

# Preparation Notes

Please review and customize this deck to prepare it for use. Some notes:

- These professional learning (PL) materials (slide deck and accompanying handout) are being offered in editable forms so that you may make adjustments to better support the specific work happening in your school or district.
- These PL materials are designed to easily accommodate remote delivery:
  - A [Jamboard template](#) is provided to facilitate discussion of student work; the facilitator will need to make a copy of this and be ready to share the link with participants as noted in the deck.
  - Text that can be readily pasted (marked with “—”) into a video call’s chat feature is included when participants need to reference the handout.
  - There are placeholders for handout links to be shared with participants in the notes field of selected slides; the facilitator will need to add a link to the handout where indicated by “[insert link].”

# M111 Overview

XQ Badge Project PL Series Baseline Session

Month XX, XXXX

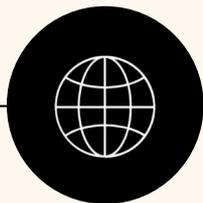


Welcome!

Community Builder:

Write a “tweet” in 140 characters or less that describes your first year of teaching. Get ready to share!

# Outcomes and Agenda



## Participants will be able to:

- Explain the content and practice expectations for the M111 badge
- Analyze tasks through the lenses of (1) content and practice expectations and (2) learning principles
- Analyze student work for evidence of learning

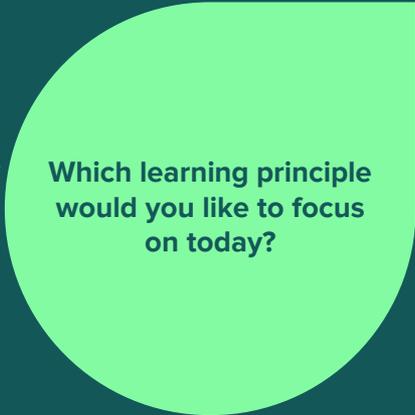


## Agenda:

- Task 1: Expectations and Learning Principles
- Task 1: Student Work
- Task 2: Expectations and Learning Principles
- Task 2: Student Work
- Closing

# Learning Principles

1. Engage with cognitively demanding tasks in heterogeneous settings.
2. Engage in social activities.
3. Build conceptual understanding through reasoning.
4. Have agency in their learning.
5. View mathematics as a human endeavor across centuries.
6. See mathematics as relevant.
7. Employ technology as a tool for problem-solving and understanding.



**Which learning principle  
would you like to focus  
on today?**

01

# Exploring the Content

What comes to mind?  
What knowledge and skills  
should students learn to  
earn this badge?



Come off mute  
or put your  
thoughts in the  
chat!

# What's the Story of these Standards?

## Selected Common Core Standards for Mathematics – Statistics and Probability

**Summarize, represent, and interpret data on a single count or measurement variable.**

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
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.
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

**Develop understanding of statistical variability.**

1. Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.
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.
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.

**How would you synthesize these?  
What are the key takeaways  
for students?**

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**Share your thinking!**

# M111 Content and Practice Expectations (CPE)

111.a	Engage in the modeling cycle.
111.b	Develop statistical questions in the course of modeling with one-variable measurement data.
111.c	Interpret differences in shape, center, and spread in the context of data sets, accounting for the possible effects of extreme data points (outliers).
111.d	Use measures of center and variability to describe one-variable measurement data.
111.e	Generate a random sample in the course of modeling with one-variable measurement data.
111.f	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.
111.g	Estimate population percentages by using a normal curve to approximate a data distribution.

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**What  
resonates with  
you?**

# M111 Content and Practice Expectations and Indicators

<b>Content and Practice Expectations</b>	<b>Indicators</b> <b>Choose an artifact where you...</b>
111.a: Engage in the modeling cycle.	i. engage with the full modeling cycle (problem, formulate, compute, interpret, validate, revise as necessary, report).
111.b: Develop statistical questions in the course of modeling with one-variable measurement data.	i. develop a statistical question to investigate.
	ii. explain or justify why your question is statistical.
111.c: Interpret differences in shape, center, and spread in the context of data sets, accounting for the possible effects of extreme data points (outliers).	i. determine and construct an appropriate graphical representation of collected data, such as box plot, line plot, histogram, or other data display.
	ii. describe the shape, center, and spread of a data set.
	iii. interpret the real-world meaning of the shape, center, and spread of a data set.
	iv. identify and explain the effect of an outlier on the shape, center, and spread of a data set.



**What new  
insights do you  
have?**

# Let's Investigate

Choose at least one task to explore:

- Speed Trap
- Do You Fit in this Car?

Which content and practice expectations are evident in each one?

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Come off mute  
or put your  
thoughts in the  
chat! What did  
you find?

# What's the Same?

# What's Different?

1. How do these content and practice expectations align to ways you've taught this topic before?
2. How are they different?

**Come off mute  
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# Inequity Is our Reality

“And by 2018, problems with the pipeline through math courses and tests were persisting. Despite the implementation of new state standards and tests, just 31 percent of students were meeting or exceeding standards in math, compared with 56 percent in English.” (Daro & Asturias, 2019)

# We Must Lead the Movement

How can this approach give space for what math can be?

## Is math...?

- About getting one right answer, the teacher's way
- Irrelevant
- About doing procedures
- Independent work
- Something my teacher made up
- Formulaic

## Or could math be...?

- About using multiple strategies flexibly
- Connected to the real-world in ways that make sense
- About understanding and applying
- Collaborative work
- Lived across continents and centuries
- Novel, challenging problems

02

# Task 1: Expectations and Learning Principles

# Let's Do Some Math!

Data can be used to gain insights about communities and help us understand issues.

## Framing Questions

What are some questions you have about your community that could be answered by collecting data?

- Why are these questions/issues important?
- Why should we care about this question/issue?
- Who else might care about these questions/issues?
- Why might it be important to them?

For this task you will prepare a presentation in any form (slideshow, report, song, artwork) delivering a message you want to share on a topic of your choice, supported by the evidence you collect.

**Do the task as a student would. Jot down any reflections that you have as you do the math!**

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**Choose 1-2 Content and Practice Expectations that student work could give evidence of.**

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**111.b: Develop statistical questions in the course of modeling with one-variable measurement data.**

# Learning Principles

**In M111 Modeling with Data: One-Variable Measurement Data, students will employ the following learning principles:**

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**Which of these principles does this task lend itself to? Which ones can the task be easily adapted to accommodate?**

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**Share what  
you came up  
with!**

03

# Task 1: Student Work

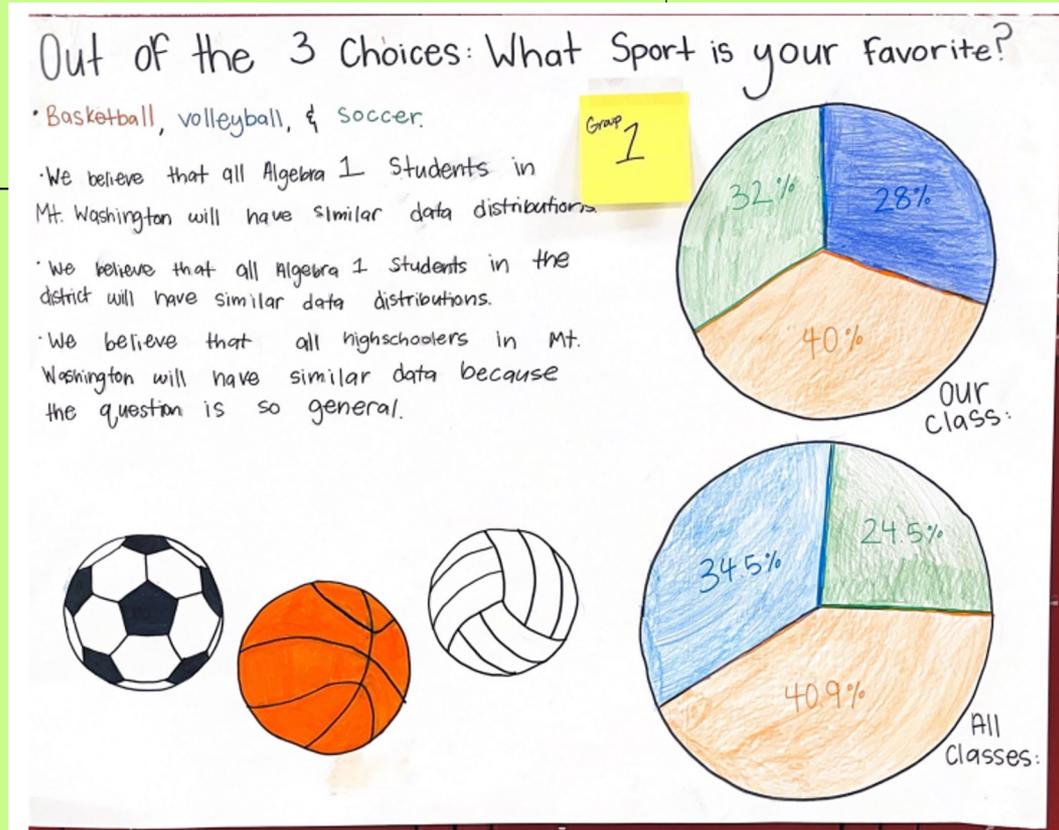
# What is the impact of our labels?

“Any kind of qualifier can be harmful because who we are is not static. Our abilities are constantly changing...I know if I was raised in this day and age, I would have been labeled a struggling reader. But what I know now is I was actually reading like a writer. I was reading slowly and deliberately and deconstructing language, not in the sense of looking up words in the dictionary, but understanding from context. I was constantly being compared to my sister who excelled, and it made me feel insecure. What gets translated is 'you are not as good,' and that gets translated into our whole bodies. That's where the danger lies.” – Jacqueline Woodson

# Round 1: What do you notice?

## Jot down

- One thing you notice about each piece of student work.

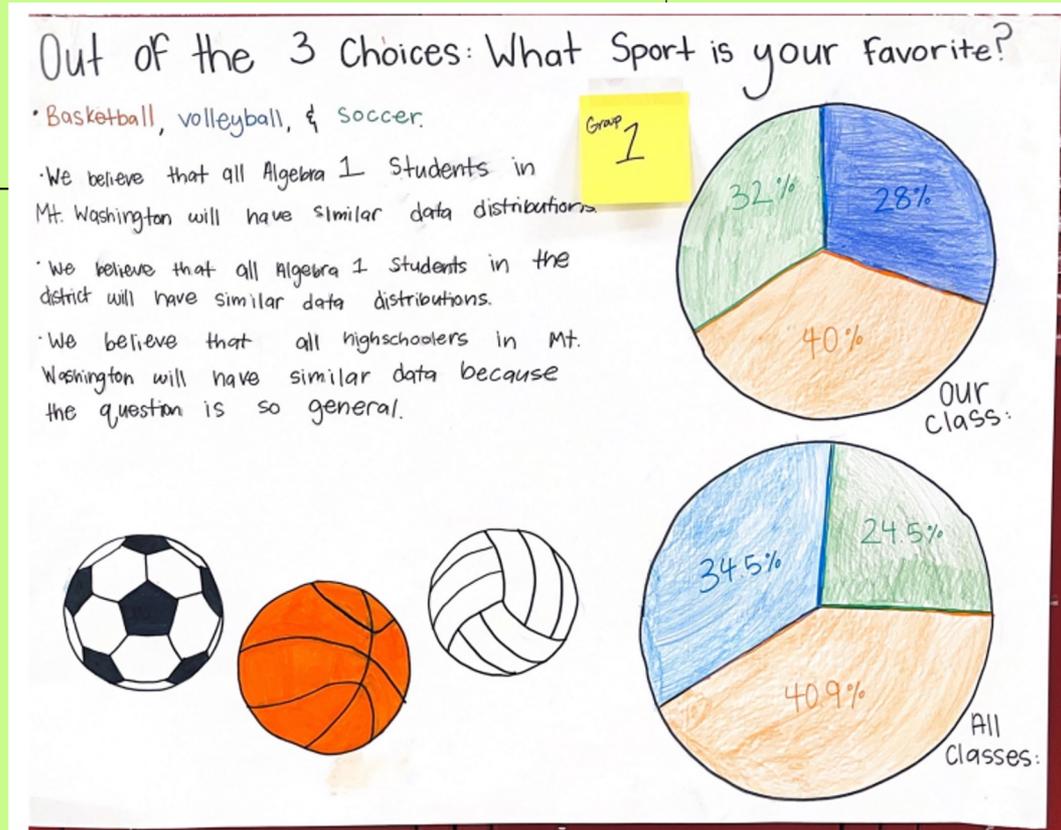


# Round 1: What do you notice?

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- One thing you notice about each piece of student work.

Come off mute  
and share what  
you saw!



# Criteria for Success

Conference and Provide Revision Support	Accept with Revision	Accept
<p>The student's artifact shows an emerging understanding of the expectations of the indicator(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of the indicator(s).</p>	<p>The student's artifact is approaching a full understanding of the expectations of the indicator(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.</p>	<p>The student's artifact demonstrates evidence that they have met the expectations of the indicator(s).</p>

**What resonates with you? What questions surface for you?**

# Humanizing Assessment

When it comes to cognition, performance assessments epitomize high-quality street data. Each task offers its own rich landscape of insight into a learner's cognitive processes, values, misconceptions, academic identity, and more. (Safir and Dugan, 2021, p. 135–136)

Source: Safir, Shane, and Jamila Dugan. *Street Data: A Next-Generation Model for Equity, Pedagogy, and School Transformation*. Corwin, 2021.

# Round 2: What evidence of learning is there?

**111.b: Develop statistical questions  
in the course of modeling with  
one-variable measurement data.**

## Let's examine some work together:

### **Conference and Provide Revision Support**

The student's artifact shows evidence of an emerging understanding of the expectations of the indicator(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of the indicator(s).

### **Accept with Revision**

The student's artifact shows evidence of approaching a full understanding of the expectations of the indicator(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.

### **Accept**

The student's artifact demonstrates evidence that they have met the expectations of the indicator(s).

# Examining Student Work

The image shows a digital workspace interface for reviewing student work. At the top, there are three tabs: "Conference and Provide Revision Support", "Accept with Revision", and "Accept". On the left side, there is a vertical toolbar with several icons: a pencil, an eraser, a mouse cursor, a document icon (highlighted with a red circle and a red arrow), a photo icon, a circle icon, a text box icon, and a scissors icon. In the center of the workspace, a large red callout bubble contains the text "Put your thoughts on the Jamboard!". In the bottom right corner, there is a red circular badge labeled "Work Sample 1".

# Example #1

Out of the 3 Choices: What Sport is your favorite?

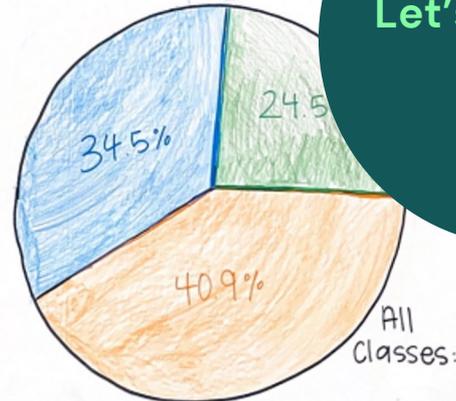
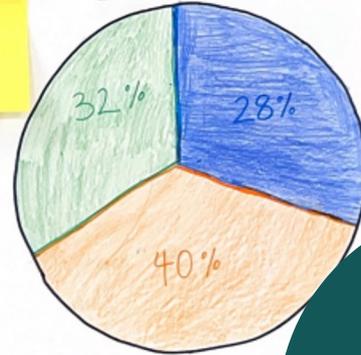
• Basketball, volleyball, & soccer.

• We believe that all Algebra 1 Students in Mt. Washington will have similar data distributions.

• We believe that all Algebra 1 Students in the district will have similar data distributions.

• We believe that all highschoolers in Mt. Washington will have similar data because the question is so general.

Group 1



Let's compare notes.

# Example #2

What Other Languages (Other than English) do you Speak/study?



1. The typical values for the data we collected was Spanish
2. All Algebra 1 Badging students in Mt Washington will most likely have similar data distributions because most language classes will be the same.
3. All Algebra Badging students in the district will most likely have different data distributions because language classes most likely be different.
4. you could not generalize to a larger population with data because people speak different languages in different places.
5. To get data from the whole district, a quiz like this would have to be way more specific.

Let's compare notes.

# Example #3

## How many people bring lunch to School?

Let's compare notes.



### Insight Questions

#### Why is this important?

This is important because schools could learn how much they can cook for students, and save money.

#### Why should we care?

People should care about this issue because schools will be able to save lots of money.

#### Who else might care about these questions?

People who would definitely care about this would be the cooks themselves.

#### Why might it be important to them?

Mainly due to the fact that they would work less.

### Data from Others

#### Will all Algebra 1 Badgin students, or district in Mt. Washington have the same/similar data distributions?

The other classes will have different because other schools will have more or less people that bring lunches.

# Three Key Components of the Math Badging System

- Content and Practice Expectations
- Learning Principles
- Criteria for Success

Which one excites you the most?

What one will have the greatest impact on students?

What questions surface for you?



**Come off  
mute or share in  
the chat!**

04

# Task 2: Expectations and Learning Principles

# Let's Do Some Math!

Students are given a problem like this:

## Part 1: Making sense of student voice

*Do you feel like you are given space to use your voice throughout the school day? How often? Do you wish you could talk more? Or less? Think about how you would answer the following questions:*

- *How often do you get to talk in each of your classes? How would you quantify/track this?*
- *Who do you listen to? How much?*
- *How much do students talk throughout a typical school day?*

## Part 2: Using our voice

*For this task, you will have an opportunity to learn more about the student experience at your school. Your job is to prepare a presentation, in any form, that represents your answer to the question “What do you wish more teachers knew about the opportunities that students are given throughout the school day to use their voice?”*

*For this work, you will need to determine the following:*

- *What data will help you tell the story? How would you quantify this?*
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*Your presentation should include your response to “What do you wish more teachers knew from these data about the student experience?” supported by the evidence you collected.*

**Do the task as a student would. Jot down any reflections that you have as you do the math!**

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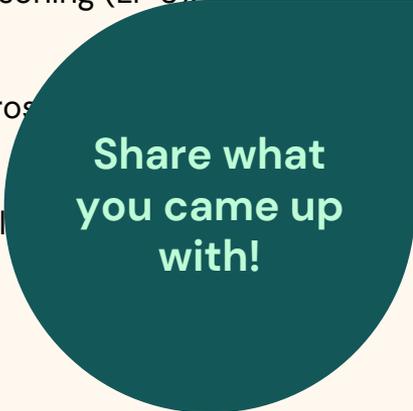
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05

# Task 2: Student Work

# Round 1: What do you notice?

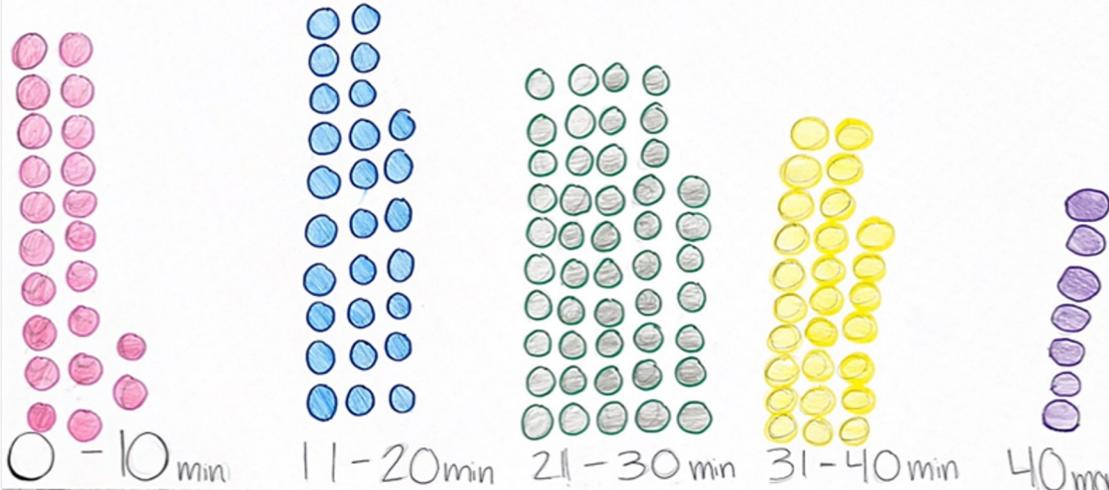
Jot down

- One thing you notice about each piece of student work.

## MATH MINUTES

• This data tells us that students talk 21-30 min of class.

• We think that teachers should know that we talk a reasonable amount, of time. 21-30 min of student talking is a good balance of student & teacher talking.



# Round 1: What do you notice?

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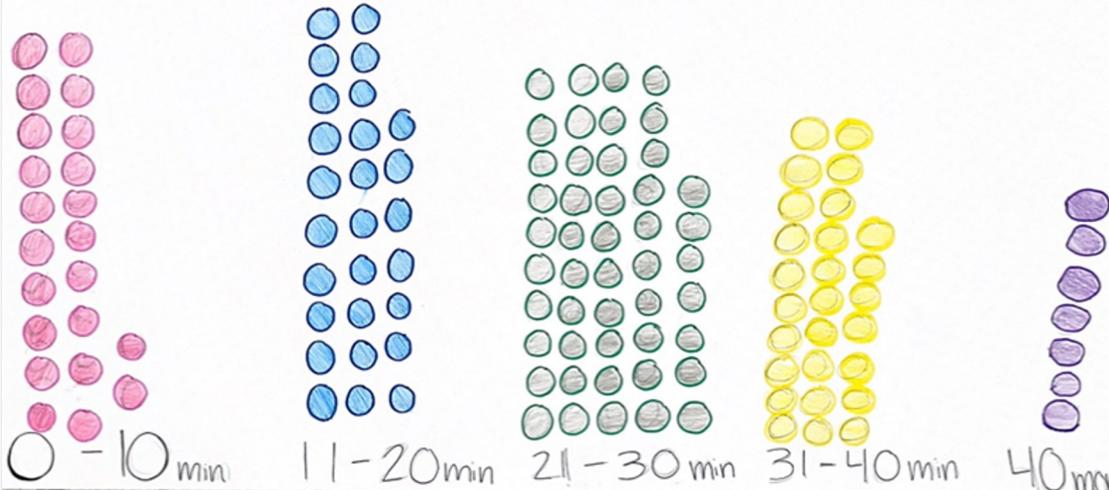
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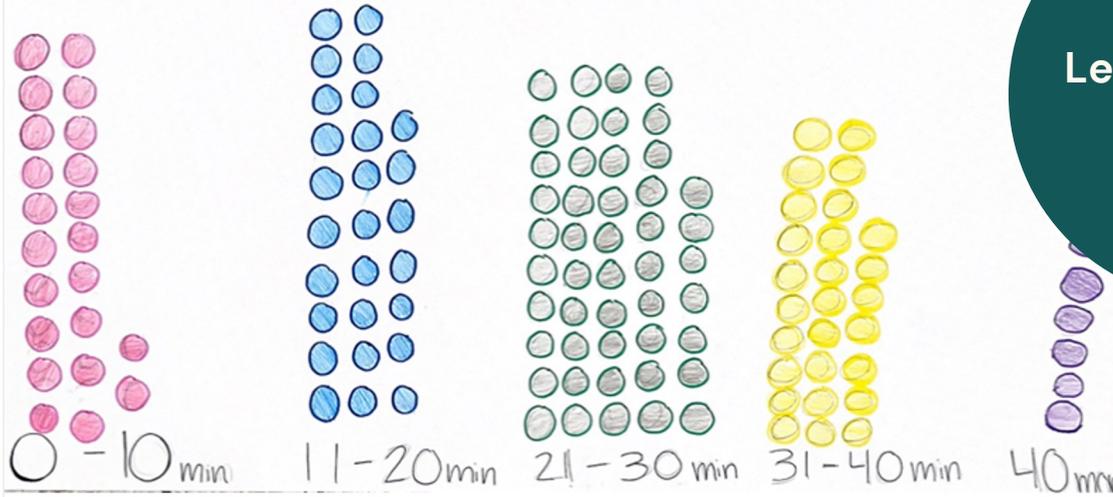
# Example #1

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6



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# Example #2

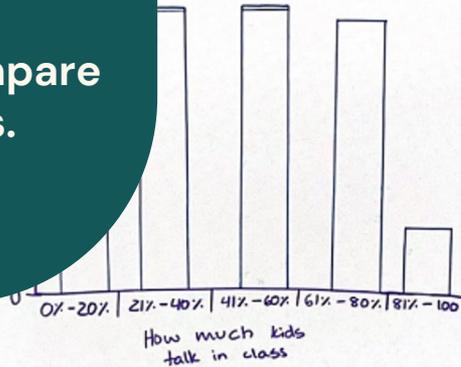
## Who's Doing The Talking?

In science class ☺

Analysis:

- We are not surprised because science involves asking questions & working together more often than just listening.
- The graph shows that most students agree that they can talk in science for majority of the period.
- If we expanded our ~~100%~~ research to the entire district, we believe that the results will change a little depending on the schools & teachers leniency with talking in class.

Results:



Group 2 ☺

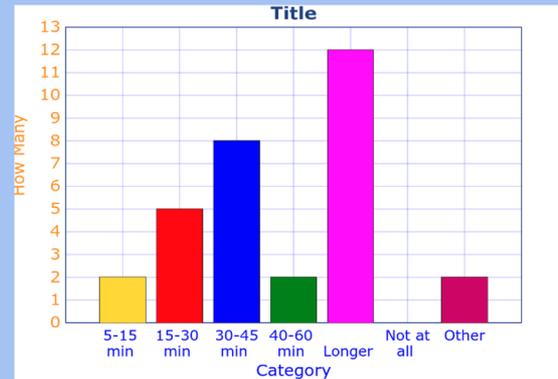
Let's compare notes.

# Example #3

Question: How long, on average, do you talk with your friends during the school day?

On Average more students spend longer than an hour talking to their friends during a school day.

Out of 31 people 14 responded with answers higher than an hour.



Let's compare notes.

## Reflection

1. The data tells that more students spend part of their school day talking to friends.
2. It shows how many people spend x amount of time talking to their friends during the school day.
3. It was challenging to get people to answer this question. It was also challenging because there are students answering that range from 13-19 years of age.
4. If I could do this again I would make two so that I could see answers from two different age groups. This would help to separate the answers from the younger students and the older students.

# Let's Hear Some Reflections

What kinds of support will students need to demonstrate evidence of learning?

Has your thinking changed at all on how to implement this task? If so, how?

**Come off  
mute or share in  
the chat!**

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# Closing

# What Are Your Takeaways?

Choose one question to respond to:

1. Which content and practice expectation are you most excited about? Why?
2. Which learning principle are you most excited about connecting to M111 content? Why?
3. What impact do you think using a portfolio system will have on your students? Why?