

Making and STEM activities are popular today, and they do not have to be relegated to a particular space or subject area. In fact, making and STEM projects can coincide with the writing process and can help develop writing skills. Making is all about creativity and critical thinking—so is writing. Teachers around the globe are incorporating robotics and making to help support reading and writing. This approach to reading and writing allows students to participate in hands-on literary analysis and story building. This chapter discusses how makerspace projects can be presented in conjunction with writing to help boost student writing, collaboration, and communication skills. Yes, journaling and blogging about the maker process and projects are the traditional avenues for blending literacy and making, but there are a lot more options for innovative literacy—and you don't need a million-dollar, state-of-the-art makerspace lab to take advantage of them.

In this chapter, you will find a range of projects created by educators from around the globe. From no-cost recycled maker projects for puppet shows, to Legos and Play-Doh for stop motion animation and brainstorming for creative writing, to more expensive, complex robotics for coding and storytelling, maker tools can help students tinker with writing and thinking. At the end of the chapter, I include additional resources for makerspace curriculum, including grants and organizations that offer discounts and funding for makerspace materials. The chapter is organized by projects, tools, and complexity that can be added to elevate the writing process or stand alone. Making and tinkering supports students as design thinkers and creative communicators. As our digital world continues to evolve with multimedia, literacy and engineering are blended as a global initiative.

## **Low-Budget Makerspace and Writing Activities**

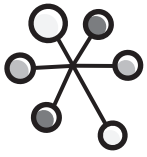
When I was teaching a career exploration class, I gave small groups of students a shoebox filled with recycled items and things that others might throw away: packing peanuts, blank CDs, zip ties, coffee filters, even bottle caps. I told students that they had thirty minutes to create a prototype for



## MAKERSPACE MOVEMENT VOCABULARY

Before your dive into STEM and writing activities, make sure everyone is clear on the terminology—and using it the same way. Depending on the teachers that you speak with, *makerspace* has different definitions; for some it is a class or a curriculum, whereas for others it can be an after-school club in the library or a supplemental project in the classroom. Here's a breakdown some key terms to help you understand the depth and variety of the maker movement as it is addressed in this chapter:

- **DESIGN THINKING** (or the **DESIGN LEARNING PROCESS**) is a hands-on approach to learning. Students brainstorm, collaborate, and prototype ideas and products that are solutions to problem-based learning. Teachers engage in problem-based learning experiences, and students use creative thinking and hands-on learning to build understanding and critical thinking.
- **CODE** is the set of instructions or commands used to control a device. A programming language is a type of code that is used to instruct a computer to perform specific actions.
- A **MAKERSPACE** is a place where students are able to make, create, and tinker on projects that can be tactile, virtual, or a combination of digital and tactile. A makerspace can be found in the classroom, the school library, a lab, or an after-school club space, depending on resources and budget.
- **MAKING** is the act of creating or inventing. There are companies that publish lesson plans and curriculum for making and makerspace projects, and there are others who believe that making is organic and driven by the students' interests and creative thinking.
- **PROGRAMMING** (or coding) is the act of writing instructions for a device to perform. Students can program computers, robots, and other circuit-based tools, such as Raspberry Pi, Makey Makey, Ozobot Evo, and Sphero Bolt or Mini. Students can learn programming and code through such initiatives as Hour of Code, Scratch, and Codecademy.
- **STEM** stands for science, technology, engineering, and math. This educational and career initiative launched by President Obama in 2011 encourages schools and students to pursue these fields for innovation and career readiness.
- **STEAM** stands for science, technology, engineering, art, and math. STEAM adds arts to the sciences and emphasizes the aesthetics and design elements required for engineering. Along with visual arts and digital arts, this also includes language arts and communication skills.
- **ROBOTICS** is the teaching, programming, and coding of robots in the classroom. Students make something tangible and then program it to perform actions. Lego has a robotics division, and some secondary students are building robots from the ground up. Smaller robots and circuits, from such companies as Ozobot and Sphero, are often used in schools to introduce students to engineering, programming, and robotics.



a new object that they would market to the world. Along with the recycled products in the shoe box, students had to complete a business proposal answering questions about the name of the item, cost to manufacture, price it would sell for, and how it would improve people's lives. This assignment brought to the forefront inventions that were thoughtful, sometimes silly, and always visionary. It was a hands-on building and writing assignment that required design thinking, collaboration, and inventiveness—but not a lot of funding or special equipment.

You do not have to get fancy with outfitting a makerspace or spend lots of money. Recycling provides lots of inexpensive and even free materials that you can use for creative writing or as a catalyst for a more formal writing assignment. Before you throw it away, think how someone else might repurpose it. Recycled objects might be used for designing puppets for which students write their own puppet show, for example. Or, students could create and write rules for their own games, following the example of *Caine's Arcade*, a documentary about a young boy who designed an interactive arcade out of cardboard boxes from his father's auto parts store in California. Is your classroom or household overrun with used bags? Watch *How to Make a PLARN Bed Roll* to learn how to crochet plastic shopping bags into sleeping mats for the homeless. In addition to students experimenting with recycled items, imagine them writing a children's book or feature article about their projects and their impact on the world. For a smaller writing project, students could write letters to local homeless shelters inquiring about the amount of donations needed and the intention to offer the mats to those in need.

Some projects just lend themselves to blending making and writing. One of my students was an amazing musician who wanted to work to build music appreciation with little kids for a class project. She contacted the public library and asked to teach a series of workshops for children ages four to six. At the librarian's request, she then outlined her ideas using one of my lesson plan templates. Each class included making instruments from recycled and upcycled materials: oatmeal tubs and coffee cans for drums, plastic eggs filled with dried beans for shakers, and so on. That summer, she presented her classes at the library with great success. From



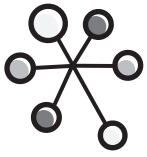
an educational point of view, this student was using communication skills, public speaking, researching, writing, and making. Clearly, this was an active learning opportunity in and outside of the classroom. Our students have great ideas, and as their teachers, we can help them facilitate their ideas to make something happen.

## ***Legos and Play-Doh for Digital Animation and Storytelling***

Writing and the writing process does not just have to be on paper written at a desk. Homemade modeling compound, store-bought Play-Doh, or building bricks such as Legos can be used to help facilitate storytelling and the writing process. These tactile tools are fun to use in any content area to showcase understanding, brainstorm writing projects, or even help writers think out ideas. Making and writing work together to help students tell stories, demonstrate, inform, and create something. For some, breaking out of the confines of a two-dimensional paper or from behind the computer screen is freeing and gets ideas flowing. Using modeling compounds and building bricks helps to transfer learning. Whether making or writing, students are creators and designers.

For example, in *Teach Like a Pirate* (2012), Dave Burgess described using Play-Doh on the first day of school to challenge students to create something that is important to them (p. 26). This hands-on activity helps build community in the classroom by learning about one another. Many teachers have adapted the Play-Doh Challenge to use it to help students communicate their ideas and interests.

Working with modeling clay or building bricks doesn't just have to be a one-time activity, either. Throughout the school year you can use Legos and Play-Doh in activities that build knowledge and evaluate understanding. Both toys are tangible items that can help students express their thinking. In my classroom, I use Legos to showcase reading and understanding of a chapter or the summary of a text. I often pull out a giant tub of the bricks and have students recreate scenes from the books we are reading. Think of this



activity as building a three-dimensional storyboard. In the movie industry, projects are storyboarded before going to film. A script is written or perhaps only outlined, and then the director sits with a storyboard artist to draw out the types of shots and how the story will play out visually. During this process the script is revised, edited, and sometimes pieces are added or omitted for length or purpose. As writers, we follow the same processes—sometimes with the artistic element and sometimes without. Drawing, building with Legos, and modeling with Play-Doh can help our visual learners outline their thinking and develop their ideas before and during writing.

In addition, Legos and Play-Doh can be brought out for brainstorming ideas and showcasing a concept in science, history, or math. Often in my classroom, we will have a challenge in which groups of students are given a short amount of time (five to ten minutes) to re-create a concept or answer a question using Play-Doh or Legos. (Simply forming the answer's letters is not allowed.) When time is up, we have a “gallery share” where we view the groups' creations and ask questions. This allows the creators to extend their thinking and clarify.

One of the seventh-grade science teachers in my school uses modeling clay for students to create a stop motion animation about the phases of mitosis. *Stop motion* is a film technique in which inanimate objects are posed, photographed, and re-posed repeatedly, replaying the sequence of captured images rapidly then creates the effect of movement. Students first learn about mitosis in class, create their own storyboard or outline of the process, and then begin modeling and capturing images for their stop motion videos. Students spend a week working in small groups during class time to re-create their storyboards in a modeling compound, taking pictures, and then editing the images into a video (**Figure 5.1**). For Macs and iOS devices, iStopMotion and the iStopMotion Remote Camera app can help you capture and create stop motion videos, or you can try Stop Motion Studio, which is available for creating on all major desktop and mobile devices.

**FIGURE 5.1**

After writing an outline or creating a storyboard, students produce stop motion animations to demonstrate mitosis in seventh-grade science.

Stop motion animations can be created in Google Slides, too, if you don't want to use tactile items and prefer working with digital images only. By making multiple slides and incorporating GIFs on the slides, students can make short animated videos to convey a science concept, illustrate how they solved a math equation, describe an event in history, and more. In **Figure 5.2**, I share the assignment page for a biography project my students made using Google Animations and screencasting.

Using a screencasting tool, such as Screencast-O-Matic, students can blend their stop motion animation with their voice-overs and musical interludes. Once the videos are completed, post online to share with others. Scan the QR code to view one of these student projects.

Based on your content area, grade level, or unit of study, this activity can be adapted and revised to best meet student needs. This is a great activity to use as an introduction to Genius Hour and Passion Projects. Or, it can be completed for a biography project for history, science, mathematics, or a side quest about great writers. You can create a checklist of items students should include in their video, including a key quote, symbolic images, and music to convey the theme.



Stop Motion Project

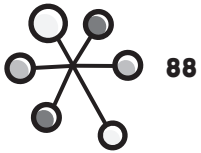


FIGURE 5.2

The Google Animated Stop Motion Video activity for middle-school students blends research, writing, and animation.

### WHAT DOES GENIUS LOOK LIKE? GOOGLE ANIMATION VIDEO PROJECT

Choose a genius visionary that has inspired you: Albert Einstein, Thomas Edison, Steve Jobs, Elon Musk, Coco Chanel, J.K. Rowling, Martin Luther King, Jr., Walt Disney, Taylor Swift, Malala, Gandhi, or Shaun White.

Then, research and find out more about them: their education, their inspiration, telling quotes, and accomplishments. What characteristics do they have that makes them genius and a visionary? (A graphic organizer is provided for note-taking and student research.)

Create a Google stop motion animation movie showcasing this person, using images and GIFs. After your stop motion animation slide deck is complete, write a script and describe the genius and visionary characteristics of this person. When your script is complete, you will screencast your description over the Google animation to create a stop motion animation movie.

The following directions to making a stop motion animation with Google Slides are adapted from Google Innovator Eric Curts' blog post "Stop Motion Animation with Google Slides" (2017).

1. **Create** your Google Slideshow as normal.
2. Insert **images, shapes, text**, and other items as needed.
3. To save time, **make copies of slides** and make small changes to the items on each slide to simulate movement.
4. To make certain slides last longer, make multiple copies of the slide.
5. When done, use the "**Publish to the web**" option to get **playable link** for your slideshow.
6. Adjust the "Publish to the web" link to **shorten the time between the slides** to make them appear animated (from 3000 to 2000 or 1000, depending on which speed which works best).
7. **Share** the link with others to view!





## Small Budget Projects: Enhancing Stories Maker Tools

In Chapter Four, I shared poetry projects that used Makey Makeys and Scratch to become auditory and visual experiences. Similarly, such interactive maker tools as the Hummingbird robotics kit can elevate student writing and writing experiences to bring the words off the page for readers to now touch, hear, and interact with. As Colette Cassinelli explained in a blog post for *School Library Journal*,

*Adding electronics and coding brings a new dimension to creative projects. The designer needs to pay special attention to how the user will interact with the project and requires students to think through the design process. Librarians can combine student's interests in making and electronics and use them for book talks, book character robots, reader's advisory, and classroom projects to support curriculum goals. (2018)*

Authors always have to think about their audience and purpose for writing and creating. With immersive technology, our experiences with text are interactive. When creating, students are not only thinking about their words, but they must also consider the audience, purpose, and design elements. Images and audio allow readers to experience text. These maker tools are a catalyst for writing and creativity that have endless possibilities, as Cassinelli suggested.

There are many ways to go about incorporating these interactive maker tools with writing. Some teachers have a set project in mind and then give parameters to their students for making (as with Chapter Four's poetry project), whereas other educators give their students the maker tools and allow open exploration and creation. Either way, using these tools is similar to the writing process: Students need to brainstorm what they are going to do or make and then outline their plans using design thinking. Outlining is an important part of both the writing and design process because it helps students to map out where they are going and necessary points that help to support a claim or prove a point. An outline is like a road map for the writer and designer. After outlining and drafting occurs, students undertake the revision process,

trying out their ideas and making any necessary edits and additions so that the arguments are clear and the design works smoothly.

A great introductory maker project that includes writing, making, and programming, the interactive poster in the previous chapter can be adapted to any subject. In math students could create a poster of interactive word problems then add a Makey Makey to the back to trigger the answer. In science, students could make models of the solar system or an organism, and in history, students could make an interactive poster about a famous historical figure or interactive timeline. Think about how writing can come to life by programming sounds and sound effects to emphasize mood and tone or important events. Students can write creatively, and then record sound effects to appear at certain points of the story as triggered by the Makey Makey. Remember those interactive reading books that allowed you to press a button and hear music or a sound effect? Students can make their own with Makey Makey. The story comes first, and then the sound effects are recorded and programmed after.

Enchanting with light rather than sounds, Chibi Lights from Chibitronics are circuit stickers that also help to make stories visually appealing and impactful. These lights enable you to blend circuits with creative writing and arts. I was introduced to Chibi Lights as an educational tool at ISTE's Annual Conference in 2017 when a librarian and media specialist shared a World War II interactive map she created using circuit stickers. With a press of one button, the Allied powers lit up on her map; pressing a second button highlighted the Axis powers. This sparked a flow of ideas about using circuit stickers in the classroom for creative and innovative activities, such as storyboarding, book creation, and more.

When I first started teaching in New York City, for example, my students created and illustrated their own children's picture books about an original hero myth they wrote as part of a unit on world mythology. If I were presenting the same lesson today, I would have students incorporating Chibi Lights and paper circuits to add another layer of a fun and interactivity to these stories. Within this assignment are opportunities for mini-lessons about characterization and word choice. Students need to decide which words or aspects of their illustrations they want to make light up for emphasis and theme.

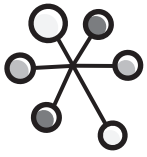


Makey Makey and Chibi Lights introduce students to programming and circuits while at the same time flex their writing muscles. Whether the writing is creative or grounded in facts, these tools help words come to life and expand literary learning to incorporate more than reading, writing, speaking, and listening. For a total immersive experience with text, virtual reality (VR) and augmented reality (AR) can help students step into a storybook and soar beyond the words on a page.

## Creative Writing and Virtual Reality

Learning doesn't only happen within the confines of the classroom walls. In fact, AR and VR break down the walls of the classroom to allow students to learn by suspending reality to travel in space, underwater, and to countries around the globe. Virtual reality companies are making more story-based virtual reality experiences that bring students into a place or take them back in time.

In *Personalized Reading* I mentioned TimeLooper, an augmented, virtual, and extended reality app that allows students to step into history and experience places and events in history around the world. These augmented reality field trip experiences allow students to immerse themselves in a time and place that could then be used for writing, reflecting, questioning, and guided learning. For example, with TimeLooper's Ambassador Program for educators, viewers can step into World War II to examine the multiple technologies developed during this time to determine whether these technologies were beneficial or detrimental to society. Immersing students into these experiences is more impactful reading than a textbook passage or viewing a movie because students are learning through experience. Combining all these layers makes for a deeper learning. Additionally, teachers can add writing prompts and open-ended questions or speech bubbles for students to answer and reflect to demonstrate their understanding. Virtual reality and augmented reality provide writing opportunities for students to showcase their learning and understanding.



Students can make their own story-based VR and AR experiences, as well. Using ZapWorks, Metaverse, and similar tools, students can be AR creators and storytellers. Zapworks is a platform that allows users to build and publish immersive AR experiences. This platform has many tutorials online to get started. Whereas Zapworks has a fee, Metaverse is a free augmented reality app that allows students to overlay characters, scenery, and animations into the physical world and interact with them. Metaverse has hundreds of ready-to-use, free learning experiences that have been created by teachers for teachers. No coding is required to make your own AR experience.

## Big Budget Projects: Robots and Robotics

With STEM and engineering at the forefront of secondary school curriculums, students are building and programming robots in classes, in clubs, and for competitions. Robots can be made out of recycled products like cardboard or with a commercial kit, such as Mindstorms kits from Lego or a Hummingbird Bit kit from Birdbrain Technology, which consists of a customized control board, lights, sensors, and motors for students to program and

### FUNDING STEM AND MAKERSPACE PROGRAMS

You do not necessarily have to pay out-of-pocket to provide the tools and technologies presented throughout this chapter! Many local and national grants are available to schools and teachers, including some from such corporations as 3M, Toshiba, and Lowe's. To see the range of possibilities, visit [STEMgrants.com](http://STEMgrants.com), [STEMfinity.com](http://STEMfinity.com), or [GetEdFunding.com](http://GetEdFunding.com). All three websites list grants that provide funding, supplies, and equipment to support STEM and makerspace initiatives, while GetEdFunding also provides resources for grant writing. Competitions such as EngineerGirl and THINK are another resource, enabling students and teachers to apply for cash prizes, educational opportunities, and scholarships. In addition, some teachers use [DonorsChoose.org](http://DonorsChoose.org), [PledgeCents.com](http://PledgeCents.com), or other crowdsourcing websites to reach out to vendors, local businesses, and parents to help fund tools and technologies for the classroom.



create. For a ready-made introduction to robotics, both Ozobot and Sphero offer small, programmable robots students can make light up and move while learning the basics of programming. The bigger and more expensive Cue, from Wonder Workshop, is a programmable robot that students can control through an app that allows them to create code in block-based visual languages (similar to Scratch) or text-based Javascript.

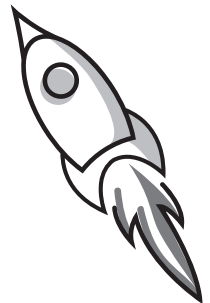
For example, Jessica Herring, an English teacher at Benton High School in Arkansas, uses Sphero robots in her English classroom. In one assignment, students choose a character from *The Adventures of Huckleberry Finn* and program Sphero robots “to represent the personality, emotions, and journey of that character” (Schwartz, 2016). As described in the article, “How Robots in English Class Can Spark Empathy and Improve Writing,”

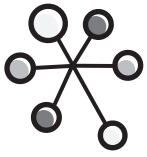
*To do this, students had to go back to the text and use close-reading strategies to find textual evidence that would back up their interpretation of the setting, motivations and feelings of the character. Then they had to decide how the Spheros [robot], a simple round ball that can light up, could represent those qualities. (Schwartz, 2016)*

The journey that the robots take around the classroom represents the journey of the characters in the book. In an assignment like Herring’s, students work on layers of learning. They must design and create a story map using textual evidence, and then use code to give the robot a command to make it move in a specific direction. These layered tasks require mapmaking, programming, and students articulating the major events along the map that the robot follows.

## Key Points

Writing a robot’s program or designing a stop motion video is like the writing process—both require close reading, writing, and revising. It is not a one-and-done process, but one that requires close examination, trying out ideas, and playing back (and rereading) to then revise and edit for better meaning. In Shanda McCloskey’s picture book *Doll-E 1.0*, tinker and coder Charlotte





receives what at first appears to be an ordinary doll as a present. Charlotte and her dog Bluetooth are unsure what to do with it, until she finds the doll's battery pack, then creative play and technology play collide. Like Charlotte in *Doll-E 1.0*, we can have students blend traditional literacy with high tech to create engaging, entertaining, innovative learning experiences that elevate learning and understanding.

Our students are knowledge constructors and innovative designers when engaged in makerspace activities. Robots and maker projects help students work on skills for the future as well as problem solving, collaboration, and design thinking. Robots do not have to be relegated to the math and sciences, but have a place across all disciplines. For example, I have seen high school students design robots to look like their favorite children's picture book characters, program the movements of the robot, and then record their reading of the book so that when the robot is hooked up to the computer it moves and recites the book for the audience. This activity involves making, reading, programming, speaking, creative thinking, and collaboration. To add writing, students can write an explanation of how the robot works, write a prequel or new ending to the robot story, or storyboard before getting started with making.

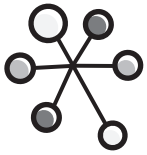
The future lends itself to a world of innovative literacy where students are working in mixed mediums to communicate, build, create, and problem solve. When given the opportunity to take risks, students develop, test, and refine prototypes as well as their own written ideas. Students are being asked to create innovative artifacts, take risks, and effectively express their ideas with different mediums. Schools are preparing young people for the changing landscape of the world and work. This chapter presented makerspace projects and ideas that "prepare [students] to thrive in a constantly evolving technological landscape" and meet the ISTE Standards for Students (ISTE, 2016). Moving forward, I look at the writing requirements for career fields and how you can bring them into your classrooms to help prepare students for the written requirements outside of school.



TABLE 5.1 Tools, Strategies, and Standards

Teaching Techniques & Strategies	Resources	Links	ISTE Standards for Educators and for Students	Common Core State Standards
Upcycling	<i>Caine's Arcade</i> <i>How to Make a PLARN Bed Roll</i>	<a href="https://youtu.be/falFNkdq96U">youtu.be/falFNkdq96U</a> <a href="https://youtu.be/yr_WHW_tGSE">youtu.be/yr_WHW_tGSE</a>	(S) 4c. Innovative Designer Students develop, test and refine prototypes as part of a cyclical design process.	CCSS.ELA-Literacy.W.8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.
Stop Motion Video Projects	HUE Animation Studio Lego Movie Maker app Minecraft Stop Motion app Stop Motion Movie Creator	<a href="http://huehd.com/animation">huehd.com/animation</a> <a href="https://tinyurl.com/legomovieapp">tinyurl.com/legomovieapp</a> <a href="http://education.minecraft.net">education.minecraft.net</a> <a href="https://tinyurl.com/stopmotionapp">tinyurl.com/stopmotionapp</a> <a href="https://tinyurl.com/smmoviecreator">tinyurl.com/smmoviecreator</a>	(S) 4a. Innovative Designer Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	CCSS.ELA-Literacy.W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
Makerspace and Programming	Chibi Lights Makey Makey Scratch	<a href="http://chibitronics.com">chibitronics.com</a> <a href="http://makeymakey.com">makeymakey.com</a> <a href="http://scratch.mit.edu">scratch.mit.edu</a>	(S) 6b. Creative Communicator Students create original works or responsibly repurpose or remix digital resources into new creations.	CCSS.ELA-Literacy.W.8.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.
Virtual Reality	<i>Inanimate Alice</i> Metaverse TimeLooper TimeLooper Ambassador Program for Educators ZapWorks	<a href="http://inanimatealice.com">inanimatealice.com</a> <a href="http://gometa.io">gometa.io</a> <a href="http://timelooper.com">timelooper.com</a> <a href="http://timelooper.com/educators">timelooper.com/educators</a> <a href="http://zap.works">zap.works</a>	(S) 3d. Knowledge Constructor Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	CCSS.ELA-Literacy.W.8.3 Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
Robots & Robotics	Cue Hummingbird Duo Lego Robotics Ozobot Robots Sphero Robots	<a href="http://makewonder.com/robots/cue">makewonder.com/robots/cue</a> <a href="http://hummingbirdkit.com">hummingbirdkit.com</a> <a href="http://lego.com/en-us/mindstorms">lego.com/en-us/mindstorms</a> <a href="http://ozobot.com">ozobot.com</a> <a href="http://sphero.com">sphero.com</a>	(S) 4b. Innovative Designer Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	CCSS.ELA-Literacy.W.8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.

continued



Teaching Techniques & Strategies	Resources	Links	ISTE Standards for Educators and for Students	Common Core State Standards
STEM & Makerspace Funding	3M Gives DonorsChoose EngineerGirl GetEdFunding Lowe's Toolbox for Education PledgeCents STEMfinity STEMgrants THINK Toshiba America Foundation	<a href="http://3m.com/3M/en_US/gives-us/education">3m.com/3M/en_US/gives-us/education</a> <a href="http://donorschoose.org">donorschoose.org</a> <a href="http://engineergirl.org">engineergirl.org</a> <a href="http://getedfunding.com">getedfunding.com</a> <a href="http://toolboxforeducation.com">toolboxforeducation.com</a> <a href="http://pledgecents.com">pledgecents.com</a> <a href="http://stemfinity.com">stemfinity.com</a> <a href="http://stemgrants.com">stemgrants.com</a> <a href="http://think.mit.edu">think.mit.edu</a> <a href="http://toshiba.com/taf">toshiba.com/taf</a>	(E) 2a. Leader Shape, advance, and accelerate a shared vision for empowered learning with technology by engaging with education stakeholders.	(Not applicable)

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