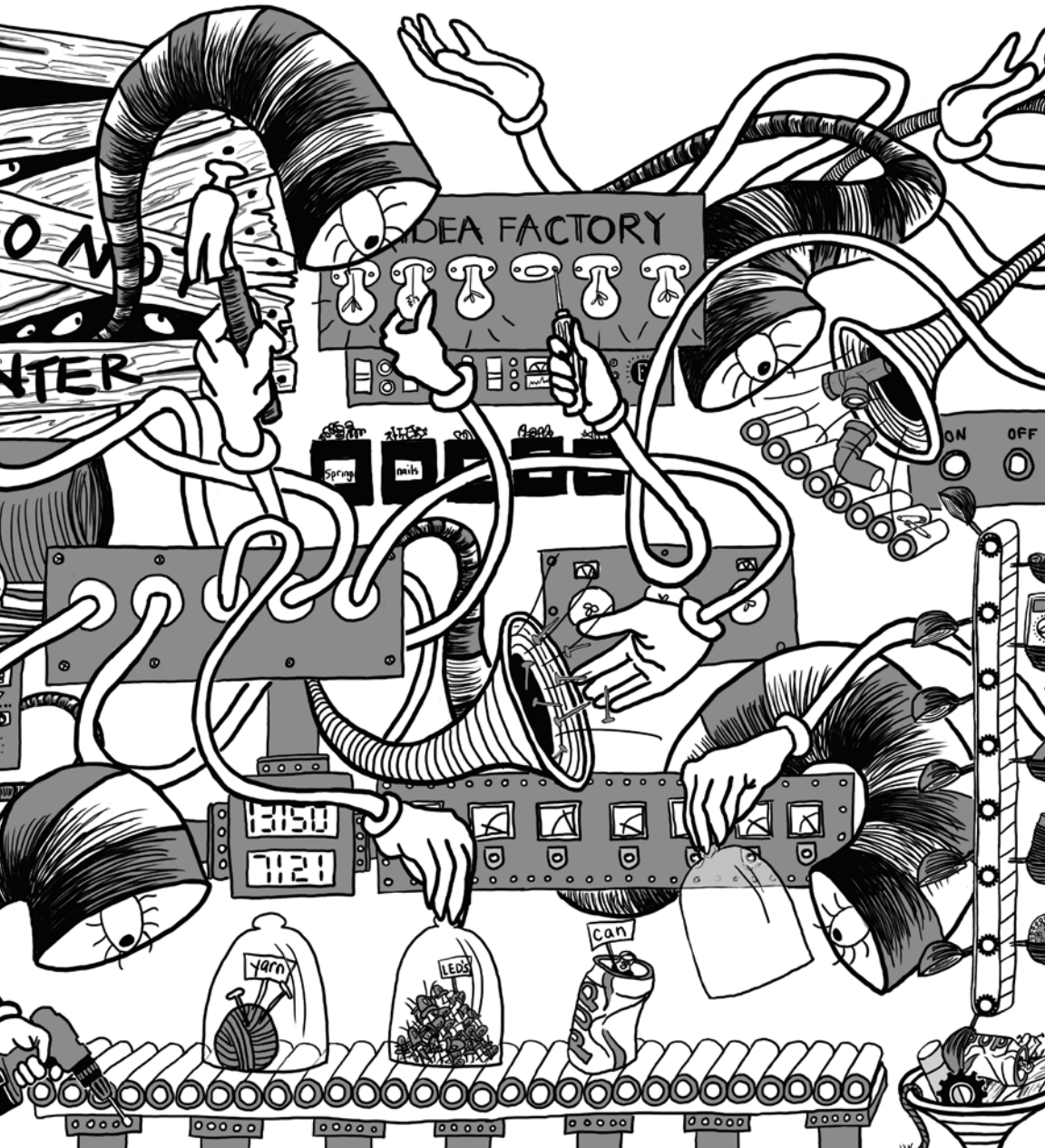


MAKER CLUB

PLAYBOOK



I believe we are all makers. We can find all kinds of makers in our communities. Yet we also want to help create more makers. My goal is that all people, young and old, come to see themselves as makers, creators and doers because I know that the people who have the skills and knowledge to make things have the power to make the world a better place.

Dale Dougherty





THE RISE OF MAKER CULTURE

Makers tinker, invent, innovate, and work with their hands.

They're often interdisciplinary, and experiment across a wide spectrum of subjects including science, technology, engineering, math, art, as well as more traditional skills like woodworking, cooking and crafting. Maker culture reclaims the "techne" ("craftsmanship") in technology, and makers take an active part in shaping and creating their worlds (Heffernan). Makers congregate at "Maker" or "Hacker" spaces, Maker Faires and meet-up groups. They're enthusiasts that value the process of making things as a means to innovate, connect, and collaborate.

Making, maker programs, and Maker Faires (www.makerfaire.com) are happening across the globe, in communities large and small and in public and private spaces. Maker Faires are events created by Maker Media (makezine.com) to "celebrate arts, crafts, engineering, science and projects in the Do-It-Yourself (DIY) mindset." The launch of Maker Faire Bay Area in 2006 demonstrated the popularity of making with over 60,000 attendees in its first year, now climbing to over 100,000. In 2014, there were 133 Maker Faires across the globe spanning from Tokyo, to Rome, Oslo, and Detroit. Vancouver will be celebrating its 7th Maker Faire in 2017.

LEFT El Pulpo Mecanico, the giant flaming octopus at the Bay Area Maker Faire, 2012. Photo by Emily Smith.
UP Participants soldering and riding tall bikes at Vancouver Mini Maker Faire. Photos by Emily Smith.



**Tell me and I forget,
teach me and I may remember,
involve me and I learn.**

Benjamin Franklin



WHY BRING MAKER CULTURE INTO SCHOOLS?

Integrating Maker Culture into schools means re-invigorating shop and Tech Ed classes.

Students are introduced to the value of what it means to create. Purchasing shiny tools like 3D printers, CNC machines and micro controllers is a popular way of embracing making — but just the beginning of what’s possible. What’s crucial, is to encourage students to become active agents in creation by encouraging them to participate in the manufacturing process and develop an understanding of what’s happening in communities, societies and the world.

Maker projects are interdisciplinary, and making almost immediately connects learners to the real world value of how a particular subject — like math, woodworking, chemistry, art or electronics — fits into the world. Students may not master fractions or their multiplication tables while building a skateboard ramp, but they will likely cultivate a deeper curiosity of how things fit together. Project-based learning that starts simply can build confidence in students and create a broader sense of how subjects relate to the world, often serving as an inspiration point and motivating students to learn.

LEFT Students sanding at a “Learn your tools” workshop. Photo by Zee Kesler.
UP Benny Zenga builds a skate ramp. Photo by the Zenga Bros.

INTRODUCING MAKER CLUB

Maker Club represents a shared connection to Making between students.

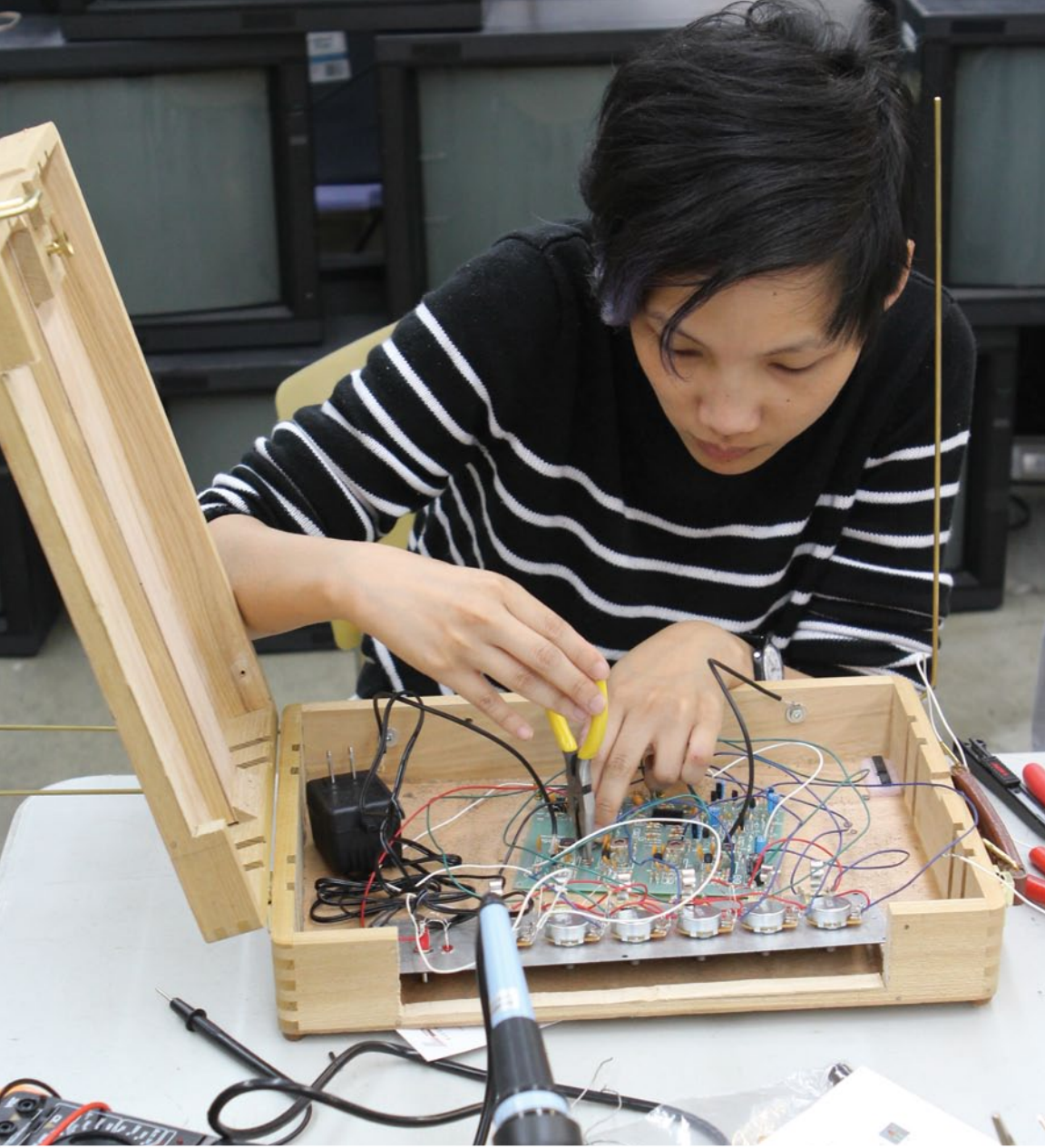
A Maker Club can be as small as 5 students, as large as a classroom of 30, involve the entire school or even go district-wide. With the resources provided, you can conduct a day of activities, a week, month, or even a year. If you'd like to get a more formal club going, it's best to start small, create partnerships with other teachers and parents, and grow the club based on the interests of those who make it up. Resources from Maker Club can be used by existing programs, after-school clubs, and Tech Ed classes.

There is no set way to start or shape your club, and the nature of Maker Culture is to share with your neighbour, and borrow project ideas from one another. In the name of "learning by doing," you may even find that there's a keen student that would like to lead their club or Maker Faire in their classroom. By starting a Maker Club in your classroom or after-school program, you get to set the rules, structure, and projects. At the end of this booklet, you will find resources on how to connect with your local Maker communities, and what's happening in your region. Learn from what others are doing, and don't be afraid to bring ideas you may see at a Maker Faire, into the classroom.

RIGHT PAGE Participant from VIVO's youth mentorship program building a homemade theremin. Photo by Emily Smith.

Attendees at Vancouver Mini Maker Faire making dolls with Kim Werker and playing with homemade instruments. Photos by Emily Smith.





Common Elements of Maker Programming

Making fosters lifelong learning by encouraging *learning by doing*.

**SELF MOTIVATED PROJECT-BASED INVENTIVE
INTERDISCIPLINARY COMMUNITY-ORIENTED
ACCESSIBLE INCLUSIVE EMPOWERING IMAGINATIVE
MENTORSHIP-FOCUSSED NON-COMPETITIVE FUN**



CULTIVATING A MAKER MINDSET

Many self-identified makers are not experts.

They are passionate hobbyists and tinkerers with a strong desire to learn, explore, and get their hands dirty. **To cultivate a Maker Mindset in the classroom, is to foster a sense of playfulness, curiosity, and to connect students to the possibility that they too can learn how to fix, create, and make things.** Present challenges, opportunities and problems to solve, and provide tools, resources, and conversation. A failed experiment is an opportunity to learn something new — and trial and error allows for individual creativity, experimentation and a chance to see something anew. **Encourage students to show and tell their projects, and share their new skills with one another in the classroom.**

Goli Mohammadi tests out "Prosthesis – The Anti-Robot", a wearable walking machine built by Jonathan Tippett of eatART at the Vancouver Mini Maker Faire, 2012. Photo by Emily Smith.



We all learn better when learning is part of something we find really interesting. We learn best of all when we use what we learn to make something we really want.

Dr. Seymour Papert

LEARNING BY DOING

You can find a series of possible Maker projects in the [Maker Club Playbook](#).

They can be conducted as part of Maker Club, or even as an extension to activities in the classroom. Each activity is mapped to the ADST Curriculum, features BC-based Makers, and can be modified and shaped by the teacher, facilitator or student. The Playbook also facilitates cross-curricular learning, and includes links to related projects in math, science, social studies, art, career ed and English. This supports students and teachers in seeing that maker culture is interdisciplinary and relates directly to the world around them.

The exercises are made with recycled and low-cost materials that we believe will be inspiring and relevant to students. All tutorials introduce kids to the tools, techniques and terminology used in trades and making.

GETTING STARTED

Start small. Focus on building up engaging activities that resonate with students. Look for activities that spark curiosity.

Try working with pre-made kits and step-by-step tutorials like the ones we've included. Simple projects to start keep students focussed on creating a tangible project and can build confidence.

Consider setting up projects like a "lab". Give them instructions and support them with getting through the steps. You can create individual and group projects.

Look for projects that you are comfortable teaching. It's okay if you're still learning while you're teaching, as long as you know enough about the safety and basic mechanics of the materials.

Journal, blog, or build an inventory of what activities worked and what didn't. Share this information with other teachers. Collaborate. Use these activities to build a larger "Maker Club," and encourage students to think divergently.

Discuss possible ideas with other teachers. Poll other teachers about the skills they may have. Get a sense of what hobbies other teachers have and encourage them to share with your class or group.

Look for projects that may relate to the culture in the school. For example, if you see a group of students interested in making friendship bracelets, link them to books and projects that may relate to their craft. Consider "knot tying" as a module to your Maker Club.

Encourage students to "pitch" project ideas and build with the class or club.

Discover your local maker community.

Google local resources and perhaps take students on a field trip to a maker space or local artist studios to get their wheels turning.

Ask students what they would like to build. Encourage them to take on leadership roles. You may see that some students have an aptitude for a particular subject. A sign that they understand, is when they start sharing with and teaching others.

A dedicated resource room may be a good way to get students collaborating between classrooms. Perhaps you can work on a class assignment that involves designing the maker space room in a way that suits the needs of their class.

Let activities and curiosities shape tool purchases. While it's good to start with some standard tools, too many tools can kill creativity. Unless you have a full shop class available to you, stick with basic table-top activities.

Create club rituals that are fun, engaging and have a project tied into them.

For example, begin each session with a "lightening talk" (1 minute talks or "Show & Tells" on a topic of their interest — anything from something they want to make, to a cool YouTube video they saw). Encourage students to create projects that support these events, such as a timer that makes a loud noise at the end of the talk.



SHARING RESOURCES BETWEEN SCHOOLS, TEACHERS & DISTRICTS

Create a tools list

Do you have tools at home you'd be willing to bring in? Make a list of what your staff is willing to share and do a call out to parents and community members for what you still need. The Industry Training Authority offers grants for Maker Day events, the funds for which can also be used to buy tools. Consider hosting a Maker Day and a Kick Off Assembly with the Magic Trout Imaginarium to get your class excited and prepared for Making!

Organize a skill sharing day for teachers, parents and community members

Look over projects in the Playbook. Do you have knowledge of tools or techniques mentioned? Do you have access to off-cuts of lumber or discounted tools?

Community Call out

Get parents involved by sending a letter home asking what tools or skills parents would be willing to share. Send the letter to local businesses in the forestry, metal fabrication, carpentry, or auto industries. Send the letter to local organizations that work with kids. Set a date and invite the community to get involved! Be sure to say "no" to large items if you don't have a particular project in mind, or storage space available.

Start a "Tool Library" for your district

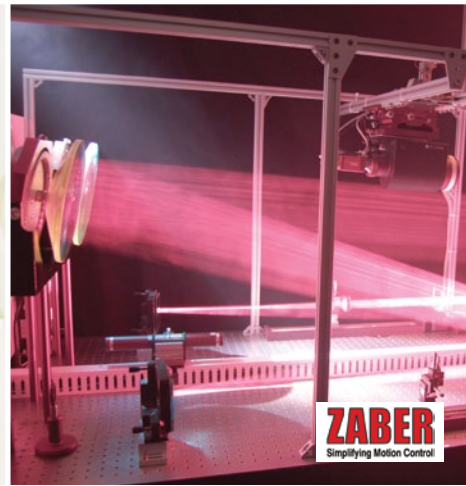
Tool libraries are a phenomenon that have popped up throughout over North America. Here is a how-to manual on how to start your own tool library:

www.shareable.net/blog/how-to-start-a-tool-library

Makers are often cross-disciplinary and bring knowledge from hobbies and creative work into their professional practice. From diving into animation and automation as a result of a curiosity about how things move -- to a red seal welder that creates art in his off-time, making is an integral part of creating meaningful work for many. Making with others — in spaces and at events — often creates work opportunities, opens up possibilities for innovation and entrepreneurial opportunities as well. Below are a very small sample of local makers whose work and projects have allowed them to gain momentum as a result of the maker movement.

JUSTIN MILES

Curious about
how things move



Justin studied animation at Emily Carr and currently works in production and assembly at Zaber Technologies, a local company that creates highly accurate linear actuators. His hobbies include making kinetic sculptures, Japanese woodworking, astronomy, card-paper modelling and “outdoor nature stuff.”

There’s no doubt that Miles’ hobbies have impacted the trajectory of his career path. He’s worked as a picture framer, animator, composer, a tech assistant at Emily Carr, and an electronics assembler.

NATHYN SANCHE

Creates art and
custom work



As a red seal welder, Nathyn Sanche creates art, custom work, and currently works in the film industry.

Just a small sample of Nathyn's past projects include creating sauna stoves, aerial hoops for acrobatic performers, custom modifications to motorcycles and dirt bikes, tiny house trailer creation, and epic art projects for Burning Man.

Zee and Emily met back in 2008 while visiting the Vancouver Hack Space. They bonded over a shared interest around the connections between making and education. After collaborating on numerous Maker Faires, they've recently decided to come together as a duo to focus on creating materials for teachers and administrators — like this one you're currently reading! It's the passion for the maker movement and "learning by doing" that ignited an interest, curiosity and enthusiasm for re-invigorating how we think about education. Together, they make up the Magic Trout Imaginarium.

ZEE KESLER

Maker
Educator



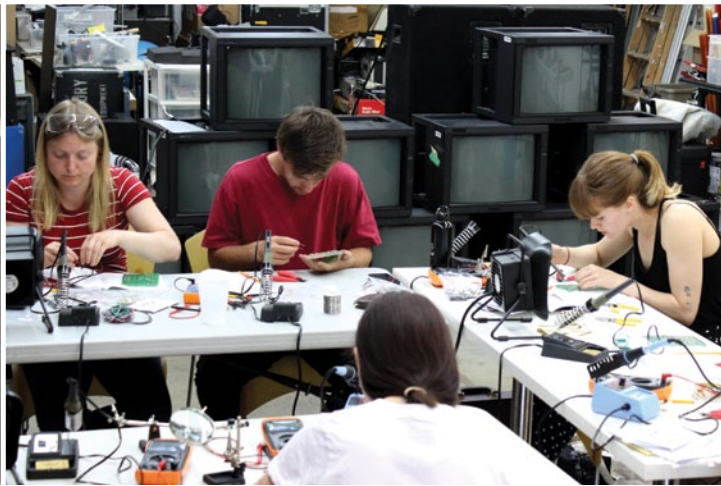
Zee advocates for adventurous approaches to learning. She is actively involved in the local maker community as a meetup facilitator and hosts professional development workshops, assemblies and seminars on project-based learning and maker culture.

Zee is the co-founder of the MakerMobile: Workshop on Wheels, a mobile hackerspace and workshop for kids; and the Magic Trout Imaginarium project: a mobile classroom (in a tiny house) and educational materials focused on inspiring kids to get making!

Personal Website: www.zeekesler.com

EMILY SMITH

Educator, researcher,
and event producer



As a hands-on learning advocate and design researcher, Emily shares knowledge through public speaking, writing, curriculum and special programming. She's passionate about the cultural shift the Maker Movement is bringing about and has devoted her time to fostering environments that encourage learning by making. Emily is the cofounder of Vancouver Maker Foundation, Vancouver Mini Maker Faire (now entering its seventh year), VIVO Youth Mentorship Program, and founder of the Vancouver Fibershed community. She is currently a Masters student and conducting Design Research at Emily Carr.

Personal Website: emilysmith.net

THE MAGIC TROUT IMAGINARIUM

Magic Trout Imaginarium is a mobile curiosity cabinet, classroom and company dedicated to inspiring wonder for the world around us.



The Imaginarium offers unique workshops as well as cutting edge professional development, curriculum and resources for educators. We encourage hands-on exploration of natural and mechanical wonders with a community-based maker approach.

PARTICIPATING IN THE MAKER COMMUNITY

A number of online resources are available.

- Google and visit Makerspace near you
- Involve local makers in your programming
- Go to Maker Faires
- Exhibit at Maker Faires



How to Apply:

- Visit www.vancouver.makerfaire.ca
- “Call for Makers” is announced in March
- Event happens in June
- Maker Faires around the world: makerfaire.com/map

The Vancouver Mini Maker Faire brings together Makers, performers, workshop leaders, and speakers from across a wide range of disciplines for two days of exhibiting projects, building community, and sharing knowledge and inspiration. The community-driven festival showcases the amazing works of all kinds of Makers – anyone who is embracing the do-it-yourself (or do-it-together!) spirit and wants to share their accomplishments with an appreciative audience.

Vancouver Maker Foundation brings together Vancouver artists, hobbyists, creatives, collectives, and small businesses through events and projects including the Vancouver Mini Maker Faire, Maker Music (vancouver.makerfaire.ca/maker-music-schedule-announcement/), the Young Makers Program (www.vancouvermakerfoundation.org/events-and-programs/young-makers/), and the Vancouver Maker Education Meet-up Group (www.meetup.com/Vancouver-Maker-Education-Community/). Their driving purpose is to continue on this mission of connecting like-minded tinkerers in order to cross-pollinate ideas, share resources, and inspire one another in exploring passion projects, hobbies, businesses, or achieving unique feats of wonder.

The biggest challenge and the biggest opportunity for the Maker Movement is to transform education. My hope is that the agents of change will be the students themselves.

Dale Dougherty, founder of Make Magazine and Maker Faire



Schools host Maker Faires because they are a perfect combination of part science fair, part county fair, and part something entirely new. School Maker Faire exhibitors, or “makers,” are primarily students — either as individuals, clubs, classes or groups. And Maker Faire exhibits can be from any discipline — from science to art to gardening to engineering to craft.

School Maker Faire organizers can be teachers, parents, administrators and even students.

Your school may want to host a Maker Faire in order to:

- showcase the making already taking place on campus
- replace a more limited science fair model
- connect with larger creativity, innovation, STEM, or art initiatives
- cultivate awareness of the Maker movement
- build school community

The typical result of a School Maker Faire is a student body bursting with creative invention and excited to get more into making and STEAM (science, technology, engineering, art, and math). Our School Maker Faire program is intended for K-12 (or international equivalent) schools or school districts. University or college-level programs — or schools interested in hosting city-wide Maker Faire events — should apply through the Maker Faire Global program website (makerfaire.com/global).

How to Make a School Maker Faire (makerfaire.com/global/school)

Get Going with your School Maker Faire (www.youtube.com/watch?v=L3hleNoZJTw)

Other Resources

Sign up for the Make Education Newsletter: makezine.com/join

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