

While you wait...
Answer the following question on
your device.

Network: NABE2020
Password: riseup2020

What is your professional
role?

Please
go to

joinpd.com

Enter the
code on the
screen.



Students choose an option

Pear Deck Interactive Slide
Do not remove this bar

Digital Discourse:

The potential of technology to
amplify student led discourse in
elementary mathematics

NABE 2020, Las Vegas

Presenters:

Adria Patthoff, Jolene Castillo, and Alejandra Treviño



Why is this important?

NCTM Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

“The goals of dual language [programs] are for students to **develop high levels of language proficiency and literacy** in both program languages, to demonstrate high levels of academic achievement, and to develop an appreciation for and an understanding of diverse cultures.” - Center for Applied Linguistics

- **interactive** learning;
- use of **technology** to **explore and create** rather than to “drill and kill”; and
- the **right blend of teachers and technology**. - Darling Hammond et al. (2014)

Objectives

- **Discuss** how teachers can use technology to amplify student discourse in bilingual mathematics.
- **Consider** what PD teachers rely on to use technology and how technology PD can better support teachers to amplify student discourse in bilingual mathematics.
- **Interact** with applications to experience how students can use technology to mediate, support, and amplify their discourse in mathematics.

The Research



Case Study of 3 Teachers engaged in a year-long PD working to integrate language and mathematics in Dual Language Programs

Data: classroom lesson videos, informal observations, recorded workshop conversations, and interviews



This research was supported by a grant from the US Department of Education, Office of English Language Acquisition, National Professional Development Program, Grant #T365Z170070

The Research

“I have been hearing that in the upper grades, for example, now the teachers, just sit and monitor the students, and then the students are in the technology, all the time. ... It will be nice, the kids to be that engaged, in math, using the technology, but at the same time, that’s scary. That’s scary, you know I don’t want a teacher just monitoring, ahm, technology issues instead of math issues.” - Jane

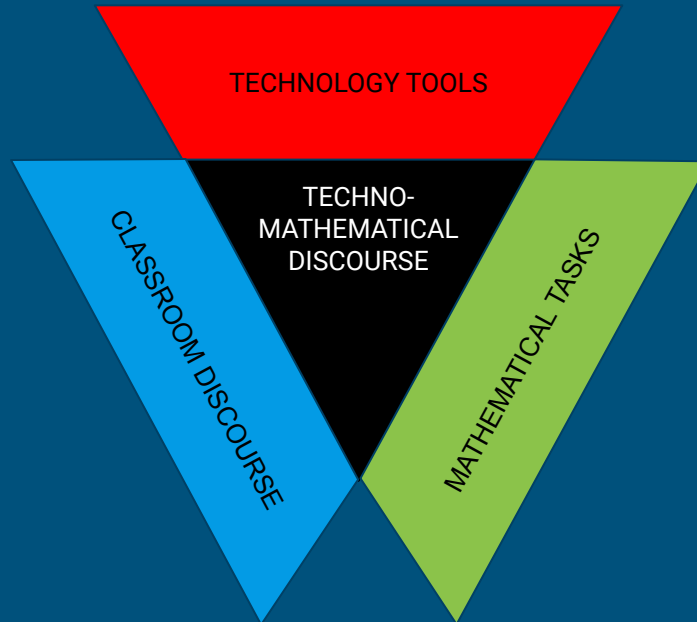
About our teachers

Pseudonym	Years Teaching	Grade Taught	State	Free and Reduced Lunch	English Learners
Grace	5	4	TX	65%	16.4%
Jane	23	2	CA	58.5%	37%
Ann	3	K	CA	64%	57.9%

Techno-Mathematical Discourse Framework

Anderson-Pence, 2017, p. 2

- **Speech**
- **Symbols**
- **Writing**
- **Drawing**
- **Gestures**



**Meaningful High
Level Tasks**

vs.

Low Level Tasks

Share:

What are reasons to
use technology in
classrooms?



Students, write your response!

What technology do dual-language elementary teachers use in mathematics?

Hardware:

Document cameras
Projectors
Smart Boards
Computers
Tablets

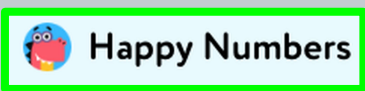
Software:

Deliver Instruction (9)
Drills/Practice/Games (9)
Formative Assessment (8)
Communication/Feedback (4)
Recording Drawing/Voice (3)
Portfolio Organizer (3)
Summative Assessment (2)

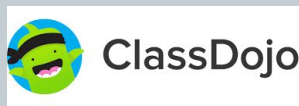
Software



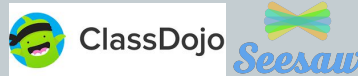
Drills/Games/Activities/
Rote Practice



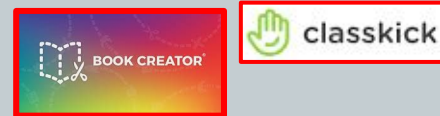
Student Portfolio/
Classroom Organizer



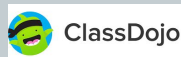
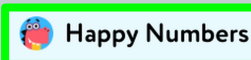
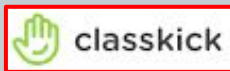
Communication/
Feedback



Activity: Requires
Talk/Recording



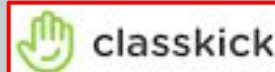
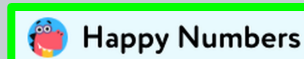
Formative Assessment



Summative
Assessment



Deliver Instruction (e.g. Tutorials)

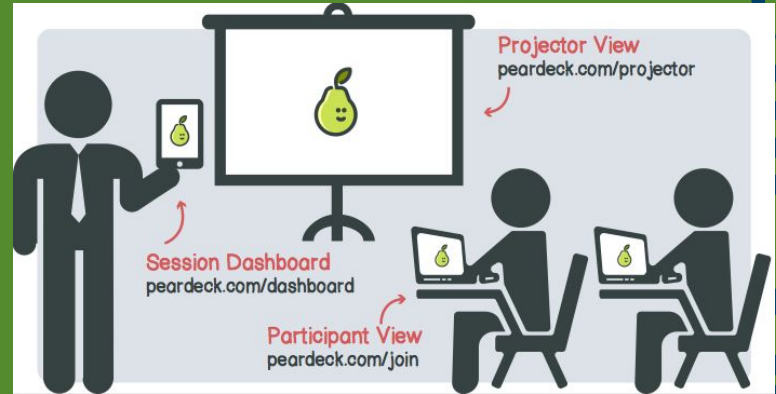


Why use technology in elementary dual-language classrooms?

Engage Students



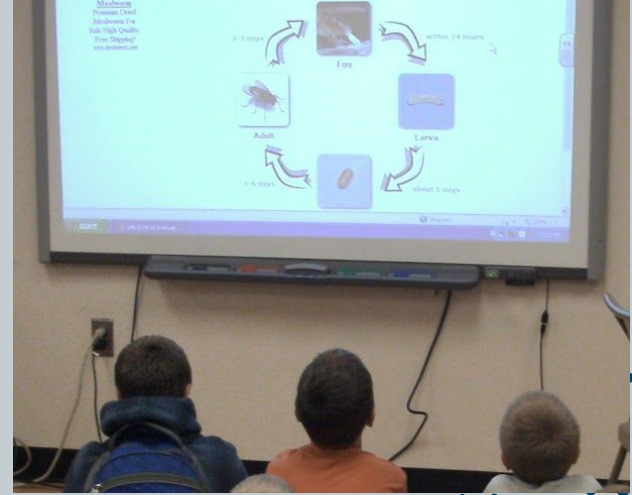
Direct Content & Student Focus



Engage Students

“ The video explains the same topic, but in steps. But then I **stop the video**, and then they have to **communicate with a partner**, about what to do, how to do it, and then come to the board and **show us the way they are thinking**, or the way they think they can solve the thing.

-Jane



Engage Students

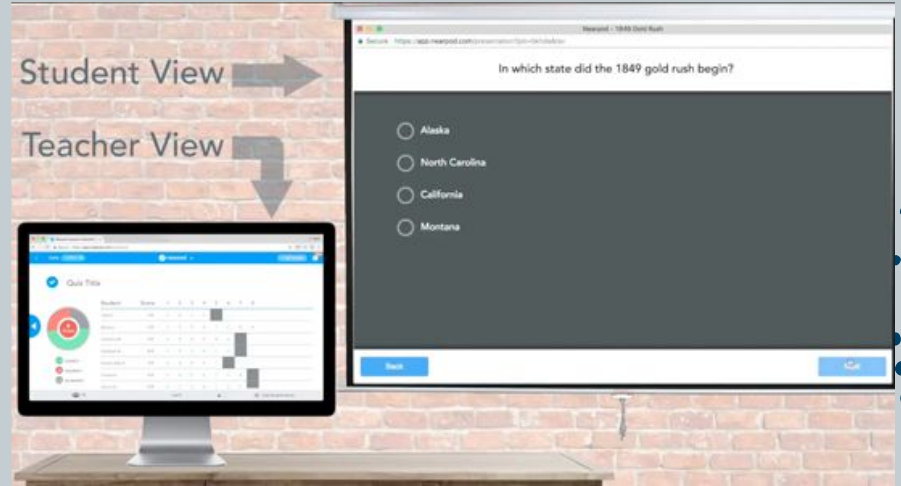
“ ...the way they get to **see math and it is not just writing numbers** on a paper, **now we get to engage and play and learn, and create** these beautiful videos and share them.

-Ann



Direct Content & Student Focus

“ As I show my lesson, and I move my slide, all the iPads, simultaneously, I have **control** of all of them.
-Grace



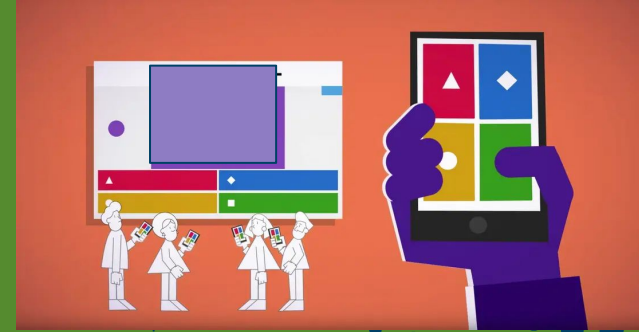
How to use technology in elementary dual-language classrooms



Digital Discourse

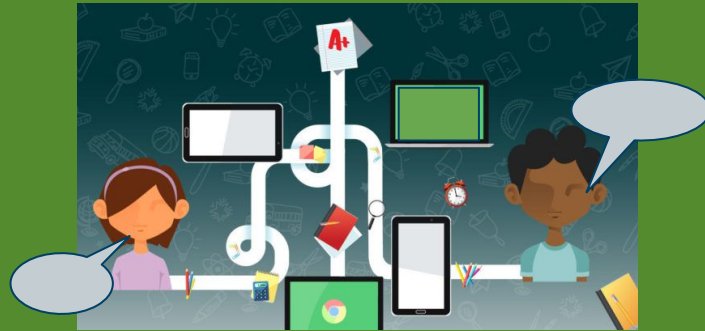


Access to Students'
Meaningful work



Formative Feedback and
Assessment

How to use technology in elementary dual-language classrooms



Digital Discourse

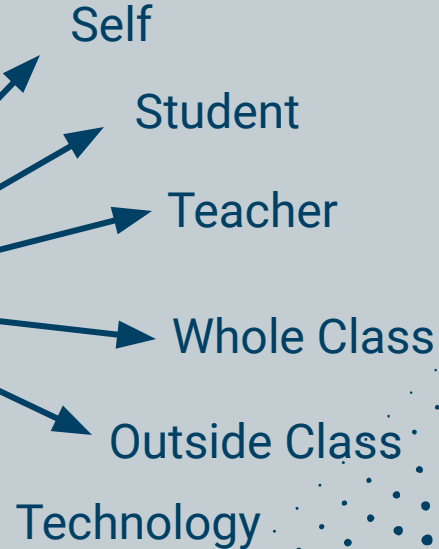


Digital Discourse

technology amplifies &
mediates student explanations
to visible & invisible audiences



Student:





Digital Discourse

- Student: Self
- Student: Student

“ I have a lot of students that **struggle with speaking in front of the class**, like just raising their hand and sharing. But when they have an ipad they can record themselves in their little corners, **they can give me more than what they can give me in front of the class.** - Ann





Digital Discourse

- Student: Self
- Student: Student

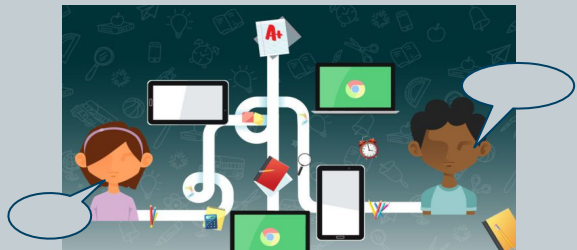




Digital Discourse

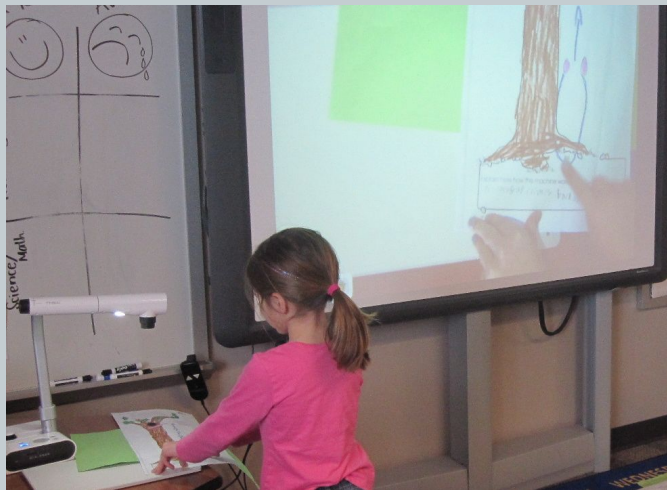
- Student: Self
- Student: Student

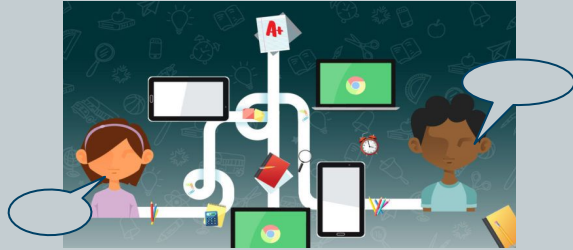




Digital Discourse

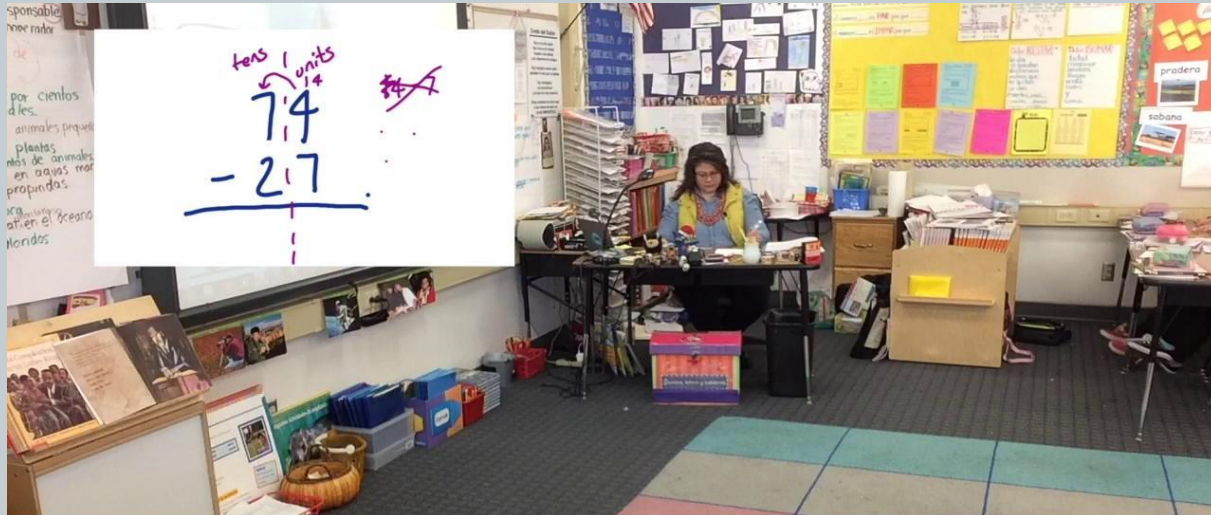
- Student: Class



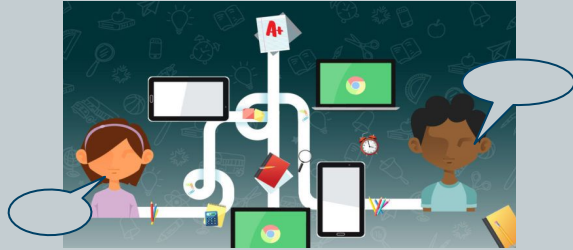


Digital Discourse

- Student:Class



y luego el 4 ya es un 14. Y luego 7 menos 14...
and then the 4 is now a 14. And then 7 minus 14...



Digital Discourse

- Student: Teacher

Station 2-5-2019 (Feb 5- 2019 at 9-49 AM).png

Open with ▾

Handwritten math work on lined paper. The top part shows a multiplication problem: $12 + 12 + 12 + 12 + 12 + 12 + 12 + 12$ with a result of 96. Below this is a long division problem: $96 \div 4 = 24$. The bottom part of the page shows a word problem: "Write an equation for O, the number of cookies Ms. Weber shared with her students." with a table of 12s and a box for 0. The number 20 is written in the top right corner of the problem box.

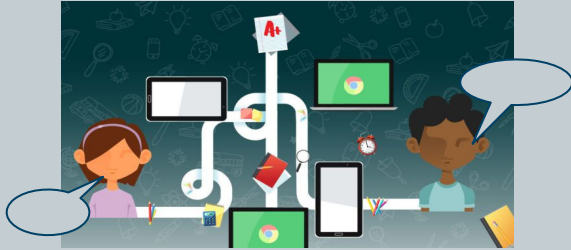
52	0						
12	12	12	12	12	12	12	12

of dozens

Files

Turned in on Feb 5, 2019, 10:03 AM

- Station 2-5-2019 (Feb...
- Station 2-5-2019 (Feb 5- 201...
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- Station 2-5-2019 (Feb 5- 201...
- Station 2-5-2019 (Feb 5- 201...
- Station 2-5-2019 (Feb 5- 201...



Digital Discourse

- Student: Outside

A screenshot of a social media post. At the top is a video player showing several toy animals (horses, cows, and a dog) on a wooden table, each with a red ribbon around its neck. Below the video, the text reads "Seen by: Michelle L". Underneath that is a blue "Math" tag. The post is from "Michelle L" and includes a heart icon and the text "Great job Bella! I really like the story." At the bottom are icons for "Like", "Comment", "Share", and "Bookmark". A green arrow points from the left side of the slide towards the "Like" icon.



Digital Discourse

- Student: Outside

“ They go home and they talk about it, or their **parents** show them the videos they are making at school, or the **principal** likes their videos and (students) are like, ‘Oh, I got a star from the principal!’

-Ann.

How to use technology in elementary dual-language classrooms



Access to Students'
Meaningful work



Access to Students' Meaningful Work

NCTM Standards for Mathematical Practice

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8. Look for and express regularity in repeated reasoning.



Access to Students' Meaningful Work

1

2

3

4

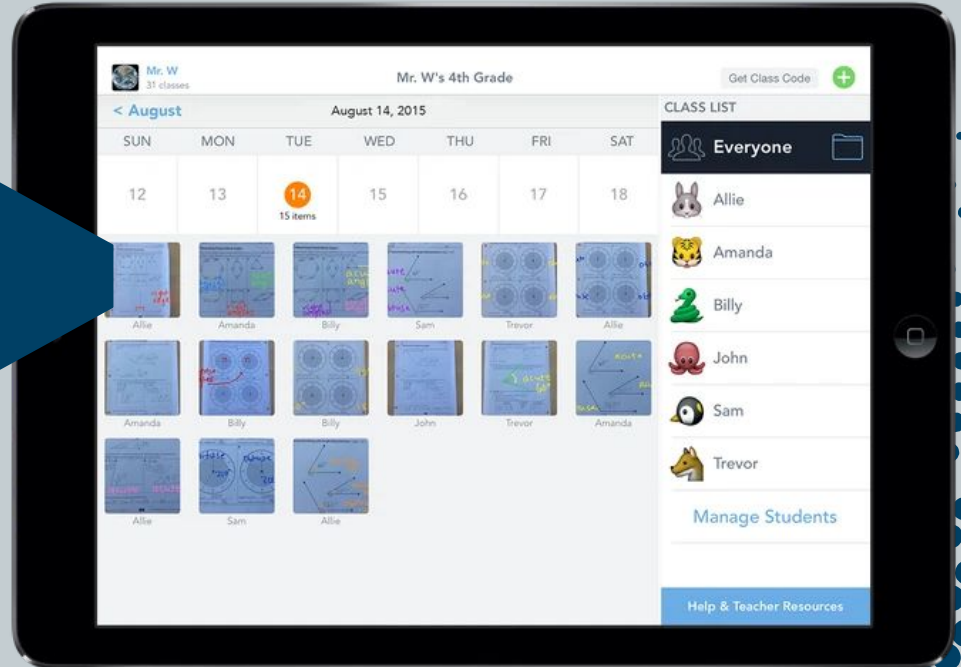
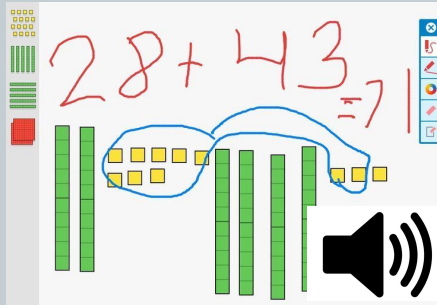
5

6

7

8. LOOK FOR and express regularity in repeated reasoning.

Access to Students' Meaningful Work



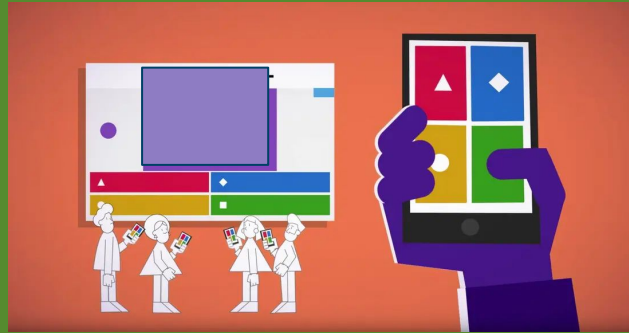


Access to Students' Meaningful Work

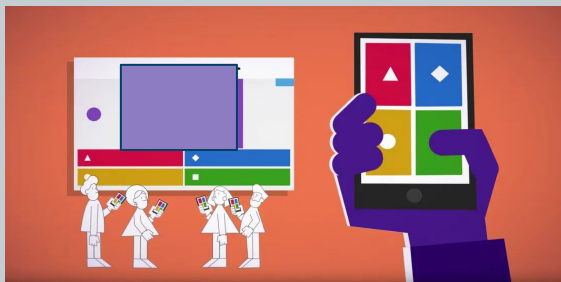
Taking it up a notch

- Make it dialogic: orally and written
- Bring assignments to real audiences
- Add subtitles

How to use technology in elementary dual-language classrooms



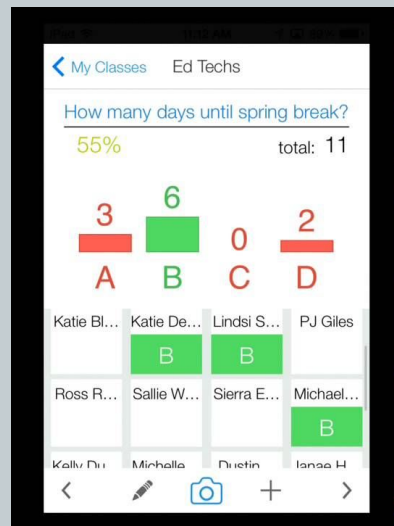
Formative Assessment
and Feedback



Formative Assessment and Formative Feedback

“ I can have my questions...and they can answer, and it gives me right there, let's see how many of them got the answer right. I can see (if) more than 50% got it wrong. Let's stop and let's talk about this one.

-Grace



What kinds of Professional Development/Resources do teachers use to learn about technology?

- ☆ -District/School Provided
- ☆ -Pre-service Training
- ☆ -Conferences
- ☆ -Teacher Blogs, Websites
- ☆ -Colleagues



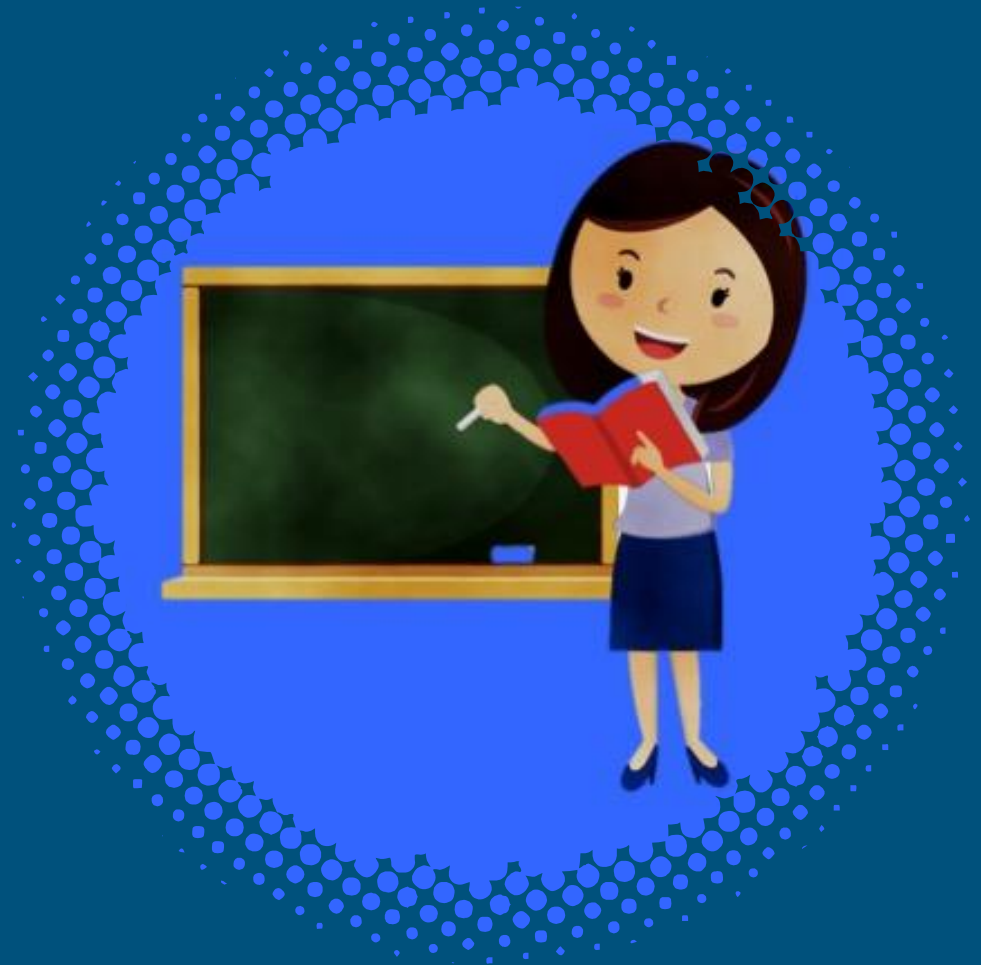
“I learn from co-workers, you know, what they use, how do they use it, and I try to use the same, yeah. But sometimes it’s not that easy, you know, because explanations are like five minutes, you know, between classes, or after school, and then you really don’t have the chance to see how they log in, what they need to do, and all of that, so once you are in the class, then you don’t do it.”

-Jane



Implications for: **Teachers**

Use technology to engage students **WITH** mathematics and language through discourse in the classroom and also beyond the classroom.



Implications for: **Administrators**

- Access to technology that promotes the NCTM eight mathematical practices
- Provide PD for teachers in how to use technology in Dual Language contexts

NCTM Standards for Mathematical Practice

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Implications for: **PD/Teacher Educators**

- Use technology to support high level content instruction and standards
- Adapt technology to serve the needs of students, and
- Vet technology to identify applications that best serve student needs.



The image features four white silhouettes of people in a discussion against a dark purple background. From left to right: a woman pointing upwards, a man gesturing with his hands, a woman with her hand to her chin, and a man gesturing with his hands. Four colorful speech bubbles are positioned above them: a yellow one on the left, a red one in the upper center, an orange one in the center, and a light blue one on the right. The text is distributed across these bubbles and the background.

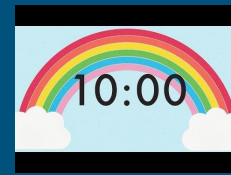
**Expanding
Mindsets:**

**From Passive
Monitor**

**To
Engaging
Tool**

**Engaging
students WITH
mathematics
and language
through
technology.**

Activity: Let's Play!

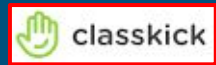


Create a Math Textbook



<https://bookcreator.com/>
Individual QR CODES at Station

OR Sign in with Google. CODE: 5 N 6 R F M B



Complete assigned tasks

<https://classkick.com/>
Login → Student
CODE: W D Q N O J



Create a video tutorial.

1. [App.seesaw.me](https://app.seesaw.me)
2. Choose "I'm a Student"
3. ← SCAN QR CODE

OR Code @ Station, Sign in with
Google Account.



Respond to a video tutorial.



[https://tinyurl.com/
w 6 s 3 g d c](https://tinyurl.com/w6s3gd c)

Students choose an option

Thank You!

Any questions?

Apps you recommend?

You can find us at:

adria@ucsc.edu

jcastillo@ucsc.edu

alejandra.trevino@utsa.edu



<https://malli.sites.ucsc.edu/>



Students, write your response!

Pear Deck Interactive Slide
Do not remove this bar

YOU CAN ALSO SPLIT YOUR CONTENT

White

Is the color of milk and fresh snow, the color produced by the combination of all the colors of the visible spectrum.

Black

Is the color of coal, ebony, and of outer space. It is the darkest color, the result of the absence of or complete absorption of light.

IN TWO OR THREE COLUMNS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

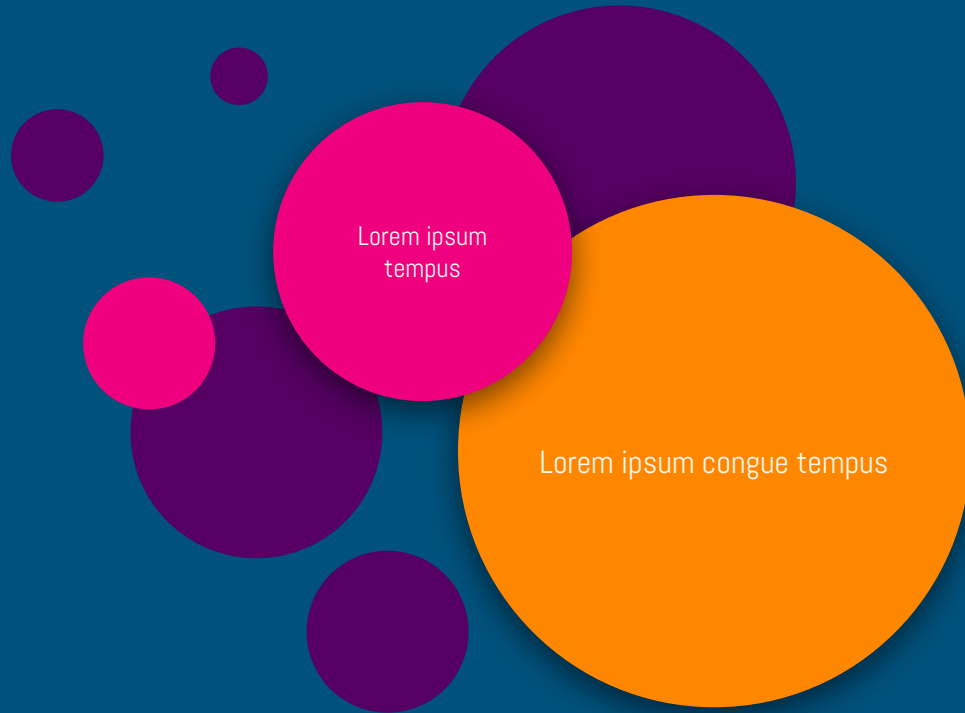
Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

Red

Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.



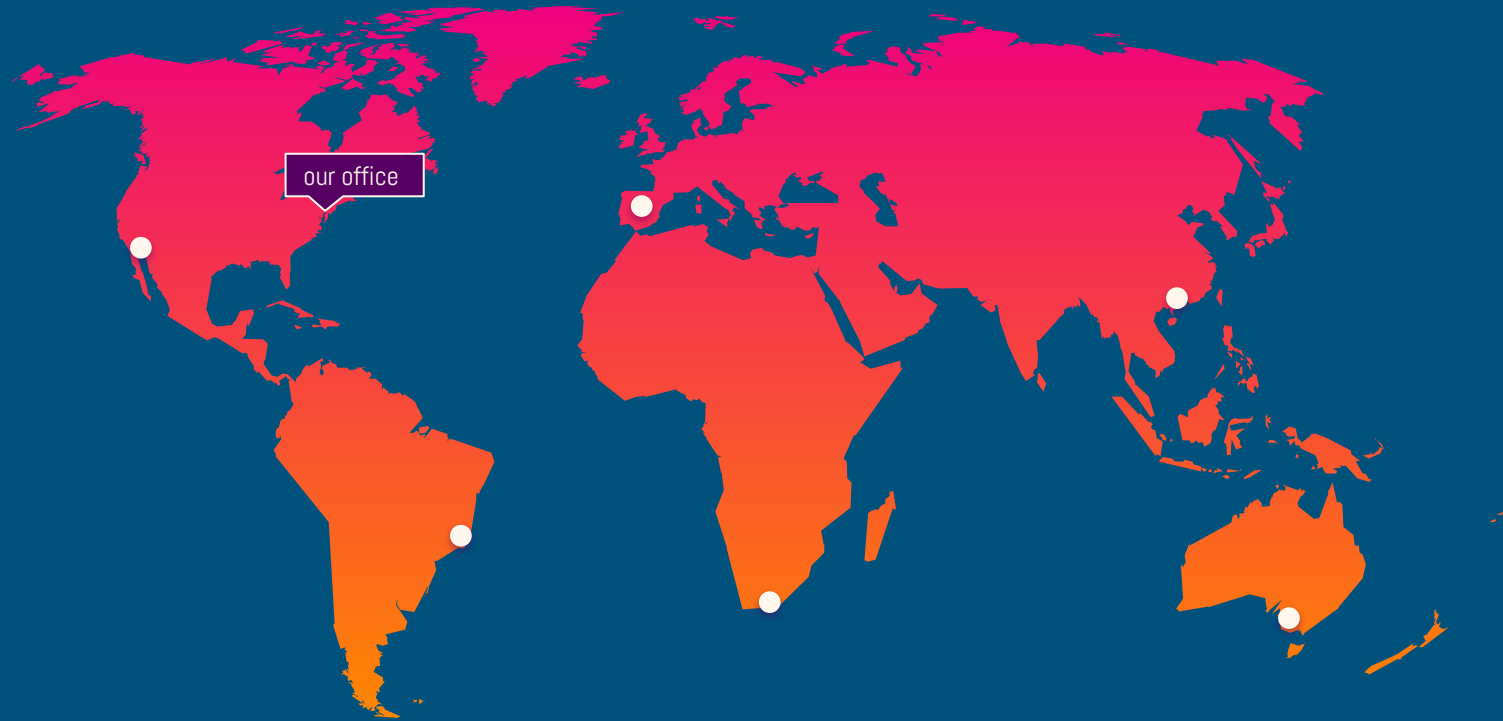
USE DIAGRAMS TO EXPLAIN YOUR IDEAS



AND TABLES TO COMPARE DATA

	A	B	C
Yellow	10	20	7
Blue	30	15	10
Orange	5	24	16

MAPS



89,526,124\$

That's a lot of money

185,244 users

And a lot of users

100%

Total success!

OUR PROCESS IS EASY

1

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

2

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

3

Vestibulum congue tempus

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor. Donec facilisis lacus eget mauris.

LET'S REVIEW SOME CONCEPTS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

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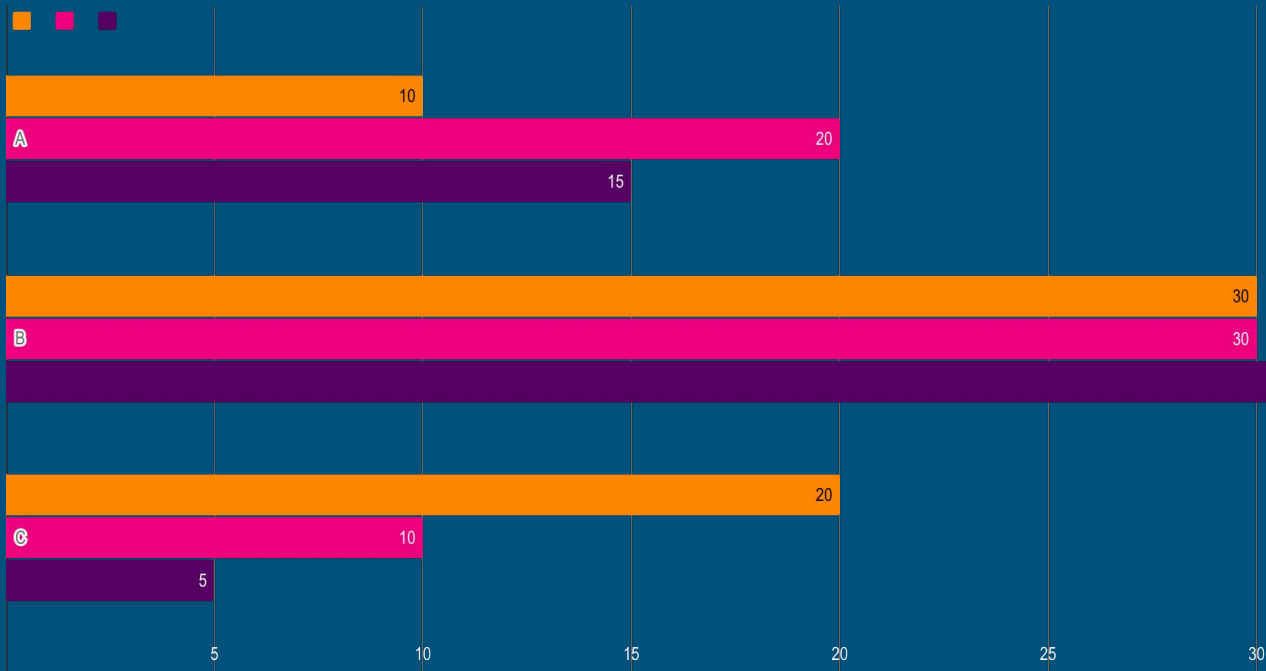
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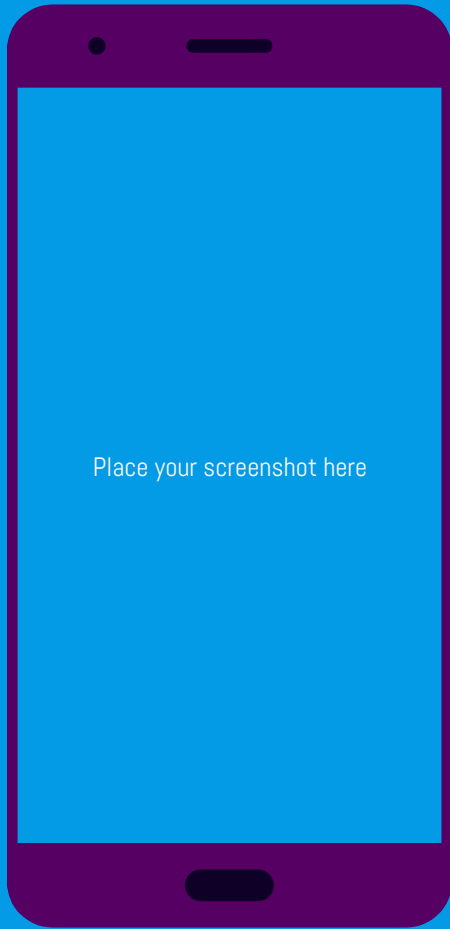
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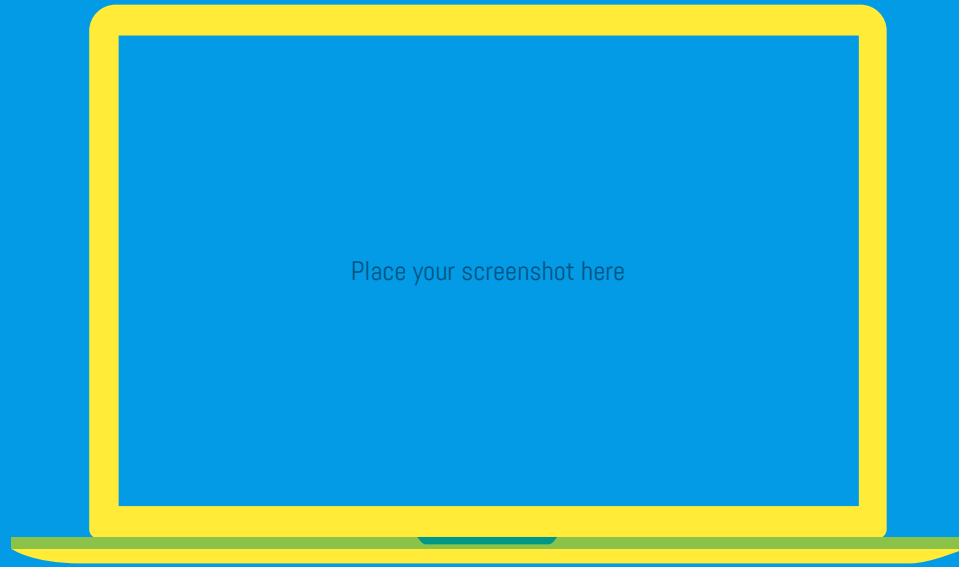
You can insert graphs from [Google Sheets](#)



MOBILE PROJECT

Show and explain your web, app or software projects using these gadget templates.

DESKTOP PROJECT



Show and explain
your web, app or
software projects
using these gadget
templates.

CREDITS

Special thanks to all the people who made and released these awesome resources for free:

- Presentation template by [SlidesCarnival](#)
- Photographs by [Unsplash](#)

PRESENTATION DESIGN

This presentation uses the following typographies and colors:

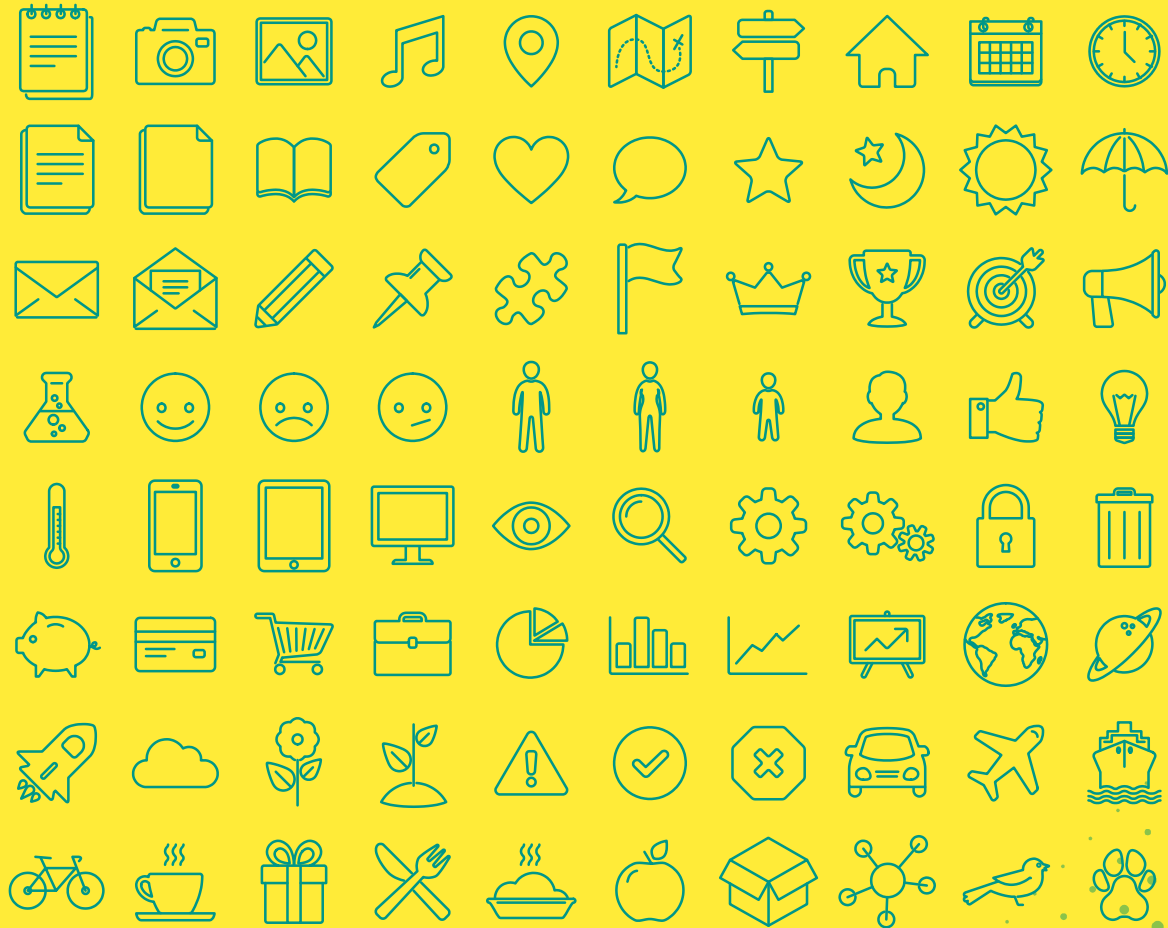
- Titles: Abel
- Body copy: Abel

You can download the font on this page:

<https://www.fontsquirrel.com/fonts/abel>

You don't need to keep this slide in your presentation. It's only here to serve you as a design guide if you need to create new slides by using all the fonts to edit the presentation in PowerPoint ©

Orange #ff8700 Magenta #ef007e Purple #550062



SlidesCarnival icons are editable shapes.

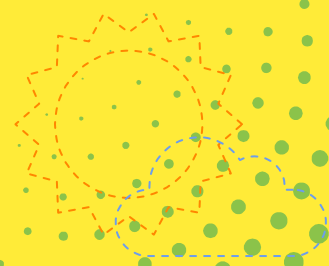
This means that you can:

- Resize them without losing quality.
- Change fill color and opacity.
- Change line color, width and style.



Isn't that nice? :)

Examples:



Now you can use any emoji as an icon!

And of course it resizes without losing quality and you can change the color.

How? Follow Google instructions

<https://twitter.com/google/docs/status/730087240156643328>



and

many more...



Free templates for all your presentation needs



For PowerPoint and
Google Slides



100% free for personal
or commercial use



Ready to use,
professional and
customizable



Blow your audience
away with attractive
visuals