2018 S.T.E.M. Camp Schedule

Friday:
6:00PM – 8:00PM Check in for optional camping at the trading post

Saturday:
7:00AM – 8:00AM – Check In - Trading Post
8:00AM – Opening followed by Activities – Court of Flags
12:00PM – Lunch – Dining Hall
1:30PM – Activities
5:15PM – Dinner – Dining Hall
7:00PM – Evening Program – Callahan Shelter
9:00PM – Stargazing – Meet at Dining Hall

Sunday:
Please depart by 10:00am for optional campers

Morning Activities – Open from 8:05AM to 11:30AM
Slow Ball – Learn about Gravity by using your Engineering Skills to tape pool noodles to a wall anyway you like in order to make the ping pong ball take the longest amount of time and move the slowest possible to reach the floor. Prize awarded for the slowest ball to reach the floor!
Location: Dining Hall
Recommended for Boy Scouts; estimated 30 minutes

Lava Lamp & Oobleck – Come learn about solids, liquids and gases by make your own lava lamp and bag of Ooblek a special kind of liquid that acts like a solid! Place the oobleck under a black light and watch your creation glow in the dark!
Recommended for Cub Scouts; estimated 30 minutes

Franks Fishing Facts & Contest along with Butterfly Session - Catch, clean, and eat fish! Learn to tie your own fishing flies! Dig out your own worms for bait! Prize awarded for the biggest fish caught! Please bring your own rod & reel or create your own fishing pole with provided line, hooks, and sticks. When you're done fishing join us in making milkweed seed bombs while learning about Monarch Butterflies.
Boy Scouts: Try your hands at creating a fishing lure. Use the provided materials to make a frog popper and deer tail lure!
Location: Apache Point
Recommended for Scouts of all ages; estimated 30 minutes for program, fish all you desire!

Hovercraft – Learn, build, and practice with your mini hovercraft so you can enter the afternoon contest!
Location: Scoutcraft
Recommended for Scouts of all ages; estimated 10 minutes to build, practice and have fun as long as you want!

Invisible Ink – Come write secret messages to your friends with our invisible ink! Only painting over the invisible ink with a special chemical will allow you to read the message hidden on the note card.
Location: Handicraft
Recommended for Scouts of all ages; estimated 15+ minutes

Gold Rush – Learn about chemical reactions by turning ordinary copper pennies into silver and gold pennies to take home!
Location: Nature
Recommended for Scouts of all ages; estimated 15 minutes

Afternoon Activities – Open from 1:30PM to 4:45PM

Welding - Have you ever wondered what a welder does? Come check it out and see! Older Scouts will have the opportunity weld.
Location: Maintenance Shop
Recommended for Boy Scouts; estimated 30 minutes

Salt Tree – Come learn about crystallization by making your own crystal trees to take home!
Location: Scoutcraft
Recommended for Boy Scouts; estimated 45 minutes

Milk Art – Learn how dish soap works by making tie dye milk art!
Location: Winter Cabin
Recommended for Cub Scouts; estimated 20 minutes

Invisible Ink – Come write secret messages to your friends with our invisible ink! Only painting over the invisible ink with a special chemical will allow you to read the message hidden on the note card.
Location: Nature
Recommended for Scouts of all ages; estimated 15+ minutes

Flight of the Butterfly Video – Learn about the Monarch Butterfly and take a break from the heat.
Location: Dining Hall
Recommended for Scouts of all ages; estimated 45 minutes

Pipe Cleaner Contest – Come put your engineering skills to the test and build the tallest tower out of pipe cleaners as part of the Pipe Cleaner Contest.
Location: Callahan Shelter
Recommended for Scouts of all ages; estimated 20 minutes

Hovercraft Contest – Bring your hovercrafts from the morning session and race them in our hovercraft race!
Location: Trading Post
Recommended for Scouts of all ages; estimated 20 minutes
Starting at 4:30

MATERIALS

Red from Amazon
Blue from Flinn Scientific

Slow Ball
Pool Noodles
Stop Watches
Ping Pong Balls
Duct Tape

Lava Lamps
Clear Plastic Bottles
Clear Baby Oil
Food Coloring
Alka Seltzer Tablets
1 Cup Measuring Cup

Oobleck
Corn Starch
Tonic Water
Bowls
Spoons
Ziplock Baggies
¼ Cup Measuring Cup
½ Cup Measuring Cup
Black Light

Fishing and Milkweed Bombs
Supplies for lures
Compost
Clay
Milkweed Seeds

Hovercraft
CD's – I probably have 50 to 100
Sharpies
Pop Bottle Caps
Hot Glue
Push Pins
Large Balloons
Stopwatches for Contest

Invisible Ink
Q tips
Paint Brushes
Baking soda

Water
Bowls
Spoons
Grape Juice Concentrate (thawed)
Index Cards

Gold Rush
Gold Rush Demo from Flinn
Ziploc Baggies

Salt Trees
Water
Salt
Ammonia
Cardboard
Food Coloring
Scissors
Spoon
TBSP Measuring spoon
Bluing
Petri Dishes

Milk Art
Whole Milk
Toothpicks
Food Coloring
Dawn Dish Soap
Petri Dishes

Pipe Cleaner Contest
Pipe Cleaners

Crazy Chemist
Everything from Flinn

INFORMATIONAL SHEETS FOR ADULT HELPERS AT EACH STATION

Slow Ball - Recommended for Boy Scouts

Introduction - Try jumping up and down. What causes you to land back on the ground? Why don't you just float off into space when you jump? When you jump up into the air there is an acceleration called gravity that pulls you back down to Earth's surface when you're in the air. You can feel this acceleration called gravity every day. Every time you take a step, or sit down, or spin, everything you do is affected by gravity. You might not be able to see gravity but it is always around us.

Sir Isaac Newton, a man born in England was the first to study gravity. There is a famous story about Sir Isaac Newton and an apple you may have heard about. Supposedly Sir Isaac Newton was hanging out under an apple tree when an apple fell and hit him in the head. This was Sir Isaac's "ah ha" moment. Sir Isaac figured out that as the Earth spins a gravitational acceleration is created that keeps your feet on the ground and makes things fall down towards the surface of the Earth. This acceleration points directly down into the center of the Earth. Whatever goes up, must come down.

In this activity, we're going to see if you can "cheat gravity" and make a ping pong ball fall slowly to the ground. Your challenge is to use a ping pong ball, pool noodles and duct tape to create a track on the wall that will take the longest time for the ball to reach the ground. You will have 4 pool noodle halves cut to various sizes, a roll of duct tape and one ping pong ball for this engineering activity. Your ball must hit the floor and you can't go any higher than 6 feet off the ground. Keep working on your track and when you are ready for an official time to be taken for the contest let me know.

Slow Ball Contest Record Sheet

Name	Time

Lava Lamp and Oobleck – Recommended for Cub Scouts

Introduction- Every object found in the universe can be categorized as a solid, liquid, or gas. A **solid** is something that has a shape and takes up space. A **liquid** is something that doesn't have a shape but takes up space, such as water and juice. A **gas** has no shape and doesn't take space, such as air. Can a solid turn into a liquid? Yes, a cube of ice can turn into a liquid with heat. Can a liquid turn into a gas? Yes, if you boil water on the stove the bubbles are formed because the liquid water is turning into water vapor, a gas.

To make the lava lamp you will be seeing all three states of matter, a solid, liquid and a gas. For the lava lamp you'll need a clear plastic bottle, 1 cup of water, food coloring, an alka seltzer tablet, and clear baby oil. Add the water to the bottle (a liquid) and drop in a couple drops of food coloring. Fill the rest of the bottle until it's about 4/5 th's full with the baby oil (another type of liquid). Break up an alka seltzer tablet (a solid) and drop it into the water. Close the cap on your bottle and watch your lava lamp go wild! The solid alka seltzer tablet is dissolving into the water and releasing a gas that bubbles up through the oil carrying the colored water with it. All three states of matter can be found in one bottle!

The word Oobleck comes from Dr. Seuss, the guy who wrote the Cat in the Hat book, it is not a science word. Dr. Seuss wrote another book called Bartholomew in the Oobleck. In the book there's a king who gets bored with normal everyday weather so instead he makes sticky stuff fall from the sky. That's where Oobleck, the stuff we're going to make today gets its name.

Oobleck is a special liquid. It is called a Non-Newtonian Fluid. Non-Newtonian Fluids are substances that don't behave like we expect them to behave. These fluids might look like a liquid but behave like a solid, or vice versa.

For the Ooblek you'll need a bowl, spoon, ¼ cup tonic water, ½ cup corn starch and a black light. Mix the cornstarch and water together using the spoon and bowl. Try pushing, punching, squishing it in your hand to make a ball and releasing your fist to see what happens to the Oobleck under pressure.

Fishing and Butterflies

I don't know if you wanted anything written about fish or butterflies, but I can write something if you'd like.

Hovercrafts

Hovercrafts trap a cushion of air underneath itself and then floats along on top of it. This air cushion holds it high above water and land obstructions, meaning it can travel on land or water.

Hovercrafts come in all shapes and sizes from giant passenger ferries that can carry hundreds of people to smaller beach rescue craft and one person fun machines, or even smaller like the ones we're going to make today.

Hovercrafts are on top of the surface versus on the surface so they don't get affected so much by **drag. Drag is the resistance that ships face as they push through water, or cars face as they drive down the highway. Drag is a force that pushes against an object.**

To make your hovercrafts, you'll want to take a CD and color or create a design on it first with the **Sharpies. Then use a push pin and make holes in the top of a bottle cap (younger scouts may need help with this). When you finish making all the holes you want in your bottle cap, use the hot glue gun to stick the bottle cap onto the hole in the center of the CD so that the bottle cap faces upright and the holes are on top. Let the glue dry. Blow up a balloon and twist the opening. Put the opening of the balloon over the bottle cap and untwist your opening to allow the air to blue through the pin holes on the bottle cap. Enjoy watching your hovercraft move on a pocket of air!**

Invisible Ink

Our vision is often described as a molecular switch. The word switch probably makes you think of a light switch. In our eyes, the switch is much smaller than a light switch; however, there is a reaction in our eyes that works as a switch to turn "on" and "off" our vision. To begin this explanation, we will talk about the source of this switch, a molecule called retinal which is in all of our eyes. The retinal molecule responds to light. As the light hits our eyes, retinal "switches on" our vision. When we close our eyes or are in a very dark room with no light at all, we are no longer able to see. However, the objects in the room are still there even though we cannot see them. We will simulate this by using invisible ink.
Activity

1. Mix equal parts water and baking soda.
2. Use a cotton swab, toothpick, or paintbrush to write a message onto white paper, using the baking soda solution as 'ink'.
3. Allow the ink to dry. This will take about 10 minutes.
4. Use a different paint brush or cotton swab to paint over the paper with purple grape juice. The message will appear in a different color.

Baking soda and grape juice react with each other in an acid-base reaction, producing a color change in the paper. The baking soda is a base or is said to have a basic pH and the grape juice is an acid.

Gold Rush

Will add this when we get the demo in. There is usually a great explanation that comes with the demos.

Salt Tree

Crystals are a special kind of solid material where the molecules fit together in a repeating pattern. This pattern causes the material to form all sorts of unique shapes. The process of crystal forming is called crystallization. Crystals often form in nature when liquids cool and start to harden. Certain molecules in the liquid gather together as they attempt to become stable. They do this in a uniform and repeating pattern that forms the crystal.

In nature, crystals can form when liquid rock, called magma, cools. If it cools slowly, then crystals may form. Many valuable crystals such as diamonds, rubies, and emeralds form this way.

Another way crystals form is when water evaporates from a mixture. Salt crystals often form as salt water evaporates. These are the types of crystals we'll be making today.

Cut the cardboard into a tree design, two pieces. Cut one from the top and the other piece from the bottom so they create a 3D cardboard piece when slid together. You don't want to make these trees too big, they should be able to sit in the petri dish. Put drops of food coloring on the tips of each limb. Mix 1 TBSP of hot water, 1 TBSP salt, 1 TBSP Mrs. Smith's Bluing, and a little bit of ammonia in the petri dish with a spoon. Place the cardboard upright in the center of the petri dish. Watch the salt crystals form.

Milk Art

Milk is a type of matter called a colloid. These mixtures occur with a solid is suspended in a liquid but does not dissolve. Milk is a special type of colloid where a liquid is suspended into another liquid but they don't mix. This type of colloid is called an emulsion. Soap can be used to separate the two liquids found in milk. This is what we're going today.

Place a little milk in petri dish, enough to half fill the petri dish. Add food coloring drops to the milk in the petri dish. Put a small amount of dish soap on a toothpick. Insert the toothpick into the center of the milk and watch the colors go nuts. Try it a few times. What happens when you don't put the soap in the middle but on the side of the milk instead? What happens when you change the amount of placement of the food coloring drops?

Pipe Cleaner Towers

This is an engineering challenge to test your skills at build towers made out of pipe cleaners. Thinking about what you've learned about gravity and the different science topics throughout the day to try to make the tallest tower that doesn't fall over. Get creative with your colors and shapes. You can use ten pipe cleaners to create your tower. The tallest tower at the end of the contest wins!!