

# TIME FOR CHANGE:

DREAM. ACT. CHANGE OUR WORLD.

Changemaking is a mindset and an approach to life that addresses today's pressing challenges and injustices through the application of four key abilities: conscious empathy, teamwork, changemaking leadership, and changemaking action.



## ABOUT THIS SERIES

Developed based on feedback from First Book educators, this series of tip sheets offers guidance about incorporating changemaking into various subjects and settings. Refer to the featured tips, booklists, and activities for cross-curricular connections that help students understand how the skills they're learning in the classroom can help them thrive as changemakers in their communities.



## ABOUT THIS TIP SHEET

This tip sheet offers practical guidance and strategies for incorporating the changemaking abilities and a changemaker mindset into STEM classes and lessons.

This guide includes:

- best practices
- booklists
- “sparks” to ignite changemaking
- lessons, activities & other educational resources
- inspiring stories of young changemakers

Whether you're just starting to dip your toes into the world of STEM and changemaking or you're a seasoned educator seeking fresh inspiration and content, this tip sheet is your catalyst for igniting innovation and seamlessly integrating changemaking concepts into your students' STEM education.

### The Next Generation Science Standards

The Next Generation Science Standards (NGSS) were developed because our world is increasingly complex and technical, and STEM education impacts our continued innovation and prosperity. The NGSS encourage *learning science* by *doing science*, a practical, hands-on approach that uses many of the same abilities as changemaking: teamwork, leadership, perseverance, and taking action. Read the Next Generation Science Standards (NGSS) [here](#).

### GRADE LEVEL

K-12

### SUBJECTS

STEM Education

### RATIONALE

STEM fields offer powerful tools for understanding and solving real-world problems, making them ideal platforms for fostering changemaking skills. Integrating changemaking into STEM education prepares students to tackle complex global issues, innovate for the greater good, and contribute meaningfully to a more sustainable and equitable future.



**STEM is using all of your knowledge, skills, and abilities to solve problems and create opportunities in the world. STEM is more than a content area, it is a philosophy.**

This definition of STEM was adapted from 2013 National Teacher of the Year, Jeff Charbonneau. He watched his students solve real world problems and develop valuable STEM skills, all by asking themselves what was possible and believing they had the power to achieve it.

Source: [ISTE Learning Library](#)

## BEST PRACTICES: HOW TO INTEGRATE CHANGEMAKING INTO STEM

Below are general best practices for developing changemaking mindsets in STEM environments and empowering students to become innovative problem-solvers in their communities.

### INCORPORATE PROJECT-BASED LEARNING (PBL)

- Design projects that challenge students to identify real-world problems and develop solutions using STEM concepts.
- Encourage interdisciplinary collaboration and inquiry-based learning to address complex challenges.

### ENGAGE & SERVE THE COMMUNITY

- Foster partnerships with local organizations and experts to give students authentic learning experiences connected to community needs.
- Involve students in service-learning projects that allow them to apply STEM knowledge and skills to address societal issues.

### INTRODUCE DESIGN THINKING

- Introduce design thinking methodologies to guide students through the process of empathizing with users, defining problems, ideating solutions, prototyping designs, and gathering feedback.
- Incorporate design challenges that require students to think creatively and iteratively to develop innovative solutions.

### EMPHASIZE ETHICS

- Incorporate discussions about ethics, equity, and social responsibility into STEM curriculum to help students understand the broader implications of their work.
- Encourage students to consider the impact of their technological innovations on society and the environment.

### EMPOWER STUDENTS

- Empower students to take ownership of their learning and become active agents of change by providing opportunities for choice, autonomy, and self-direction.
- Foster a growth mindset by celebrating failure as a natural part of the learning process and encouraging perseverance and resilience.

### INCLUDE A GLOBAL PERSPECTIVE

- Incorporate global perspectives into STEM curriculum to help students develop a broader understanding of cultural diversity, global challenges, and interconnectedness.
- Encourage collaboration with students from diverse backgrounds to promote cross-cultural communication and empathy.

### MODEL CHANGEMAKING

- Model changemaking mindsets and behaviors as an educator by demonstrating empathy, collaboration, and a commitment to social responsibility.
- Provide opportunities for students to observe and learn from real-world changemakers through guest speakers, field trips, or virtual experiences.

## STEM-THEMED BOOKS THAT FEATURE CHANGEMAKERS

To help students make the connection between changemaking and STEM, share stories that showcase how changemakers can use STEM to address problems in their communities. The following books, recommended by First Book's Title Selection team, were available on the [First Book Marketplace](#) at the time of publication.

### READALOUDS FOR PRE-READERS

Pre-readers are born scientists! Look for books that reinforce numeracy concepts like counting or comparison; or incorporate elements of the scientific process like problem-solving, trial and error, and observation.

*All About Rosa* series by Jessica Spanyol

*Gato Guapo* by Anika Aldamuy Denise

*How to Bird* by Rasha Hamid

*The Life Cycles in Room 6* series by Caroline Arnold

### EARLY READERS

Spice up your leveled reader collection with true stories and kid explorers. Look for individual titles and series that are illustrated with clear diagrams and vivid photos.

*Abby in Orbit* series by Andrea J. Loney

*Ada Twist, Scientist: The Why Files* series by Andrea Beaty

*If You Love..., You Could Be...* Ready-to-Read leveled reader series by May Nakamura

*The Questioners* series by Andrea Beaty

### READALOUDS FOR OLDER STUDENTS

Picture book biographies and other true stories are a great way to start the whole class on the same page when introducing a new subject. Look for books that reflect your students' identities to show them a world of possibilities.

*Dive! The Story of Breathing Underwater* by Chris Gall

*Grace Hopper: Queen of Computer Code* by Laurie Wallmark

*Night Owl Night* by Susan Edwards Richmond

*One Day This Tree Will Fall* by Leslie Barnard Booth

*One Step Further: My Story of Math, the Moon, and a Lifelong Mission* by Katherine Johnson

### MIDDLE GRADE

Expand the horizons of your independent readers with science fiction and science fact.

*Figure It Out, Henri Weldon* by Tanita S. Davis

*Girls Who Code* series by Reshma Saujani

*The Boy Who Saved the World* by J.A. White

*The Last Beekeeper* by Pablo Cartaya

### HIGH SCHOOL

Coders, cosplayers, and future engineers all have obstacles to overcome in young adult fiction. Look for anthologies that celebrate people breaking barriers in math and science.

*Indigenous Ingenuity: A Celebration of Traditional North American Knowledge* by Deidre Havrelock

*My Antarctica: True Adventures in the Land of Mummified Seals, Space Robots, and So Much More* by G. Neri

*Nyxia* by Scott Reintgen

*The Infinity Courts* by Akemi Dawn Bowman

Shop the  
First Book  
Marketplace

The First Book Marketplace offers diverse titles for a range of reading levels that celebrate STEM fields, curiosity, problem-solving, and innovation. Explore the following pages for titles to inspire your budding scientists and young changemakers.

STEAM

CREATIVITY

MAKING A DIFFERENCE

## “SPARKS” TO IGNITE CHANGEMAKING IN STEM

The following 5-minute activities spark students’ imaginations and encourage creative problem-solving while reinforcing STEM concepts:

### PROBLEM-SOLVING PUZZLE

- Present a simple problem or challenge, such as figuring out how to reach a toy on a high shelf.
- Encourage students to brainstorm different solutions and choose the best one.
- Discuss how thinking creatively and trying new things can help solve problems in everyday life.

### DESIGN A SUSTAINABLE SOLUTION

- Challenge students to design a sustainable solution to a local environmental issue, such as plastic pollution or water conservation.
- Give students 5 minutes to brainstorm ideas and sketch their designs on paper, emphasizing the importance of eco-friendly materials and energy efficiency.

### BUILD A MINIATURE PROTOTYPE

- Provide students with simple materials like cardboard, tape, and recyclables.
- Have them build a miniature prototype of an invention or tool that could solve a community problem, such as a solar-powered streetlight or a water filtration system for clean drinking water.

### DESIGN AN ACCESSIBLE PLAYGROUND FEATURE

- Challenge students to design an accessible playground feature that accommodates children of all abilities.
- Give students 5 minutes to sketch a design for a wheelchair-accessible swing, sensory play area, or inclusive climbing structure.

### STEM STORYTELLING

- Read a short story or watch a video related to a STEM topic, such as space exploration, inventions, or environmental conservation.
- Afterward, ask students to imagine themselves as characters in the story and brainstorm ways they could solve a problem or make a positive change using STEM skills.
- Encourage them to share their ideas and discuss how STEM can be used to address real-world challenges.

### TRASH TO TREASURE

- Provide students with recyclable materials such as cardboard boxes, paper rolls, and plastic bottles.
- Challenge them to create something useful or artistic from the materials, such as a bird feeder, a toy car, or a sculpture.
- Discuss the importance of recycling and reusing materials to reduce waste and protect the environment.

### INVENT A WILDLIFE CONSERVATION TOOL

- Challenge students to invent a tool or device to help protect wildlife in their area, such as a bird feeder or bat house.
- Give students 5 minutes to brainstorm designs that provide habitat, food, or protection for local wildlife species.

## CHANGEMAKING IN STEM: LESSONS & EDUCATOR RESOURCES

Below are educator resources that emphasize systems thinking, innovation, and bringing the outside world into the classroom – practices that nurture changemaking mindsets. For each resource listed, we have included some of our favorite features that relate to changemaking.

### ELEMENTARY SCHOOL

#### **STEM Playground**

STEM Playground offers hands-on STEM projects with an optional online competition for students in grades 3 through 5. The site includes 30-minute projects that use everyday materials and emphasize teamwork and communication.

#### **Build the Change**

First Book partnered with the LEGO Group to create resources to help students feel empowered to address climate change and other environmental issues. These course packs emphasize creative solutions to pressing environmental issues by building the skills of resilience, teamwork, leadership, and taking action.

### MIDDLE SCHOOL

#### **Global Problem Solvers (GPS)**

This animated video series features a team of smart, STEM-savvy teenagers who work together to solve real-world problems. The characters are fun and relatable and contribute diverse skill sets and views.

#### **Science Buddies**

These NGSS-aligned lesson plans can be standalone or used with the GPS series listed above. The lessons contain interactive, hands-on STEM activities that allow students to design and prototype solutions to problems that parallel GPS storylines.

### HIGH SCHOOL

#### **USA Science and Engineering Festival**

USA Science and Engineering Festival offers free lesson plans that incorporate STEM and SEL and include NGSS and CASEL standards-aligned curricula for the classroom. Topics include issues of interest to many young changemakers, such as endangered species, climate change, and accessibility.

### CHALLENGES AND COMPETITIONS

Changemakers don't just think of creative solutions to persistent problems — they strive to implement their ideas and test their efficacy and sustainability. One way to test-drive creative STEM inventions is through science fairs and competitions. Encourage your students to share their innovative designs and hone their entrepreneurial skills through these challenges and competitions:

- **Global Youth Entrepreneurship Challenge**
- **Genius Olympiad**
- **Diamond Challenge**
- **Conrad Challenge**
- **National High School Design Competition**

### EDUCATOR RESOURCES

#### **Oak Ridge Institute for Science and Education**

Oak Ridge Institute for Science and Education offers a free curriculum toolkit for K-12 educators with resources designed to develop students' thinking, reasoning, teamwork, and investigative abilities – skills they can use to solve problems and make positive change in all areas of their lives.

#### **PBL Works**

PBL Works specializes in project-based learning, a teaching method in which students learn by engaging in real-world and personally meaningful projects. This type of learning enhances motivation, retention, and applying STEM concepts to problems and inefficiencies students see in their communities. Explore STEM-related questions with a changemaking focus, such as: *How can we use adopter data to connect shelter pets with a loving home?*

## INSPIRING YOUNG CHANGEMAKERS

Limiting mindsets can keep young people from realizing their full potential in STEM fields and as agents of positive change in their communities. Stories of young changemakers using their STEM interests and skills to take action on social issues can inspire students to find personal meaning in their STEM education and take the first steps toward taking action around issues that are important to them.

Photo credit: © Reilly Brooks/Ashoka



WATCH ▶

### Linking STEAM to Changemaking: A Powerful Combination

Anys planned a STEAM night to get others in her community to see science and technology as a viable career and as a way to solve problems.



WATCH ▶

### Making AI Accessible

Taylor equips girls worldwide with the tools and confidence to understand and apply AI in their own lives. Share Taylor's video with your students!



WATCH ▶

### Making Financial Education Accessible

Isaac founded Students Teaching Finance (STF), an initiative that trains high schoolers to bring financial instruction to K-8 students in their communities.



### Sibling Changemakers Improve Communities Through STEM

Trisha and Tejas share their story about how they are mobilizing their shared passions for education and technology to lead change.

Photo credit: © Reilly Brooks/Ashoka

## ABOUT TIME FOR CHANGE

**Time for Change: Dream, Act, Change Our World** is a joint initiative between Ashoka and First Book, made possible by Swiss Haute Horlogerie manufacturer Audemars Piguet.

In our world of accelerated change, everyone — regardless of geography, race, or socio-economic background — needs to respond to injustices and inefficiencies and take action to create change for the common good. The goal of the Time for Change initiative is to help educators incorporate a changemaking mindset into their schools and nurture the young changemakers in their classrooms and programs.

Explore the complete collection of Time for Change resources, including the [Inspiring Young Changemakers](#) video series, on the [First Book Marketplace](#).