



Hang On!

This module is designed to help you explore how engineering affects your life each day.

1. Choose A or B or C and complete ALL the requirements.
 - a. Watch about three hours total of engineering-related shows or documentaries that involve motion or motion-inspired technology. Then do the following:
 - i. Make a list of at least two questions or ideas from each show.
 - ii. Discuss two of the questions or ideas with your counselor.

Some examples include—but are not limited to—shows found on PBS ("NOVA"), Discovery Channel, Science Channel, National Geographic Channel, TED Talks (online videos), and the History Channel. You may choose to watch a live performance or movie at a planetarium or science museum instead of watching a media production. You may watch online productions with your counselor's approval and under your parent's supervision. One example is the NOVA Lever an Obelisk page on ancient Egypt and the use of levers, available at <http://www.pbs.org/wgbh/nova/egypt/raising/lever.html>.

- b. Read (about three hours total) about motion or motion-inspired technology. Then do the following:
 - i. Make a list of at least two questions or ideas from each article.
 - ii. Discuss two of the questions or ideas with your counselor.

Examples of magazines include—but are not limited to—Odyssey, Popular Mechanics, Popular Science, Science Illustrated, Discover, Air & Space, Popular Astronomy, Astronomy, Science News, Sky & Telescope, Natural History, Robot, Servo, Nuts and Volts, and Scientific American.

- c. Do a combination of reading and watching (about three hours total). Then do the following:
 - i. Make a list of at least two questions or ideas from each article or show.
 - ii. Discuss two of the questions or ideas with your counselor.

2. Choose ONE STEM field of interest from the following list. Complete ALL the requirements for a Venturing STEM exploration in that field. [Venturing exploration topics](#). (If you have already completed a Venturing STEM exploration in one of these fields, please choose a different field for this award.)

Archery	Inventing
Aviation	Model Design and Building
Composite Materials	Railroading
Drafting	Rifle Shooting
Electronics	Robotics
Engineering	Shotgun Shooting

Composites can be found just about everywhere: in airplanes and sports cars, golf clubs and guitars, boats and baseball bats, bathtubs and circuit boards, and even bridges. Composites make bicycles and skis lighter, kayaks and fishing poles stronger, houses warmer, and helmets tougher." Choose one of these items for your discussion to answer requirement 3c.

3. Do ALL of the following:
 - a. Make a list or drawing of the six simple machines.
 - b. Be able to tell your counselor the name of each machine and how each machine works.

Helpful Links

"Six Simple Machines": [ConstructionKnowledge.net](http://www.constructionknowledge.net)

Website: http://www.constructionknowledge.net/general_technical_knowledge/general_tech_basic_six_simple_machines.php

- c. Discuss the following with your counselor:
 - i. The simple machines that were involved with the motion in your chosen STEM exploration (Hint: Look at the moving parts of an engine to find simple machines.)
 - ii. The energy source causing the motion for the subject of your STEM exploration
 - iii. What you learned about motion from doing the STEM exploration
4. Choose A or B and complete ALL the requirements.

Check off List:

1 Choose one:

__ a __ b __ c

Date Completed:

Counselor:

2 Choose One:

Date Completed:

Counselor:

3 Do All:

Date completed:

Counselor:

4 Choose One:

Date Completed:

Counselor:

5 Do All

Date Completed:

Counselor:

- a. Visit an amusement park. Then discuss the following with your counselor:
 - i. The simple machines present in at least two of the rides
 - ii. The forces involved in the motion of any two rides
 - b. Visit a playground. Then discuss the following with your counselor:
 - i. The simple machines present in the playground equipment
 - ii. The forces involved in the motion of any two playground fixtures
5. Do the following:
- a. On your own, design one of the following and include a drawing or sketch: an amusement park ride OR a playground fixture OR a method of transportation.
 - b. Discuss with your counselor:
 - i. The simple machines present in your design
 - ii. The energy source powering the motion of your creation
6. Discuss with your counselor how engineering affects your everyday life.

6 Discussion:

Date Completed:

Counselor:
