



Engineering Merit Badge

The Great STEMaTHON Invitational includes a bridge building competition that will be showcased live online, on Saturday, September 5, 2020. This competition facilitates requirement 6g of the Engineering Merit Badge, and thus we have designed an Engineering MB session to help you earn the remaining requirements of the Engineering Merit Badge. All youth who participate in this competition are also invited to join the STEMaTHON Engineering MB cohort.

RULES:

- 1) All communications with the merit badge counselor are to be two-deep. This means that when e-mailing, calling, or video conferencing at least one other adult, preferably the scout's parent or guardian, should be CCed, on the phone or in the same room during video conference.
- 2) No recording of video meetings is allowed.
- 3) Assignments are due to the MBC 24 hours before synchronous sessions.

Meeting 1: August 4 or 5, 2020 via ZOOM (two days, scout's choice)

Come prepared with these pre-reqs done ahead of time:

From the "Engineering merit badge workbook"

Do requirements 1*, 2 & 3 and be prepared to discuss.

During the meeting:

We will discuss requirements 1, 2 & 3 live.

We will do together Requirement 4.

*Special advice for meeting 1.

- 1) Do 1st requirement, (Select a manufactured item in your home (such as a toy or an appliance) and, **under adult supervision and with the approval of your counselor**, investigate how and why it works as it does.
 - a. Optionally make a video of your investigation
 - b. Write notes on what sort of engineering activities were needed to create the manufactured device.
 - c. Create a short bibliography of your sources of information learned to be ready for discussion with counselor.



Meeting 2: August 17 or 18 via ZOOM (two days, scout's choice)

Come prepared with these pre-reqs done ahead of time:

From the "Engineering merit badge workbook"

Do requirements, 5, 7, 8, & 9

During the meeting:

We will discuss requirements 5, 7, 8 & 9 live

Meeting 3: September 5, 2020, the STEMaTHON Showcase

Showcase your work!

Ahead of time, you will construct a bridge & car (for req 6, see specifics below).

Explain how Newton's First Law applies to your bridge.

Optional: Your bridge will be tested live on-line, transmitting from the Marriott Scout Service Center on Labor Day Weekend.

Be sure to invite a friend to see your bridge in the Great STEMaTHON invitation!

On August 5, you will be sent a kit to build a bridge.

You may only use the materials in the box:

- 100 small popsicle sticks
- 20 medium popsicle sticks
- 25 binder clips
- 1 glue bottle
- 100 rubber bands
- Eye bolt & washer

Additional rules for the bridge competition:

- The bridge must be at least 2 feet long
- The bridge must have a width of at least 6 inches
- The bridge will compete based on how much weight it can bear.
 - We will use cans of food as the weights!
 - You may affix the eye bolt & washer to your bridge where you would like us to hang the weights from.
- The bridge must reach MSSC (9190 Rockville Pike, Bethesda, MD 20814) by August 25, 2020 in order to be featured in STEMaTHON 2020.



BONUS LEVEL II Competition:

You will be asked to create a balloon car from recycled materials that will cross over your bridge pushing a 16 ounces (or more) can of food across your bridge.

Optional: take a video of your car crossing your bridge. This video will be played during STEMaTHON on Saturday of Labor Day weekend. Explain how Newton's third law applies to your car.