



## **SAMPLE MODULES:**

### **Bridges (Physics/Engineering)**

Different types of bridges involve beams, arches, trusses, and suspension bridges. Essentially, bridges work by distributing the force through tension (pushing out) and compression (pushing in). Since truss bridges are made up of triangles, this makes them very strong. This is because the triangle has an even distribution of tension and compression and it prevents bridges from collapsing under pressure. When building bridges, it is important to consider several factors: must be strong enough to withstand all weather (wind, earthquake, etc.), must be cost effective, and must be strong enough to carry its own weight. For this experiment, each table will form a team and each team will be given a bunch of styrofoam balls and toothpicks. Keeping in mind the types of bridges, which one's the strongest, and what is important when designing a bridge, students must create a bridge with a minimum of 4 toothpicks long. To measure the strength of the bridge, count how many books it can hold without collapsing. The bridge that can hold the most weight wins.

### **Chromatography and Fingerprinting (Forensics)**

Chromatography is a process in which we are able to put a mixture through a medium and observe that different molecules travel at different paces, depending on their chemical properties. Students will begin the module by using chromatography to see which pens found in the lab may have produced the chromatograph provided to them. After this, they will employ dactyloscopy, the study of fingerprints, to identify the criminal by the fingerprint left on the note. In order to do this, they will have a chance to see how their own fingerprints differ by shading a piece of paper with pencil, rubbing their thumbs in the shading, and using tape to copy their thumb prints.

### **DNA Extraction (Biology)**

Ever wanted to know what deoxyribonucleic acid really was? Well, now you can find that! This module guides students as they learn how their genetic makeup is determined and finishes off with actually extracting DNA from their cheek cells!

### **Epidemiology (Biology)**

This unique module allows students to gain sight of how our immune system works and what it takes for people to get sick. It is a great introduction to the simpler subjects of biology. This module includes an activity which further allows students to gain insight into the world of an epidemiologist. 'You are all a population! One of you is "sick": "Patient Zero" Let's all be epidemiologists and figure out who is "sick" so we can stop the outbreak!' It is 60 minutes long and ideal for students 8-10 years of age.



### **Fluffy Slime (Chemistry)**

Easy and fun way for children to learn about physical and chemical changes! The states of matter which consists of solid, liquid, and gas will be discussed. There will also be a basic introduction to what atoms, molecules, and polymers are. The module runs for 45 minutes and is ideal for 5-8 year olds.

### **Heart Rate (Biology)**

This module is an awesome introduction to how the heart works. This module entails a number of different activities to give students an idea on how our heart rate affects our daily living. This module is 40 minutes long and suited for children 5-8 years of age.

### **Sound (Physics)**

This fun module informs students about the basic concepts of sounds and how it is created. For the experiments, students create cup and string telephones! The module is about an 45 minutes long and ideal for 5-10 year olds.

### **Smiley Face Genetics (Biology)**

A great introduction to biology, this module allows students to learn the basics of genetics. This experiment involves students creating their own personal “smiley face” which is a guide into illustrating their phenotype in a fun way! This module is about 45 minutes long and is recommended for students aged 12-14.

### **Vision (Biology)**

This experiment is a stepping stone into the world of reflection and refraction. Students are introduced with the basic concepts of optics and then given the opportunity to work with magnifying glasses and examine different optical illusions. This module is about 60 minutes long and ideal for children aged 8-12.