**STEM workshops for grades 3-12 (**some workshops not age appropriate for all students)**

1. **Archeology & DNA (120 min)** Explore how DNA fingerprinting is being used in archaeology and anthropology. You will become a forensic archaeologist by learning how to extract DNA, copy it, then get a DNA fingerprint from the sample. Use this information to solve an ancient ice-age mystery about how 2 different civilizations came to live in Colorado, what they hunted, and how they may have disappeared. If you like history, biology, and a good mystery, join us! (requires electrophoresis equipment, available at UCCS)

2. **Arduinio-Release Your Inner Inventor (45-90 mins)** Using Arduino microcontroller technology and free Arduino software to create a circuit using LEDs, resistors, and wires. Then learn to control the circuit by modifying and writing your own code. Grades 3-5 uses

3. **Art in STEM (45-120 mins)** – Introductions to the visual arts through the lens of math and science. Work with various elements of 2D and 3D art such as light, color, line, shape, volume, composition, perspective, and point of view through the eyes of both artist and audience. Explore the intuited math and science that empowers art

4. **Awesome Aquifers (60 - 90 minutes)** – Water, water everywhere and hopefully it’s clean enough to drink! Come learn how mother nature cleans our drinking water.

5. **Biotech – DNA cheek cell extraction (45 mins):** what is DNA and how is it used? Join this workshop to extract and see their own DNA as well as perform other experiments related to biotechnology.

6. **BioTech – Strawberry DNA extraction (45 mins):** – same as above with strawberries  
   *Note: The above biotech workshops are 45 minutes long and can be combined for one 90 minute workshop*

7. **Battery Buggies (90 mins) (grades 6-12):** -- calling all gear heads! Join this workshop to use principles of mechanical engineering and electricity to construct and race a car of their own design.

8. **Bridge Building (90 – 120 mins):** – are you a bridge builder? Come find out by constructing wood bridges to see how much weight your design can hold.

9. **Catapults (45-90 mins):** Let's face it, there's something about launching stuff that is just outright fun! Come design and build a catapult and see if it gets the job done right, just right every time! Use video motion capture to create a mathematical equation that “describes” the trajectory.
10. **Cell Phone App Development (120 min) (grades 6-12):** Using MIT’s App Inventor, you will design and program an “App” to run on an Android phone simulator.

11. **Computer Game Design (90-120 mins)** this fun workshop that uses a free version of Scratch or Gamemakers Apprentice software to create and enhance a computer game in a contest of strategy and problem solving. *Computer lab required*

12. **Cryptology (45 – 90 mins)** - do secret codes interest you? How does computer encryption work? Join this workshop to learn about the math, science, and linguistics behind creating and breaking codes and ciphers.

13. **CSI – Crime Scene Investigation (90 -120 mins):** do you love a mystery? Join this workshop to piece together a crime from forensics clues gathered at a mock crime scene. - *Science Lab required*

14. **Drawdio (90-120 mins):** how do music, electronics, and creativity relate? Make your own Radio pencil to find out. You will use high tech tools to construct a circuit that turns an ordinary pencil into a cool electronic musical instrument. Make a pencil that lets you draw music. *Soldering irons required*

15. **Environmental Forensics – Mystery of the Croaking Chinchillas (3 hours)** – You can handle up to 48 students. We have a farmer that is raising chinchillas and they are mysteriously getting ill and dying. There are old wells, storage tanks, a septic tank and an abandoned gold mine on the property. Who and what is responsible? Learn about aquifers, use science to gather evidence and find out who is culpable. *Chemistry lab required, safety googles*

16. **Genetics (Grades 3-5)(60-90 mins):** Students explore concepts of genetics including heredity, dominant vs recessive, incomplete dominance, co-dominance, DNA base pairing and structure. Students play games and participate in a variety of activities.

17. **GPS and Geocaching (90-120 mins)** - you hear about GPS, but what is it and how it used? Join this workshop to learn how to use GPS technology and mathematics to find hidden treasure on a geocaching course.

18. **Green Energy – Biodiesel (90-120 mins):** How do they take used vegetable oil that made a weeks’ worth of French fries and turn it into diesel fuel that will power a bus, plane or car? Let’s find out.

19. **Green Energy - Solar Car Sprint (90 mins):** how do those solar panels that you see around work? Learn how by constructing a working solar powered model car and examine the topics of photovoltaic cells, gear ratios, and electronics.

20. **Green Energy – Solar S’mores (90 mins):** harness the power of the sun to do a little solar cooking using your own self-built parabolic solar cooker oven. Test out your engineering skills by cooking a marshmallow to use on your solar s’more.
21. **Green Energy – Wind Power (90-120 mins):** you are hearing all about Green Energy but what is it? Sign up for this workshop to find out! You will construct a working wind generator to find out which turbine.

22. **Health Science and Emergency Medicine (grades 3-5) (90 mins):** thinking about a career in healthcare? Join us in this workshop to learn how to treat wounds, to suture, and diagnose patients in both a triage and emergency situation.

23. **Indoor Flyers (90-120 mins):** are you interested in airplanes and flight? Join this workshop that explores the mechanics of flight by building your own ultra-light rubber band powered airplane that really flies.

24. **It’s electric! A combination of snap circuits, squishy circuits and light box creation (grades 3-12 *Soldering irons required, grades 3-5 does not do light box) (120-150 minutes)**

25. **Kitchen Chemistry (60-90 mins):** science and food, what could be better? Join this workshop to explore the role that chemistry has in developing artificial flavors.

26. **LEGO Robotics (90 – 120 mins)** - do you like LEGOS? Are you interested in robots? Join this workshop where you can combine your interests to build and program a LEGO Mindstorms robot to perform certain tasks and move on a playing field.

27. **Mousetrap Vehicles (90 mins):** do you like to tinker and experiment? Join this workshop and use common household materials to construct and race a car powered by the kinetic energy stored in a mouse trap.

28. **Rocket Chemistry (90-150 mins):** students interact with basic chemical reactions in order to create $\text{H}_2/\text{O}_2$ Rocket Gas generator and collections system

29. **Rockets (90 mins)** - what does it take to launch a rocket successfully? Join this workshop to build and launch a basic Estes rocket.

30. **Snap Circuits (45-90 mins)** - do you like electronic gadgets and wonder what all those little parts in a circuit actually do? Join this workshop to find out by making your own circuits and find out what all those little parts actually do!

31. **Squishy Circuit (grades 3-8) (45 -90 mins):** Can you use ingredients you would find at home and turn it into an electrical circuit? Make your own play-doh and use it to power various components like LEDs, motors and speakers.

32. **Underwater Robotics (grades 3-8) 120 minutes:** Become a true engineer by building an ROV, or Remotely Operated Vehicle, that is a tethered underwater robot. Learn Archimedes’ principal of buoyancy and apply it to your design. Come and see how you can use robotics to study ocean life, or how the ROV is used to perform special tasks to solve real-world problems. (requires a location for a portable swimming pool and kits shipped from MATE in California).