

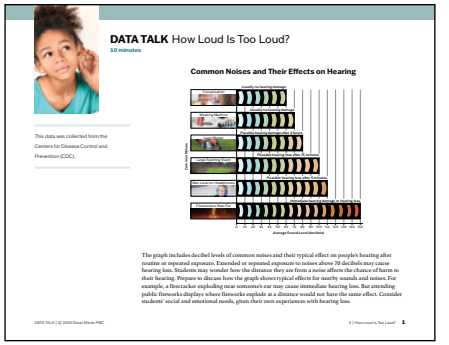
Discussion Questions

What do you notice and wonder about the sound levels in our classroom?

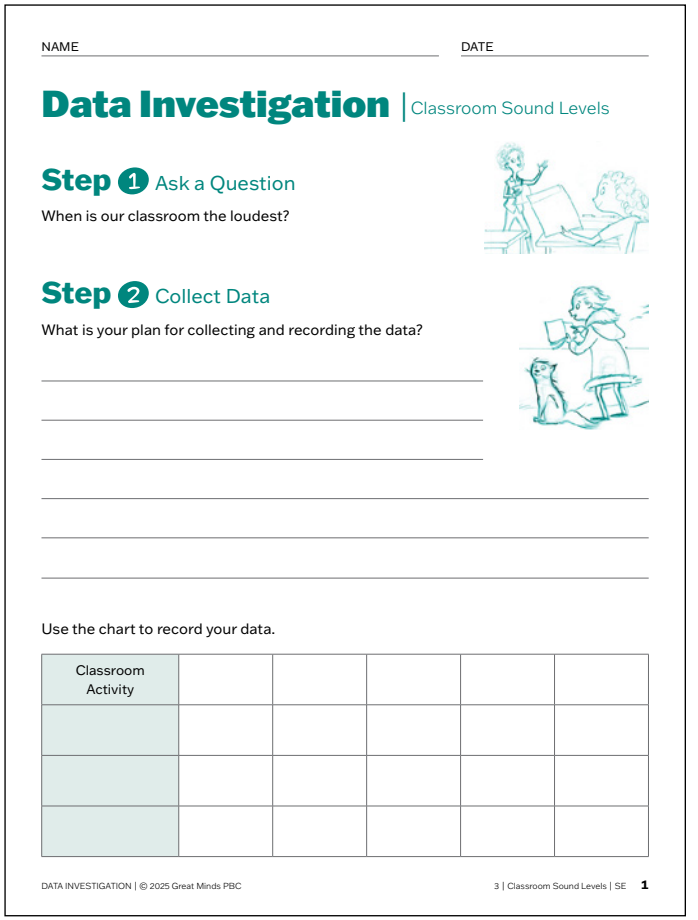
- How do you think the sound level changes in our classroom throughout the day?
- If we measured the sound level in our classroom at the same time every day, would we get the same value? Why?
- Review the graph in the Data Talk. How loud, in decibels, do you think our classroom is when it is the loudest?

Have students consider the statistical question for this Data Investigation:
When is our classroom the loudest?

> **Teacher Note**
> Consider the social and emotional needs of students with sensory-processing differences or hearing loss while planning, collecting, and analyzing data related to sound levels.



Data Talk: How Loud Is Too Loud?


NAME DATE

Data Investigation | Classroom Sound Levels

Step 1 Ask a Question

When is our classroom the loudest?

Step 2 Collect Data

What is your plan for collecting and recording the data?

Use the chart to record your data.

Classroom Activity					

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Student handout

Step 2 Collect Data

Use a selection of the discussion questions to guide a class discussion about investigating the statistical question.

Discussion Questions

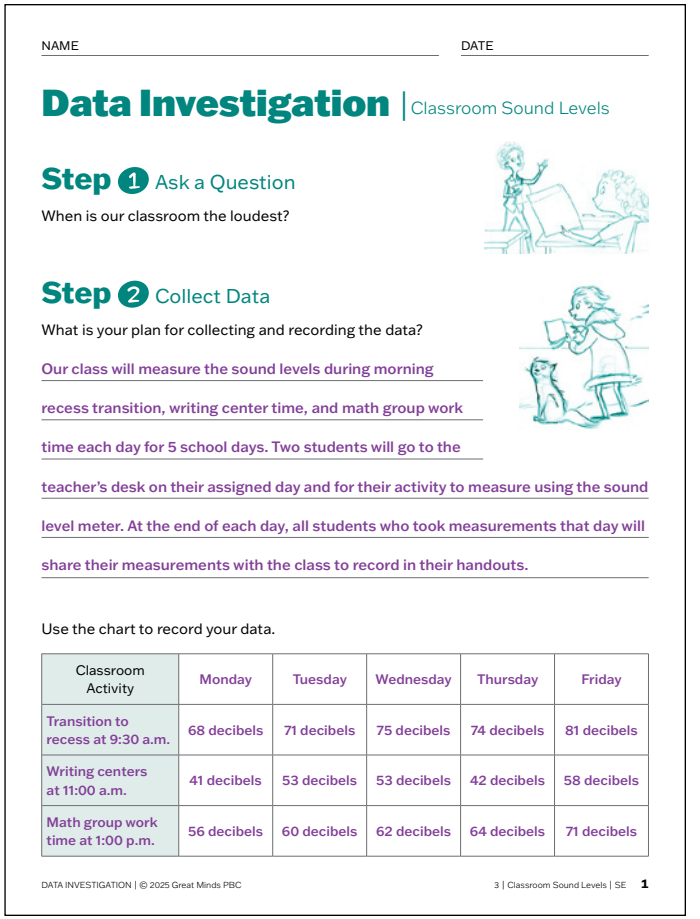
What information will you need to try to answer the question?

- How could collecting data help tell us when our classroom is the loudest?
- When and how often should we measure the sound level in our classroom? Why should we choose those times to help answer the question?
- Is the placement of the sound level meter important? Why?

Have students develop a plan to collect and record the data needed to answer the statistical question and write the plan in Step 2 of their student handout. Students must finish collecting their data before moving on to Step 3.

Teacher Note

In deciding a data collection plan, students could select three times during the school day when they think the classroom will be the loudest. This selection may lead to displays with a shorter range of data points, which means that students could find it more challenging to pinpoint the loudest time of the day. Alternatively, students could select three times during the school day when they think the classroom will have varying sound levels. With this approach, students may be able to only answer which of the three times they chose was the loudest.



NAME _____ DATE _____

Data Investigation | Classroom Sound Levels

Step 1 Ask a Question

When is our classroom the loudest?

Step 2 Collect Data

What is your plan for collecting and recording the data?

Our class will measure the sound levels during morning recess transition, writing center time, and math group work time each day for 5 school days. Two students will go to the teacher's desk on their assigned day and for their activity to measure using the sound level meter. At the end of each day, all students who took measurements that day will share their measurements with the class to record in their handouts.

Use the chart to record your data.

Classroom Activity	Monday	Tuesday	Wednesday	Thursday	Friday
Transition to recess at 9:30 a.m.	68 decibels	71 decibels	75 decibels	74 decibels	81 decibels
Writing centers at 11:00 a.m.	41 decibels	53 decibels	53 decibels	42 decibels	58 decibels
Math group work time at 1:00 p.m.	56 decibels	60 decibels	62 decibels	64 decibels	71 decibels

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Student handout

Step 3 Analyze Data

Use a selection of the discussion questions to engage students in a discussion about why it might be useful to create a data display and how to represent their data.

Discussion Questions

How could you display the data you collected?

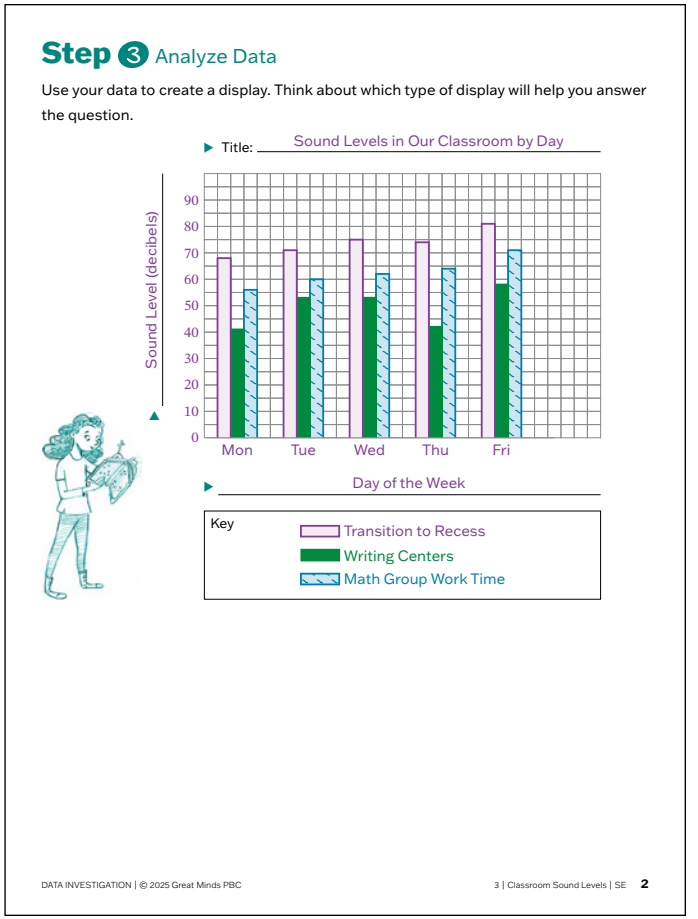
- What type of data display would best help us determine when our classroom is the loudest?
- Why would it be helpful to organize the data in the display by day or activity?
- How can knowing the lowest decibel measure and the highest decibel measure help you make the scale on your graph?
- How could you label the graph and the axes to help others understand the data?

After the discussion, have students create a data display in Step 3 of their handout to help them analyze, or make sense of, their data. Displays may vary.

Differentiation

Support: Support students in determining the type of display they will make by asking them to define what *when* means to them. They may choose to define *when* as a day of the week or as an activity type, both of which produce viable answers to the question. Encourage discourse about why both responses are acceptable and why interpreting the question differently leads to different analyses.

If students need support envisioning a display, consider having students start by creating a graph that focuses on the decibel levels during one day or one activity. Then ask students how they can include the rest of the data in their graph.



Student handout

Step 3 Analyze Data

After students create their data displays, use a selection of the discussion questions to engage students in analyzing the data their displays show.

Discussion Questions

What do you notice about the data?

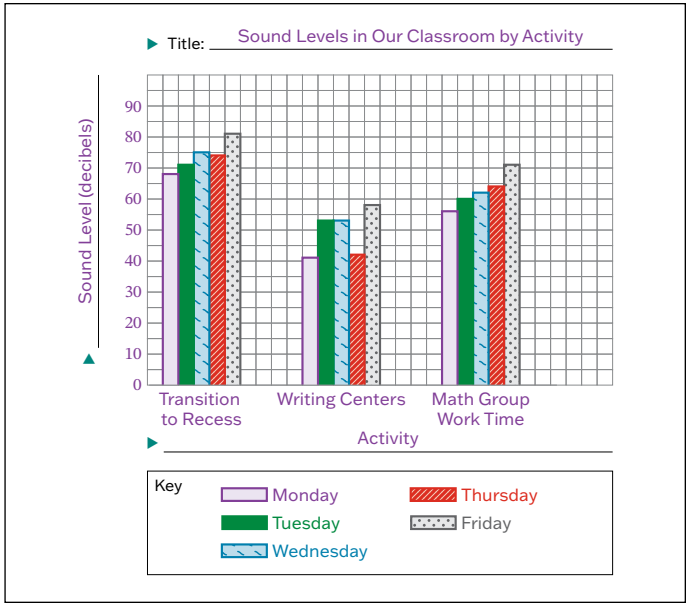
- What might you need to look for in the data to help you answer the question?
- Choose one of the days or activities you collected data on. Are the data values far apart or close together? What does that information tell you about the sound levels for that day or activity?
- Do you have all the information you need to answer the question?

As time allows, consider inviting students to share their displays with a partner or in a gallery walk.

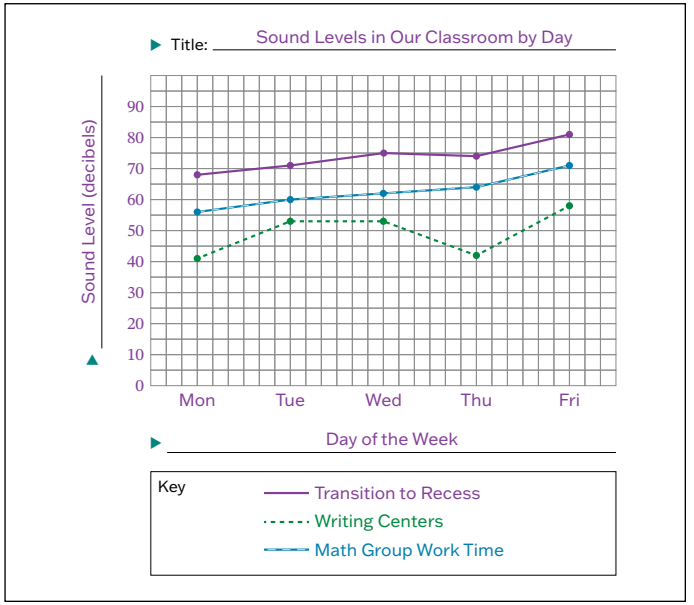
Language Support

Support identifying whether data values are close together or far apart. Begin by demonstrating how objects can be close together or far apart (e.g., by moving your hands so they are almost touching and then moving them so they are far apart from each other). Then invite students to explain how they can determine whether the data values are close together or far apart by looking at their display.

As an extension, consider discussing how the scale affects whether the bars can seem closer together or farther apart.



Additional sample student work



Additional sample student work

Step 4 Interpret Results

In Step 4 of their handout, have students use their data to answer the statistical question, **When is our classroom the loudest?** Revisit the discussion from the end of Step 3, if needed.

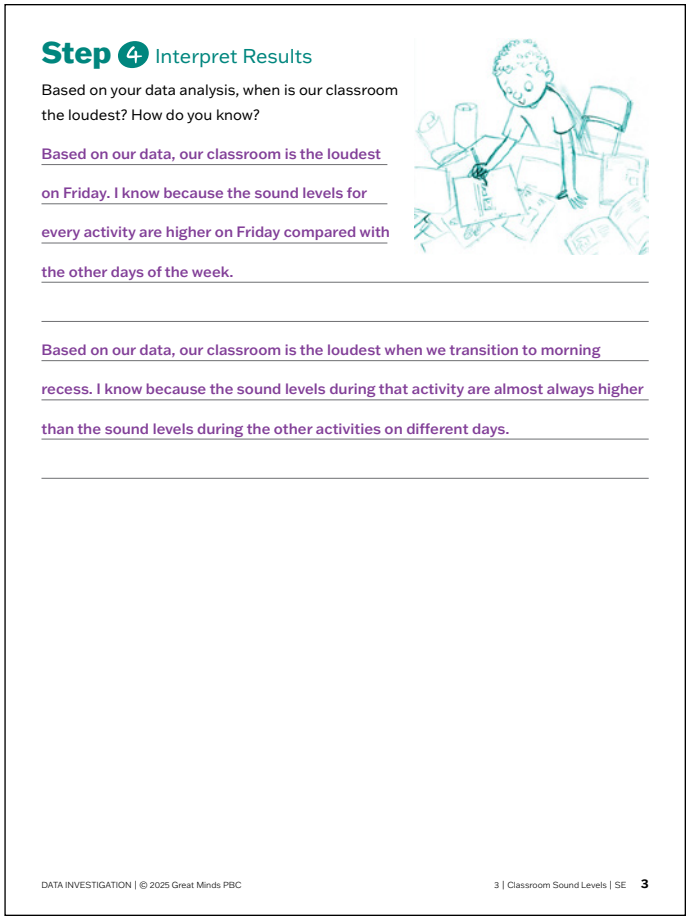
Use a selection of the discussion questions to guide a class discussion to reflect on the investigation and the investigative process.

Discussion Questions

How did your data help you answer the question?

- What surprised you about the results? Why?
- Do you think the results would be different if we collected data for the whole school year? Why?
- How could this data on sound levels in our classroom be helpful to our class?
- What new questions do you have?

If students have new questions, consider recording any that could be investigated at a later date, either by collecting new data or by performing further analysis on the data they already collected.



Step 4 Interpret Results

Based on your data analysis, when is our classroom the loudest? How do you know?

Based on our data, our classroom is the loudest on Friday. I know because the sound levels for every activity are higher on Friday compared with the other days of the week.

Based on our data, our classroom is the loudest when we transition to morning recess. I know because the sound levels during that activity are almost always higher than the sound levels during the other activities on different days.

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Student handout