NAME: (Resource Exchange)

Dr. Christine M. Cunningham, Pennsylvania State University

Dr. Christine M. Cunningham is a Professor of Practice in Education and Engineering at the Pennsylvania State University. She aims make engineering, science, and computational thinking education more equitable, especially for populations that are underserved and underrepresented in STEM. Christine is the founding director of Youth Engineering Solutions (YES), which develops equity-oriented, research-based, and field-tested curricula and professional learning resources for preK-8 youth and their educators. Her research focuses on articulating frameworks for precollege engineering education.

Dr. Darshita N. Shah, The Pennsylvania State University

Darshita (Dipa) Shah is the Curriculum Director for Youth Engineering Solutions at The Pennsylvania State University. Dipa has spent her career grappling with the challenge of how to best design motivating and engaging curriculum materials for students across the K-16 spectrum that can be practically implemented across the rich variety of our nation's educational contexts. Most recently, Dipa was the senior associate director with MIT's Teaching and Learning Lab where she facilitated workshops for campus educators on how to design curricular materials, implement evidence-informed pedagogies, and create welcoming classroom environments. Previously, Dipa was a manager for curriculum development for Engineering is Elementary and a lead science instructor with the Discovery Museum. Dipa received a bachelor's degree in chemical engineering from North Carolina State University and a doctorate in chemical and biological engineering from the University of Colorado at Boulder.

Youth Engineering Solutions (YES) (Resource Exchange)

YouthEngineeringSolutions.org

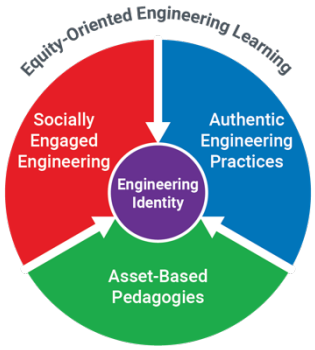
Youth Engineering Solutions (YES) features high-quality, equity-oriented, research-based and classroom-tested curricular resources for K-8 engineering. YES has developed three curricula:

YES Elementary

YES Middle School

YES Out of School

All YES units engage youth in real-world engineering problems. An **equity-oriented approach** to learning grounds YES. As youth engage in socially engaged engineering design challenges, they draw upon their communities and cultures, consider who is impacted by problems, and reflect upon the implications of their solutions. Youth develop facility with engineering practices as they use an **engineering design process** to generate and iterate original solutions. Scientific concepts, computational thinking, and asset-based approaches strengthen design ideas and solutions. By engaging in meaningful engineering activity, youth develop engineering identities.



YES Elementary
Engineering Design Process

YES Middle School
Engineering Design Process

YES units consist of approximately nine, 45-minutes lessons that scaffold students through an age-appropriate engineering design process. Units are aligned with NGSS and state science standards. **Embedded language scaffolds** provide opportunities for students, including English learners, who are developing language proficiency to interact with curricular materials, demonstrate their understandings and communicate their ideas.

Current units include:

YES Elementary	YES Middle School	YES Out of School
Engineering Sun Hats	Engineering Medicine Coolers	Engineering Sails
Engineering Nightlights	Engineering Eco-friendly Slippers	Engineering Bandages
Engineering Pumpkin Pollinators	Engineering Landing Pads	Engineering Sock Assistive Devices
Engineering Magnetic Dog Doors	Engineering Vision Extenders	Engineering Rescue Shuttles
Engineering Safety Vests	TBD	
Engineering Plastic Filters	TBD	

Units will be available for FREE download when completed. Sign up here to be notified:

YES Elementary

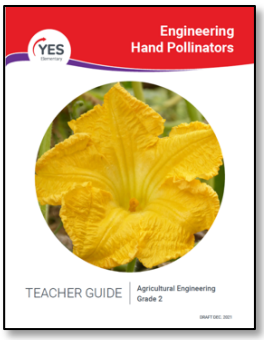
YES Middle School

YES Out of School

YES Resources

A suite of resources, design to support learning and instruction accompany each YES unit. These are available in print and digital form and include:

Teacher Guide: Contains eight to ten, 45-minute lessons



Context-Setting Narrative: Introduces the engineering problem students will solve.

(K–2) A story is read aloud and its illustrations projected.
(K–2 OS) A dynamic poster introduces the activity's focus.
(3–5) Comics preview the engineering work students will do.
(6–8) Videos situate the problem in a real-world context.

Engineering Notebook: Records students' observations, sketches, plans, and reflections.

Print Materials: Include print materials for group activities such as cards or signs.

Slides: Facilitate classroom projection of guiding questions, discussion prompts, sentence frames, and images.

Vocabulary Cards: Introduce new vocabulary through visual cards that can be posted on an engineering vocabulary wall.

Assessment Tools: Include opportunities and rubrics to evaluate students' engineering growth.

Family Resources: Spur conversations about engineering at home and connect students' learning to their communities.

Optional Lessons: Provide either additional background that prepares students for success in an engineering lesson or deeper explorations of related STEM topics.

Materials Kits: Include the hands-on materials that youth use to design their solutions

Computational Thinking Modules: YES Middle School units are accompanied by two computational thinking modules

MathWorks®

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