

- [Host] The LD at School is very pleased to welcome our guest speaker, Anthony Howell whose presentation this afternoon is entitled, Math Made Digital, Unlocking the Power of EquatIO. The Ministry of Education has kindly provided funding for the production of this webinar. Please note that the views expressed in this webinar are the views of the presenter, and do not necessarily reflect those of the Ministry of Education nor the Learning Disabilities Association of Ontario. We will also be live tweeting throughout the webinar. So if you'd like to participate, you can send us a tweet by using our handle, @LDatSchool which is at the bottom of the screen there. Or you can use the hashtag #LDwebinar. We'd be happy for you to join us in the conversation. So that takes care of all the housekeeping side of things for this afternoon. So let's get started with the presentation. It's now my pleasure to introduce our speaker Anthony Howell. Anthony Howell received his M.Ed from OISE and has been teaching with Peel District School Board since 2011, working specifically in K to eight environments and special education classrooms. His current assignment as an Assistive Technology Resource Teacher has Anthony supporting a superintendency of schools from K to 12, helping facilitate staff and students in learning how to access the curriculum using various assistive technology devices. Welcome, Anthony, the cyber floor is now all yours.

- Thank you, Susanna, for that introduction. And before we get into the presentation I do wanna say a few thank yous. And I'd like to begin by sending thanks to LD at School for creating this opportunity to share with all of you this incredibly vital and necessary tool for all our students who are currently working in school or displaced virtually. This tool is so robust in terms of accessibility, that I'm probably going to hit the limit of your cognitive load today. And that is going to be my intention, but always remember this is being recorded, and as we dive deep into the program just know that you'll always be able to revisit this and practice using this tool at your own pace. I'd also like to thank my team at the Peel District School Board. I'm one of 13 Assistive Technology Resource Teachers along with three central staff members and our coordinating principal. Without them I would not be the educator I am today. Together, we troubleshoot, we learn, we develop resources. We perform vital and necessary tasks around the special education department for the entire school board, for staff and students. And so honestly, I mean, I've played on a lot of different sports teams my entire life, high competitive level of varsity, but this is definitely the best team I've ever been a part of. And lastly, I wanna thank the beautiful brains at Texthelp, the creators behind EquatIO and Read & Write for Google Chrome, Texthelp PDF and Screenshot Reader. Their tools enable accessibility for staff and students to a brand new level of independence that we've never seen before. They've literally created the digital pencil and paper. And as we dig deeper into today's tool EquatIO, you will see how they've created a tool that every mathematics teacher has always wanted, but never had for digitizing math. They truly deserve all the recognition today as I just get the privilege to showcase their brilliance. So with that in mind, let's begin. EquatIO, again is built on the principles of universal design for learning, providing students with multiple means of representation, engagement, and expression, and that equals or equates student success for all learner profiles and gained confidence in math. So this is a note from Chad Downes. He previously presented for LD at School and for accessibility and using some tools. And he had made this note on building independence. And he used a pause and go approach. And so we look at stop where we



gradually release responsibility and basically telling the student I'll show you how to use this tool which I'm doing today for you. And then we take a growth mindset that it's okay to make mistakes, and in fact, mistakes are how we learn. And so I'm going to model a few mistakes as we go. And hopefully, if I make some organic mistakes, that's great too. And then once we have that in place then we can also use the prior knowledge of the student to access what they already know. And I'm gonna show you how this tool really builds on that. And it's such a unique tool because of that. So let's get started. This is an extension to a Chrome browser. So you can only use this currently in a Chrome browser, or actually they just developed it for Brightspace, but I'll get into that later. So you're gonna go to--

- Anthony?

- Yes?

- Hate to interrupt you, but we can't currently see your screen.

- Oh.

- [Susanna] Yeah, we can see everything now.

- Okay, perfect, let's just get right to it. All right. So I mentioned briefly about student success and this slide, this is the slide from Chad Downes, you're gonna have the access. So this is where I got cut off. So it is a Chrome extension. You have to install it from the Chrome Web Store which you can access it when you just type in Chrome Web Store. This is what it looks like when you do go to EquatIO, it'll pop up like this. You just add it to Chrome and then it'll pop up. You have to make sure you're into your Gmail, so you have it as well access into your G drive. Once you do have it, it'll automatically pop up saying that you've added it to Chrome, and then it works across all of these platforms. So any G Suite for education, you have Google Drive you have access to Classroom, to Docs, through Slides, through Google Draw, you have it all access, and it's all embedded within. The other cool thing is that they've actually released it through D2L Brightspace. So a lot of the virtual learning environments for some school boards are only through D2L. You can access this through D2L as well. But for today's purposes I'm going to only actually work through it in a Google Doc just because it's gonna be easier to help demonstrate for everybody. When you do actually open it for the first time, there is this kind of tutorial window. I suggest going through it even though you're gonna see this today I suggest you click on it, go through, either I'm a teacher, or I am a student and walk through the steps because they will actually provide you some cool features and teach you some of the cool things through the tutorial. So when you do open it up you'll



look at the bottom of my screen here. That's what the toolbar looks like. We're gonna go through all that toolbar today and we're gonna make sure that everybody understands what every single tool does. And I apologize, it's gonna be a bit rushed now that we've already killed a little bit of time, but that's okay. It is gonna be recorded and you can be able to access that at your own time. So just quickly, you'll see that in a Google Form this little blue box appears that shows that you can not embed EquatIO. Anything that we do today, you can actually embed it into all your Google products, in Google Slides, in Google Spreadsheets, and Google Drive as well. So what I invite everyone to do is just like these no fearing kids here, jump right into the deep end. You know, even if you've never learned how to swim before just try to take, do your best to jump into the deep end and try to just grasp whatever I can, or whatever you see today, try to grasp what you can and then, you know, take something home, and then again, you'll have this recording, so you can always go back and try to learn all the tools that are available to you. So let's just go right in. I created this doc just quickly to showcase how to use some of the tools, and you're gonna have access to a bunch of files. Not this one. I don't think I included this one, but again this will be in the main part of the video. So you'll be able to see using the video, what the features do. So I'm just gonna shrink this a bit so we can see the toolbar a little bit better. So when I click on the EquatIO toolbar my little tool bar will appear at the bottom here. And I'll just give it a second because I am on a different computer, it's a lot slower, that luckily I did bring it as a backup or else we'd be in trouble today. Okay, so what is Equation Editor? Now, if you don't know what all these buttons are called if you just kind of hover your mouse over top you'll notice that they have labels and titles. And so I'm gonna go through each one and Equation Editor being the very first one. However, before we do go in there is some housekeeping. I just wanna make sure that when you do have this for the first time, and you do access it, click on the EquatIO button here under the options. And I want you to go into the math options here and just make sure these are all clicked blue. That means it's off, clicking it blue means it's on. The prediction feature is that accessibility piece where the stop, pause, and go from Chad Downes, speaking about how and when we get to the green part just go, activating the prior knowledge of the student. So this is how we're gonna activate that prior knowledge from the student, because whatever the student, however they think about the math in their brain it's gonna pop up in the program. So for example, let's say we had a question here find the area of a triangle. So watch, when I click on my equation editor, and now this is like the meat and potatoes of the program. It's gonna follow me wherever I go. But this actual tool here is, I'm gonna start with, and you're gonna see what I mean by the meat and potatoes. So I'm just gonna, these three bars right here, you can actually drag it up. You can create a bigger workspace if you'd like, you know some people like more space to work in. So that that's what that does. But we have to work on this question. So the question is find the area of the triangle, and actually move that over here. I just need to recall what the question was. All right, so the base is five and the height is 11. So let's go back and let's start working in the equation editor. So if I type in A-R and all of a sudden you can see all the prediction features that appear. So really all you need to do is memorize the first two letters of any math term or know the first two letters of any math terms. So, you know, thinking of kindergarten to grade 12 and it'll predict all, everything that you're looking for based on those two letters, but we're looking for the area of a triangle and you can see all these formulas here. So I need the area of a triangle. I pop it in, this is not gonna do the math for me. This is an extension of my brain. My brain is the tool. This is the extension. So my brain still needs to do the work.



But this just helps organize my thinking. So right, we go five, and I'm gonna work down here and you see as soon as I pressed enter these buttons appear. These are alignment tools. This is gonna help get that perfect alignment that every math teacher wants. They want the equal sign to line up perfectly, left side equals right side. And so that's what that's for. But as I worked through the program, you can see. So now we get to a fraction. Fractions are the linchpin of every math program in any school. So how do you write that on a keyboard? Well, it's very intuitive. I can just write it the way I think about it in my brain. If I say one half I can start to write one half and it pops up right there. Or I can use the keyboard itself by pressing one and the forward slash underneath the question mark and get the number two, and then it gives me my fraction. Unclick away from the denominator. And now I'll put in my base and my height. So I'll put a bracket, and my base was five. And now again, multiplication, right? Some kids say times, some students will say, you know multiplication or multiply, but no matter how you say it, or however your brain thinks about it it pops up and it predicts, so there's times or if I say multiply, there it is as well. I'm gonna use a dot, as you get older in grades, you know we wanna get away from that operation symbol and use the dot. And we're gonna say 10. We have to include units, right? So the units were centimeters. And again, if I just type in centimeters it pops up and it predicts them for me and gives me that. So let's go ahead and just finish this question and say you know, half times five and 10 is 50. I guess I can leave that, but keep it like that. So we know centimeters, and then we're gonna get to the last part, which is 25. And then we get to here to the point where we need to square it. So how do you write that superscript right, that up above? So again, the same idea, however, your brain thinks of it. You just type in squared and it automatically appears and it pops it in. So you can remove this. So you can see that now I have my answer, and it's fully nice, and you know, not really in line. So that's what I'm gonna use these tools for. I'm gonna use these tools to help align what I have here. Sorry about that. So you can see how I have the equal signs all align now and I can go ahead and insert my math. So when I answer my math, I don't have to do anything else. The program works by itself, it's like magic. You know, it does everything. My hands are like, you can see my hands, and it basically just pops right in. Oh, wait, well, that didn't work out. So wherever my cursor is that's where it's gonna put the math in, but I want it to go into this box. So here's a good little trick. If I click on the image and I break the text I can now drag it wherever I want it. And I can go ahead and bring it into the question right here to help organize it a bit better. Not so nice there, not so nice there either. Maybe because I didn't create a line. So watch this, here's a cool feature that I'm gonna go ahead and erase this, right? And I'm gonna go click right here to create a new line. If I go back to my equation, it's all right there. So another cool feature is that it doesn't actually delete anything that I've worked on previously. It kind of saves it and puts it where I want it to put it, or it kind of doesn't like, let it go. So I'm gonna go ahead. Now, it's nicely inline there. I'm gonna create a new space by hitting enter on my document right here because now we need to write a therefore statement. But now I'm looking at my math. You know, I've done all the steps, all the steps but I've just realized I did make a mistake. Right, my height is 11, not 10. So all the steps are correct. As a student, I might feel frustrated I have to go through it all. But this program, again, it's really intuitive. So I could either go back and I have it already saved, but an even better option which works anywhere is that these images aren't static. They're very dynamic. When I click on them, I can go ahead and edit my math, this button right here. I can go back into my math and it's gonna replace the image with the right answer with my updates. So that, just change that. And I'm gonna go down here, it was 27.5, that, and



now I'm gonna go ahead and insert my math. Again, the magic in the background works without me doing anything. And I go ahead and close it and it's all updated right there. So it's really, really cool because it kind of limits the frustration because you know, the student did the right math but they just had the wrong variable in the wrong place, so I'm gonna go right back into my equation editor. It's right there, but I don't need it anymore. And I'm gonna write a therefore statement. So I'm just going to click on this trash or clear button. But if I was working, let's say with, if I was working with let's say an area of a triangle for lots of questions, and I wanted to, let's say, save this formula. I have a favorite spot in here, which is really cool. I can go ahead and favorite this button give it a name and just say area of a triangle. And I can save it in my area right here where I get my favorites and I can list them. I have area of a trapezoid, triangle, and I can unfavoritize them to get rid of them. That's a quadratic formula. So you can kind of see how it kind of helps. I can personalize all my features and my favorite tools. And so we want a therefore statement for this question, but you know, every time I write therefore, right there, there's just three buttons, but we'll say the area, you see how everything's always being predicting. And it's always like listing this list. It can get kind of distracting for the students. So let's temporarily pause that by clicking on the text button. I'm gonna go ahead and say, now the area of a triangle, the area of the triangle is 27.5. Now we want centimeters squared, right? So I'm gonna just click outside of my text box, and I'm gonna get that prediction feature returned right back to me without doing anything. So that's a really, really cool feature too because again, you know, it's intuitive, it helps the students to not have to think too much. And everything's at the click of a button. So equation editor is your area where you're gonna create equations. It's the meat and potatoes. You're gonna see as it follows me wherever I, as I go through the tools you're gonna notice that it will be a large part of the program, but there's more, especially in this equation editor. Like that was just the area of a triangle. But if we're talking about like multiplication, and we're using three digit verticals, so again it's not gonna do the math for me but it's gonna help me organize my math digitally, help me process and do the math. So, you know, all I have to do is insert the numbers and all of a sudden I can work with, you know I can work with the math. Now I'm not gonna do this math right now because that's gonna take a long time and we're running short for time. But just so you know there are lots of things in this equation editor. All you need to know is the first two letters. So for greater than or equal to I just type in G-R, and you can see everything there. Now you can also see, I'll make mention there is like really high level math going on to science. And so this program is for K to 12. Like it can get very basic in the Mathspace to use with kindergarten primary students. But again, it also goes towards grade 12. So again, anything, any first two letters you can think of just type it in and it'll show up. And that's what's so amazing about the program because it has that accessibility feature. However the students think that's what's gonna happen as it populates and predicts what the students are thinking. So it just builds confidence in math, and it really is an amazing tool. So let's go down to the next feature. The handwriting recognition tool. I'm gonna skip one, two, three, four buttons or five buttons here, two buttons, sorry, skip two buttons and get to the handwriting recognition tool. We're gonna go back to these two but these are kind of connected to the equation editor. So that's why I wanna get to them now. So when I click on handwriting recognition tool, look what happens here. I get my equation editor, it's still there. Just like it was in my equation editor here. I have my handwriting recognition tool here. And so, but now I can use my hand. And if I'm a fine motor skill expert or if I'm a kinesthetic learner and I like using my hands and a lot of these Chromebooks, they



have touch features on the screen. So you can go ahead and use your finger, like on my screen, unfortunately, it's not a touchscreen so I'm gonna use my mouse, so it's gonna get sloppy. But if I wanted to actually write, I can start to write everything down on my equation editor, oops, and let's say two y and I can go ahead and put an underline, let's say over two. And so I can create anything I want using my finger or by touch. And, you know, if I did make a mistake you can scribble it out and you can, you know reapply it and it fixes it in real time. And you go ahead, insert your math. And the magic happens in the background. Really, really cool. We'll put this over here maybe, there we go. So you can see how hand-writing recognition tool is basically a different variation or an accessible tool to the equation editor using your kinesthetic learners or your touch. So your speech input, exactly the same thing. So if I go down to speech input and I get my equation editor here, again, see how everything follows me very important to note that things don't just erase or disappear once you're done with them. And I really love that because we're never really done with the work, we're always improving, we're always working, we're making mistakes all the time. And so it's really important to know that it kind of follows you wherever you go. But I am gonna get rid of it because I wanna showcase a new feature. So Equation Editor on the right, Speech Input on the left. So when I go to the speech input, it's really, really fascinating because it doesn't pick up any of the non-math terms. I'm just gonna go ahead and click on the record button. And I'm gonna show you what it can do. Three x plus four y, ah, it's really snowing outside today. Oh, equals five. I'm gonna pause it, so you can see how that disappeared, my recorded speech disappeared, but it did show it, I don't know if you saw quickly but you could see in the recording, it picked up everything that I said about it snowing outside, but it doesn't pick it up in the math, and that's amazing because you know, a lot of students required time to, you know, chunking the time, processing, or time to process the information, and so they might say three x, um, you know, thinking, like, oh four y or whatever, and it doesn't pick that up and it only picks up the math. So that's really, really important for our learners as well. So I'm just gonna go ahead insert the math, click on that button, let the magic happen, and it pops it in right there. So again, equation editor is the meat and potatoes, but handwriting recognition is that kinesthetic accessibility, speech input is that voice input accessibility. And now we're gonna go back to LaTeX Editor with screenshot reader and discoverability which are kind of connected. So LaTeX editor, again, here is my equation editor. It's followed me where I am here, but this is a different input. So I'm just gonna go to Google and I'm going to pop something up. I'm gonna show you some stuff. So if I just type in fractions. And I find this image, so this could be from the teacher lens, but it could also be from the student lens. If I find let's say, let's see. I wanted actually a number here. Okay, well, let's use this one here. So let's say, for example, I had this question right here, and I could open this image, and I wanted to take this multiplying fractions question, and I want it to bring it in. So I'm gonna go and open up my EquatIO extension. Now this is like a mini version. You're not gonna get the full accessibility of it into like the Chrome extension in here. But what's cool is that when I go and take a screenshot of this math, like that it's gonna process, it's gonna think, and it's gonna recognize the math.

- [EquatIO]  $2/4$  times  $3/6$ .





- So, you know, not just as a student if I wanna learn how to say something in math I can screenshot anything now, and learn how to properly say it in a mathematical term. But in these three dots are these more options I can copy the LaTeX, which is the code of how to create this  $\frac{2}{4}$  times  $\frac{3}{6}$ . And now we can come in here and I can Right Click, and paste the LaTeX to get that exact same question. So that's really cool. You know, coding is a big thing now and students wanna learn, and this is a way of coding mathematics into various applications. So, and you know, if kids wanted to learn they can just type in different numbers. You can see how this changes the code on the right side. So it's interactive, it's intuitive. But I basically just taking this image, which I could easily Right Click, I could copy image. I can go to my document here and paste it, but what's the difference is that this image is static. I can't do anything, right? I can't edit the math, nothing's working, but now that I've taken it into LaTeX I can now insert the math, excuse me. And I've now made that question that I found off the internet accessible just by clicking it, I can go edit math. And now I'm back into my equation editor where I can work Out the details. So LaTeX is really cool, but you know, it's good for coding, but it's also good for teachers and students to take math from the internet. Screenshot reader is what I used to screenshot this image. But discoverability is a new feature which is new to the equation, oh, so I had to do a little bit of background check on it, but let's say I go to Wikipedia or any webpage that has math on it. So I'm gonna, again, I'm gonna open up my EquatIO extension. And what happens now is all the, you can see that it is open, but my toolbar's hiding. There it is, so you can see now that if I unclick this discoverability all the math lost, I don't know if you saw it, but there was like a blue hue around the question. So if I go back and I click on discoverability, check what happens here. So see now I have this like blue outline of a box around everything that's math. So now I can actually capture the math, so I can take it or I can listen to how it's stated. So again, if I'm learning.

- [EquatIO] Squared plus bx plus c.

- So let's not get into all of it, but just so you know that's what you can do with discoverability. You can discover math online, on the web and you can actually now take it, copy the LaTeX, I can take it and go back to my LaTeX editor again and just paste it right in. And I can get that equation or that quadratic equation right there. So that's really cool that, you know any math that's on the internet already, you can import it and you can make it a question, or you can manipulate it or you can learn how to say it if you're a student. So really, really cool feature. Alright, graph editor. I'm looking at the time, we're doing okay. I feel like I was talking really fast but everybody knows, you know, that's what happens when you run out of time. So Graph Editor, it's really cool. They've worked with Desmos. If you are familiar with Desmos, it's the same company. You can see it's powered by Desmos, and they've worked together. But what's amazing about this is that once we get into math space, you can do some really incredible things. Bar graphs, label, you can do it all, but just quickly if you've never seen this feature or a Desmos, you can zoom in or zoom out. It's an infinite amount of scales. You can go from really, really deep into the numbers, right, you know, looking at fractional amounts, looking at deep amounts. And so like, now if I wanted to write anything I could just start putting points So if I wanted to say minus five, five, and you



can see that dot, right? And so now it automatically appeared in real time on my graph. And if I go into this edit list, I can do something cool by creating a table. And now it'll help me organize how I put all next amount of numbers or points on my graph. Say something like that. Oops, I wanted the y axis to be five. It's the same one. Let's do that at zero, there we go. And now we do five and five. And so now I've created a straight line. I can go back to my editing button, click on the color. I can change the color. If I want it to make it orange, I can connect the lines. I can change the style of the points 'cause sometimes we talk about those points being basically an approximation because numbers are so infinite, right? So you can do all kinds of cool things and, you know, oops, oh see like I made a mistake, that was organic. But if you lose something, again, undo is there, it's your best friend. So if I wanna add onto this another layer onto the graph I can take my graph here and just click on number two, you see this faint number two and three. I can continue to make lines, right? So I'm gonna go ahead and just type in one, you know, and look what happens if I, you know, my prediction power in the equation editor still follows me. So even though I'm in now the Desmos calculator, so that's really amazing. And you can see how my graph is changing in real time because all of a sudden, now I have an equation, this is an equation for a circle. If I wanted to do a hundred. So you get the idea, this is maybe an upside down, let me see, maybe a thousand. No, but you get the idea. So I was trying to make an emoji but my mouth is upside down. And so, I'm very basic when it comes to using this tool, but just quickly it's really important to know that students and people out there are really getting rich with this. And they're making Desmos art. And Desmos art is basically, you know, it's art that's using not like a way to draw it. They're actually using the equations to represent these lines in these pictures. So that's an amazing thing how deep you can actually go with this with this tool. You know, so all these equations below represent something on the graph and the kids are using the colors to fill them in. I'm trying to do a very basic emoji with an upside down straight face and it didn't really work out, but you can see if you really invest the time you can do some amazing things. And let's say you did, if this is a grade 10 question, right, the equation of a circle. Let's say I did wanna insert the graph into my work. It pops in right there. If I am doing that kind of Desmos art, and it's really, really time-consuming, again, nothing's static, right? This is dynamic, go back, click on the graph and go back to Edit Math. And you can see how it, if I click on Edit Math. It should bring it back up. Maybe, Yeah, there we go. So it does bring it back up and I can continue to work on my art or my graph or whatever it is that I'm working on within this graphing editor. So really, really cool tool. I think it's amazing. So let's move on. EquatIO mobile, so this is another accessibility feature. If you click on it, it's gonna give you a QR code that's gonna connect to this document. I'm not actually gonna do it because I don't have a mobile with me. And, you know, I can bypass this one, but basically I'll tell you that when you do scan on it it's for students that don't have a desktop or laptop, but they do have a mobile phone. And we do know that a lot of our students and staff members, maybe not staff, but I know a lot of students access curriculum through mobile devices, it's actually a high number. So EquatIO mobile is pretty big because it'll allow students with some basic features, they won't have all these tools, but they'll allow students to collaborate or create on a Google Doc using handwriting recognition, speech input, and I believe equation editor to a degree. So just know that it is another form of accessibility for, but more so unlike the equity piece of technology, All right, STEM tools is really awesome 'cause I'm a big science buff. So when I click on STEM tools, you can see I have a few tools. Now, you might've saw these when I went on to Wikipedia to look at math, and they followed me in that





like shortened version of the extension, but a scientific calculator pops up. So you don't have to go to Google, kids use that on their own. Or a periodic table because this is a science tool as well. I love this. You know, if you wanna see what sulfur looks like it shows you, you know, a picture of the sulfur in real time, it gives you some information, the atomic number, this is just a really cool tool because these are the Lego pieces of Earth, Lego pieces of our solar system, and the Lego pieces of everything from the table to our eyes, to our clothes, to our chairs. And it's just like, and it all came from the guts of a star. So I think that's really cool. So I like that it's in there. And then you have your Molecular Viewer, sorry, Molecular Viewer. So if I ever wanted to showcase what carbon dioxide looks like, well, disulfide. You go in, you can move it around, you can twist it around you can change the way it's represented and so forth. And it's just a really cool tool. So I like the STEM tools, but I know this is more making math digital, but I did wanna showcase that, okay? So we're getting to the point in the presentation where if everything I showed you already was kind of big and robust, just know that's just the tip of the iceberg because the Mathspace here is like the bread and butter. So I'm gonna click on insert Mathspace and watch what happens. It's gonna take me to a brand new space. So this brand new space, taking some time, I apologize, I have a slower computer. But it's gonna take me to a brand new space with the same tools but also a few new tools. So I still have my equation editor that like if I were to use my equation editor quickly just to show you here, area of a square, insert it. It doesn't go into my document anymore. It actually goes into my, this little toolbars is in the way. Let me just move this here. It goes actually into this Mathspace. So it doesn't go into the doc anymore. So everything that I insert is gonna go right into this Mathspace, and I'm gonna create whatever I want and then put it into my doc using this button right here. So what's cool about this is that I have some of these cool smart shapes, so smart shapes are interactive shapes. So if kids are familiar with video games, the way I tell it to them is it's like an avatar or a skin of an avatar where they can manipulate, change the way it looks, put on different clothing, whatever. So it's kind of really cool. So if I have, let's say a protractor. Open up my protractor, and I have this on this right side, this follows me whatever I use in Mathspace. This is like my avatar skin. This is how I change things. So I'm gonna go ahead and change the graduation to 10 degrees so I can see the numbers better. And I'm gonna go ahead and let's say, if I told the student, can show me how to make a 47 degree angle. So I'm gonna take this line. I'm gonna go ahead and I'm going to pop it into the zero and try to find 47 as best as I can 44, 46, 47. And then I'm gonna go ahead and move this away. Okay, so see what happened, I tried to move the protractor, but I created more lines. So in order to move something now whenever I choose an option in here I have to use this new select tool. So the select tool allow me to move things around. So I can go ahead, just move this over to the side and I can go ahead and move this new angle that I created. Okay, so same thing. So I tried to move it, but it's not connected. So I'm gonna use my select tool, I'm gonna highlight everything and I'm gonna group it, and now I have it all together. And if I wanted to, I can use another smart shape tool called Angle Measurement. And I said, I can make this a little bit bigger. And down here, I have the option to change it to 47 degrees. That's what I was looking for. And, you know, if I was a teacher I can remove the label or show it. And I could just make a bunch of these angles and ask students to measure the angles using the protractor or vice versa. Use the protractor and make angles. So however you wanna get into it. The program allows you to do that. You can see that the 47 degree angle is pretty bang on. So I can go ahead and finish this tool. I can go ahead and do that nice little half semicircle, which is ugly there, terrible. But



you know, just for time purposes, I can go ahead and type in 47 degrees in my equation editor. And you can see that I have that little degree symbol, which is amazing because that's so hard to find digitally. And I'm gonna go click this. And I'm just gonna move this underneath and shrink it a bit, so it fits. And again, I gotta group everything, so I use my select tool, group it all, so it's all one piece and now I can move it around, right? And now if I'm gonna go insert that, if the question was create a 47 degree angle, I have to go put this into my Google Doc now. I'm gonna go ahead and click on Insert here. That's how I do it, but whatever's on my screen is gonna insert with it. So I don't want my protractor, my angle measurement tool. So I'm just gonna use my select tool just select that. And I'm gonna trash it up here. So I have a few buttons, copy and paste button as well, which I'm not gonna get into because most people know. So let's just insert that and move on to the next thing. So I'm gonna insert that, the magic happens, my hands are free. It does everything on its own, quite an amazing program to know that I can do this kind of stuff. So let's go back to Mathspace 'cause there's more. Again, tip of the iceberg. We're just scratching the surface. All right, so there is more. So for younger kids here is an interactive number line. I love this. So if I get to my number of segments here in my app like my little avatar window, I can go ahead and, you know increase the number of segments. Well, let's say 12 segments 'cause we go up to 12 times tables. I don't know why, it's such an arbitrary number. It could be 10, it could be 11, it could be 14. But for some reason we always focus on 12, but that's fine. So let's start at the number seven, and then let's go up by seven. So now I can help students learn their seven times tables or their multiples of seven or they skip counting by seven by creating this number line that just focuses on seven. And it's really, really cool. I can change the placement of the numbers. You know, it's interactive. I can insert it into my document to have it basically as a model for the students. So it's just really cool. So these smart shapes are really smart, really. Here's another idea of a fraction bar. So if we're doing, let's say I ask a student, let's go out here, what is  $\frac{3}{11}$  plus  $\frac{7}{11}$ . Okay, so let's just do that. Now., I can go back to my smart shape and I can create another one, but I want proportions to be the same, right? It's not, that does not equate to the same proportions. So I'm going to remove that. And I'm just gonna click on this and I'm gonna copy and paste the whole thing. Right, and we said  $\frac{3}{11}$  plus  $\frac{7}{11}$ . So I'm gonna go back to my avatar skin window here and I'm going to increase gonna increase it to  $\frac{7}{11}$  and then I can rotate it around like that. And I can just superimpose. Oh, wait, did I say, that's  $\frac{8}{11}$ . And I'm gonna superimpose the fraction bar on top of each other. So now I can go ahead and I can learn, and I can show that I know  $\frac{3}{11}$  plus  $\frac{7}{11}$  equals  $\frac{10}{11}$ . Right, and I can go ahead and I can insert that into my document. I could actually write it out. You know, I can write down  $\frac{3}{11}$  here. Right, again, plus, or I can say add, you know it's very intuitive that way. So plus add, however, and then I can make it very elaborate and explain it a little bit better. But again, in the interest of time I'm just going to insert these into my document just you have to keep pressing this insert button. Like you get used to it, like any tool, I kind of stress to every student and staff member, the more you use it, the better you're gonna get at it. I was never a pro at this, you know you can see I had technical difficulty in the beginning of this presentation with computer, and I'm an Assistive Technology Resource Teacher. So, you know, I'm not by any means not a pro. I just may appear as a pro because I've been using this tool for the last two years, you know, every day. And so if you take the time to use this tool and unlock the features, you'll be able to get to the level that you see me at right now as well. I can see the time is winding down. And I do wanna just showcase one other thing. In the shape section, so that's another tool, these are basic



shapes. So I'm not gonna get into them and you can bring them in. You can actually change the color if you wanted to by clicking on it and then change the color, sorry. You can import files. This is really important. So if I wanted to import anything off the internet. Let's say here's an image of a really cool winter landscape. And you can, you know, ask students pull your protractor and find the angles, measure the angles in this house, whatever, right? But it's just really cool that you know you can do this kind of stuff, but in the shapes, now this is the bottom of the iceberg I wanna get to. These are basic. This line path tool is really cool to create irregular shapes, but these three dots here, I wanna send feedback and maybe I'll make a mention. If you ever find something, Texthelp is so good at really listening to feedback. They send back emails like the same day. So if you ever find something that you said I wish this tool, I wish I wish EquatIO had this tool then just send them feedback and they will, and they've changed it. And I know they've changed the program over time. So what I'm gonna send next is that these three buttons here, and it needs its own button because it's so big. Watch what happens when I click on it there's so many things in here. There's money, there's tangram art, you know, and these tangram pieces I can pull them apart by just selecting one. Again, I can copy and paste them, turn them around. We're doing tangram art. Like there's my bow tie, we're looking cute, you know, and I go back into my more shape. There's so many things down here square base pyramids, base 10 blocks. I love these, you know, if I asked a student with real physical base 10 blocks and we move this over. If I asked students to show me 484, you know physically, it's gonna take time, but right here if I just unlock one of these I'm gonna go to copy and paste it. There's 400 and I'll take one of these, gonna copy and paste eight of them. I think I did eight of them, just one for good luck. And then if I go ahead and click this one here and there's 484, I'm gonna go ahead insert my math. And I've just showed you using 3D base 10 blocks a representation of 484. I don't know if I could physically actually do that faster. So, you know, this program is so robust and so accessible that anybody virtually or anybody at home, or even in the workspace now, we're actually using this more in school. You can do incredibly amazing things fast and in real time. Now again, Mathspace just worth mentioning is if I click on it, it is also not static. I can go edit my math and it will take me back to that Mathspace window, which is really good to know. Again, glitching is always happening, I don't know why, but it does happen. So it does bring you back. It should bring you back and it hasn't, but I can assure you that it does. If I go back here, let's try this one. Maybe because that was the last one I did. Let's try it. Maybe not. Well, I'll look into that more, but I wonder if that's something else that maybe I'm missing perhaps. But again, go into these more shapes, there's Venn diagram. So again, if you're looking at, this doesn't have to be math, this could be social studies. You know, and I can pull these apart, I can make them bigger, change the color. If we're looking at like the school landscape for students in 1920 to 2020, you know we can use social studies and use this program to help look at the differences between school a hundred years ago to now. So just really cool things. And then you go down here there's even like building resistors and motors and electrical circuits, it's really amazing because you can just, again, bring them in. And then again, just like I showed you with the select tool the highlight and you group them, and now they're one piece. So you can build standard models. You can build a representations for grade six and grade nine science as well. And, you know, it's really amazing. So again if you're not sure you can just type in prism up here, and you can see that I have prisms as well. Again, the bottom of the iceberg is for you to explore. And I would suggest that. Like when you get this tool, go ahead and explore and try click buttons, you know, make mistakes,



learn things, you know, watch the recording again, and again, and again, whatever you need to do to learn what this tool does, just go ahead and do it. Because you know, the more you use it the better you're gonna get it. So that's it for the toolbar. I do wanna end it there, but I'm gonna go back to the presentation because there is just a couple more slides. First for teachers and staff members, assignment and assessment. there is this workspace and everything in this presentation that you're getting is hyperlinked. So don't worry if you're not sure how I get that because you can just click on everything that you see here. And it brings you to this Mathspace where what's amazing is I've created, let's say this question right, you know, I created this in Mathspace, find the angles of this, what is it, a playground? And now you can see, I have slides like my presentation. This is a workspace for my students. And now my buttons changed. Look at that, it looks like it's a share button and I can actually go ahead and I can make a copy for each person, expect a response and I can click continue. And it creates a unique link. I can send that in my Brightspace, I can send that via my student email or I can just click on my Google Classroom. And once I click on my Google Classroom I can select a class. And I can, let's say, I did a camp history through music, I say, create an assignment, click on Go. And now I can differentiate, you know, my math questions for which students should get this math question. Then I can go ahead and send it to them. I can give them titles and instruction, and there's the Mathspace with the question. So it's brilliant, it really is. Like, it's very intuitive. This Mathspace dashboard, you can start by creating questions in here and then, you know have assignments sent to the students. It'll also be submitted where you can send them back and you can give real time feedback to the students. Hi, this has worked well, maybe it didn't. Can you try this? Can you remember what a triangle looks like and so on and so forth. So it really is an amazing tool because there's a backend as well. Part of the presentation, I linked five documents. There is something with a tutorial and there is like walkthroughs for this section as well. So if I've gone through this one quickly and you're like, oh, I wish you spent more time on this. Don't worry, there is more coming connected to those five documents. So just make sure you download those five PDFs. Included in those five PDFs are exemplars for assessment for, of, and as learning. If you just go ahead and click on it you can see that I've done this through Google Forms, and you can bring math into Google Forms. And when you try it out this one is really cool because this is the actual question. So, you know, which one is closer to one, which fraction is closer to a half then to one. So if I go ahead and click on like something really off,  $9/5$  and go next, I can sectional it by saying, well, that wasn't right. Maybe watch this video, review it, and try it again. You know, you can give them multiple opportunities to try. And they're like, oh yeah, I remember now. And they're like, okay, maybe it's, you know  $7/10$ . Like, oh, well you know what, you're closer, you know check out this fraction wall and so forth and so on. And then you can finally get the right answer or at least guide the students and help them out to know that the answer is  $6/10$ . And then it'll go on to the next question. And you can embed, students can click on the EquatIO link and they can actually, you know, build in the math within the Google Form as well. So that's all there for you as well. You have the opportunity to have these exemplars, click on them. You can make a copy and then you can manipulate, change them however you want, but you have them for you as well. All right pricing. So I implore everybody to beg to their principals, beg to their school boards because obviously if you go for the whole district school board, it's \$1 per students, super cheap. Peel District School Board has purchased this for every staff and student out there. I'm not sure about other boards, but we have. But you know if you have a principal and says, I



believe in it, but you know, the board doesn't, but I believe in it then it's, you know, \$10 a student. Parents out there, it may sound expensive, but really a hundred dollars is not that much money for what this is unlocking and the power that it has. However, one thing worth noting is it is free for teachers. So if you click on this link, again, this is hyperlinked. This is a form that any teacher can apply for and they can get Read&Write and EquatIO for free. But again, if you're a teacher you're gonna wanna use this with students. So I definitely would implore you to go back to your principal and ask to get it. And when I say free for teachers I'll remind everybody it's any staff member in the board. If you have a board email address, if you're an EA, a DC, educational resource facilitator, you know, anybody, a psychologist, school psychologist, it doesn't matter. You have it free as long as you have that board email attached to your name. And finally, with a few minutes, I apologize for going over but it is what it is, I apologize. But if there are any questions now would be the time to ask. And my homage to Alex Trebek, by the way I made this presentation before he passed away. So this is out of respect, not out of making fun. I watched Jeopardy all the time. I loved Alex. He was like part of our household.

- [Susanna] All right, Anthony, thank you so much. I'm gonna briefly mute you and then I will unmute you. All right, so thank you so much for that presentation. It was a deep dive, it was fast paced, but like Anthony said the recording will be available to everyone. So feel free to come back, look at things over again. And I will be sending out all the slides and links to everything tomorrow. So you'll be able to look into these documents with a little bit more time, a little more time to think about things. Just really quickly while you still have EquatIO open on your screen. One of our first questions that we got from the audience was how to teach time using EquatIO. Are there clocks available?

- Great question. Yes, there's a few options. So let's get right back into that. There are, where's the deep end? Excuse me, there are two options. So if I go to, time's always a big one, I know that, and I usually do mention it, but again, running out of time, might have missed some assignments. So I'm gonna open up my toolbar and I'll show you in, it's in Mathspace. So if I go ahead and click on the Mathspace button here too, there's that smart shape, 'member the one where it's like an avatar, you can change the skin of it. So I have my clock right here, I can make it as big as I want, or uh-oh, let me refresh that. Sometimes when you go off the screen, it kind of just re-jigs itself. And then, what I've basically, I guess I'll mention this now, since we're recording, anytime is an issue, 99% of the time it's solved by clicking this little refresh button. And so it's been a savior. So I'm gonna go ahead, except for the beginning of this presentation. So here I have this clock, I can change the time in real time or just, you know put my, if I wanna work, I dunno, let's just say you have the ability to change the time, let's say. Oops, where'd it go, oh there it is. Let's say 3:33 and 33 seconds in the PM. Okay, and it shows in real time, you have the ability to show the hands or not show the hands, show the second hand. I don't know why it changed to numerals, the stroke with, however, in the more shapes down here, that little bottom of the iceberg, there is a, okay, I can't find it, so I'm gonna use the function here, clock face, and this is just a blank clock clock face, which I love. And so if I'm teaching younger kids I might model this versus that, I might ask them to, oh, I actually have a question like that. So if I go to my EquatIO textbook here's an example of



what I've done if I go into using that clock model. So grade three, I think, is time, perhaps, where is it? Oh, there it is. So grade four or five, maybe grade three. I forget when the curriculum says, and it's always changing, especially with the new math curriculum, but you look for example. So here's three clock faces using these three clocks show three important times in school and explain why. Very open-ended question. You know, students can use their line tool just to pop in a few time, three o'clock because I get to go home. It's my favorite time, or I guess that would be 12:15, but you get the point, right? So it's a pretty cool that you have both this interactive clock, but also the clock face. And while I have you on here too, just because I saw this as I was scrolling, you know this is not just math. Like you can, however your brain has to use this tool. You can use it. So just like neighborhood planning, right? And I just imported these images from the internet. I use these lines, and basically we're making a map, right? So it's not just math. I just wanna, you know, bar graphs. You can make bar graphs within the Mathspace, and have them all labeled, it's quite a robust tool that's not just math. I just wanna stress that as well.

- That's perfect.

- Yeah. Well, thank you for that. I'll do a few more questions. I know we're running late. If you have to leave, go ahead. You can watch the questions in the recording, but if you can stick around for a few more minutes and we'll try to do maybe two or three more questions. If you have a question you can still write it into the questions box, and I'm still checking and picking out new ones. So our second question we had a couple of questions about this one. Can use EquatIO to work with Microsoft Teams or does it only work with Google programs like that? No, so it is delivered now. So your school board would have to set this up, but it is being delivered two D2L Brightspace and Brightspace is at least in our board is the engine that they use for Microsoft Teams. The ones, the two that like kinda, that's where when you're in D2L you meet on Microsoft Teams to have your synchronous learning. So it would work in D2L, but Microsoft Teams being that kind of like Google Meet there is nowhere to showcase it on Microsoft Teams. Maybe I'm wrong. I do know that there is apps on Microsoft Teams. So that's something that I could, I don't think it's available, but I could be wrong. And it's just a matter of again, when you go to sending the feedback or going to their actual website, they will have all those resources. I know they have resources on their website for Windows, Macs, perhaps Microsoft Teams, I don't know, but I know that it is built within, it is offered within Brightspace, which is usually the environment that's connected to Microsoft Teams.

- [Susanna] Okay, thank you. And now I know to get the most out of EquatIO it's best if the teacher, and all the students have access to their own accounts, but is it still usable if only the teacher has access?





- Yeah, so I mean, the teacher, it's usable in the sense where you can still use it. Students will get a free version, which basically grays out the Mathspace and it grays out the STEM tools. So a free version, which is accessible still for anybody who doesn't have the program will give you Equation Editor, LaTeX, Graph Editor, handwriting, and speech, and I believe mobile and Screenshot Reader. So the only thing you don't get is the Mathspace, which for example, if I was using Mathspace, sorry, if I didn't have access to the full program I wouldn't be able to make this bar graph 'cause this is built within Mathspace because I was able to write, manipulate it, turn it around, change the scale of the graph editor because the graph editor outside of Mathspace, so outside of, you know, just in a Google Doc, for example, the free version, it's just plot and point. So I just have the ability to put points on a graph and that sort of thing. So there is some limited capabilities even if you don't have a full version, but that's where, you know, be advocates for your students those teachers out there, you know, tell them, in this digital age where everything is virtual, like this is a program that if your school does not have it, then their behind and the students are behind. And really when it comes down to it, you know we need to be those advocates for those students. So I would say, if you don't have it, you can still use it. But again, you're not gonna unlock the full power.

- [Susanna] Okay, now is there any age that's maybe too young to use EquatIO with? Or do you think it's really suitable for K to 12?

- Well, you know so we support primary classes and I've seen, you know very basic number line uses, but again like asking a primary kindergarten student to locate the spacebar is a challenge. Right?

- It's true.

- Having them navigating a Google Drive and a Google Doc when they're still learning phonemes and letter sounds and where they are on the keyboard. Right, so that's where I think with the kids, sorry, with the primary kids, either the speech input, 'cause they may know how to say one plus one, right? And that will pull it up, you know, one plus one, and then you get that right there, very basic kind of use or even the handwriting. I know, cause they're learning, right? Even their fine motor skills are difficult. So asking them to use a mouse. It's obviously a challenge, but there are ways to use it for sure. Like even if I'm a teacher maybe that's where the free version for a kindergarten or grade one teacher is great. 'Cause I get full access but my kids don't really need Mathspace 'cause they don't really know how to get in there, but what they need are visual representations of a number line or a clock face or whatever, especially if they're doing virtual learning at home. So if I'm a kindergarten teacher, I can create this, right, and post it on their screen, and they don't have to really press many buttons, right? Or they get help from someone just to show them, where the hands of a clock go or that sort of thing, right? So it's a challenge because they're so young, and they're still learning so many other things that we're expecting



them to like locate the spacebar, which is, you know, the biggest button on the keyboard, and it's probably a challenge for them.

- [Susanna] Yeah, that would be a tough one to teach. So just talking about this document that we're looking at now, you created this in Google Docs for the just text sections and then inserted the math. Is that how you went about building it?

- Yeah, so if I were to basically go to like a new document, right? And all I honestly did was I just inserted a table, just to separate questions, right, I just wanted to have that separate, like the organization. So all I did was I'd say, I did six questions, and then I just you know, Enter, Enter, Enter, Enter, Enter, and it created a big box. And now I opened up my EquatIO extension tool, and then I went into, so if I use equation editor I'm just gonna get, you know, equations. But if I want visuals, I would go into my Mathspace. And so that's where I would create all my visual tools. Right, my visual representations. So if I wanted to do that area of a triangle, I can do my triangle like that and just represent it that way. And then do everything I wanted to do then insert it into my document. And it just plops it right there. Like the magic is quite amazing. I just love that you don't need to be technical. You just need to know how to press a button that says insert. It does it for you, I think that's brilliant. So yeah, that's all I really did. And you can number it, like question one, and then however else you would format these numbers, whatever you know, so that's all I really did. And I gave it a title. If you go back here, you'll see it, that's all I did. I just gave it a title, created boxes and I started inputting my math.

- [Susanna] Perfect, well thank you for walking us through that. I think that is all the time we have today for questions. So we're gonna end--

- My apologies.

- [Susanna] Oop.

- No, I just wanna say I apologize for taking some of that time for those questions, but, feel free, we didn't discuss this, Susanna, but if you wanna email me to ask me questions I'm open to that too. I don't know if that's something you're okay with, but you know, if people do wanna reach out to me I am available like, you know, board or not. We're here for the students right, first and foremost. So, you know, if you feel like you really need a little bit of help, but you don't have anybody at your school board, or you're a parent, and you don't have anybody as a teacher who knows how to use this tool, and you just want a little bit of help, I can offer my services.



- [Susanna] That's great. So how about we do this? If any of the viewers have a question they can email it to the email there [info@LDatSchool.ca](mailto:info@LDatSchool.ca) and then I can forward it to you, Anthony, and we can get answers to all your questions. Also, I just noticed that you, Anthony are on Twitter, so I will tag you in some of our posts so that people can find you that way as well.

- Awesome, I am not an avid Twitter user, I'm on because, you know, have some kind of connection school-related stuff, but yeah I will follow it. I get the notifications. I will appreciate it.

- [Susanna] Perfect, well, as the slide says, if you need anything from LD at School, we're always available to you just email [info@LDatSchool.com](mailto:info@LDatSchool.com) or use our hashtag on Twitter, and we'll endeavor to get answers to all of your questions. For those of you that are interested we do have another webinar coming up in January. This one is called The Road Ahead, the undergraduate learning experience for students with LDs, and it'll be presented by Sarah Tarebery. Following this webinar today you will all receive an email tomorrow morning. And in that email, you will get the link to register for this upcoming webinar as well. So on behalf of the whole LD at School team I'd just like to thank Anthony once again for his presentation and thank all of the participants today for joining us and for your patience with our small technical glitches here and there. Please remember we'll send you all the sides, all the handouts. And tomorrow in that email they'll also be a link to a short survey and we use that survey to help us plan future webinars. So if you do have the time, it only takes about five minutes and we'd greatly appreciate your answers. So with that, I will say good night for the evening and we will be sending you the recording as well in approximately three weeks. So thank you, Anthony. Thank you to our lovely audience and have a great night.

- Thank you, bye everyone.

