

Overview

Looking to share your love of Desmos with others? Whether sharing with colleagues in your department, or offering a session at a workshop or conference, the Desmos Calculator PD Pack is here to help. Start with the resources we've gathered here, then customize them to meet the specific needs of your participants. Let us know how it goes!

Outcomes

The Desmos Calculator PD Pack is designed to support a **60-90 minute presentation**. During the session, participants will:

- **Experience** a math task from the student perspective.
- **Consider** how Desmos can be used to support student learning and exploration.
- **Level up** their graphing skills by completing a series of graphing challenges.
- **Discuss** next steps for using Desmos with their own students.

Resources

- Presenter Notes (this document!)
- Slides ([Google Slides](#), [Keynote](#), [PowerPoint](#))
- [Desmos Calculator Scavenger Hunt](#)
- [Awesome Graphs Handout](#)

Agenda

- | | |
|--------------------|-------------|
| 1. Welcome | (10 min) |
| 2. Charge! | (20 min) |
| 3. Calculator Demo | (10 min) |
| 4. Working Groups | (20-50 min) |
| 5. Wrap Up | (5 min) |

For a detailed look at each item on the agenda, see below.

Welcome (10 min)

Customize Your Slide Deck

- Replace the title, name, and contact details with your own. If relevant, add a hashtag.
- If you plan to use another task, replace the *Charge!* slides with your own.
- Add, edit, or remove slides to make the slide deck your own!

Presenter Notes

Start the presentation off with a brief introduction. Consider sharing a story about how you got started with Desmos, or offer a preview of what's to come. Something short and sweet that gets at the question of "Why Desmos?" is a great way to start.

Discussion

Consider kicking off the session with a brief discussion. Here's what we often use:

1. How have you seen technology hinder a math class?
2. How have you seen technology energize a math class?

We ask these questions both to learn about teachers' previous experiences with technology and to help keep us accountable. By the end of the session we hope participants can tell us how Desmos helps energize student learning.

Charge! (20 min)

Many of our favorite professional learning sessions involve participants *doing* mathematics. Here we recommend using a task that is **accessible to a wide range of learners** that can be **solved in many ways**. We often use *Charge!*, a linear modeling task with a surprise at the end, though we encourage you to use any short, accessible task you're personally comfortable with.

Here's what typically unfolds when we use *Charge!* in our own sessions.

1. **A familiar visual engages participants' ability to notice and wonder.** We ask for "the first question that comes to your mind, if any." After collecting several responses, we declare our focus for the rest of the task: When will the phone be fully charged?
2. **Participants offer estimates for when the phone will be fully charged.** By starting informally, we ensure that everyone can participate.
3. **Participants then request additional information.** We supply some (in the form of more visuals).
4. **Invite participants to calculate a more precise answer** using whatever method they prefer. Here is a non-exhaustive list of methods we typically see:
 - a. Using ratios and proportional reasoning.
 - b. Writing (and solving) a linear equation.
 - c. Organizing data into a table, then extending the table.
 - d. Plotting known data points, then using a linear function with sliders to fit a line.
 - e. Plotting known data points, then using regression to find the line of best fit.
5. **Share some of the methods participants used**, honoring both paper-based and technology-supported strategies. Call attention to the fact that these final calculations are much closer together than the initial estimates.
6. **Segue from these participant strategies** to a brief demonstration of several ways the Desmos graphing calculator can be used to solve this problem.

Whatever task you choose, do your best to keep it **short** (20 minutes or less) and **focused**. The task really only serves one purpose: to demonstrate how technology in general—and Desmos in particular—can support student learning in the math classroom.

Note

There's a twist at the end of this task. Students who use a linear model will be off by about 60 minutes. In a full-length treatment of the activity, this provides an excellent opportunity to discuss with students (and teachers) the importance of checking our assumptions. Given the abbreviated time allotted for the task in this particular session, we encourage presenters to give a quick nod to the potential for this rich discussion without diving into the discussion itself.

Calculator Demo (10 minutes)

After highlighting participant solutions to the task, show several possible approaches in the calculator that haven't yet been shared. Here's a list of the features we typically demonstrate:

1. Plotting points by entering [ordered pairs](#).
2. Plotting points by organizing data in a [table](#).
3. Graphing lines, in three ways:
 - a. Manually, for cases where we found a charging rate to use for the slope.
 - b. Using [sliders](#), one for the slope and one for the y-intercept.
 - c. Using [regression](#).
4. Adding [text and folders](#) to help organize thinking.
5. [Saving](#), [sharing](#), and [printing](#).
6. Revealing the [answer](#) to the *Charge!* task.

Debrief/Reflection

Ask participants to reflect and share out ways technology might energize/hinder student learning during *Charge!* or a similar task.

Working Groups (20-50 min)

In our experience, this “working group” time is often the most productive. With that in mind, any additional time you can spare in your 60-90 minute session should be invested here.

Spend a moment introducing two resources:

1. **Awesome Graphs.** See what’s possible in the Desmos graphing calculator by exploring this collection of course-specific graphs for Grades 6-12. (Looking for a challenge? Try to rebuild one of the graphs from scratch!)
2. **Desmos Calculator Scavenger Hunt.** Level up your Desmos graphing skills by working through a series of beginner, intermediate, and advanced graphing challenges. (Need some help? Every challenge comes with a solution!)

Then invite participants to find a partner, select a document, and dive in!

Wrap Up (5 min)

Offer a discussion question to help participants reflect on their experience while keeping the focus on student learning (rather than technology for technology's sake). We often use this:

- How do you envision these tools helping or hindering student learning?

After the discussion, encourage participants to reflect on their next steps, possibly by writing down and sharing their responses to the following:

1. What did you learn today?
2. What's your next step?

We usually close our own sessions with an invitation for participants to connect with us via email or Twitter to share questions, comments, suggestions, and success stories. Consider extending a similar invitation as you wrap up your time together.

Also, be sure to highlight the links at the bottom of the slide:

- www.desmos.com – One-stop shop for everything related to Desmos.
- teacher.desmos.com – Find the best digital activities for your math class.
- learn.desmos.com – Level up your Desmos skills with videos, challenges, and more.

And that's it! Let us know how it goes, or how we could make these resources more helpful.