**CASE 10:** How can we use technology to support teaching math, science, and ADST in elementary schools?





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| 📌 Manage Apps   | technological tools for use in schools ar<br>math, science, and applied design, skills          |   |  |             |  |  |  |
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Follow

A non-profit organization that aims to encourage young students especially girls and people of colour to learn computer science.

Every student in every school has the opportunity to learn computer science:)

7:20 PM - 10 Mar 2020









Code with Anna and Elsa Grades 2+ | Blocks

Star Wars: Building a Galaxy with Code Grades 2+ | Blocks, JavaScript

All curriculum resources (K-12) such as lesson plans will forever be free to use and openly licensed under a Creative Commons license. I will use some lessons provided on the Hour of Code to teach children basic concept of code and have them practice coding.

M



UBC

Educatio

11 2 0 1





























ELLs ELL · Mar 10

#### Replying to code.org

HW UBC TC · Mar 10

Replying to code.org

Hour of Code is offering lessons and instructions in over 67 languages, used in 180+ countries. I can learn coding in my first language.



M

## Justin Trudeau PM · Mar 10

Replying to code.org

172

"This Hour of Code website... code.org. I'm going to get my kids to go on that." (https://www.youtube.com/watch?v=8QwT58VTj\_g)

Interactively explore the water cycle!

Explore angles by making beautiful art!

Animate dinosaurs to talk about prehistory

| Kindergarten  | 1 <sup>st</sup> Grade   | 2 <sup>nd</sup> Grade                                     | 3 <sup>rd</sup> Grade   | 4 <sup>th</sup> Grade  | 5 <sup>th</sup> Grade   |                     | Middle scho |
|---|---|---|---|--|---|---------------------|-------------|
| Course A  | Course B  | Course C  | Course D  | Course E   | Course F  | 6                   | 7           |
| Pre-Reader Ex   | press Course  |   | Express   | Course   |   | CS Disc             | overies     |
|   |   |   |   | C O Lesso  | on 4: Programming with Angry Birds 🔸  |                     |             |
| Overview<br>Using characters from the game<br>bird from one side of a maze to to<br>together in a linear sequence, m<br>Purpose | Angry Birds, students will deve<br>the pig at the other side. To do t<br>aking them move straight, turn l<br>lop programming and debuggin<br>zles help students learn about s | eft, or turn right.<br>g skills on a computer platform. T | a View on Code Stu<br>Objective<br>Students will be a<br>• Translate mover<br>• Identify and loca |  | Otherwise I mig<br>Get the bird to<br>Blocks  | the pig and avoid t | he TNT.     |
| Warm Up (4 min)<br>Review Unplugged A<br>Bridging Activity - Progra<br>Transitioning from U<br>Previewing Online Puzzle         | amming (10 min)<br>Inplugged to Online  |   | class. Make sure every Links Heads Up! Please   | student ha:<br>student ha:<br>Common (<br>S L - L<br>S L -<br>Common (<br>MP G - C<br>MP G - C | anguage<br>Speaking & Listening<br><b>Core Math Standards</b><br>Seometry<br>Math Practices<br>Operations And Algebraic Thinking<br><b>A.1</b> - Use addition and subtraction within 10<br>comparing, with unknowns in all positions, | 0 to s              | (code.org)  |



## Technology, Mathematics and the Flourishing of the Elementary Student

Judy de Waal

This action research study investigated the effects of using technology as part of the instruction and implementation in a primary mathematics classroom, determining if such technology would make a difference in increased student performance. The participants were 71 first grade

https://www.coolmath4kids.com/



E34







#### Up next



AUTOPLAY



Lessons on Multiplication Sue Sweeney 34K views

EX



prodigy

**Prodigy: Math Game Platform** 

5,682 views Mar 9,2020





**Prodigy Education** 943 subscribers

Prodigy is the online math game platform where students from grade 1 to 8 can practice more than 1,300 mathematical skills by playing games in a fun and engaging way. It is free to use and allows teachers to see the progress of each student in real time by providing detailed reports. Children will be fascinated by this "role playing game," where they play a role of a character and level up their character in the immersive Prodigy world.



#### Lessons on Multiplication

Agape Management 471K views





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## Lessons on Multiplication

Julie Garcia 10K views

#### Select a Quiz

Edutopia 📀 58K views



George Lilley **18K** views



#### 85 Comments = SORT BY



Add a public comment...



Allegra 2 days ago

Teachers can create their own account and start to use it right away. Once they log in they can create a class which has specific class code. When students create their own accounts and enter their classcode, students are automatically added to their class list.

Thank you!

I AI REPLY





Caitlin 1 day ago

For primary children, teachers can create their accounts for them and send the letters to parents that are automatically provided for each student in the class list by Prodigy.

🖆 🖣 REPLY



#### Claire 6 days ago

Prodigy's in-game math content aligns with Ontario's standard curriculum from Grade 1-8. It can automatically adapt content based on how students play and provide instant feedback to help them overcome trouble spots.





#### Robin 6 day ago

My daughter loves this game and I love that she is actually learning math. She is very engaged and even talking about doing math during lunch time.

REPLY



#### Carli 6 days ago

Kids are so motivated to learn math and I have seen great improvements in math skills in my classroom



Justine 6 days ago

My classroom has been using this to have students to practice math skills. I have seen that even students who didn't like doing math are very much engaged in doing math and their math anxiety level decreased.

REPLY

















#### Math Centers and Guided Math Groups FREE Tips Video

Not So Wimpy Teacher 15K views

#### Interactive Notebook Hacks Brianne Beebe 23K views

#### WHAT HAPPENS INSIDE YOUR BODY? || 360 VR BRIGHT SIDE ©

Recommended for you 360°

## Icebreaker bad math

Matt Owens Recommended for you

#### Station Rotation: Differentiating Instruction to Reach All... Edutopia © 272K views

## Grant Wiggins - Understanding by Design (2 of 2)

Avenues: The World School Recommended for you

#### Reaching All High School Students: A Multi-Tiered...

Edutopia 🛇





#### What is a Coronavirus? | COVID-19 | #aumsum

73,118 views Feb 21, 2020





It's AumSum 💿 Time 1.58M subscribers

It's AumSum Time is the YouTube channel that provides educational videos for kids, children, students and teachers. It creates a number of ~ 5min long animated videos that answer to questions children are curious about daily phenomena with scientific explanation. It covers broad spectrum in science area such as biology, chemistry and physics as well as mathematic contents.





Q

AUTOPLAY



EH:

Sue Sweeney 34K views







...

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#### Why do our Hands Shake?

Agape Management 471K views

What if all Volcanoes Erupted at Once? Julie Garcia 10K views

#### Life Cycle of a Butterfly

Edutopia 📀 58K views





**18K** views



Has anyone used **#StarWalk2** for teaching science to kids? I've been playing with it and I wanna make a lesson with it! It's so cool there's so much I can do. (1/?)

4:17 PM. March 10, 2020 Twitter for TELL-3C

18k Retweets 160 Likes

Available in <u>Google Play</u> and <u>Apple App</u> stores (Click for app pages)





## Mr. Walsh @DWalshBC · 4h Replying to @DWalshBC

First I just played around with the AR function to find out where the moon is (looks like it's inside Virgo right now). Then I realize how much you can do beyond seeing where the stars and moon are. You can adjust the clock and see when objects will be visible. (2/?)



Click here to see the Vito Technology (owners of Star Walk apps) media website



## Mr. Walsh @DWalshBC · 4h Replying to @DWalshBC

Suddenly the app notified me about the Super Worm Moon going to be visible in my location. It's a pretty exciting way to stay informed on astronomical events and new discoveries! (3/?)



#### What's New

It's Time to See the Zodiacal Light Mar 10, 2020



March Super Worm Moon: The First Supermoon of 2020 Mar 6, 2020



How to See Venus Shining with Uranus this Weekend

The Moon and Venus Grace the Sky: When and How to See...  $_{\mbox{Feb}\ 24,\ 2020}$ 



The Moon Meets Mars, Jupiter And Saturn This Week: Wh... Feb 15, 2020

2º



40 🔿 213

The app is very entertaining, I spent a long time reading about Betelgeuse and watching Venus and Uranus.







The Moon Meets Uranus Jan 30, 2020

Betelgeuse: What Is Special About It? Jan 30, 2020



## Betelgeuse - General Information



Betelgeuse is a semiregular variable star located approximately 724 light-years from the Earth With an apparent magnitude ranging between 0.3 and 1.2, it is the ninth brightest star in the night sky. Although Betelgeuse has the Bayer designation Alpha Orionis ( $\alpha$  Orionis /  $\alpha$  Ori), it is most often the second brightest star in the constellation Orion behind  $\alpha$ ; Rigel (Beta Orionis) is usually brighter (Betelgeuse is a variable star and is on occasion brighter than Rigel). The star marks the upper right vertex of the Winter Triangle and center of the Winter Hexagon.

Betelgeuse is a red supergiant, and one of the largest and most luminous stars known. For comparison, if the star were at the center of our solar system its surface might extend out to between the orbits of Mars and Jupiter, wholly engulfing Mercury, Venus, the Earth and Mars. The angular diameter of Betelgeuse was first measured in 1920–1921 by Albert Abraham Michelson and Francis G. Pease using the 100 inch (2.5 m) John D. Hooker astronomical interferometer telescope atop Mount Wilson Observatory.

Astronomers believe Betelgeuse is only a few million years old, but has evolved rapidly because of its high mass. Due to its are Betelgeuse may go supernova within the part

Betelgeuse has been dimming faster than other stars like it. It may have even already gone supernova.

What's New

Full Snow Moon 2020: Is It a Supermoon?

See the Moon Inside the Winter Circle Feb 3, 2020

Jan 30, 2020 Close Approach of the Moon, Venus and Neptune

#### Betelgeuse





Venus and Uranus both appear within binocular viewable distance in the evenings around March 8th, 2020.

> With the AR feature, I'm able to align my thumb and pinky finger with Betelgeuse and Orion's belt indoors, in the middle of the day!





## Mr. Walsh @DWalshBC · 4h Replying to @DWalshBC

You can also follow the sunrise and sunset times, and keep up with the phases of the moon and positions of the planets. With the app I'll get my class to track data on the moon and keep a journal for it! (4/?)



The app provides opportunities for data collection on the moon and other bodies in space. Including their distance from earth, rotation and orbit speeds, and additional, more complex statistics.



 $\sim$ 

### Mr. Walsh @DWalshBC · 4h Replying to @DWalshBC

After a month, the class should have enough info on rise and set times, and wax and wane %s to make a moon timeline project, some could look artistic, and math and measuring are needed for % of light-dark on the moon, and amounts of time the moon is above our horizon. (5/?)

| <        | Moon - Fi                   | gures          | Û |  |  |
|----------|-----------------------------|----------------|---|--|--|
| <b>G</b> | Now                         | Time Machine   |   |  |  |
|          | Apparent Diameter           | 0° 32' 47.01"  |   |  |  |
|          | Distance from Earth         | 364288.11 km   |   |  |  |
| A•       | Average Distance from Earth | 384,400 km     |   |  |  |
|          | Radius                      | 1,737 km       |   |  |  |
|          | Relative radius             | 0.27 x Earth   |   |  |  |
| G        | Volume                      | 0.02 x Earth   |   |  |  |
| Ġ        | Mass                        | 0.0123 x Earth |   |  |  |
|          |                             |                |   |  |  |
| 0 4      | ↑, 22 (*) 157               | ~°             |   |  |  |



### Mr. Walsh @DWalshBC · 4h Replying to @DWalshBC

The app has so much it really deserves full exploration. I'm considering getting the full version for \$4 which lets you see ... (6/?)



This image of Cassiopeia from the free version of the app is shown on the gamma background. There are also x-ray, infrared, microwave, and radio backgrounds



3D constellation and planet models with planetary layers in AR, follow satellites, add the updated solar system objects (dwarf planets, comets, asteroids, and meteors), add nebulae and other galaxies, and educational cartoon videos. (7/7)





Q

#### Up next



Differentiation in the secondary classroom - 8th grade math ...

AUTOPLAY

Sue Sweeney 34K views



Classroom Management - Meet Mr. Hester Agape Management 471K views





### Academic Success for All Students: A Multi-Tiered...

Edutopia 📀 58K views









Math Stations Julie Garcia

George Lilley **18K** views



## Using Dig! and Merge Cubes for Teaching Volume

14 views

Mar 11, 2020

IN LIKE DISLIKE =+ SAVE ...

SHARE



Denis Walsh 0 subscribers

Augmented reality has been finding its way into classrooms since the release of Pokemon Go! and there are great AR tools that are valuable in schools... (click here to view in YouTube)

SUBSCRIBE



📃 🛛 🕨 YouTube 🖓

Search

- Augmented reality has been used in classrooms since the release of Pokemon Go! and there are AR tools that have value in schools.
- With the Dig! app, students can create and examine things using cubes, I demonstrate this by building a 3D composite shape.
- The Dig! app with Merge cubes allows for the exploration of building, architecture, geometry, transformation, and further engineering and mathematical areas of study. Teachers can find ways to incorporate this technology in such a way that it bolsters their teaching of the BC curriculum for math, ADST, and other desired subject areas

Here is how I made this video:

- The printable version of the Merge Cube is available here https://www.arvrinedu.com/single-post...
- The image of the small and large Merge Cubes is from this twitter moment's page here https://twitter.com/i/events/99336000...
- **Dig!** for Merge Cube is available in the **Apple app store** here https://apps.apple.com/ca/app/dig-for...
- and the Google Play store here https://play.google.com/store/apps/de...
- The app contains a screen capture feature which was used to make the video footage.
- I've linked a copy of the script I wrote for this video here Script for Using Dig! and Merge Cubes for Teaching Volume
- The audio was recorded using Audacity which is available for free on Windows, Mac, and Linux here https://www.audacityteam.org/
- The music is from the YouTube video **Discovery Scott Buckley [Vlog No Copyright Music]** on the channel **Audio Library Music for content** creators and can be found here https://www.youtube.com/watch?v=M8Zwl...
- I sent the captured video from my phone to my PC and watched it while playing both the song, and my recorded audio. While watching it I recorded the windows with the video and google chrome tabs with the images using the free broadcasting software **Open Broadcaster Software (OBS) Studio 64bit**, which can be downloaded here https://obsproject.com/





Add a public comment...



#### Scarfe Digital Sandbox 1 day ago

The merge cube has uses for other subjects too! I've seen it suspended from the ceiling and the device casts an image of the solar system over it. Check out our blog post about the merge cube on our page here https://scarfedigitalsandbox.teach.educ.ubc.ca/merge-cube/

I A REPLY



#### Denis Walsh 1 day ago

Thank you for the link! I think there are a lot of unexplored avenues with these cubes. At first it seems like most of what they can do is for games, but with a creative mind they can go beyond entertainment and become the focal point for learning opportunities.

I REPLY

#### Circular Merge Cube 2 days ago

I've been fascinated with AR for years now and kids are experiencing it on a daily basis as soon as they're born in some cases. I'm a firm believer in using AR educationally so that kids don't see it so separate from school, like one is fun and one isn't. Your video reminds me of a resource I found where a teacher named Gabe Haydu shows how he can use the Dig! App in a math setting like you showed. Check it out! <u>https://www.youtube.com/watch?v=-Q-I8tndI5k</u>

I REPLY









#### WHAT HAPPENS INSIDE YOUR BODY? || 360 VR BRIGHT SIDE Recommended for you









#### Math Centers and Guided Math Groups FREE Tips Video

Not So Wimpy Teacher 15K views

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#### Reaching All High School Students: A Multi-Tiered...

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72K views

Instagram

**Q** Search





ms.wong

353 posts 884 followers 432 following

Gr 2/3 UBC Teacher Candidate

Check out this link for more ADST examples: https://teachyourkidscode.com/best-robot-toys-for-kids-coding/

I PICTURES & VIDEOS

Banana

Pianc









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Instagram









ABOUT HELP PRESS API JOBS PRIVACY TERMS LOCATIONS TOP ACCOUNTS HASHTAGS LANGUAGE

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Instagram





ABOUT HELP PRESS API JOBS PRIVACY TERMS LOCATIONS TOP ACCOUNTS HASHTAGS LANGUAGE

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WHATSAPP 10m age Mom Home in 5 mins. Did you make rice?

## ••••• Verizon 12:15 PM 12:15 PM < Messages</td> Crystal Bacic Details

#### Today 11:33 AM

Did you hear about the new technology for science called Virtuali-Tee? All you need to do is download the free app, put on your Virtuali-Tee, scan it, and BAM the t-shirt comes to life!

## Are you okay, Crystal? T-shirts don't come to life...

Ah let me explain! It's AR technology that helps us learn more about the human body – it allows us to go explore the anatomy of the digestive, respiratory, skeletal, renal and circulatory system using only our device and the Virtuali-Tee. You can even go through the bloodstream, intestines, lungs, dissect organs, and all these cool things (Kickstarter, 2020).

OH and the best part... you can go EVEN FURTHER AND USE A VIRTUAL REALITY HEADSET WITH IT!!! 😎

Oh wow! This sounds so fun and engaging while learning interesting facts about the body that we can connect with. I can definitely see my students feeling excited about science and motivated to investigate more about the human body with this resource.

**i**Message

0



5

Virtuali-Tee's newest feature tracks your heart rate which is monitored through the camera of your device and then you can view your own heart beating live in augmented reality (Kickstarter, 2020)







Using Plickers in Mathematics (WOSU Public Media, 2016)

8,423 views • Mar 6, 2020

IN LIKE I DISLIKE A SHARE =+ SAVE



Ms. Wong <a><br/>
12,771 subscribers</a>

Ms. Wong demonstrates how she uses Plickers as a formative assessment in her mathematics class. Plickers is a quick and simple assessment tool to check for student understanding in real-time; this provides teachers with helpful immediate feedback about if students are understanding the concept or if they need to tailor the lesson halfway through.

Up next



Q

Differentiation in the secondary classroom - 8th grade math...

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EH:

Sue Sweeney 34K views



Classroom Management - Meet Mr. Hester Agape Management

2:21



...

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## Math Stations

Julie Garcia 10K views

471K views

#### Academic Success for All Students: A Multi-Tiered...

Edutopia 📀 58K views



George Lilley 18K views

#### 85 Comments = SORT BY



Add a public comment...



#### Peggy Chan 2 days ago

What a great assessment tool! Here are a few examples to use Plickers in a mathematics class: quick check for understanding with multiple choice and true/false questions, exit tickets, solving math questions or word problems (e.g., addition, subtraction, multiplication, division), matching math vocabulary with definitions, telling time/geometry shapes/fractions, and math debates/discussions.

- REPLY
- Hide replies



#### Ms. Wong 1 day ago

Thank you for sharing all your examples! Research shows that Plickers are an effective way to improve student engagement, participation, interest and confidence (Borst, 2017).

🖌 🖣 REPLY



#### Josephina Kim 6 days ago

It is FREE and EASY to use! Unlike Kahoot!, only 1 mobile device is needed – great for any financial situations and use of technology without needing the entire class to have their own device. If anyone is interested, here is the link to get you started: https://www.plickers.com/signup

I TEPLY



#### Karen Nanat 1 day ago

Love how you can use Plickers no matter the subject or grade level you are teaching! It shows me who needs more practice and who is ready to move on.

REPLY



#### Cindy Choi 4 days ago

Wow I love how highly interactive and engaged the students were AND it's anonymous too!





#### John Wu 2 days ago

That's nuts dude! If you have not tried Plickers, you are MISSING OUT!! My students LOVE it! It definitely increases engagement throughout the learning process.



















#### Math Centers and Guided Math Groups FREE Tips Video

Not So Wimpy Teacher 15K views

#### Interactive Notebook Hacks Brianne Beebe 23K views

#### WHAT HAPPENS INSIDE YOUR BODY? || 360 VR BRIGHT SIDE 👁

Recommended for you 360°

## Icebreaker bad math

Matt Owens Recommended for you

#### Station Rotation: Differentiating Instruction to Reach All... Edutopia © 272K views

## Grant Wiggins - Understanding by Design (2 of 2)

Avenues: The World School Recommended for you

#### Reaching All High School Students: A Multi-Tiered...

Edutopia 📀

#### 85 Comments = SORT BY



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UhOhError.exe

The presentation as stopped working

because it is time for our activity.

Click Close to begin the activity.

Error code: 1001

Hide details



#### Hide replies



**Ms. Wong** 1 day ago Thank you for sharing all your exam to improve student engagement, pa

F T REPLY



## Josephina Kim 6 days ago

It is FREE and EASY to use! Unlike Kahoo financial situations and use of technology If anyone is interested, here is the link to g





#### Karen Nanat 1 day ago

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REPLY



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~









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## **PLICKERS**

Answer the questions on the screen with your Plickers card.

Simply just rotate your card to determine your answer.

Up to 63 students can be assigned per class.

All students of ages and students with exceptionalities can also use this (Plickers card with larger font are available) Your PRESENTATION ran into a problem and needs to conclude. We're just wrapping up some final info, and then we'll end for you. (0% complete)

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"Technology will not replace great teachers but technology in the hands of great teachers can be transformational" -George Couros

# Conclusion

The Internet, and now social media and smart devices, raise conversations about whether they remove vital human connection. Limiting screen time is often seen as a virtue akin to dieting and exercise, and some may catch themselves or a friend being smug about how greatly they prefer face to face interactions compared to online. In spite of these somewhat wistful observations, the technology persists, and our society consumes it. For these reasons, it's important for teachers to seize their ability to incorporate technology in a responsible, constructive way so that children see the beneficial aspects of technological innovation. While doing this teachers can capitalize on the irresistible draw of emerging advancements in content sharing, coding, virtual and augmented reality to entice their students into participating in focused periods of study.

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