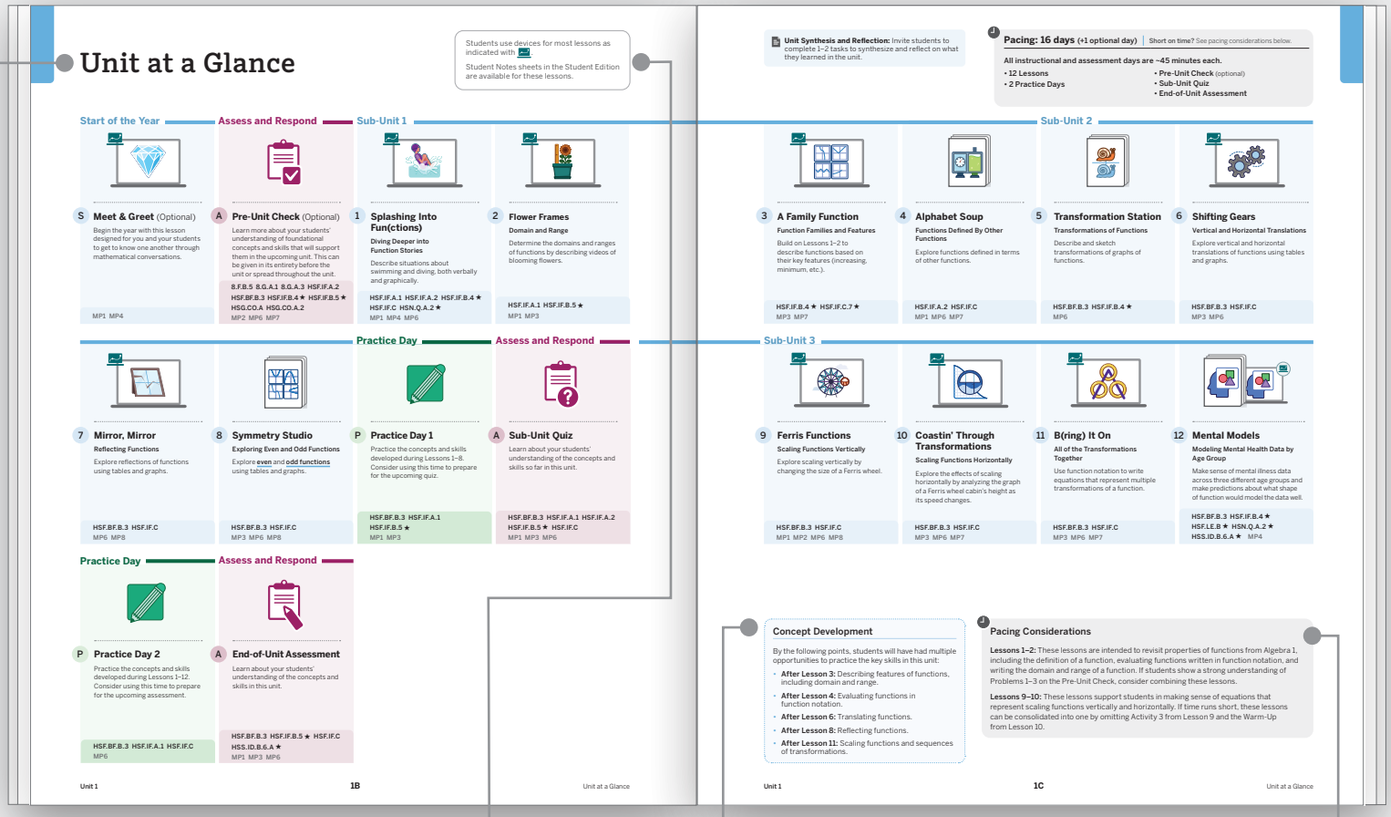
Navigating the print program

Unit & Sub-Unit Resources

Each unit includes a range of resources designed to support teachers in thinking through the progression of mathematics that students will engage with over the course of the unit. These resources can support teachers in their unit planning, as well as choices they make in response to students' thinking, strengths, and needs that arise over the course of the unit.



Unit at a Glance

Students use devices for most lessons as indicated with

Student Notes sheets in the Student Edition are available for these lessons.

Start of the Year | Assess and Respond | Sub-Unit 1

S Meet & Greet (Optional) — Begin the year with this lesson designed for you and your students to get to know one another through mathematical conversations. MP1 MP4

A Pre-Unit Check (Optional) — Learn more about your students' understanding of foundational concepts and skills that will support them in the upcoming unit. This can be given in its entirety before the unit or spread throughout the unit. 8.F.B.5 8.G.A.1 8.G.A.3 HSF.IF.A.2 HSF.BF.B.3 HSF.IF.B.4 ★ HSF.IF.B.5 ★ HSG.CO.A HSG.CO.A.2 MP2 MP6 MP7

1 Splashing Into Fun(ctions) — Diving Deeper into Function Stories — Describe situations about swimming and diving, both verbally and graphically. HSF.IF.A.1 HSF.IF.A.2 HSF.IF.B.4 ★ HSF.IF.C HSN.Q.A.2 ★ MP1 MP4 MP6

2 Flower Frames — Domain and Range — Determine the domains and ranges of functions by describing videos of blooming flowers. HSF.IF.A.1 HSF.IF.B.5 ★ MP1 MP3

Practice Day | Assess and Respond | Sub-Unit 1

7 Mirror, Mirror — Reflecting Functions — Explore reflections of functions using tables and graphs. HSF.BF.B.3 HSF.IF.C MP6 MP8

8 Symmetry Studio — Exploring Even and Odd Functions — Explore even and odd functions using tables and graphs. HSF.BF.B.3 HSF.IF.C MP3 MP6 MP8

P Practice Day 1 — Practice the concepts and skills developed during Lessons 1–8. Consider using this time to prepare for the upcoming quiz. HSF.BF.B.3 HSF.IF.A.1 HSF.IF.B.5 ★ MP1 MP3

A Sub-Unit Quiz — Learn about your students' understanding of the concepts and skills so far in this unit. HSF.BF.B.3 HSF.IF.A.1 HSF.IF.A.2 HSF.IF.B.5 ★ HSF.IF.C MP1 MP3 MP6

Practice Day | Assess and Respond | Sub-Unit 1

P Practice Day 2 — Practice the concepts and skills developed during Lessons 1–12. Consider using this time to prepare for the upcoming assessment. HSF.BF.B.3 HSF.IF.A.1 HSF.IF.C MP6

A End-of-Unit Assessment — Learn about your students' understanding of the concepts and skills in this unit. HSF.BF.B.3 HSF.IF.B.5 ★ HSF.IF.C HSS.ID.B.6.A ★ MP1 MP3 MP6

Unit 1 1B Unit at a Glance

Unit Synthesis and Reflection: Invite students to complete 1–2 tasks to synthesize and reflect on what they learned in the unit.

Pacing: 16 days (+1 optional day) | Short on time? See pacing considerations below.

All instructional and assessment days are ~45 minutes each.
- 12 Lessons
- 2 Practice Days
- Pre-Unit Check (optional)
- Sub-Unit Quiz
- End-of-Unit Assessment

Sub-Unit 2

3 A Family Function — Function Families and Features — Build on Lessons 1–2 to describe functions based on their key features (increasing, minimum, etc.). HSF.IF.B.4 ★ HSF.IF.C.7 ★ MP3 MP7

4 Alphabet Soup — Functions Defined By Other Functions — Explore functions defined in terms of other functions. HSF.IF.A.2 HSF.IF.C MP1 MP6 MP7

5 Transformation Station — Transformations of Functions — Describe and sketch transformations of graphs of functions. HSF.BF.B.3 HSF.IF.B.4 ★ MP6

6 Shifting Gears — Vertical and Horizontal Translations — Explore vertical and horizontal translations of functions using tables and graphs. HSF.BF.B.3 HSF.IF.C MP3 MP6

Sub-Unit 3

9 Ferris Functions — Scaling Functions Vertically — Explore scaling vertically by changing the size of a Ferris wheel. HSF.BF.B.3 HSF.IF.C MP1 MP2 MP6 MP8

10 Coastin' Through Transformations — Scaling Functions Horizontally — Explore the effects of scaling horizontally by analyzing the graph of a Ferris wheel cabin's height as its speed changes. HSF.BF.B.3 HSF.IF.C MP3 MP6 MP7

11 B(ring) It On — All of the Transformations Together — Use function notation to write equations that represent multiple transformations of a function. HSF.BF.B.3 HSF.IF.C MP3 MP6 MP7

12 Mental Models — Modeling Mental Health Data by Age Group — Make sense of mental illness data across three different age groups and make predictions about what shape of function would model the data well. HSF.BF.B.3 HSF.IF.B.4 ★ HSF.LE.B ★ HSN.Q.A.2 ★ HSS.ID.B.6.A ★ MP4

Concept Development

By the following points, students will have had multiple opportunities to practice the key skills in this unit:
- **After Lesson 3:** Describing features of functions, including domain and range.
- **After Lesson 4:** Evaluating functions in function notation.
- **After Lesson 6:** Translating functions.
- **After Lesson 8:** Reflecting functions.
- **After Lesson 11:** Scaling functions and sequences of transformations.

Pacing Considerations

Lessons 1–2: These lessons are intended to revisit properties of functions from Algebra 1, including the definition of a function, evaluating functions written in function notation, and writing the domain and range of a function. If students show a strong understanding of Problems 1–3 on the Pre-Unit Check, consider combining these lessons.

Lessons 9–10: These lessons support students in making sense of equations that represent scaling functions vertically and horizontally. If time runs short, these lessons can be consolidated into one by omitting Activity 3 from Lesson 9 and the Warm-Up from Lesson 10.

Unit 1 1C Unit at a Glance

Every unit has a **Unit at a Glance** page that shows teachers everything they need to know to get started planning out their upcoming unit.

Student Notes sheets support student recall and retention when engaging in digital lessons.

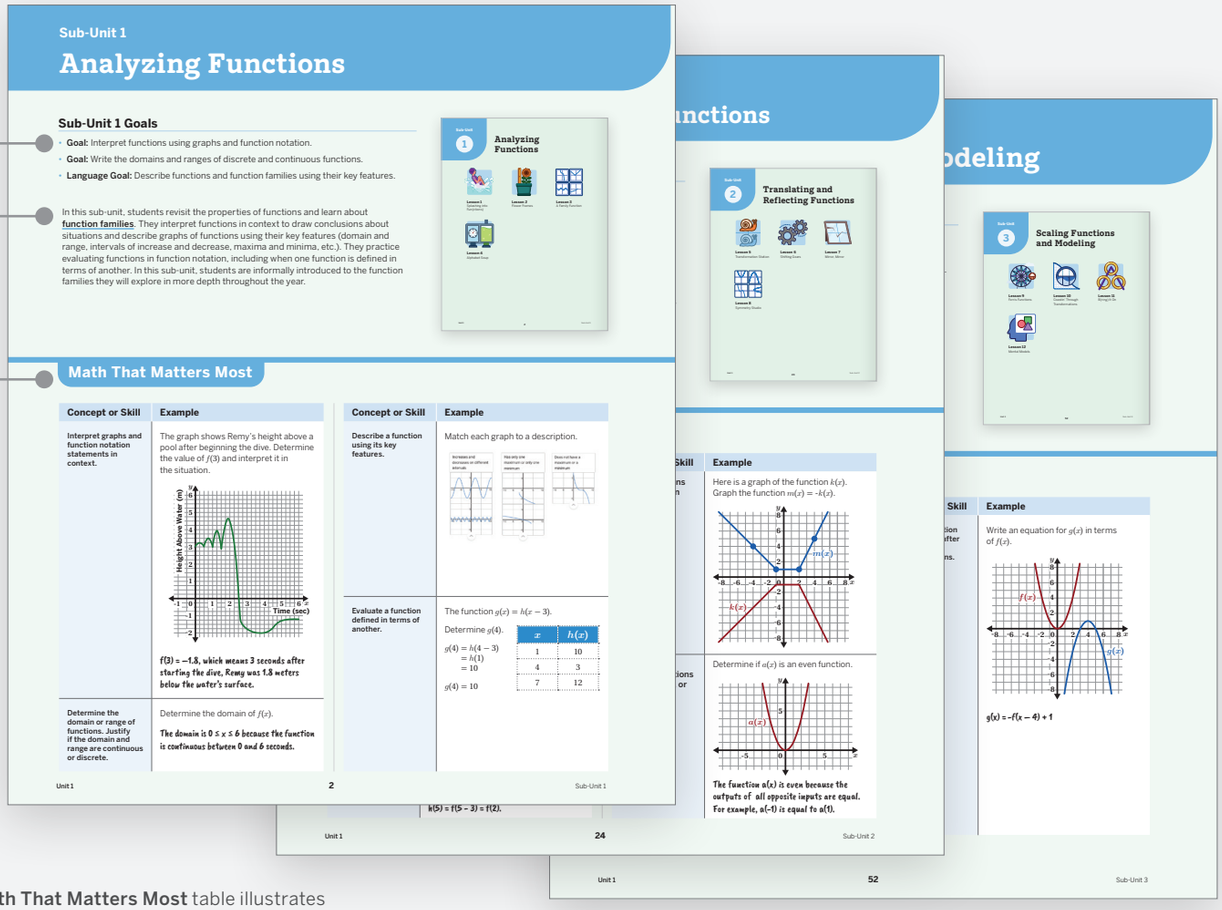
This overview of **concept development** supports teachers in making decisions about potential intervention points during the unit. It indicates at which point students have had multiple opportunities to focus on each key concept or skill. It does not necessarily mean there are no further opportunities to strengthen and develop these skills.

Teachers are provided with thoughtful **pacing considerations** for how they can adjust the pacing of the unit as needed without compromising unit learning goals.

Unit Overview pages

Teachers will find a comprehensive set of resources for each unit, including an overview of the math of the unit, a visual summary of the Unit at a Glance, materials, a preview of each of the unit assessments, and guidance about differentiation, supporting math identity and community, accessibility, language development, technology, and connections to future learning. Each Unit Overview also includes a professional development activity and a formative Pre-Unit Check that teachers can use to learn more about students' understanding of foundational concepts and skills that will support them in the upcoming unit.

The **Sub-Unit Overview** page summarizes the **key goals** and **vocabulary** for this part of the unit.



The **Math That Matters Most** table illustrates for teachers the most important progressions of strategies, skills, and language that develop over the course of the sub-unit.

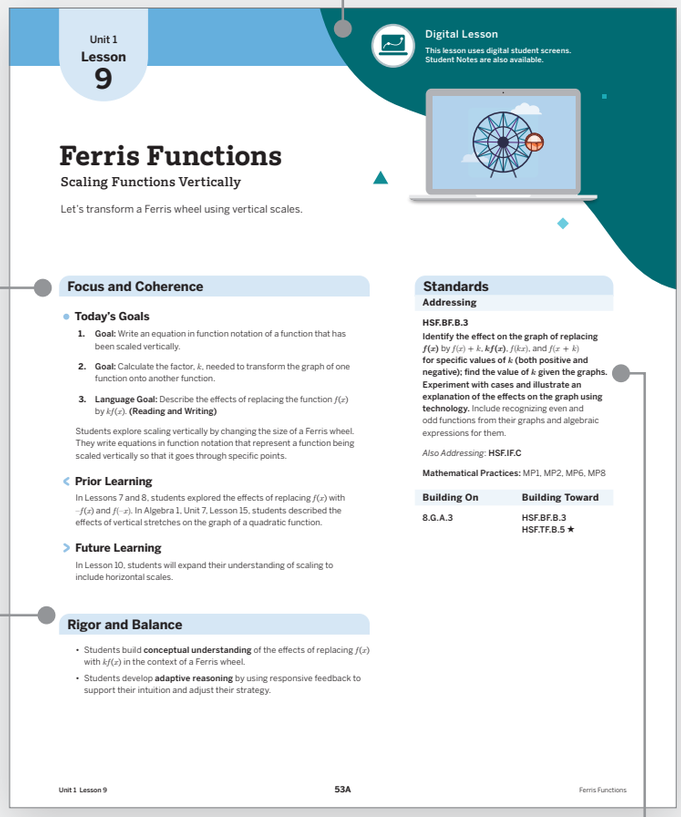
Sub-Unit Overview pages

The lessons within each unit are grouped into sub-units that address a related group of concepts. All lessons in each sub-unit include lesson practice and Show What You Know formative assessments, and targeted sub-units include a practice day and assessment.

Lesson Supports

Throughout this Teacher Edition, lesson guidance for teachers is organized clearly and consistently so that they have all of the information they need at their fingertips.

Lesson modality shows teachers how they should plan to have students engage in the lesson.



Unit 1
Lesson
9

Digital Lesson
This lesson uses digital student screens. Student Notes are also available.

Ferris Functions

Scaling Functions Vertically

Let's transform a Ferris wheel using vertical scales.

Focus and Coherence

Today's Goals

1. **Goal:** Write an equation in function notation of a function that has been scaled vertically.
2. **Goal:** Calculate the factor, k, needed to transform the graph of one function onto another function.
3. **Language Goal:** Describe the effects of replacing the function $f(x)$ by $kf(x)$. **(Reading and Writing)**

Students explore scaling vertically by changing the size of a Ferris wheel. They write equations in function notation that represent a function being scaled vertically so that it goes through specific points.

Prior Learning

In Lessons 7 and 8, students explored the effects of replacing $f(x)$ with $-f(x)$ and $f(-x)$. In Algebra 1, Unit 7, Lesson 15, students described the effects of vertical stretches on the graph of a quadratic function.

Future Learning

In Lesson 10, students will expand their understanding of scaling to include horizontal scales.

Rigor and Balance

- Students build **conceptual understanding** of the effects of replacing $f(x)$ with $kf(x)$ in the context of a Ferris wheel.
- Students develop **adaptive reasoning** by using responsive feedback to support their intuition and adjust their strategy.

Standards

Addressing

HSF.BF.B.3

Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Also Addressing: **HSF.IF.C**

Mathematical Practices: MP1, MP2, MP6, MP8

Building On	Building Toward
8.G.A.3	HSF.BF.B.3 HSF.TF.B.5 ★

Unit 1 Lesson 9 53A Ferris Functions

In the **Focus and Coherence** section, teachers will find the goals and language goals for the lesson. There is also information on prior learning that has built to the math in this lesson, as well as future learning that this lesson is helping build to.

The **Rigor and Balance** section explains how students develop conceptual understanding, procedural fluency, application, strategic competence, adaptive reasoning, and productive disposition in this lesson.

Where applicable, the **Standards** section will list all standards addressed in this lesson, including standards the lesson builds on and standards the lesson builds toward. The **bolded** words indicate which parts of each standard described are covered in the lesson.

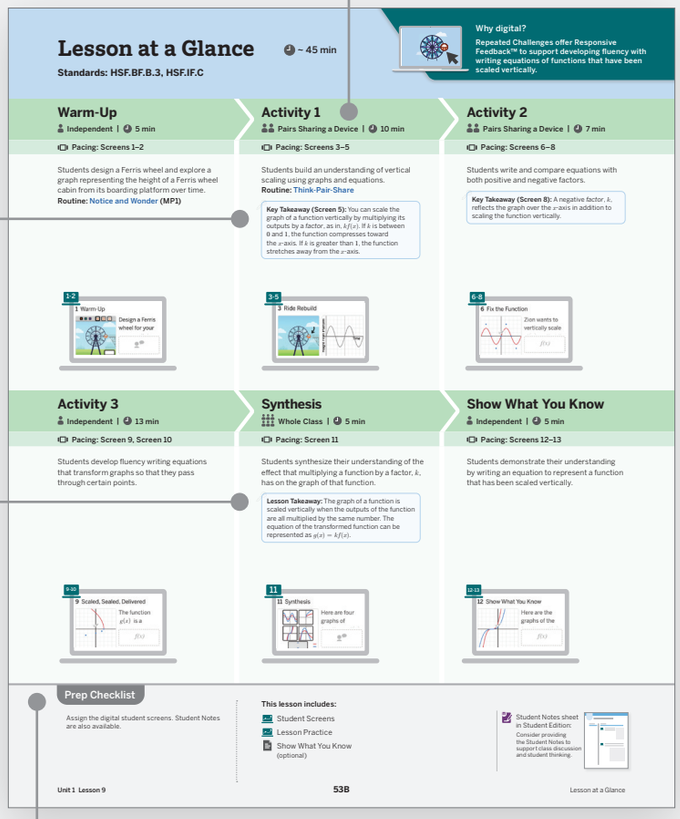
Lesson Overview

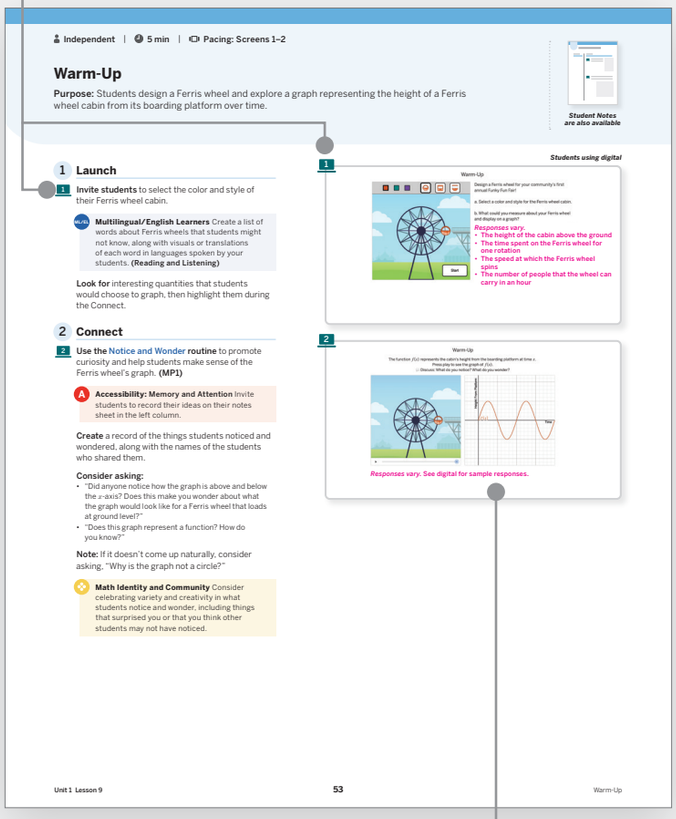
This introductory page orients teachers to the topic, standards, and key learning goals of the lesson, including any new vocabulary terms that will be introduced.

The **Key Takeaways** and **Lesson Takeaway** summarize the most important ideas in the lesson.

The **time frame** and suggested **student grouping** is listed for each part of the lesson.

The screen icon is used to show which **Presentation Screens** or **Digital Student Screens** align to each instructional moment.





The **Prep Checklist** displays all materials students will need for the lesson.

Sample student responses to the Warm-Up prompt are provided to help teachers prepare to facilitate the conversation.

Lesson at a Glance

The Lesson at a Glance page describes the purpose of the Warm-Up, Activities, Synthesis, and Show What You Know. Teachers will find suggested timing for each part of the lesson, as well as guidance on whether students should work individually, in pairs, in small groups, or with the whole class.

The page also lists which pages, Presentation Screens, or Digital Student Screens can be used with each part of the

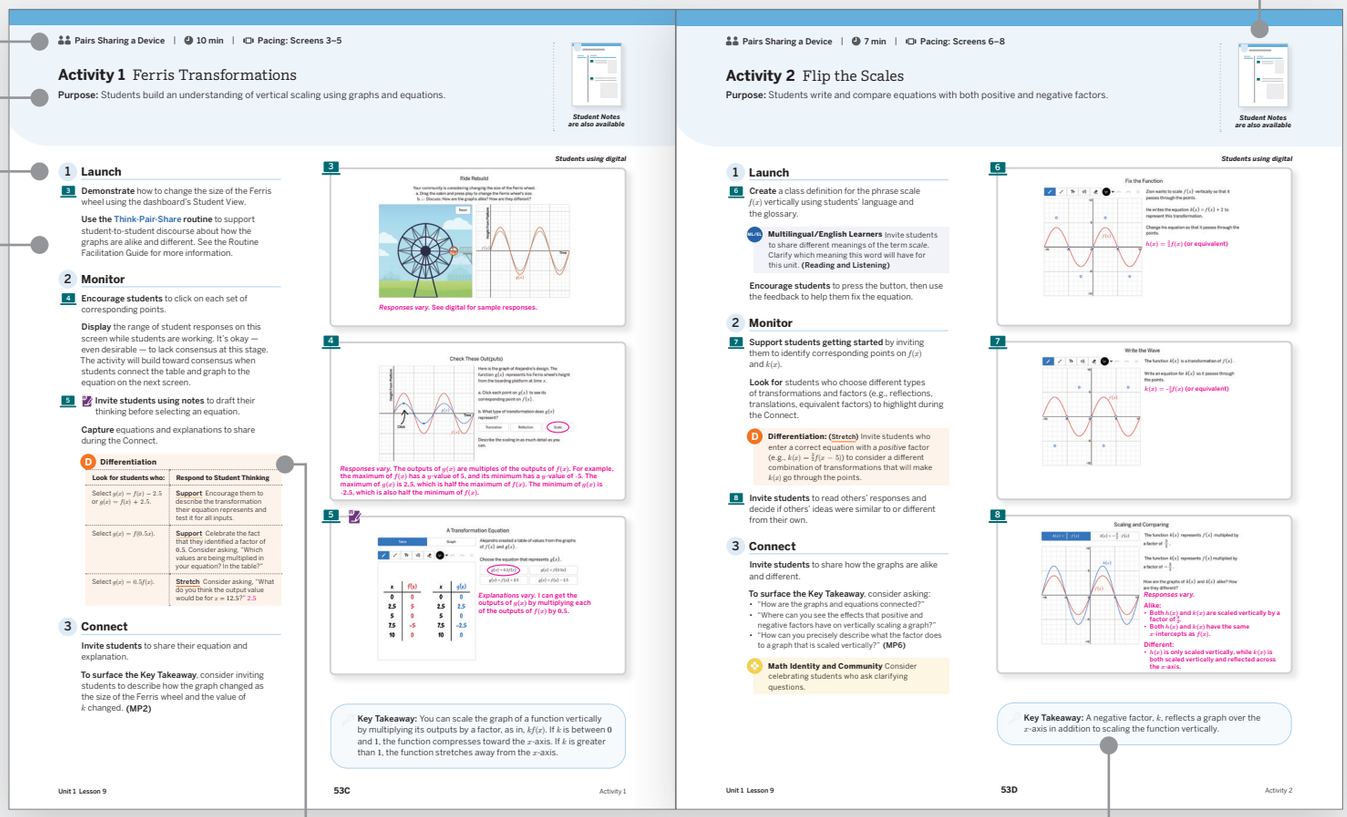
Warm-Up

Every Amplify Desmos Math lesson begins with a Warm-Up to help draw students into the lesson. It might elicit information from their personal experience or intuition, remind them of a context they have seen before, invite them to think about the previous lesson, or preview a calculation that will appear in the current lesson.

The **Purpose** of each activity is highlighted here, as well as suggestions for the **student grouping**, **time frame**, and **screen pacing** for the activity.

Teachers are provided with thoughtful **Short on time?** suggestions for how they can adjust their facilitation of the lesson as needed without compromising lesson goals.

Each lesson notes the corresponding **Teacher Presentation Screens** or related **Student Edition** pages also available to support the lesson.



In the **Launch**, **Monitor**, **Connect** guidance, teachers will find ways to help students get started, suggested facilitation moves, and discussion questions.

The guidance for every lesson includes a **D Differentiation** table to support teachers in meeting the needs of all students during the activity. This table can help teachers anticipate the ways students may approach the activity, and provides prompts that they can use during the lesson to **Support**, **Strengthen**, and **Stretch** individual students in their thinking.

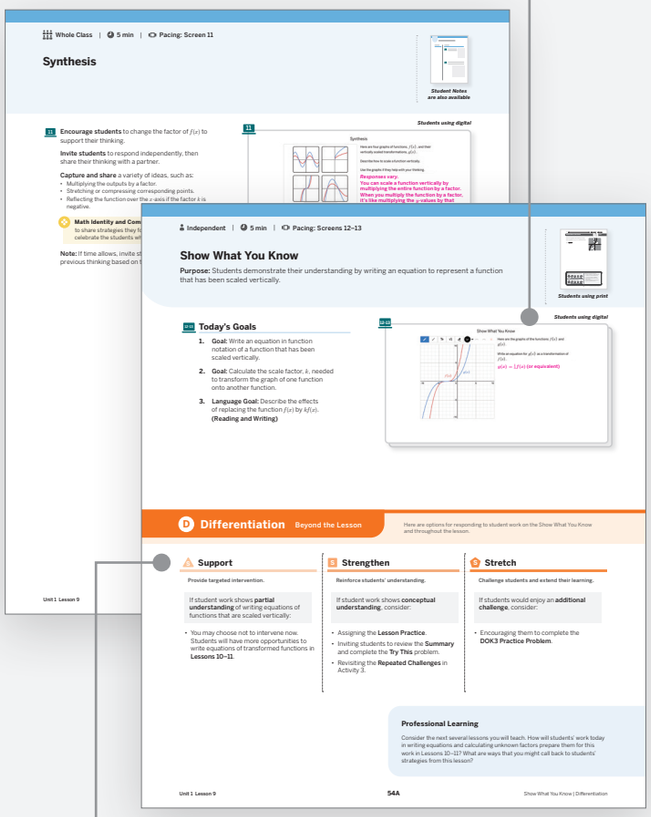
The **Key Takeaway** is called out to highlight the learning goal of the activity and provide teachers with an example of how to frame the big idea of the activity for students.

Activities

Each lesson includes one, two, or three activities. These activities are the heart of each lesson. Students notice, wonder, explore, calculate, predict, measure, explain their thinking, settle disputes, create challenges for their classmates, and more.

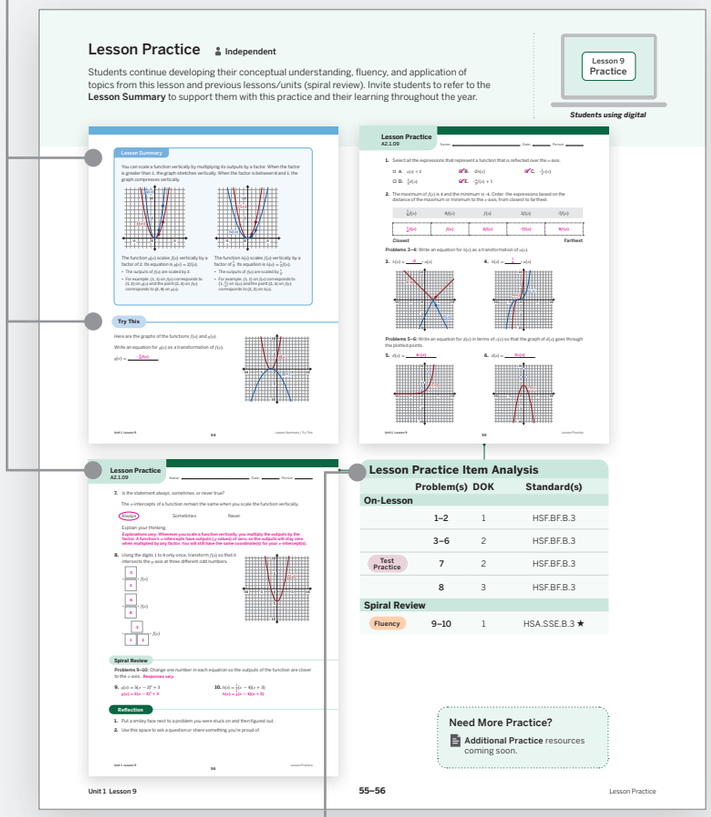
Guidance is provided to help teachers Launch, Monitor, and Connect students' thinking over the course of each activity. Teachers will also find suggestions for pacing, facilitation moves, discussion questions, examples of early student thinking, ideas for students who may enjoy a challenge, ways to increase access to the language and content, as well as opportunities to build and develop the math community in your classroom. The suggestions for facilitation provide comprehensive support for teachers as they prepare for and teach lessons.

Lessons conclude with the **Show What You Know**, which presents an opportunity for students to reflect on the main learning goals of the lesson. This is a great way for both students and teachers to access a formative check for understanding.



Each Show What You Know is accompanied by a table with suggestions in three categories: students who need **support**, would benefit from more practice to **strengthen** their understanding, or are interested in a **stretch** to deepen or extend their thinking.

Each **Lesson Practice** includes a **Summary** and **Try This** problem. Students can highlight big ideas of the lesson in the summary or share it with a caregiver or classmate. They can also engage with the Try This to further apply the lesson content.



A **Lesson Practice Item Analysis** table breaks down the problems by type, Depth of Knowledge (DOK), and corresponding standards.

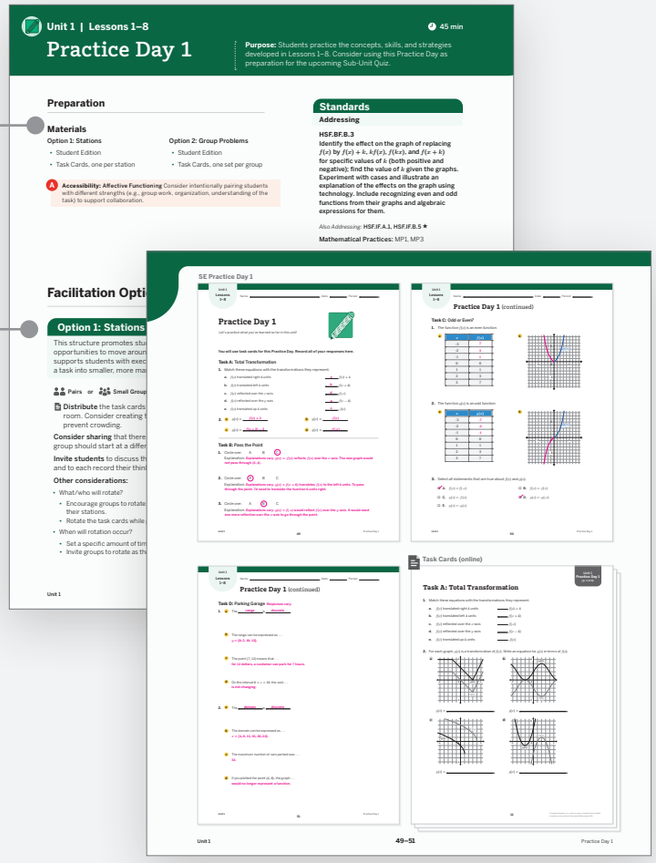
Synthesis

The Synthesis is an opportunity for students to put the key ideas from the lesson into their own words. There is typically an open-ended prompt followed by a discussion for students to consolidate and refine their ideas about the learning goals. If time allows, it is also an opportunity for students to revise their responses after the discussion.

Lesson Practice

Daily practice problems for each lesson are included both online and in the Student Edition, including Fluency, Test Practice, and Spiral Review.

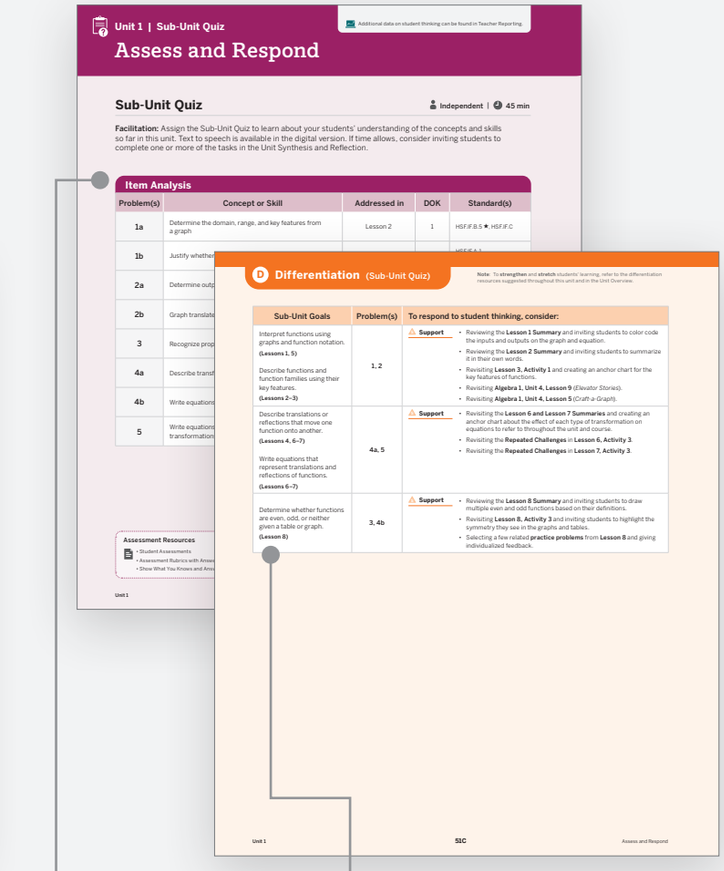
Practice Days are always **print-based** and may involve **materials** like Problem Cards.



The Teacher Guide typically provides **two different approaches for facilitating** Practice Day activities.

Practice Day

Practice Days are included before each Sub-Unit Quiz and End-of-Unit Assessment. These lessons provide an opportunity for students to consolidate and apply their knowledge and skills from the preceding lessons. Practice Days often incorporate student movement and collaboration.



An **Item Analysis** is provided to show what concepts and skills are assessed in each problem.

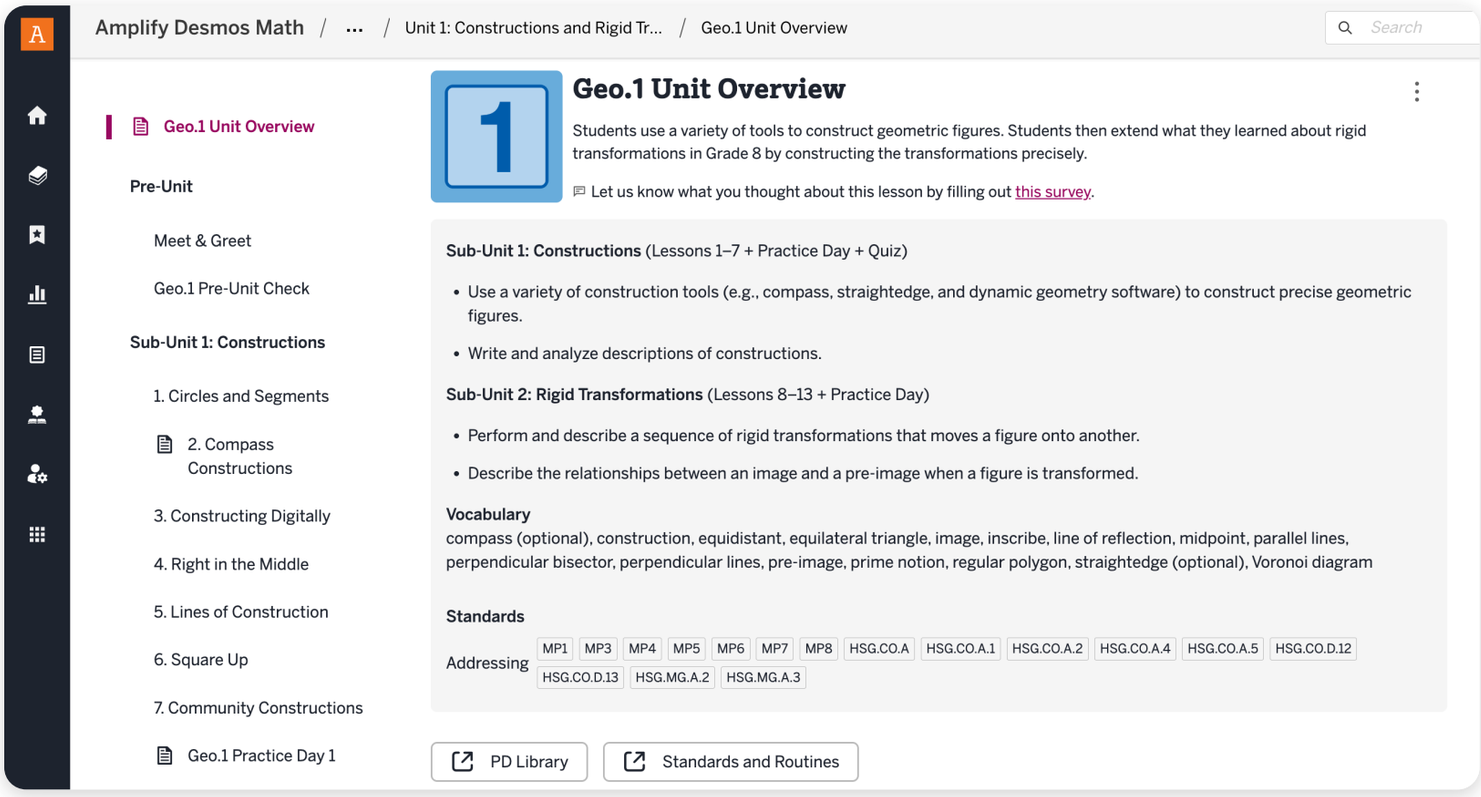
A **Differentiation** table suggests specific materials from the unit to **Support**, **Strengthen**, or **Stretch** students' understanding based on their responses to different assessment problems.

Assess and Respond

Each unit typically includes one or two Sub-Unit Quizzes. Quizzes are designed for students to show what they know and can do based on what they have learned so far in the unit. Each unit includes Assess and Respond guidance for the Pre-Unit Check, Sub-Unit Quizzes, and End-of-Unit Assessment.

Navigating the digital program

Unit Landing Page



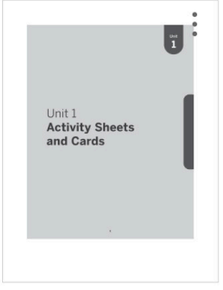
On the Unit Landing Page for each unit, you'll find Unit-at-a-Glance information, including sub-unit descriptions and learning goals, vocabulary found in the unit, and standards addressed in the unit (where applicable).

Paper Resources

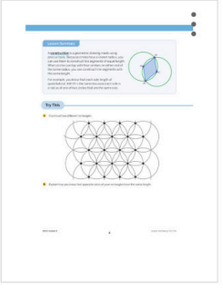
Unit Teacher Edition

Unit Student Edition

Unit Activity Sheets and Cards

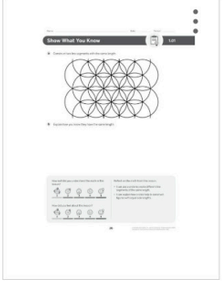


Unit Lesson Practice

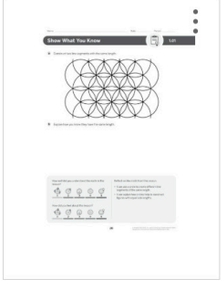


Unit Lesson Practice (Answers)

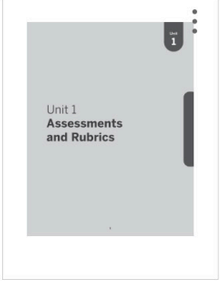
Unit Show What You Knows



Unit Show What You Knows (Answers)

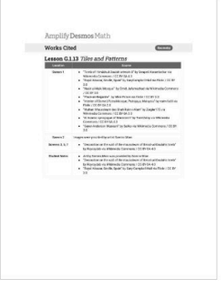


Unit Assessments and Rubrics



Routine Facilitation Guide

G.1 Works Cited

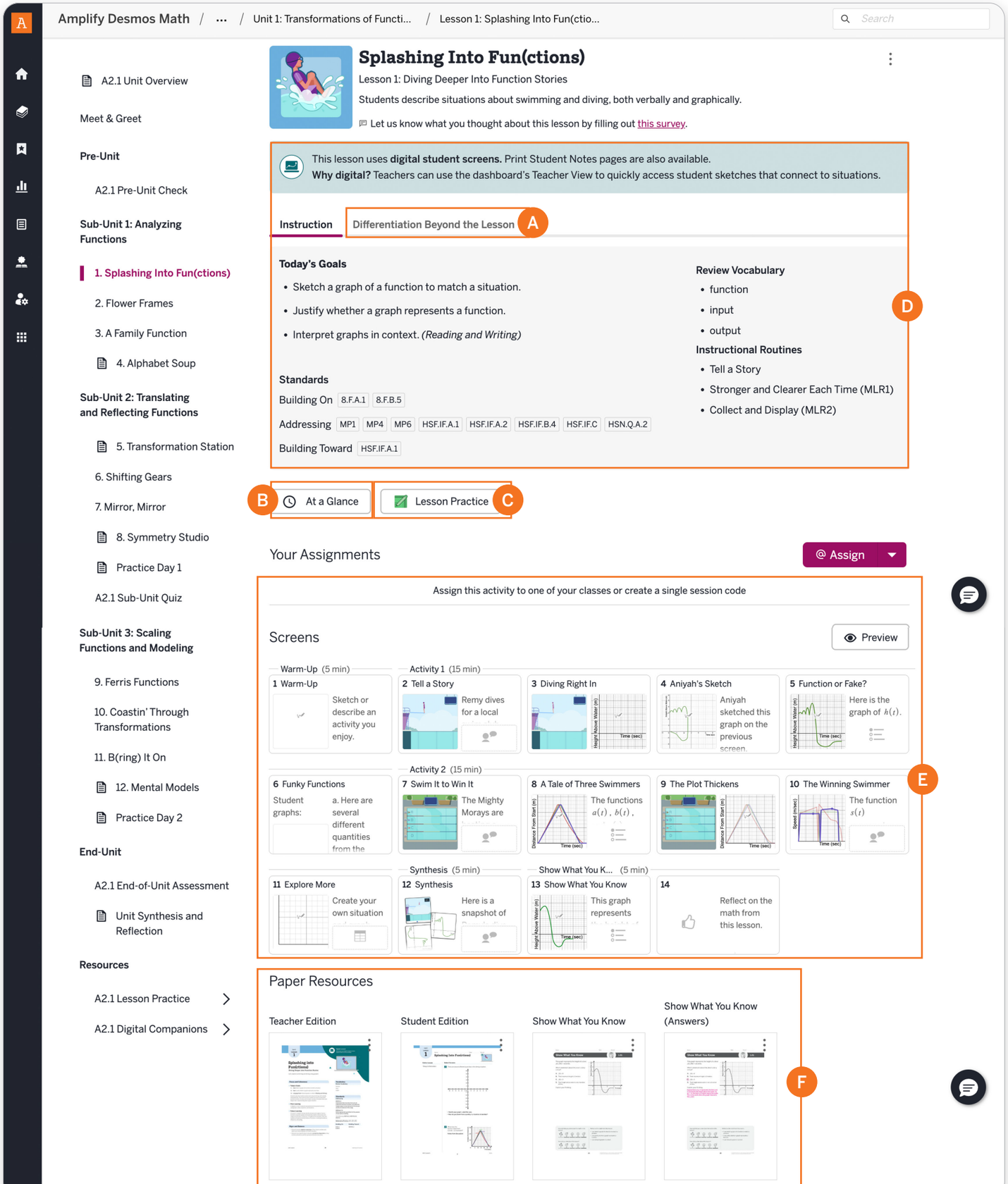


The Unit Landing Page also includes a variety of paper resources available for that unit. Those resources include:

- A printable PDF of the Teacher Edition and Student Edition pages for the entire unit (the Teacher Edition pages include assessment answer keys)
- Unit lesson practice, Show What You Know, and assessments
- Routine Facilitation Guides for the routines found in the unit
- Activity Sheets and Cards for lessons in the unit that call for additional resources not included in the Student Edition

Lesson Landing Page

Like the print Lesson Overview, the Lesson Landing page has helpful information for planning and facilitating the lesson.



A Differentiation Beyond the Lesson
The Differentiation Beyond the Lesson tab provides guidance and differentiation resources after each lesson for students in three categories: Support, Strengthen, and Stretch.

B At a Glance
The At a Glance button will pull up a preview of the lesson Warm-Up, lesson activities, Synthesis, and Show What You Know. You'll find suggested timing for each part of the lesson, as well as guidance on whether students should work individually, in pairs, or with the whole class. The Focus and Coherence and Rigor and Balance information for the lesson is also found here.

C Practice Problems
Every Amplify Desmos Math lesson includes a digital Practice Problems set, which you and students can access via the Lesson Landing Page.

D Lesson prep
In the gray box on the Lesson Landing Page, you'll find the goals for that lesson, any materials needed for the lesson, vocabulary found in that lesson, and standards addressed in the lesson.

E Lesson Thumbnails
Teacher Presentation Screens enhance lessons and are for the teacher to project. Lessons where student devices are suggested have Student Activity Screens.

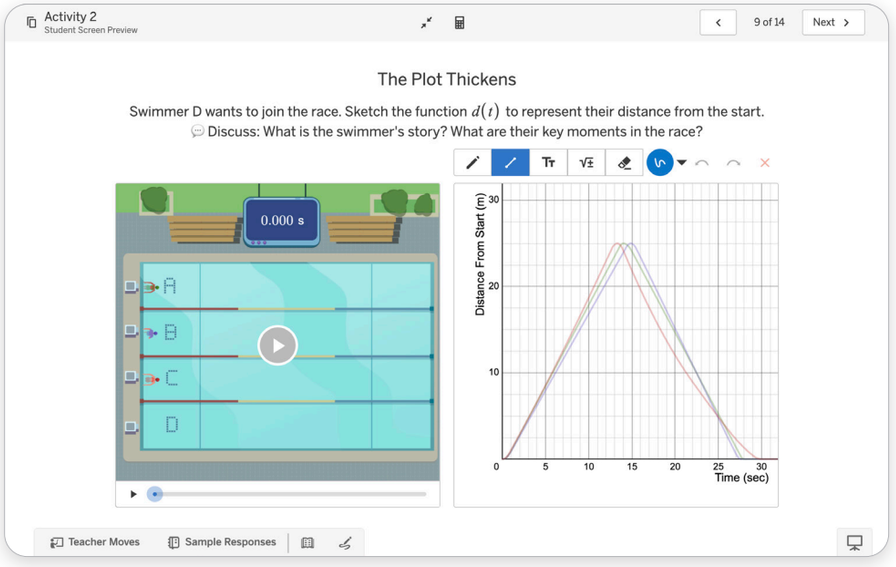
F Paper resources
Paper resources for each lesson include print Teacher Edition pages, print Student Edition pages, and the lesson Show What You Know printable PDF.

Student Screens

Student Screens make the lesson highly interactive for students working on devices individually or in pairs or small groups. You can preview by clicking Activity Screens from the lesson landing page.

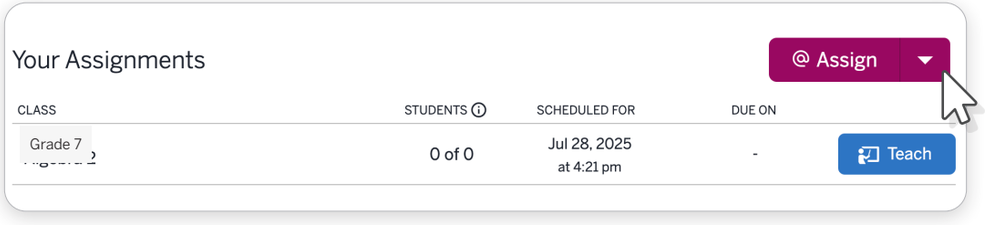
To make planning and teaching seamless, tips for instruction are available in both the print Teacher Edition and digitally at point of use. At the bottom of Activity Screens, the teacher will see suggestions for facilitation to support great classroom conversations:

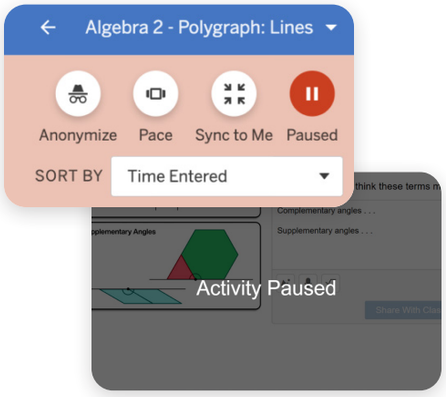
- **Teacher moves:** Suggestions for pacing, facilitation moves, discussion questions, examples of early student thinking, and ideas for early finishers, as well as opportunities to build and develop the math community in your classroom.
- **Sample responses:** One or more examples of a possible student response to the problem.
- **Student supports:** Facilitation suggestions to support students with disabilities and multilingual students.



Assign

Getting your students started with a digital lesson is a breeze. To have your students try one of these program preview lessons, simply generate and share a single-session code by clicking the arrow next to @Assign. If you have individual classes set up, getting students online is even quicker!





Pause allows you to stop the lesson and gather student attention—whether for a brief announcement or a class discussion.

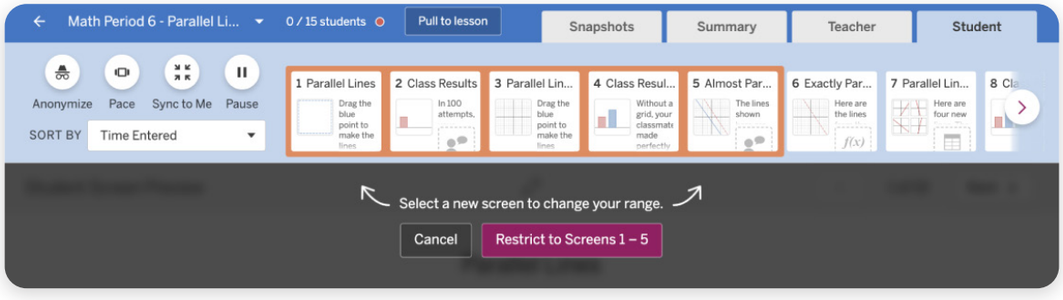
Keep an activity paused for as long (or as briefly) as you want. When you're ready for students to continue, press the Pause button again to resume the activity.

With Pause activated, students can see their current screen but cannot interact with the activity at all.

Pacing

Pacing allows you to lead students through part of an activity one screen or one section at a time. To activate, click the Pacing icon. Then select the screen (or screens) you'd like to gather your students on. They'll automatically go to that location in the activity, and the navigation outside of that range will temporarily be disabled.

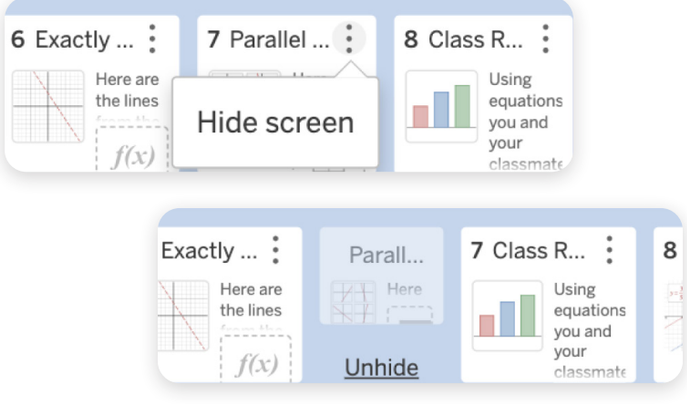
Once Pacing is activated, you'll see clear indicators for what screens your students may access. You can edit or extend that range, or even disable pacing, with a single click.



Hide screens

Are you running out of time in class? Or do you want to refine an activity to better suit your students' needs? You can hide screens from students by clicking the Menu (three vertical dots) on the screen's thumbnail. This allows for non-sequential teacher pacing.

Notice that the screens automatically renumber themselves when one is hidden. Change your mind? Simply click Unhide and students will be able to access the screen again.

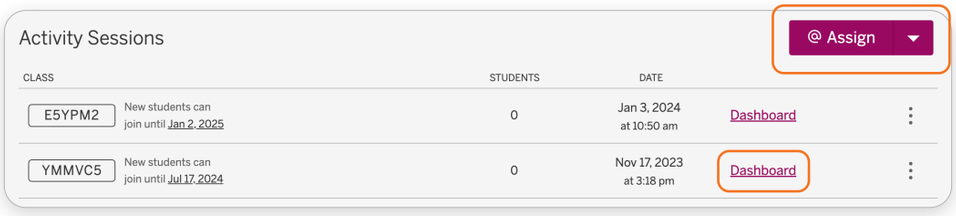


Teacher supports and facilitation tools

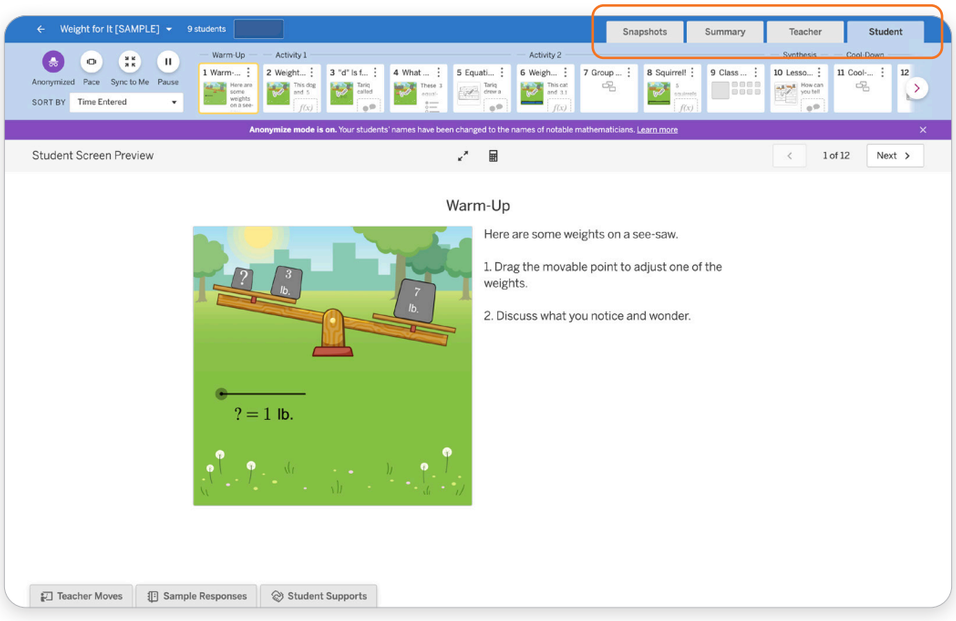
Teacher Dashboard

The powerful Teacher Dashboard helps teachers play an active role as discussion facilitators, monitoring student work in real time, choosing moments to share and discuss, and synthesizing learning. Teachers get insight into student thinking in real time, meaning they can select student work to display and discuss quickly and easily, and ask better questions to guide more productive discussions.

To teach a lesson with students on devices, click the Dashboard link next to your single-session code or class name to launch your Teacher Dashboard with facilitation tools.



The Teacher Dashboard has four tabs at the top. In addition to these views, the Teacher Dashboard also has facilitation tools, including the Class Conversation Toolkit and Written Feedback.



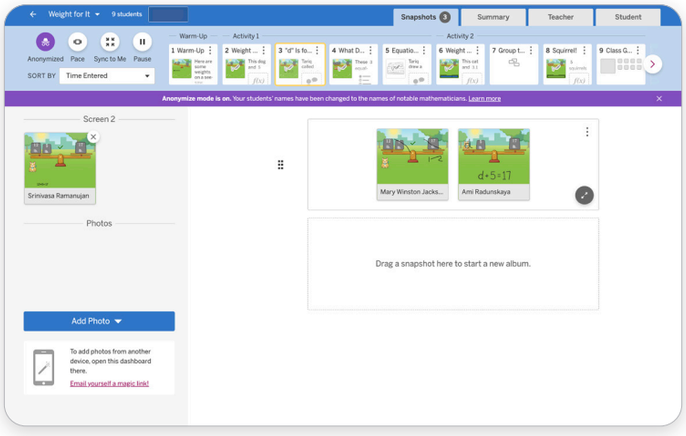
Snapshots

Peg Smith and Mary Kay Stein's *5 Practices for Orchestrating Productive Mathematics Discussions* offers a clear and useful framework for facilitating class discussions around student thinking. We added a Snapshot tool to make it even easier to select and sequence student work for those discussions. Try your hand at selecting and sequencing student work for discussion during your next Amplify Desmos Math lesson.

Snapshot student screens

To select a response for discussion, simply click the camera icon.

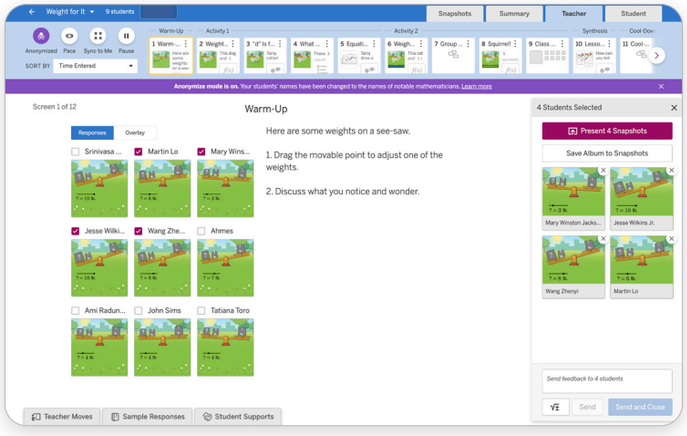
Then, in the Snapshots View, you can organize your snapshots into albums. Each album can hold up to four snapshots.



Present your albums to facilitate class discussions. Consider entering a title or question, or simply share your discussion prompt aloud! (**Note:** The teacher must present the album of snapshots to students in order for the album to show on student devices.)

Snapshot in Teacher View

To select a response for discussion in the Teacher View, click the response's checkbox to bring up the snapshots and the Feedback sidebar.

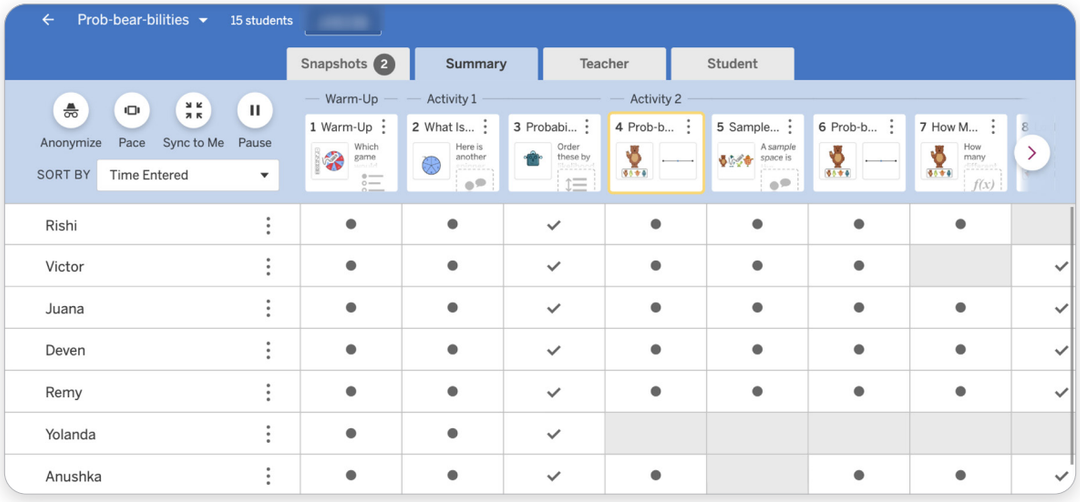


You can select up to four pieces of work and present them to students right from the Teacher View, or save them as an album in Snapshots.

Dashboard summary view

When you open a dashboard, you will first see the Summary View. Here you will see a row for each student in the activity session, along with a quick overview of where they are in the activity, a symbol to let you know more about their work on that screen, and a triangle indicator in the corner if you've sent the student feedback on that screen.

You can click on any of these boxes to see the current state of the student's screen. You might use a student screen as a jumping-off point for a class discussion and modify the screen together with the class. Any changes you make will not change the work for the student.



Here is what the symbols on this page mean:

Dash: There is no required input for this screen, but students still need to look at it.

Check: Everything on this screen is correct.

Cross: Something on this screen is incorrect.

Warning: Something on this screen isn't merely incorrect but indicates the student may have misunderstood the question itself—intervene ASAP!

Dot: This screen requires teacher interpretation.

You might also see a triangle indicator in the corner. Here's what they mean:

Teal triangle: You sent feedback to the student on that screen, but the student has not yet seen the feedback.

Gray triangle: You sent feedback to the student on that screen and the student has seen the feedback.

Teacher View

In the dashboard, you can use the Teacher View to answer questions like:

- How did all my students answer this question?
- What answers were most common?

If the screen has some components that can be correct or incorrect, you can check the Show Correctness checkbox in the upper-right corner of the screen. This will add icons to pieces of work showing if they're correct or incorrect.

You can also leave written feedback and create and present albums of snapshots from the Teacher View by selecting the student response checkboxes.