Featured Library Workshops

- 60 min (can be flexible)
- Maximum 35 participants
- Legend: 💧 = Requires water
- Inquire if you have a specific topic you are interested in that's not shown below!

Anatomy/Physiology

- **Spread of Infectious Disease**
  - This lesson introduces participants to the exponential spread of infectious diseases. Participants will model a disease outbreak through an activity where they spread an “infection” through a population of pony beads, first without any “immune” pony beads, then adding the concept of wearing masks in public, and finally with an increasing percentage of “vaccinated” pony beads to demonstrate the concept of herd immunity

- **Experimenting with the Eye**
  - This lesson’s multiple short activities will walk participants through the structures of their eyes, from back to front. Participants will explore the distribution and behavior of the rod and cone cells of their own retinas through experiments with peripheral vision, afterimages (an experiment with color vision), and blind spots. They will have the opportunity to investigate the focal length of their eye’s lens, and the light response of their iris.

- **Fingerprinting**
  - Participants discover which type of fingerprints they have before investigating the various ways of leaving behind, collecting, and analyzing prints. Participants will explore fingerprint inking, dusting and lifting, and analysis.

Chemistry

- **Polymer Investigation** 💧
  - Participants create cross-linked polymers (slime!) and investigate their polymer’s behavior. They will then ask and answer a testable question to compare their polymers, (e.g., which one bounces the highest, stretches the longest, keeps its shape) to discover the properties of their slime.

- **Chemical Identification** 💧
  - In this lesson, participants will discover ways to identify a mystery white powder by testing known powders (baking soda, chalk, cornstarch, powdered sugar) and seeing how they react with other chemicals (vinegar, water, iodine). They will

distinguish between chemical and physical properties used to identify the mystery chemical.

- **Properties of Water 💧**
    - This lesson demonstrates the unique properties of water through a series of simple activities that encourage participants to investigate and make observations. Participants will explore cohesion, adhesion, and surface tension and will physically model how water molecules interact.

Earth Science

- **Oil Spill 💧**
    - This lesson provides participants with a deeper understanding of the issues that surround an oil spill and highlights methods of environmental clean-up. Using a model of an oil spill in an "ocean," participants act as environmental engineers to test different methods for effectively cleaning up the spill, and determine the harmful effects that oil spills and their clean-up have on animals and the environment.

- **Intro to Tectonics**
    - This lesson is an introduction to plate tectonics and the structure of the earth. Participants consider how mountains are formed and work to construct a puzzle model of Pangea. After having time to build and revise their model, participants analyze a modern-day map of the tectonic plates, model the plate boundaries using putty and tiles, and then return to the opening question about mountain formation.

- **Solar System**
    - This lesson provides an overview of the objects that make up our solar system, with an emphasis on modeling the scale of both the sizes of objects and distances between them. Participants will challenge their assumptions about the scale of our Solar System by building models in order to begin to visualize how much of space is really just . . . vast, empty space. They will use two separate models, one for relative size and one for relative distance, evaluating the strengths and weaknesses of each.

- **The Greenhouse Effect**
    - Participants will be able to explain why greenhouse gas concentrations are increasing in our atmosphere. Participants will also be able to use their model to explain the relationship between greenhouse gas concentration and temperature.

Engineering

- **Rover Restraint**
    - This module gives participants a hands-on introduction to engineering within the context of space exploration. They learn about NASA's Mars rovers as examples of the challenges engineers face in balancing competing goals, while creating a lander for a mock rover to be tested in an egg drop activity.

- **Simple Machines**
    - Participants are introduced to the six basic simple machines and are then challenged to design and build their own complex machine by combining multiple simple machines into one Rube Goldberg Machine. After the machines are built, the participants will present their design and describe the simple machines used in their machine.

- **Earthquake Resistant Buildings**
    - Participants build different block configurations and test them using shake tables to determine which model provides the most stable building design in a simulated earthquake. Participants will then identify the benefits and drawbacks of the models, comparing them to real-world engineering techniques.

Life Science

- **Owl Pellets**
    - Participants learn about the adaptations owls have that allow them to swallow their prey whole – including bones, fur, and teeth! They will then dissect an owl pellet to gather data about the owl's diet. Participants can go on to learn about several other owl adaptations including stereo eyesight, keen hearing (and uneven ears), and silent feathers.

- **Sustainability**
    - This lesson uses a fishing game to explore the concepts of sustainability and the tragedy of the commons. Initially, participants play a round of the game with no strategies or goals. Once most "villages" run out of fish, participants get a chance to devise a strategy together that will allow them to fish sustainably. After the activity, participants present their strategies and their results and discuss a strategy that will allow them to continue to fish indefinitely.

- **Camouflage & Mimicry**
    - Camouflage and mimicry are explored as examples of animal adaptations that increase their chances of survival. Participants play a hunting game to gain an appreciation of the problems that these adaptations pose for predators. Classes with more time can continue to explore different examples of camouflage and mimicry.

- **Food Webs**
    - Participants construct a food web model that represents a simplified version of the Yellowstone ecosystem and consider what would happen to the ecosystem if the food web were disrupted by the removal of a native species and/or the introduction of an invasive species.

Physics

- **Electrical Conductivity**
    - In this introduction to electrical conductors and insulators, participants are challenged to build a simple circuit, test and classify various materials as conductors or insulators, and add a switch to the circuit. Participants will then use the evidence gathered in their exploration to explain why wires are made of a copper core encased in a plastic coating.

- **Electromagnetism**
    - Participants explore an electric current producing a magnetic field as they build and test an electromagnet. With this experiential understanding, participants demonstrate how electromagnets work and how to modify the magnetic fields they produce.

- **Introduction to Magnetism**
    - This module provides an experience-based introduction to the behavior and properties of magnetic materials. Participants will investigate and use different types of magnets and items, including iron filings, to explore the strength of magnetic forces, as well as what happens when magnets interact.

- **Light: Reflection, Transmission, and Absorption**

    - This activity introduces students to the idea that reflected or emitted light is the only thing we see; we perceive this phenomenon as seeing objects. Participants will explore how white light interacts with various objects. They will then observe that white light is made of all the colors of light, and will finish by exploring how filters can block all but one color of light, connecting this to the ideas of light absorption and transmission.

Technology

- **Binary Code**
    - This introductory lesson explains binary code and its role in any computer. Participants will practice counting in binary using cards and then use their new knowledge to encode and decode English alphabetic characters, illustrating how computers are designed to communicate information. Participants will also make a Binary Name Bracelet with beads.

- **Cryptography**
    - Participants get a crash course in cryptography, the science of encoding and decoding secret messages. Participants are introduced to different types of ciphers, including transposition and substitution ciphers. Participants work through a variety of code-breaking activities that make use of tools, keys, or just their own brains!