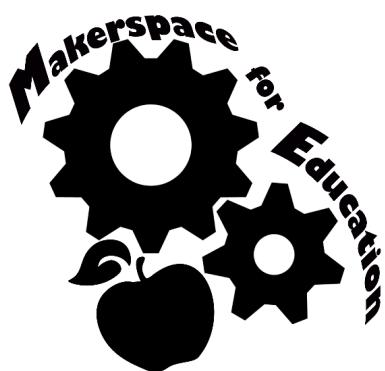
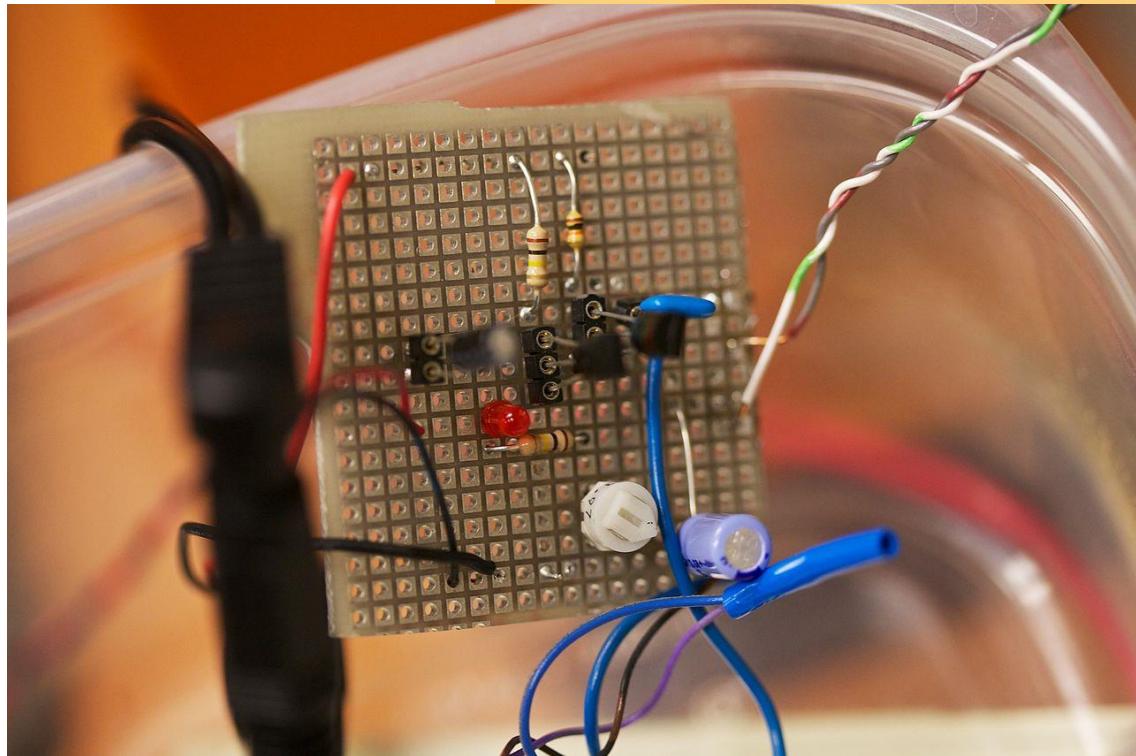


# ETEC 510

## The Making of a Makerspace: Pedagogical and Physical Transformations of Teaching and Learning

Curriculum Guide



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University of British Columbia

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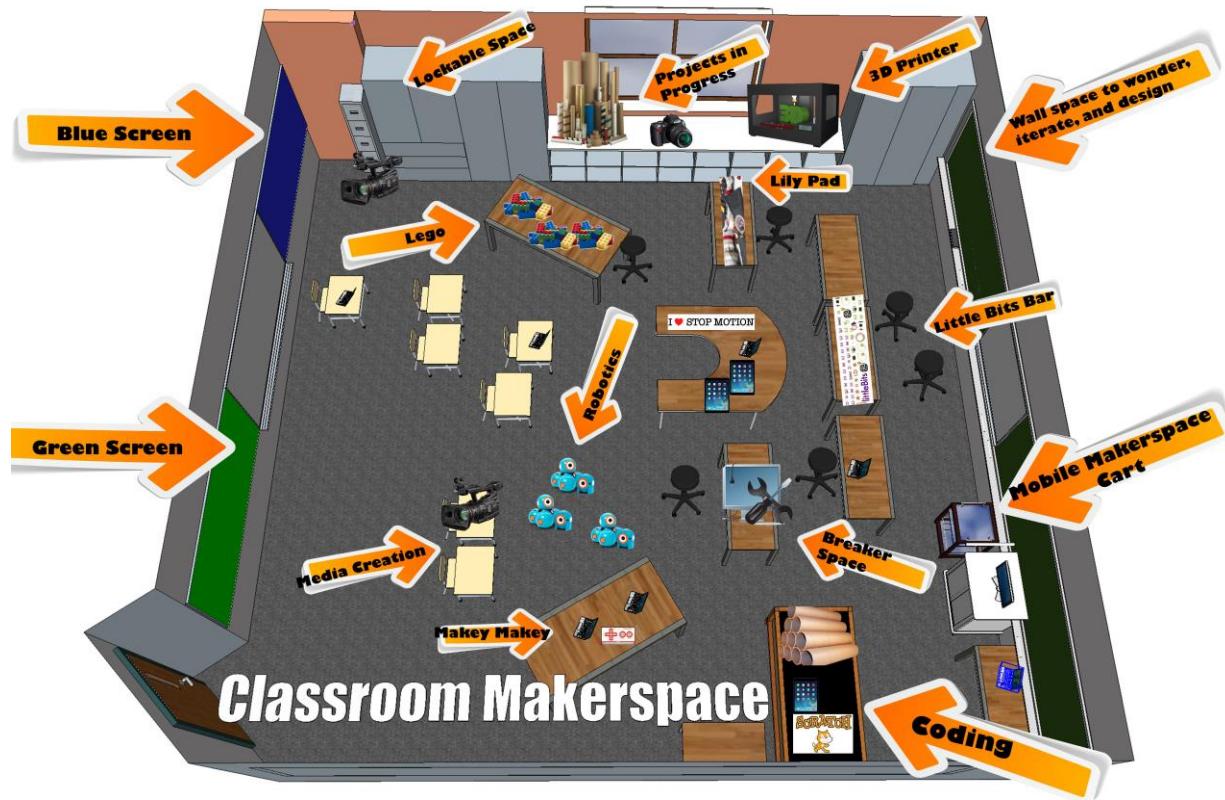
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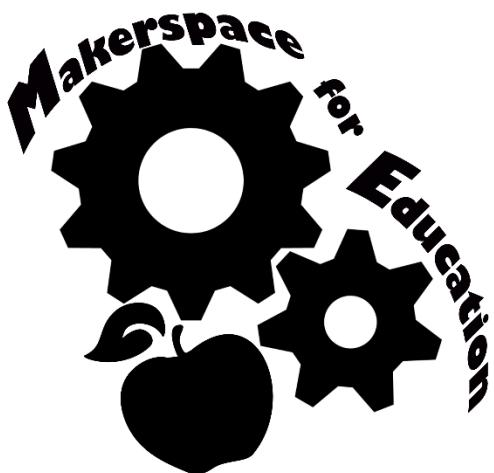
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# Welcome and Introduction



## Why Should Teachers Consider a Makerspace for Education?



Despite the popularity and trend of the term "[makerspace](#)", educators have to search hundreds of articles, websites and books to determine what this term is, how to begin, where to locate materials and determine the educational significance. Another complication is that the resurgence of this DIY movement found its grassroots in the public population and is just starting to make its way back to education. This makes navigating materials from an

educational lens even more challenging. [Makerspace for Education](#), a collaborative digital space for educators to explore how to create and use makerspaces in their own environments,



will help to transform pedagogies of individual educators through immersion in the context and the support of an educative community.

The Maker Movement is a vehicle that will allow schools to be part of the necessary return to constructivist education. It is a movement that will allow students to be creative, innovative, independent, and technologically literate; not an “alternative” way to learn, but what modern learning should really look like ([Stager](#), 2014).

Makerspace builds on a constructivist ideology to form a constructionist approach to education, as introduced by [Jean Piaget](#) and developed by [Seymour Papert](#). The primary goal of constructionism is to have learners create their own knowledge by creating and interacting with physical objects. It has clear connections to media literacy, as well as to self-directed learning. Innovative researchers, and those who wish to see schools develop 21<sup>st</sup> century learners, with the skills to work in today’s multidimensional career settings, know constructionism is a necessary tool.

The Maker Movement is a theoretical and physical embodiment of constructivism that will reform how we educate students (Roffey, 2015). Education grounded in “making” has the capacity to transform the way we think about pedagogy and learning (Kurti, Kurti, & Flemming, 2014). At the heart of this movement is the understanding that “learning happens best when learners construct their understanding through a process of constructing things to share with others” (Donaldson, 2014, p. 1). Key to the success of the Maker Movement in education is the shift away from ready-made knowledge to a classroom environment ripe for exploration, creativity, innovation and collaboration (Donaldson, 2014; Papert & Harel, 1991; Schön, Ebner, & Kumar; Schrock, 2014) with hands-on materials and real-world problems (Hatch, 2013). “Ultimately, the outcome of maker education and educational makerspaces leads to determination, independence and creative problem solving, and an authentic preparation for the real world through simulating real-world challenges. In short, an educational makerspace is less of a classroom and more of a motivational speech without words” (Kurti et al., 2014, p. 11).



The purpose of [Makerspace for Education](#) is to provide educators with a hands-on, creative, user friendly, “anytime, anywhere”, professional development tool that can be used as part of a community of practice. It allows educators to inform themselves, with tools at their fingertips, on the various aspects of the makerspace as they are ready. Using interactive tools that allow access to necessary information, directly from a user-friendly interface and based on the key frameworks of [constructionism](#), the [maker movement](#), [design thinking](#) and [media literacies](#), teachers will have the tools they need to begin, or continue, their makerspace journeys. This site will evolve and grow as the participating educators add to the content and support the construction of knowledge.

## About the Authors



Trish is an Emerging Technology Consultant in Edmonton, Alberta, Canada. In this role, Trish specializes in supporting teachers and students to explore makerspace, assistive technology, coding and robotics, and blended learning. She has taught in a variety of educational settings from Kindergarten to Grade Eight. Trish holds a BEd in Elementary Education from the University of Alberta and is currently enrolled in the MET program at the University of British Columbia.

Trish has a particular interest in supporting teachers as they explore educational technology and constructivist practices. You can follow Trish on twitter @MrsRoffey or contact her at [Trisha.Roffey@ecsd.net](mailto:Trisha.Roffey@ecsd.net)



Catherine is an elementary educator from Ontario, currently with the Niagara Catholic District School Board. She is in her 25th year of teaching and specializes in grades 5-8. Catherine has a Bachelor of Kinesiology Degree from McMaster University and a Bachelor of Education Degree from the University of Western Ontario. She is currently enrolled in the MET program at UBC and pursuing a certificate in Autism Spectrum Disorder. Although a veteran teacher, Catherine is intrigued by the developments in educational technology and realizes that there is a disconnect between the possibilities that

technology affords and how it is actually used in most classrooms. She loves the concept of a makerspace and is excited to keep exploring maker technologies in her class.





Janelle is trained in elementary education, however, now finds herself teaching adult students at NorQuest College in Edmonton, Alberta, Canada. She holds a Bachelor of Arts degree and a Bachelor of Education degree from the University of Alberta. She is currently enrolled in the Master of Educational Technology program at the University of British Columbia. You can view Janelle's teaching dossier [here](#). Through the development of this project, she has become a tinkerer herself, and inspired those around her to dive in! Janelle looks forward to exploring ways to integrate the maker movement into the world of adult education, giving adult learners all of the benefits afforded to primary and secondary students through these methods.

### **How to Use the Website and Curriculum Guide:**

Congratulations for taking the first step toward your maker education! This website was created so that you can explore different avenues of a makerspace independently. Each module can be completed on its own, with all of the other exciting and fantastic modules ready for you to explore when you are ready.

Not sure where to start? Watch this [video walkthrough](#) of our site!

The How to Use this Website page has a video walkthrough of our site and some of the highlights we don't want you to miss.

If you are ready to begin your adventure we ask that you take a few moments to [complete our pre-assessment survey](#) prior to using our site so that we can know a little bit more about you and your expectations of our makerspace website. Thanks!

Link to Pre-Assessment survey:

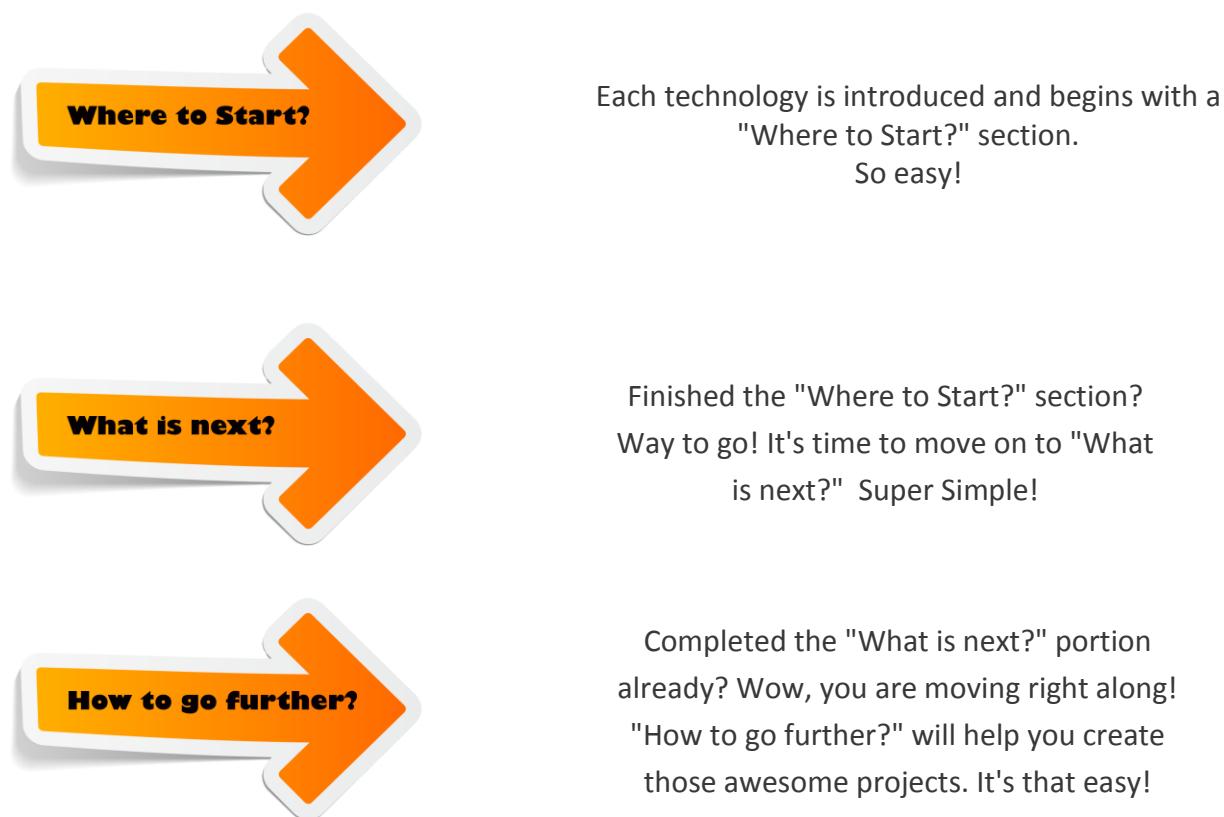
[https://docs.google.com/forms/d/1RNsjMnL9PrSUxd\\_UjzosCt5xEeEmABpLome7rFykrA/viewform](https://docs.google.com/forms/d/1RNsjMnL9PrSUxd_UjzosCt5xEeEmABpLome7rFykrA/viewform)



## How to Use this Site:

The pages of our website will start to look familiar as you explore each maker technology. We have designed a simple, streamlined format that takes you through each module in exactly the same way.

All of the technologies are supported with videos, manuals and student challenges.



Once you have had a chance to explore and implement a couple of technologies, please take time to complete our Post-Assessment Survey. This will help us ensure the site fulfills your needs!

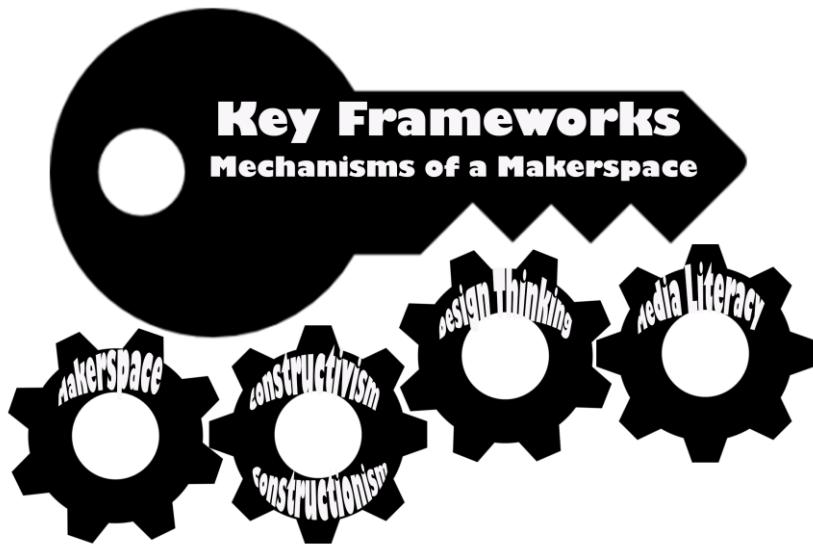
Link to Post Assessment Survey:

<https://docs.google.com/forms/d/1Evo2D9i82StpimrKgTTi-9s37CLzgaOuuZcAxFRhJoo/viewform>

We look forward to your contributions to our lesson plan ideas, blog pages and picture gallery! Please do the pre and post assessment questionnaires, as this is how we can monitor progress and help include more of what you need on the site.



# Mechanisms of a Makerspace; Key Frameworks for Makerspace in Education

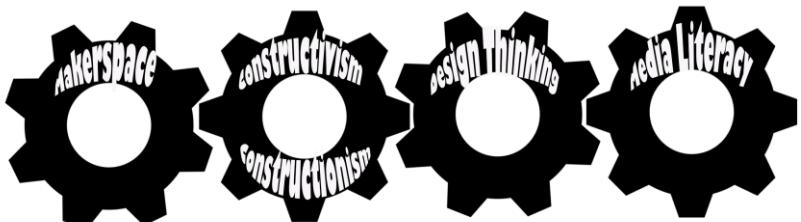


implementing a makerspace, take some time to review the main theories and frameworks supporting this movement and the mechanisms behind them.

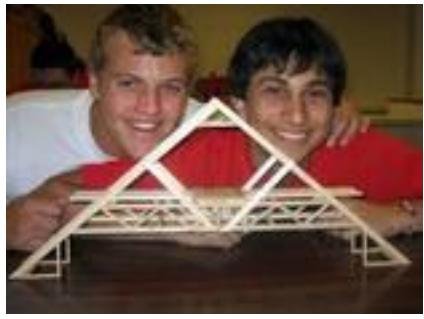
The **Makerspace for Education** resource has been developed to immerse the user, the educator, in these frameworks; constructionism, the maker movement, design thinking, and media literacy, allowing a holistic approach to learning and operating within these constructs. Through utilizing this resource, exploring and engaging with the content, educators have an opportunity to learn as we expect our students to learn; through [constructionism and constructivism](#) and the [maker movement](#), while utilizing [design thinking](#), and exercising and expanding [media literacies](#).

In our site, you will see that the key frameworks support our maker materials and activities.

## Supported By



## Constructionism & Constructivism



Constructivism and Constructionism were born out of the research and life-long work of Seymour Papert (see video link below). As stated by Hamir et al., "Constructivism is a theory of learning based on experience and observation. Through experience, and reflecting on these experiences, individuals construct their knowledge and understanding of the world" (2015).

According to constructionist models, students learn best by making tangible objects through authentic, real life learning opportunities that allow for a guided, collaborative process which incorporates peer feedback.

In constructionist educational settings, a fundamental significance is placed on the development of positive technological fluency in students and the promotion of learning through designing and sharing within collaborative environments (Papert, 1996).



Constructionist theory stresses the importance of tools, media, and context in human development, and the processes by which individuals come to make sense of their experience and envision a better world through technology fluency and integration (Ackermann, 2001). Constructivist and constructionist principles, through their emphasis on active educational opportunities, have led to the development of the maker culture and STEM focused approaches to student learning and engagement (Hamir, S. et al 2015).

The maker movement is holistically tied to constructionism and constructivist theory. The creation of objects whether they be through building a computer using Raspberry Pi, creating a video through the use of stop motion animation and green screen technology, to the development of programs using elements of coding in programs such as Scratch, all have at their core constructionism. Please view the video below as well as explore the video library on this page in our site.

Seymour Papert -- inventor of everything: Gary Stager at TEDxASB  
<https://www.youtube.com/watch?v=6-dFTmdX1kU>



## Makerspace

Makerspace is a constructivist and constructionist movement that is taking the world by storm! Imagine DIY meets education! Makerspace is not only a hackshop where you can go to learn how to use an arc welder for the afternoon. Makerspace is an educational concept as well, having materials available that can act as a provocation for inquiry, as well as modern technology and items to invent with.



critical for policy makers to understand as we develop frameworks that move away from consumption, towards creation in our educational settings (Alberta Education, 2011; Fullan, 2013; Wagner & Compton, 2012). A makerspace is about “turning knowledge into action” (Flemming, 2015, p. 7), and allows for a true opportunity to support personalized learning (Martinez & Stager, 2013).

The Maker Movement is about teaching and learning that is focused on student centered inquiry. This is not the project done at the *end* of a unit of learning, but the actual vehicle and purpose of the learning. The time to change education is needed now more than ever, and we are facing an educational system in crisis and a global economy feeling the ripple effect of this failure (Wagner, 2012). Wagner captured the voice of business leaders describing the need for students to graduate with the skills of creativity and innovation, and that our educational institutions are failing to meet this mark (2012). “There are essential elements of educating young people to become innovators: the value of hands-on

Makerspace is more than a space itself, it is a mindset that can and should be taught (Gerstein, 2014). We have a student culture of children who have learned to consume technology. Educational zombies with all of their technological skill residing in the swipe of an index finger. With a makerspace, we can move beyond consumption to creation. There is a strong advocacy for this type of teaching and learning and it is



projects where students have to solve a real world problem and demonstrate mastery; the importance of learning to draw on academic content from multiple disciplines to solve a problem; learning to work in teams" (Wagner & Compton, 2012, p. 52). This description can be found at the heart of the maker movement manifesto; imploring individuals, community centers and schools to allow people to make, share, give, learn, tool up, play, participate, support, and change (Hatch, 2013).



A makerspace can take many forms, from an entire library transformed into a learning commons, a CTS lab, an early learning Atelier inspired by Reggio Emilia, or bins, buckets and carts that form a mobile makerspace. What is important before you begin the physical transformation of a space, is to consider the pedagogical implications of transforming teaching and learning first. The space can then be determined based on budget, physical location and access for students.

In the [makerspace](#) section of the website you will find critical pedagogical and practical information for starting your own makerspace in your school, as well as the best [resources](#) and [websites](#) for makerspace in education. Check back often as this site will grow and evolve with additions from our community of practice!



## Resources

This page is a collection of what to read, who to follow and other resources to help educators in their makerspace journey!

[Learn More](#)



## Innovation Learning Center

The Innovative Learning Centre is bringing together students, educators and industry partners to collaborate and engage in the cycle of learning in order to create new innovations in the world of education. We are challenging the idea of a traditional classroom by exploring how physical and virtual environments can affect and improve learning.

[Learn More](#)



## Best of the Web

This is a collection of handbooks, resources and ideas for makerspaces in education.

[Learn More](#)



## Design Thinking

**Design thinking, put quite simply, is a method to solve a problem.** In schools, we often have a traditional model of a teacher providing knowledge and a student replicating that knowledge in the form of a project *after* the knowledge transfer has taken place. Despite this project perhaps being viewed as "hands on learning" and some type of creation made by the student, it is not constructionism just because a student "constructed" something. There was no problem to be solved, only information to be reproduced.

**Design thinking is the crucial element that MUST occur BEFORE, DURING and AFTER making happens.** This thinking process is the true evidence of creativity, application and problem solving using what the student already knows and *giving them a reason to learn more*. This design thinking is a methodology that will encourage the solving of complex problems through ideation and iteration.

Creativity has the potential to help reform education, and yet we have educated our students out of creativity with our factory model classrooms and high stakes testing (Robinson & Aronica, 2015). With the maker movement finding its way into our schools, we have a chance to use design thinking as a way to teach and develop complex skills of creativity. Creativity can and must be taught if we are to prepare students for a world that requires innovators (Wagner & Compton, 2012). This design thinking must be approached with intentionality.

Dr. Susan Crichton from the Innovative Learning Centre warns of what can happen if the maker movement is not approached with a shift in purpose.

"Unless educators intentionally pursue innovation and creativity as learning outcomes, makerspaces will become "imagination ghettos" where issues of access, purpose, and ownership resemble those common in the cloistered environments of early computer labs and many of today's shops and students are tasked with cookie cutter activities and trivial projects to complete." (Crichton & Carter, 2015, p. 3).

### Purpose of Design Thinking in Maker Education

Giving students a real life problem to solve, as an intentional reason to use design thinking, changes the quality of the learning. Students are not learning because a teacher simply told them information they are required to remember, students are learning because they *need and want* to solve a problem to



make the world a better place. This type of design thinking has the power to transform students into global citizens committed to creative solutions to solve global problems. This is the type of student innovator we are missing in our current educational settings (Wagner & Compton, 2012). You will find three examples of student innovations that have changed communities for the better. You can use these examples as inspiration with your students.

### **Iterations Design Thinking**

In design thinking, repeating a process to test, improve and design is crucial. This is known as iterations. In education we often allow children two iterations; rough copy and good copy. In design thinking we need to expand our understanding by allowing students to continually revise their design on an ongoing basis for the support of a process over the completion of a product. You will see step by step instructions for introducing iterations to your students on our site.

### **Design Thinking Educational Resources**

Our site contains four amazing sites for design thinking in education. Try one of the design challenges from the [Innovative Learning Center makerday tool kit](#), [the Stanford d.school](#), [the K-12 Lab Wiki](#), or [Design Thinking for Educators](#). Also, you can share the concept of iteration and failure in design by watching this video of a student with his [Rube Goldberg Machine](#).



## Media Literacy

The growing need in the workforce for workers that are creative, innovative, adaptive, and responsive means literacy needs to be redefined to include technology and media literacies.

Core media literacies (Jenkins, H., 2009) include:

- **Appropriation;** the ability to remix existing products. Up to now, education has emphasized the creation of original products. More and more, the value of appropriation and remixing (with attribution to the original authors) is being recognized. This allows one to begin with a springboard and think beyond the basics of early attempts.
- **Distributed cognition;** the ability to utilize tools to enhance one's work. Utilizing tools to compliment one's cognitive processes allows one to accomplish much more than would be possible without the assistance of tools. For example, Scratch allows one to code complex projects without being fluent in any coding language. The program itself takes care of the coding language while the user simply clicks, drags, and drops building blocks.
- **Collective intelligence;** the ability to access the expertise of others in problem solving. Accessing the knowledge of others allows people to bring their strengths to a project, while allowing others to contribute additional strengths. This allows for a much more complex product than one would be able to produce singly.
- **Transmedia navigation;** the ability to take explore the possibilities across mediums. The ability to create in one medium or platform is no longer enough. One needs to be able to utilize multiple mediums to communicate various elements of a project. For example, a website base complemented by external videos, resources, activities, and wikis.
- **Networking and negotiation;** the ability to collaborate with people in various contexts. Possibly one of the most valuable skills in the ability to embrace and function within multiple communities with varying cultures. This may include the cultures of the people participating, or the culture of the virtual community. Flexibility and adaptability are crucial to developing this skill.



Media Smarts advocates for media literacies. Click the image for more information.

The screenshot shows the Media Smarts website. At the top left is the logo 'Media Smarts' with three colored circles above it. To the right is a search bar with the placeholder 'Search this site' and a magnifying glass icon. Below the search bar are social media icons for Twitter, Facebook, and RSS feed. The top navigation bar includes links for 'Press Centre', 'How to Support MediaSmarts', 'Contact Us', and 'Français'. A secondary navigation bar below has links for 'Home', 'Digital & Media Literacy', 'Research & Policy', 'Teacher Resources', 'Blog', and 'About Us'. Under 'Digital & Media Literacy', the 'General Information' section is selected, leading to the 'Digital & Media Literacy Fundamentals' page. This page features a large image of children using laptops and tablets. On the left, a green callout box says 'In this section, you can find...'. The text inside the box reads: 'Welcome to the "fundamentals" section of our website, where we bring together the various concepts and competencies that define what it is to be literate in today's complex media culture. Here we explore digital literacy and media literacy and their underlying aspects and principles.' Below the image is a decorative graphic of overlapping colored circles (blue, purple, yellow, green).

Through a virtual makerspace for teacher professional development, educators are able to enhance their own media literacies; a necessary step in developing these literacies in our students.

Traditional pedagogy is not adequate in teaching media competencies. In order for this literacy to grow holistically, pedagogy needs to be based in situated practice, immersion into an authentic community; overt instruction, collaboration with the support of more advanced peers; critical framing; examining learning objectively to gain insight to the larger picture; and transformed practice, applying new knowledge to situated practice (New London Group, 1996). A virtual makerspace will immerse educators in the experience of these key pedagogical elements, as well as position them to apply this pedagogy in their own classrooms.

Historically, professional development on technology has consisted of an expert-led demonstration in a context-barren environment. Teachers are not given opportunities to explore, apply, discuss, or collaborate using the new technology. This results in poor uptake of the new tool. For educators to truly engage with, and utilize technology and media, it must be



introduced holistically, through design (Mishra, P., Koehler, M.J., 2006). Immersion in a makerspace provides educators with the opportunity to learn this technology through design, which significantly increases the chance of uptake and application in the classroom.

Be sure to explore our Media Literacy in action on our page!

## Media Literacy in Action!



Joseph Gordon Levitt has recently launched a collaborative online community that aims to be a large-scale production company. Take a look at this take on media literacy!



Listen as Salman Khan, founder of Khan Academy, discusses media literacy in terms of the power of video, interactivities, and a flipped classroom.



Watch a summary of what media literacy is, and what it takes to be media literate in today's world.



## Papert's Big Ideas

Seymour Papert was the founder of the Constructionist Learning Lab, and he had 8 big ideas that were crucial to the undertaking of this type of teaching and learning. These big ideas are found in [Invent to Learn: Making, Tinkering and Engineering in the classroom](#). We have created a poster to hang in your classroom makerspace to use with both teachers and students as they approach a new understanding of creativity, inquiry and makerspace in the classroom!

You can view the Poster we have created representing these big ideas, or download a copy for yourself

# 8 Big Ideas of Maker Centered Education

**1 Learn by doing!**  
We all learn better when learning is part of doing something we find really interesting. We learn best of all when we use what we learn to make something we really want.

**2 Technology as building material!**  
If you can use technology to make things you can make a lot more interesting things. And you can learn a lot more by making them. This is especially true of digital technology.

**3 Hard fun!**  
We learn best and we work best if we enjoy what we are doing. But fun and enjoying doesn't mean "easy". The best fun is hard fun. Our sports heroes work very hard at getting better at their sports. The most successful carpenter enjoys doing carpentry.

**4 Learning to learn!**  
Many students get the idea that "the only way to learn is by being taught". This is what makes them fail in school and in life. Nobody can teach you everything you need to know. You have to take charge of your own learning.

**5 Taking time!**  
Many students at school get used to being told every five minutes or every hour to do this, or do that, and now do the next thing. If someone isn't telling them what to do they get bored. Life is not like that. To do anything important you have to learn to manage time for yourself.

**6 You can't get it right without getting it wrong!**  
Nothing important works the first time. The only way to get it right is to look carefully at what happened when it went wrong. To succeed you need the freedom to goof on the way.

**7 Do unto ourselves what we do unto our students!**  
We are learning all the time. We have a lot of experience of other similar projects but each one is different. We do not have a pre-conceived idea of how exactly this will work out. We enjoy what we are doing but we expect it to be hard. We expect to take the time we need to get this right. Every difficulty we run into is an opportunity to learn. The best lesson we can give our students is to let them see us struggle to learn.

**8 Digital world!**  
We are entering a digital world where knowing about digital technology is as important as reading and writing! SO learning about computers is essential for our students' futures BUT the most important purpose is using them NOW to learn about everything else.

Makerspace  
for Education

by Dr. Seymour Papert

**INVENT TO LEARN**  
MAKING, TINKERING, AND ENGINEERING IN THE CLASSROOM  
Seymour Papert & Mitch Resnick

You can go even deeper into the big ideas and share our collective understanding of the concepts through experience and research. This image below is taken from our [Papert's Big Ideas page](#) showing one of the big ideas. You can find all 8 by visiting the page itself!

# Going Deeper into the Big Ideas...our thoughts, experience and research!

## Idea 1

### Learn by Doing!

Learning becomes solidified when the content and pedagogy are authentic and relevant. That is, in order for deep learning to occur, one must interact with the content and knowledge directly. Makerspace allows this to occur for students, by making them the creators and designers of their own knowledge. The same premise is applicable to educators. Through experiencing the concept and content of a virtual makerspace as professional development, educators are deeply engaged with the framework and better able to envision this pedagogy at work in their own work environments. As we know, learning through design is the most effective way to learn and integrate new knowledge into current memory structures.

Finally, we would like to hear from you! Please contribute your own big ideas of maker education to our community of practice!

Do you have a big idea for maker education? Please share your experience with us!

### Big Ideas!

Name \*

First

Last

Email \*

Comment \*

**Submit**



## **Materials of a Makerspace; No Tech, Low Tech and High Tech**

The technologies presented in the [Makerspace for Education](#) resource have been selected to support educators in introducing, or expanding, makerspace in their own classrooms or schools. A wide variety of technologies have been included; from no-technology requirements, such as [inventions with recycled materials](#); to mid-technology requirements, such as [digital storytelling](#), to high-technology requirements, such as [Dash and Dot](#). There is something for everyone! Each technology page contains links to resources that are informative and instructive for that element of the makerspace. Each section offers classroom applications, lessons, tutorials, and videos. Introduce one technology at a time, as to not overwhelm yourself or your students. By mastering one technology at a time, the likelihood of sustaining and expanding the makerspace is improved. The purpose of these pages is to have the materials at your fingertips when you are ready. If you are new to a technology, take time to review the resources and videos, and complete the student challenges yourself; making yourself comfortable before introducing the technology to your students. In this way, you will be better able to support and challenge your students appropriately.

### **Look for these signs to help navigate and choose your own makerspace adventure!**

**Where to Start?**

A PLACE FOR A BEGINNER WITH NO PREVIOUS EXPERIENCE TO START. THIS IS A CHANCE TO LEARN!

**What is next?**

A CHANCE TO TEST DRIVE THE MATERIALS WITH STUDENTS IN A SAFE AND EASY WAY. STEP BY STEP LESSONS WITH SUPPORT AND VIDEOS ARE PROVIDED.

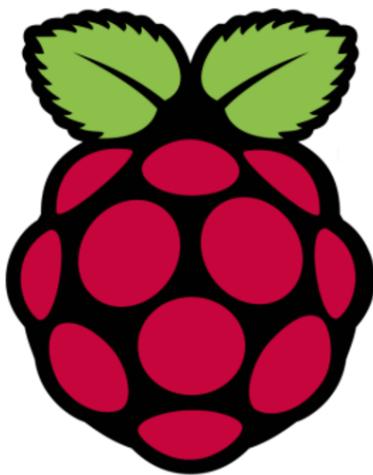
**How to go further?**

AN OPPORTUNITY TO GO DEEPER INTO THE TECHNOLOGY FOR MORE ADVANCED USERS WHEN THEY ARE READY. STUDENT CHALLENGES, ADDITIONAL LESSONS AND RESOURCES ARE PROVIDED.

You will also have an opportunity to contribute lesson ideas to our makerspace community as well as participate in our page by page discussion group. Look for these two features at the bottom of each page.



# Raspberry Pi - What is it?



The Raspberry Pi is a credit-card sized computer that costs only \$35, plugs into a computer monitor or TV, and uses a standard keyboard and mouse. This computer is accessible to people of all ages to learn how to build a computer and start exploring computer programming using languages like Scratch and Python. You can use this mini computer just like you would your desktop computer to do everything from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games.

What's more, the Raspberry Pi is part of the maker movement! You can connect with people from all over the world to invent a wide array of digital maker projects, from music machines and parent detectors to weather stations and tweeting birdhouses with infra-red cameras.

**Where to Start?**

HERE YOU WILL FIND INTRODUCTORY VIDEOS, MATERIALS AND A "HOW TO" FOR YOUR VERY FIRST RASPBERRY PI SET UP [HTTPS://WWW.RASPBERRYPI.ORG/HELP/QUICK-START-GUIDE/](https://www.raspberrypi.org/help/quick-start-guide/)

**What is next?**

THIS IS THE GETTING STARTED LESSON FOR THE RASPBERRY PI WITH YOUR STUDENTS [HTTPS://WWW.RASPBERRYPI.ORG/HELP/QUICK-START-GUIDE/](https://www.raspberrypi.org/help/quick-start-guide/)

**How to go further?**

THERE ARE MANY LESSONS AND MAKERSPACE PROJECT IDEAS TO HELP YOU TAKE YOUR RASPBERRY PI FURTHER [HTTPS://WWW.RASPBERRYPI.ORG/RESOURCES/](https://www.raspberrypi.org/resources/)

**Key Frameworks:** Raspberry Pi is a credit card sized computer you build and code yourself. There are tons of great free resources to help you get started and to support Raspberry Pi in your Makerspace.



**Materials:** For the Raspberry Pi it is recommended you order a [basic starter kit](#), as well as have a monitor, keyboard and mouse. Subsequent projects may require additional maker materials.

**Resources:** The maker community has many resources for educators using the Raspberry Pi. The [free projects and ideas book](#) is an amazing way to get started in any classroom with over 200 projects!

**Sample Activities and Learner outcomes:** Our two student challenges are based in [literacy outcomes of storytelling](#) as well as [numeracy outcomes of elapsed time](#). You can use the challenges as they are, or tailor them to suit your grade and outcomes.

Don't forget to contribute to our community with your lessons and discussions!



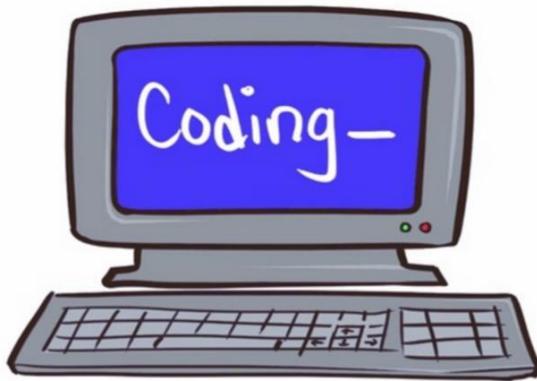
Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Raspberry Pi FAQs and Support

Comments, questions, suggestions, or feedback about Raspberry Pi? Post them here! Feel free to respond to other members' posts as well!

Topics (0)	Replies	Last Post	Views
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# Coding - What is it?



Coding, also called computer programming, is a series of instructions to a computer in a specific computer based language such as Python, HTML, Java, C++ and more.

Traditionally these computer languages were reserved for college level students and were intensely complicated with syntax. Coding has never been more accessible to students of all ages! Thanks to block based coding languages such as Scratch, students and teachers can learn to code in a safe and easy environment. Coding in education has received world wide attention, especially since the UK mandated computer programming for all grades starting in 2013. The BC school board just announced their new coding curriculum for September 2016! Coding is becoming an important part of education!

What's more, coding is part of the maker movement! You can connect with people from all over the world to code robotics, machines, games and a wide array of digital maker projects,

**Where to Start?**

[CODE.ORG](#) IS AN AMAZING RESOURCE FOR BEGINNER CODERS, FOR TEACHERS AND STUDENTS. THE WORLD WIDE EVENT, HOUR OF CODE, LETS YOU TRY CODING FOR 1 HOUR IN SAFE AND EASY TUTORIALS. TRY HAVING STUDENTS WORK IN PAIRS TO COLLABORATE AND PROBLEM SOLVE TOGETHER. THESE TUTORIALS ALSO WORK ON ANY DEVICE!

**What is next?**

NOW THAT YOU TRIED YOUR FIRST HOUR OF CODE, YOU ARE READY FOR SOME MORE CODING LESSONS! [CODE STUDIO](#) HAS OVER 20 HOURS OF SELF PACED COURSES FOR STUDENTS AGED 4-18! THE FOCUS IS ON PROBLEM SOLVING, NUMERACY AND LITERACY SKILLS.

**How to go further?**

[SCRATCH](#) IS AN EDUCATIONAL BLOCK BASED CODING LANGUAGE. SCRATCH HAS AN ACTIVE EDUCATOR COMMUNITY THAT SHARES LESSON IDEAS AND STUDENT PROJECTS. THIS [EDUCATIONAL GUIDE](#) FROM THE SCRATCHED TEAM CAN HELP TEACHERS GET STARTED WITH THEIR FIRST LESSON IN SCRATCH!

**Key Frameworks:** Don't be afraid of coding. There are some user friendly beginner programs to help you and your students start coding.



**Materials:** Coding can be done on a PC, MAC, iPad or Android device depending upon the format you want to try. You can also code "[unplugged](#)" and teach student computer science without the computer! There is a free download of the [educator guide](#)!

**Resources:** We have created 20 student challenges that all link to websites with more information, tutorials, lessons and ideas. You can also download and print the [trading cards](#) for your students!

**Sample Activities and Learner outcomes:** Coding fits many aspects of literacy and numeracy outcomes across many grade levels. We challenge you to start by using code to tell a story!

Don't forget to contribute to our community with your lessons and discussions!



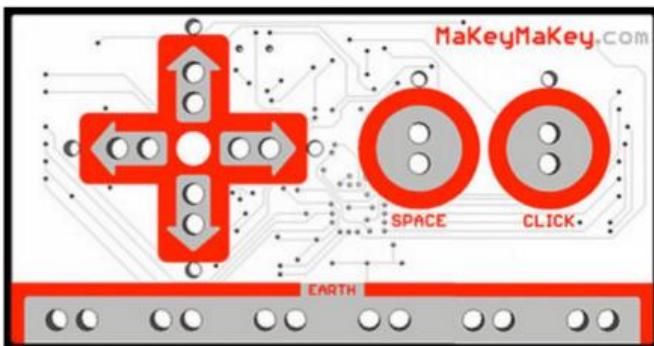
Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Coding FAQs and Support

Comments, questions, suggestions, or feedback about coding? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options
Topics (0)	Replies	Last Post
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# Makey Makey - What is it?



MaKey MaKey - An Invention Kit for Ever...

Where to Start?

THE ["HOW TO" PAGE](#) OF THE MAKEY MAKEY SITE FEATURES THE MAKEY MAKEY QUICK START GUIDE! YOU CAN GO STEP-BY-STEP TO HOOK UP AND TRY YOUR MAKEY MAKEY FOR THE FIRST TIME!

What is next?

NOW THAT YOU HAVE SET UP YOUR MAKEY MAKEY, YOU ARE READY FOR YOUR FIRST PROJECT! YOU WILL FIND THE [LESSON PAGE](#) OF THE MAKEY MAKEY SITE FULL OF FUN SURPRISES AND EASY TO USE, STEP-BY-STEP CLASSROOM LESSONS YOU COULD ADAPT AND MAKE YOUR OWN!

How to go further?

YOU ARE READY TO TAKE YOUR MAKEY MAKEY FURTHER! CHECK OUT THE CLASSROOM RESOURCES BELOW THAT WILL HELP YOU SELECT THE RIGHT PROJECT FOR YOUR STUDENTS FROM BEGINNER TO ADVANCED! THERE ARE ALSO SOME AMAZING [GROUP ACTIVITY GUIDES](#) THAT ARE FULL OF DETAILS AND INSPIRATION FOR YOUR NEXT MAKERSPACE ADVENTURE!

## Key Frameworks:



Makey Makey's are as fun to use and learn as it is to say. You are only limited by your imagination. Makey Makey is supported by a large online community to help you on your journey.

**Materials:** For the MaKey MaKey, it is recommended you order a [basic starter kit](#), as well as have a variety of conductive materials such as tin foil, copper tape, play dough and more! The MaKey MaKey requires a lap top computer with a USB port.

**Resources:** The maker community has many resources for educators using the MaKey MaKey. The [Instructables site](#) has hundreds of MaKey MaKey projects to inspire creativity and design thinking!

**Sample Activities and Learner outcomes:** Our student challenges will help get you started! You can make a [musical piano](#), [a game controller](#), your own [operation game](#), and an interactive [story](#) or [word wall](#)! You can use the challenges as they are, or tailor them to suit your grade and outcomes.

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!



## MaKey MaKey FAQs and Support

Comments, questions, suggestions, or feedback about MaKey MaKey? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options
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Free forum by Nabble		
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# Robotics - What is it?



DASH AND DOT ARE AN AMAZING ROBOT TEAM TO HELP STUDENTS LEARN HOW TO USE BLOCK LANGUAGE PROGRAMMING! THIS DYNAMIC DUO IS PERFECT FOR AGES 4 AND UP TO BEGIN THEIR EXPLORATION OF ROBOTICS AND COMPUTER SCIENCE!

KIBO IS A ROBOT THAT STUDENTS CODE USING WOODEN BLOCKS! NO COMPUTER REQUIRED! STUDENTS CONSTRUCT AMAZING CREATIONS, CODE AND COLLABORATE!

THE AMAZING MODULAR ROBOT LETS STUDENTS CONNECT AND CODE USING PRE-PROGRAMMED ELECTRONIC BLOCKS. THE LEGO ADAPTER ALLOWS FOR AN EVEN BIGGER HANDS ON MAKER EXPERIENCE!

## Key Frameworks:



Playing with Robots while learning block language programming, what could be more fun? Start your adventure with Dash and Dot, Kibo or Cubelets.

**Materials, Resources and Student Challenges:** Each page in the robotics section will take you through step by step where to start, what is next, and how to go further. The links to the product websites with costs, tutorials and classroom ideas have also been provided. We have started with [Dash and Dot](#), [KIBO](#) and [Cubelets](#), but will be adding exciting new classroom robotics soon!

Don't forget to contribute to our community with your lessons and discussions!



Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Robotics FAQs and Support

Comments, questions, suggestions, or feedback about robotics? Post them here! Feel free to respond to other members' posts as well!

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# Media Creation - What is it?

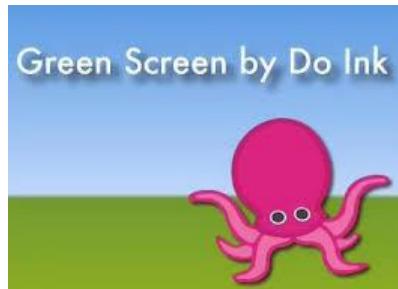
Media Creation is the use of Green Screen Technology, Stop Motion Animation and Digital Storytelling in the Classroom!



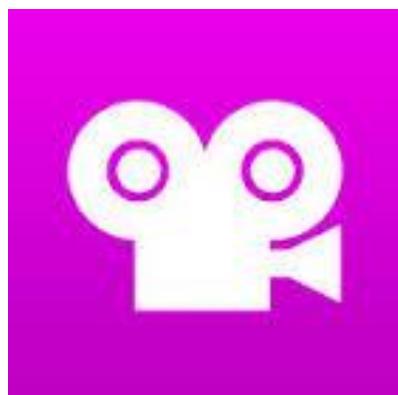
Media Creation in this module consists of the use of green screen technology, stop motion animation and digital storytelling apps and programs available for iPads, laptops and smartphones. These apps are user friendly and accessible to people of all ages to learn how to use green screen technology, stop motion animation and digital storytelling platforms. You can use these apps across the curriculum to engage students and enhance the presentation of student created projects.

What's more, Media Creation is part of the maker movement! You can incorporate green screen technology, stop motion animation and digital storytelling in your classroom and connect with people from all over the world to invent a wide array of digital maker projects, from "on location" weather reports, stop motion animation book reports to exploring cultural diversity through digital storytelling. On the connected pages you will be introduced to several apps, websites and programs. We will present some material in depth and have provided references for other apps that you can investigate further on your own when you are ready.

The media creation page is a launch page for the section on green screen technology, stop motion animation and digital storytelling.



When you are ready to learn about the awesome world of green screen technology go to the green screen page. It's an excellent place to start when entering the world of media creation!



Stop Motion Animation is a super fun way to have your students tell their stories, present projects and develop their own creativity. There are several apps and programs to choose from.





Digital storytelling is a fantastic way to have your students incorporate their media literacy skills into one project. There is an endless array of uses in every classroom for digital storytelling. An excellent way to engage students of all ages.

**Key Frameworks:** Each page in the media creation section will have its own key frameworks segment. This will give you basic information on where to start with each of the modules.

**Materials:** Each page in the media creations section will have its own section on the materials needed to get started and launch you on your way to improving digital literacy in your classroom.

**Resources:** The maker community has many resources for educators using green screen technology, stop motion animation and digital story telling. Each page will have its own resources for you to access.

**Sample Activities and Learner outcomes:** Each module will have its own student challenges. You can use the challenges as they are, or tailor them to suit your grade and outcomes.



# Green Screen Technology - What is it?



Everyone has heard of a green screen, but how do you use it effectively in your classroom to enhance digital creations, change the setting in stop motion animation and enhance the background during digital presentations?

Green screens are used in the movies to make it look like the actors are driving across the desert, and it's used on TV to make it look like your local news announcer is standing in front of an animated weather map. It is easy and fun to use green screens in your classroom media creations. Green Screen by Do Ink is one of the easiest ways to get started.

Where to Start?

HERE YOU WILL FIND SIMPLE APP INFORMATION, AND INTRODUCTORY VIDEOS FOR YOUR FIRST GREEN SCREEN PRODUCTION. [HTTPS://WWW.YOUTUBE.COM/WATCH?V=QLH3H19ABLI](https://www.youtube.com/watch?v=QLH3H19ABLI)

What is next?

ONCE YOU HAVE THE BASICS OF THE DO INK APP DOWN IT IS TIME TO MOVE ON TO LEARNING SOME OF THE OTHER AWESOME FEATURES IT HAS. THE DO INK GUIDE IS FOUND AT [HTTP://WWW.DOINK.COM/SUPPORT/](http://www.doink.com/support/)

How to go further?

NOW THAT YOU HAVE MASTERED DO INK IT IS TIME TO TRY GREEN SCREEN IN IMOVIE. ALTHOUGH A BIT TRICKIER THE EFFECTS CAN BE WELL WORTH THE EFFORT. [HTTPS://WWW.YOUTUBE.COM/WATCH?V=RU0PXLNWZFM](https://www.youtube.com/watch?v=RU0PXLNWZFM)

## Key Frameworks:



Introducing your students to Green Screen Technology will allow them to virtually travel anywhere they have ever imagined. Super powers are no longer just a fantasy, at least in pictures. Let their imaginations soar.

**Materials:** The Do Ink app is the best place to start but there are several other ways to use green screen technology including converting your white board into a green screen using a projector and green coloured computer screen. You can purchase green fabric or ready made green screen kits. To begin using green screen technology it is recommended you start with the Do Ink App (\$3.99) from the App store. Its accompanying video and guide are user friendly and have you up and running very quickly.

**Resources:** There are several guides, videos and sites dedicated to the use of the green screen the most comprehensive being [The Green Screen Handbook](#)

**Sample Activities and Learner outcomes:** Once your students have been introduced to green screen technology it can be utilized in any curriculum area where you incorporate digital media literacies including making iMovie trailers [iMovie Movie Trailers](#).

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!



Green Screen FAQs and Support      Refresh Permalink Login Register  
Comments, questions, suggestions, or feedback about green screens? Post them here! Feel free to respond to other members' posts as well!  
[New Topic](#) [Postpone](#) [Options](#) |  
Topic (0) Replies Last Post Views  
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0 Posts | Created by [Athena](#) | 11 views  
Free forum by Noxide  
[Edit this page](#)

# Stop Motion Animation - What is it?



Stop Motion Animation is an excellent way to have students begin to explore the world of movie making. There are several stop motion animation apps and programs that help you begin your journey. Stop motion animation can be very simple to extremely complex. Most students will recognize stop motion animation from movies such as The Nightmare Before Christmas, Wallace and Grommit and Coraline. Many of your students may have already explored stop motion animation on their own. There are several stop motion apps for iPad and programs for laptops available. The apps developed for the iPad are quite user friendly. Programs developed for laptops can be a bit more tricky, and better suited for a more advanced user. (They are great programs to work with once you have the basics down pat.) Many apps are free but require in app purchases to be fully operational or you must transfer your captured images to iMovie to do the final editing. Upgraded versions of the "free" apps often have built in editors as is the case with Stop Motion Pro. There are also stop motion apps available for a fee.

**Where to Start?**

TO GET STARTED USING STOP MOTION ANIMATION TRY USING THE FREE APPS AVAILABLE. WE RECOMMEND STARTING WITH STOP MOTION OR LEGO MOVIEMAKER

**What is next?**

NOW THAT YOU HAVE TRIED OUT THE FREE APPS IT IS TIME TO TRY ALL OF THE FEATURES OF THE ONE YOU LIKE BEST. AGAIN OUR RECOMMENDATION FOR STARTING OUT IS STOP MOTION PRO (\$6.99)

**How to go further?**

YOU ARE READY TO TAKE YOUR STOP MOTION ANIMATION FURTHER. THE IMOVIE APP FOR THE IPAD IS \$6.99). IMOVIE ON MAC IS ALSO AN OPTION. THESE MAY BE MORE SUITABLE FOR ADVANCED STUDENTS.

**Key Frameworks:** Everyone is a movie maker at heart. Stop Motion Animation is an excellent way to have students creatively tell their stories.

**Materials:** For Stop Motion Animation it is easiest to use a tablet and user friendly apps such as Stop Motion/Stop Motion Pro or Lego Moviemaker. If using a laptop it is best if it has an onboard camera. If there is no camera you will need a device that takes digital pictures such as a digital camera or cell phone with camera.

**Resources:** The maker community has many resources for educators using Stop Motion Animation. [The Stop Motion Handbook](#) is a great way to get started in any classroom with awesome tips and lesson ideas!.

**Sample Activities and Learner outcomes:** There are six student challenges provided in this module. Scripting, storyboarding, set building, filming, sound, titles and credits. At the end of the six challenges students will have completed their first stop motion animation film.

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Stop Motion FAQs and Support

Comments, questions, suggestions, or feedback about stop motion? Post them here! Feel free to respond to other members' posts as well!



[New Topic](#) [People](#) [Options](#)

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# Digital Storytelling- What is it?

## Digital Storytellers!



Empowering learners to constructively share their voices on the global stage!

**Digital storytelling** is a short form of digital media production that allows everyday people to share aspects of their life story. The media used may include the digital equivalent of film techniques (full-motion video with sound), animation, stills, audio only, or any of the other forms of non-physical media (material that exists only as electronic files as opposed to actual paintings or photographs on paper, sounds stored on tape or disc, movies stored on film) which individuals can use to tell a story or present an idea.

"The idea of merging traditional storytelling with today's digital tools is spreading worldwide." Anybody today with a computer can create a digital story simply by answering such questions as "What do you think? What do you feel? What is important? How do we find meaning in our lives?"

Most digital stories focus on a specific topic and contain a particular point of view. "These topics can range from personal tales to the recounting of historical events, from exploring life in one's own community to the search for life in other corners of the universe and every story in between."

Where to Start?

DIGITAL STORYTELLING CAN RANGE FROM THE VERY SIMPLE TO THE EXTREMELY COMPLEX. [ATHABASCA UNIVERSITY OPEN COURSE ON DIGITAL STORYTELLING IS](#) A GREAT PLACE TO START.

What is next?

THIS SECTION TAKES YOU THROUGH ALL THE STEPS OF THE DIGITAL WRITING PROCESS. THE LESSONS ARE DESIGNED FOR GRADES 4-10. [Digitizing the Writing Workshop.](#)

How to go further?

CHECK OUT THE AWESOME FREE CLASSROOM RESOURCE THAT WILL ALLOW YOUR STUDENTS TO CREATE AN ENTIRE PROJECT IN AN ONLINE FORMAT. [Digital Storyteller](#)

**Key Frameworks:** Digital Storytelling encompasses several digital technologies and media literacies. Start with small simple projects and before you know it your students will be amazing you with their digital reports and essays.

**Materials:** Digital storytelling can be as simple or as elaborate as you and your students desire. You will need a way to take pictures or import them from a site, a method to store your chosen photos as well as a great imagination. Every aspect of the planning process can be done both on paper and on a digital device. The choice is up to you.

**Resources:** The maker community has many resources for educators using Digital Storytelling in the classroom. The [Digital Storytelling in the Classroom](#) guide is a great way to get started with awesome tips and lesson ideas!

**Sample Activities and Learner outcomes:** There are two in-depth student challenges in this module. Challenge one introduces student to using animated creatures via apps and challenge two has creators use real photos to complete the assignment.

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

### Digital Story Telling FAQs and Support

Comments, questions, suggestions, or feedback about digital storytelling? Post them here! Feel free to respond to other members' posts as well!



New Topic	People	Options
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# LilyPad - What is it?



LilyPad is a programmable, electronic, sewable system for creating textiles with an electronic twist! The electronic LilyPad component is programmed using Arduino and embedded into the textile project using conductive thread. This allows the creator to imagine, and bring to life, interactive clothing, accessories, or other textile-based products. This may include a small bear with eyes that light up, a purse with a handle that changes color when touched, or a temperature sensitive lighting pattern in a clothing item.

Where to Start?

HERE YOU WILL FIND INTRODUCTORY VIDEOS, MATERIALS AND A "HOW TO" FOR YOUR VERY LILYPAD UP USING SEW ELECTRIC. <http://sewelectric.org/>

What is next?

HERE YOU WILL GET A LITTLE DEEPER INTO THE CODING AND SEWING ASPECTS USING THE LILYPAD ARDUINO WEBSITE AND TUTORIALS. [http://lilypadarduino.org/?page\\_id=135](http://lilypadarduino.org/?page_id=135)

How to go further?

THERE ARE MANY LESSONS AND MAKERSPACE PROJECT IDEAS TO HELP YOU TAKE YOUR LILYPAD FURTHER <http://www.wired.com/2013/01/wearable-arduinios/>

<b>Key Frameworks:</b>	Programming, electronics, sewing with conductive thread, the digital world meets the fashion world. Imaginations soar as interactive clothing and accessories are created and brought to life. 
<b>Materials:</b>	For the LilyPad it is recommended you order a basic starter kit. You can get this through <a href="#">Sew Electric</a> , or <a href="#">Sparkfun</a> . You will also need a computer with monitor, keyboard and mouse. Subsequent projects may require additional maker materials.
<b>Resources:</b>	The maker community has many resources for educators using the LilyPad. The <a href="#">Sew Electric book</a> is an excellent way to get started in any classroom! Instructables also offers <a href="#">video tutorials</a> and <a href="#">project ideas</a> .
<b>Sample Activities and Learner outcomes:</b>	Activities address a multitude of outcomes including science (electricity), math (coding) and art outcomes. These can easily be adapted for various grade levels.

Don't forget to contribute to our community with your lessons and discussions!



Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## LilyPad FAQs and Support

Comments, questions, suggestions, or feedback about LilyPad? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options	Search
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# Inventions with Recycled Materials – What is it?



Inventions with recycled materials is exactly what it sounds like! Students use recycled materials to create new inventions. The beauty of this space, is that it is nearly free! Students can contribute items from home; boxes, cans, bottles, bags, shop materials, fabric, toothpicks, popsicle sticks, anything! All that you need to provide are a type variety of common craft materials; glues, tapes, papers, scissors, glitter, cotton balls, pom-poms, doilies, paint, whatever you have on hand!

What is really great about this station, is every teacher has already done this in some form. If you have built towers for third grade science, constructed geometric shapes with toothpicks and marshmallows in seventh grade math, or built a puppet theatre for Language Arts, you are already involved! The idea now, is to make this space a fixture in your classroom, not simply connected to one project.

**Where to Start?**

HERE YOU WILL FIND THE STORY OF [CAIN'S ARCADE](#) AS WELL AS [MATERIALS LISTS](#).

**What is next?**

LEARN ABOUT THE IMAGINATION FOUNDATION AND JOIN THE CARDBOARD CHALLENGE!  
<http://cardboardchallenge.com/>

**How to go further?**

GO FURTHER THROUGH EXPLORING STEP-BY-STEP [TUTORIALS](#) AND [BOOKS](#) RELATED TO BUILDING WITH RECYCLED MATERIALS.

**Key Frameworks:** kids love creating and building with materials the rest of us may consider junk. The students of today will be the recycling geniuses of tomorrow. What will your students create?



**Materials:** Materials for recycled material inventions are boundless and all around you! For a getting started list, click [here](#). Also, check out the [Edmonton Reuse Centre](#)!

**Resources:** There are many resources for building with recycled materials! Check out these [books](#) by Ruth Thomson, these [tutorials](#) by Instructables, and these [cardboard-working tools](#) by Make-Do.

**Sample Activities and Learner outcomes:** Meet art and science outcomes with this [student challenge](#)!

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Inventions with Recycled Materials FAQs and Support

Comments, questions, suggestions, or feedback about inventions with recycled materials? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options	Search
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# Breaker Space - What is it?



Students need to have the opportunity to explore, build and discover in a makerspace. This allows us to move beyond one-size fits all projects into a personalized constructivist approach to education. Most stations in a makerspace will encourage the construction of something. The breakerspace station will encourage just the opposite. Laura Fleming suggests setting up a Take-Apart Tech Station, or "breaker space", where technology and other classroom or household items are provided and designated for students specifically to disassemble and investigate and to build.

Students will have a chance to truly wonder, ask questions, take risks, and have no fear of doing something wrong!

By providing some simple tools such as protective eye wear, scissors, hammers, gloves and old technology like broken down classroom computers, students can dissect and remix in your makerspace!

Where to Start?

THE BREAKER SPACE IS A WORK STATION IN A MAKERSPACE THAT HAS "MISFIT" TOYS AND OTHER BROKEN ELECTRONICS FOR STUDENTS TO DISASSEMBLE AND DISCOVER WITH. STUDENTS CAN USE A BREAKER SPACE TO: TAKE APART OLD TECHNOLOGY, TO REPAIR SOMETHING BROKEN, TO HARVEST FOR PARTS, TO TAKE A PART, REMIX AND REINVENT SOMETHING NEW,

How to go further?

THE [TINKERING STUDIO](#) IN THE EXPLORATORIUM HAS PUT TOGETHER A FANTASTIC BREAKER SPACE LESSON THAT CHALLENGES STUDENTS TO TAKE APART OLD TOYS AND CONSIDER HACKING THEM TO MAKE SOMETHING NEW. THERE ARE NO WRONG ANSWERS IN A BREAKER SPACE!

**Key Frameworks:** Students learn how things work through deconstruction. Taking apart tech devices and toys provides students with insight into how they work and how they are created. This in turn allows students to move on to creating their own inventions with parts harvested from the breakerspace.

**Materials:** Old toys and electronic items such as broken down classroom lap tops, protective eyewear, gloves, hammers, pliers, and other tinkering tools.

**Resources:** *The Art of Tinkering* is an unprecedented celebration of what it means to tinker: to take things apart, explore tools and materials, and build wondrous, wild art that's part science and part technology. Join 150+ makers as they share the stories behind their beautiful and bold work and use this book to do some tinkering yourself.

The Exploratorium has a Tinkering site with an amazing collection of inspiration and ideas for makers!

<http://tinkering.exploratorium.edu/art-tinkering>

Don't forget to contribute to our community with your lessons and discussions!

Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

[Breakerspace | Makerspace Support](#)

Comments, questions, suggestions, or feedback about breakerspace? Post them here! Feel free to respond to other members' posts as well!

New Topic People Options

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# littleBits - What is it?



littleBits is a platform of easy-to-use electronic building blocks that empower you to invent anything, from your own remote controlled car, to a smart home device. The Bits snap together with magnets, no soldering, no wiring, no programming needed.



**Where to Start?**

THIS SECTION PROVIDES AND INTRODUCTION REGARDING HOW LITTLEBITS OPERATE. IT IS A STEP BY STEP LAYOUT OF CONNECTING THE PIECES TO CREATE A WORKING UNIT.

**What is next?**

NOW THAT YOU HAVE LEARNED HOW LITTLEBITS FUNCITON IT IS TIME OT LEARN ABOUT THE VARIOUS KITS AND OPTIONS AVAILABLE TO YOU. [The littleBits website.](#)

**How to go further?**

YOU ARE READY TO TAKE YOUR LITTLEBITS EVEN FURTHER WITH THEIR DESIGNATED STEAM KIT. [littleBits STEAM Kit](#)

**Key Frameworks:** Electronic boards connected by magnets that is all it takes to start your students on a journey of discovery and invention. LittleBits kits can be combined to create an endless array of gizmos and gadgets.

**Materials:** littleBits will be an investment in your makerspace although the learning outcomes will be dramatic. There are various kits available to start creating your own littleBits library and the best part of all is that all littleBits kits can work with each other. littleBits offers an educator discount and an excellent assortment of resources for educators.

**Resources:** The littleBits community has many resources for educators using the littleBits product. [The littleBits Educator Guide](#) is a great way to get started in any classroom with awesome tips and lesson ideas!

**Sample Activities and Learner outcomes:** There are eleven student challenges provided in this module. Each module can be done independently. Once students have completed the eleven task cards they will be ready to tackle any littleBits project.

Don't forget to contribute to our community with your lessons and discussions!



Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Little Bits FAQs and Support

Comments, questions, suggestions, or feedback about Little Bits? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options
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# Tinkercad - What is it?



Tinkercad is a web-based 3D design program by Autodesk. All that is required to make this immediately useable to students is a free account. From there, students can work through tutorials to learn the basics of the program and then continue to learn by embarking on quests to challenge themselves to reach the next level of 3D design! These challenges offer a large variety of tasks; something to appeal to everyone, at all levels of experience.

Tinkercad operates on the premise of using basic geometric shapes to create intricate designs. Possibilities are endless; from plants to animals to buildings to microbes to home décor and even accessories. If you can imagine it, you can create it with Tinkercad. Designs constructed in Tinkercad can be 3D printed, including moveable parts, or even downloaded into the popular Minecraft!



Where to Start?

HERE YOU WILL FIND LISTS OF MATERIALS, LINKS TO TINKERCAD, AS WELL AS LINKS TO EXPLORE THE TIPS AND FEATURES OF TINKERCAD <https://www.tinkercad.com/about/features>

What is next?

THIS IS THE GETTING STARTED LESSON/ QUEST PAGE OF TINKERCAD.  
<https://www.tinkercad.com/quests/>

How to go further?

THERE ARE MANY LESSONS AND PROJECT IDEAS TO HELP YOU TAKE TINKERCAD FURTHER  
<https://www.tinkercad.com/things/>

## Key Frameworks:



Programming and design meets 3D printer and your students ideas go from thought to Reality. Every student is thrilled when their creation comes to life.

**Materials:** To get started with Tinkercad, you will need a computer with keyboard and mouse, internet access, a Tinkercad account, and a 3D printer (optional).

**Resources:** The [Tinkercad blog community](#) has many ideas suggestions, and answers to frequently asked questions. The [step-by-step lessons](#) provided on Tinkercad are a great place to start before [purchasing more advanced resources!](#)

**Sample Activities and Learner outcomes:** Our two student challenges are based in [literacy outcomes of storytelling](#) as well as a [cross-curricular lesson](#) in math, science, and language arts. You can use the challenges as they are, or tailor them to suit your grade and outcomes.

Don't forget to contribute to our community with your lessons and discussions!



Do you have a lesson idea to contribute? Please contact us to share your idea with our community of educators!

## Tinkercad FAQs and Support

Comments, questions, suggestions, or feedback about Tinkercad? Post them here! Feel free to respond to other members' posts as well!

New Topic	People	Options
Topics (0)	Replies	Last Post
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# A Community of Practice; Your Contributions & Feedback to Co-construct the Site



In order for an online learning community to be effective, certain criteria need to be met (Khoo, E., & Cowie, B., 2010). First, participation needs to be mediated action. Using specific tools as a means to attain specific goals serves to mediate goal attainment as well as facilitate relationships among users, as members contribute various levels of experience and expertise.

In this case, engaging in a virtual makerspace provides the tools to mediate a physical makerspace. Second, participation needs to be based in situated activity. Authentic, relevant collaboration in a medium that transfers directly to one's real-life application needs is crucial to a thriving community. In this case, the goal is to learn about makerspace through experiencing it, and then to apply the concept in the classroom. Third, through utilizing a virtual makerspace, an online learning community, members are able to access the knowledge and expertise of fellow members. This recognizes the principle of distributed cognition; the idea of having a diverse skill set and knowledge base across people, rather than having each person rely only on their own skills and knowledge. Lastly, for an online community to be successful, it must be goal directed. A virtual makerspace for professional development offers the shared goal of implementing the makerspace pedagogy in the classroom.

The inclusion of open and guided discussion forums (at the bottom of each technology page), as well as a [wiki-based manifesto](#) provides space for collaboration, question and answer sessions, as well as general support and feedback; which supports all four elements of successful online learning communities. The ability to upload and share lessons, tools, and artifacts, as well as to download and modify existing projects also serves to extend the efficacy of the online learning community. It is of utmost importance that you, as educators, buy into this community and help to make it a lived experience! Without participation, the community can only evolve so far. Go ahead, be involved!

We would like to welcome the educators from Edmonton Catholic Schools to our community of practice.



# The Educator Maker Manifesto Wiki

Hatch's Maker Movement Manifesto (2014) emphasizes that in order for the makerspace

movement to be truly beneficial, there must be opportunities to:

- make
- share
- give
- learn
- access appropriate tools
- play
- participate
- support
- change

This working wiki version of the manifesto (2014), is designed to be modified, changed, and adapted to fit the needs of our users. The intention of this wiki is that you, the user, contribute your ideas of what a maker space is, how it is utilized, and why it is valuable.

Welcome to the working Maker Movement Manifesto, as inspired by Mark Hatch!

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This working version of the manifesto (2014), is designed to be modified, changed, and adapted to fit the needs of our users. The intention of this wiki is that you, the user, contribute your ideas of what a maker space is, how it is utilized, and why it is valuable.

At any time, if you want to share projects, lessons plans, images, etc, and find yourself unable to do so, please email [makerspacemanifesto@gmail.com](mailto:makerspacemanifesto@gmail.com).

Find a sample chapter of Mark Hatch's *The Maker Movement Manifesto* by clicking the image below.

Hatch, M. (2013). *The Maker Movement Manifesto: Rules for Innovation in the New World of Crafters, Hackers, and Tinkerers*. McGraw-Hill, 1 edition (Sept. 25 2013).

You can access the wiki at  
<https://makermovementmanifesto.wikispaces.com/>

Each original element of Hatch's manifesto (make, share, give, learn, access appropriate tools, play, participate, support and change) is posted as a separate "Page". Please share what you are doing with your own maker spaces in each section, as well as taking the time to read and respond to how others are transforming educational pedagogy and learning using makerspaces.



PLAY!

"Be playful with what you are making, and you will be surprised, excited, and proud of what you discover."

Add Discussion

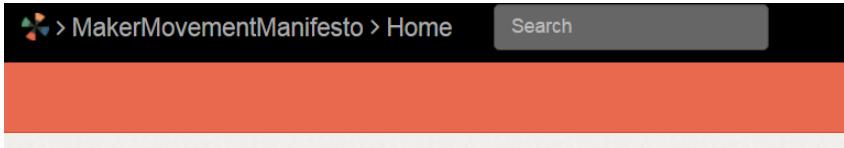
How do you "play?"  
jtherien Feb 26, 2016

How has playing enhanced your making?  
How has playing enhanced your students' making?  
What was the start point of a project that evolved through play? What was the end point?

Home pages changes

All Pages

home Change Give Learn Make Participate Play Share Support Tool Up edit navigation



## ★ Share

### SHARE!

"Sharing what you have made and what you know about making with others is the method by which a maker movement can grow. It is the way that a maker movement cannot make and not share."

 Add Discussion



"Share" your ideas, innovative projects, successes, and frustrations!

jtherien Feb 26, 2016

What innovative products have you and your students created?

What has worked well for you? What has not?

How is makerspace best managed in your classroom or teaching environment?

Feedback will be incorporated into Mark Hatch's original definitions to create a meaningful, relevant manifesto by users, for users.

Remember, collaboration and sharing is key to the longevity and success of the maker space movement!

At any time, if you want to share projects, lessons plans, images, etc, please email

[makerspacemanifesto@gmail.com](mailto:makerspacemanifesto@gmail.com)

For the latest access code visit [makerspaceforeducation.weebly.com/makerspacemanifestowiki](http://makerspaceforeducation.weebly.com/makerspacemanifestowiki)



## Teacher Contributed Lessons

This section of our site is dedicated to our community of practice educators who want to share their makerspace journeys! You can take see a makerspace in action, try their lessons yourself and contribute your own great makerspace ideas! Our community of practice needs you! Take some time to explore all of the community contributions!



Christine Lurette and  
Delia de Sousa

Christine and Delia are amazing maker educators at St Kateri school! They are also have the roles of technology coach and teacher librarian. Check out their amazing lesson below using Dash and Dot!



## Makerspace for Education Blog

Here you will have the opportunity to read school makerspace stories, discover lessons, and experience both the challenges and success of constructionist teaching and learning. We will feature several authors from multiple schools sharing their stories!



# Makerspace Gallery

Welcome to our makerspace community gallery! This is a space to share with educators and inspire schools with the many possibilities of what a makerspace could be!

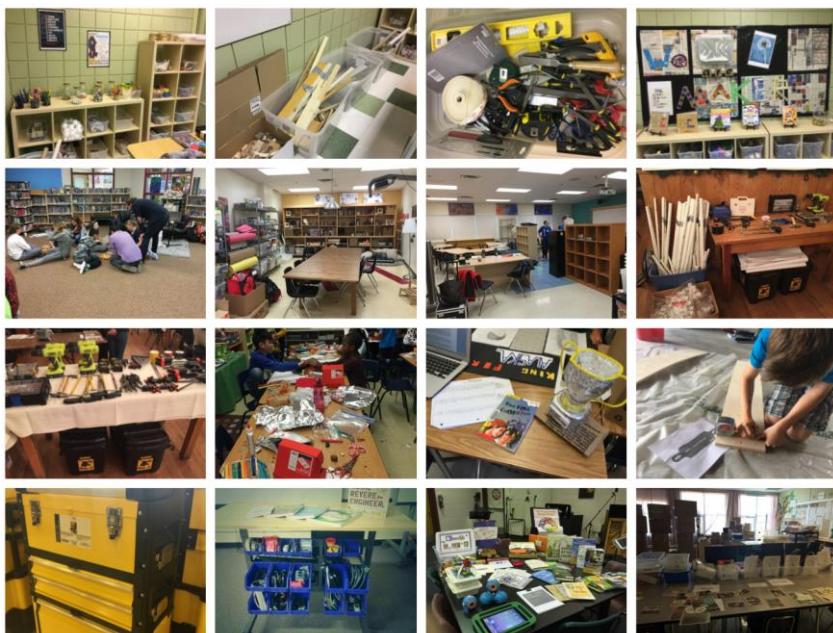
"Makerspaces come in all shapes and sizes, but they all serve as a gathering point for tools, projects, mentors, and expertise. A collection of tools does not define a makerspace. Rather, we define it by what it enables: making."

Makerspace Playbook School Edition 2013



A makerspace can take many forms, from an entire library transformed into a learning commons, a CTS lab, an early learning Atelier inspired by Reggio Emilia, or bins, buckets and carts that form a mobile makerspace. What is important before you begin the physical transformation of a space, is to consider the pedagogical implications of transforming teaching and learning first. The space can then be determined based on budget, physical location and access for students.

Explore the site to see photos of makerspaces from our community members! Please [contact us](#) you share your makerspace with our community!



## Maker Day

Hosting a staff making day is an important step to introducing makerspace into your school. The Innovative Learning Center has an amazing resource to help schools begin this journey called the [Maker Day Tool Kit](#).

You can see school maker days in action for yourself!



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- \*Click [here](#) to access all of the references for images, videos, and other resources found on the website\*

