**Engineering design challenges**

**All levels/mixed levels:**

Star net STEM Activity Clearinghouse

Can be adapted for all ages, in or out of school. Activities range from free to expensive depending on materials required. The activities usually last minutes to hours, but adaptation to multiple class sessions is possible for many, most have NGSS listed. (NOTE: several of these are featured in our check out kits)

<http://clearinghouse.starnetlibraries.org/138-engineering-design-challenges>

Science Buddies

Requires you to sign up in order to gain access to all of the projects (but it’s free & a great resource & they don’t bother you with emails, etc). All ages, but tends to be geared a little more towards middle school although it can be adapted. For in & out of school, many projects are suitable for putting together permanent classroom kits, with a list of NGSS topics for each activity & detailed lesson plans for the activities. They also offer free curriculum resources.

<https://www.sciencebuddies.org/>

Teachingexpertise

This website includes many resources, not just STEM activities. The focus is on elementary school kids, with some preK – middle school activities. This is also a good site for parents looking for fun home activities.

<https://www.teachingexpertise.com/>

<https://www.teachingexpertise.com/classroom-ideas/stem-activities-for-kids/>

NASA STEM engagement

For grades K – 12+. Tons of activities & resources, including how to become a NASA intern. JPL also has resources for K-12+, aligned to NGSS.

<https://www.nasa.gov/stem>

<https://www.jpl.nasa.gov/edu/teach/resources/engineering-in-the-classroom.php>

Technovation Families, curiosity machine

They currently have a family AI challenge that anyone can sign up for, otherwise you do need to sign up in order to use their content, geared for a number of ages, particularly middle school but includes elementary school

<https://www.curiositymachine.org/challenges/>

Teach Engineering

K-12, free curriculum (may need to sign up for full access), aligned to NGSS standards, also have math/physics oriented lessons, also includes informal activities. Some projects may be more rigorous or require calculus.

<https://www.teachengineering.org/>

Teachers pay teachers

Low cost lesson plans & ideas from teachers, K-12

<https://www.teacherspayteachers.com/Browse/Search:engineering%20design%20challenge>

STEAMsational

For ages 2 – 17, might be more aimed for preK – middle school, but some projects are adaptable.

<https://www.steamsational.com/stem-activities-for-kids/>

STEAM Powered Family

Elementary – middle school, some high school ideas. This website has a lot of resources, not just activities. Also good for parents looking for activities, although some activities require things like microscopes.

<https://www.steampoweredfamily.com/>

<https://www.steampoweredfamily.com/category/activities/>

Discount School Supply

The site has resources for preK – 8, although these activities are on the younger side of that range.

<https://www.discountschoolsupply.com/STEM-activities>

IEEE Try Engineering

These projects are for middle – high school & includes lesson plans, etc.

<https://tryengineering.org/teachers/lesson-plans/>

Code Wizards HQ STEM Activities for Kids

Free K-12 activities & design challenges

<https://www.codewizardshq.com/stem-activities-for-kids/>

Culinary arts integration article

Seems to be geared for elementary – middle school, more of an exploration of how cooking is related to STEM

<https://corp.smartbrief.com/original/2016/07/culinary-arts-integration-turning-stem-steam>

GoGuardian

STEM projects for middle & high school

<https://www.goguardian.com/blog/stem-projects-middle-school-high-school>

UNM School of Engineering

K-12, list of ideas & links

<https://ess.unm.edu/programs/future-students/covid-19-engineering-activities.pdf>

**Elementary school/preK:**

Preschool STEAM

<https://preschoolsteam.com/>

Science Sparks

A collection of STEM activities for preK – elementary school kids, mostly involving fairly cheap &/or household items.

<https://www.science-sparks.com/category/stem-challenges/>

Glebe Elementary

Projects elementary students can do by recycling materials

<https://glebe.apsva.us/wp-content/uploads/sites/16/2020/04/10-Design-Challenges-STEM.pdf>

The STEM Laboratory

Mostly for preK – elementary school kids. They do have a store where you can buy kits. They also have seasonal activities.

<https://thestemlaboratory.com/stem-activities-for-kids/>

Playdough to Plato

A subset of the STEM Laboratory.

<https://www.playdoughtoplato.com/stem-activities-for-kids/>

WeAreTeachers

This site has a variety of resources, mostly aimed at elementary school classrooms.

<https://www.weareteachers.com/stem-activities/>

Little Bins For Little Hands

For elementary school kids.

<https://littlebinsforlittlehands.com/easy-simple-stem-activities-challenges/>

Gift of Curiosity

PreK-5, STEAM challenges

<https://www.giftofcuriosity.com/engineering-challenges-for-kids-steam/>

Frugal Fun for Boys and Girls

PreK-elementary

<https://frugalfun4boys.com/awesome-stem-challenges/>

**Middle school:**

Edutopia

Free challenges for upper elementary/middle school, focus on inexpensive projects

<https://www.edutopia.org/article/quick-and-inexpensive-design-challenges>

Glenn Engineering Design Challenges

In & out of school, aligned with NGSS, grades 6-8, may be used independently, but they can help with funding

<https://www.nasa.gov/centers/glenn/stem/glenn-engineering-design-challenges>

Contact for more info: [gerald.w.voltz@nasa.gov](mailto:gerald.w.voltz@nasa.gov)

Explore Engineering

Grades 6 – 8

<https://exploreengineering.ca/activities/grades-6-8/engineering-design-challenges>

Vivify STEM Education

Grades 5 – 8, can be adaptable

<https://www.vivifystem.com/blog/2017/4/30/the-best-stem-challenge-ever>

**High school:**

National Society of High Schools

The site has 5 suggestions for design challenges appropriate for high school students.

<https://www.nshss.org/blog/5-engineering-design-challenges-for-high-school-students/>

STEM Learning

UK based, but the principles can be applied in the US

<https://www.stem.org.uk/resources/community/collection/449826/design-challenges>

13 Powerful STEM Activities for High School Students

Includes STEM curriculum, scientific method worksheets, etc. Some activities may require purchases.

<https://hessunacademy.com/stem-activities-high-school/>

Engineering Design Challenges in High School STEM Courses: A Compilation of Invited Position Papers

This is a compilation of papers with some thoughts on what makes a good engineering design challenge at high school level.

<https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=1163&context=ncete_publications>

Resilient Educator

Good real-world problems for high school students to tackle

<https://resilienteducator.com/classroom-resources/real-world-stem-projects/>