

PARENT LETTER FOR GOO, GAS, GREAT BALLS OF FIRE

If your child likes fun, magical, explosive reactions then this is the camp for them! Each day will be new (and yes, safe) adventures.

With a curriculum that is half science and half technology, your child's day will be divided so they do a little bit of Tennessee Time Killing and Parachuting in-between the science fun.

Just in case you are worried that they will only have fun and not learn much, just read on to see the concepts they will be learning!

The technology information will follow the science descriptions.

SCIENCE

PART 1: UNDERSTANDING RULES AND MATERIALS

The students will get a good understanding of what it takes to be in a lab. They will learn the terminology, begin taking notes in their Lab Note Book and begin learning about the Scientific Method. Ask them about the "Observation Test" they did today.

PART 2: PREP, DEFINITIONS AND ENDOTHERMIC AND EXOTHERMIC REACTIONS

In Part 2 the students will learn about Endothermic (absorbs heat) and exothermic (gives off heat) reactions. They will work with different salt compounds, make ice cream (ask them whether it was endothermic or exothermic), and will explore what happens with soap, fat and milk. They will continue learning about the scientific method with compare.

PART 3: ACID AND BASE REACTIONS AND OXIDATION/REDUCTION REACTIONS

In this section the students will work with Acids and Bases. They will also learn about Oxidation/Reduction reactions.

They will start off with the third Scientific Process: Predict

They will tie all of these fun activities together to test our first claim: Will a soft drink rot your teeth.

The students will make indicators and test many different acids and bases. They will create a neutral solution. Next they will have fun with bottle balloon races where they will understand the importance of a constant and a variable. Ask them which the constant for their team was.

Weather permitting, they will observe a HUGH reaction that will blast high in the air and once again review an exothermic reaction.

Once we have finished with this portion we will move on to more oxidation/reduction activities where they will help create pure oxygen with liver and hydrogen peroxide.

Now they have enough information to draw a conclusion from the question “will soft drinks rot your teeth?” Ask your scientist what the answer is.

They will conclude by testing and creating their own soft drink using the science they have learned. This activity reinforces constants and variables. They will conduct a survey and learn ratios. Please be sure to ask for a taste of the soda drink that your child creates.

PART 4: NON-NEWTONIAN MATERIALS

Next we will work with the 4th scientific principle: Conclude. Here we will also work with plastic and other Non-Newtonian materials where we have fun making GAC and putting a needle through a balloon.

PART 5: TESTING SOLUTIONS

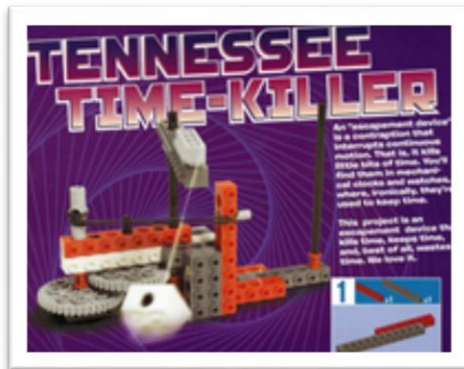
In our testing solutions portion, we will learn the 5th scientific method- Communicate. We will test for monosaccharaides and carbohydrates. We will test powders using flame test and look for starch. They will have the opportunity to use a burette.

PART 6: DRY ICE AND FLUORESCENT BUBBLES

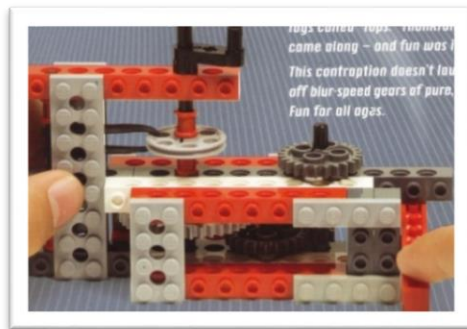
To top things off, the students will have the opportunity to learn about frozen carbon dioxide and understand how fluorescence works as they do a series of experiments with each. These two activities may be done out of order with the rest of the curricula.

Wait until the children tell you about the amazing growing and glowing eggs! Ask your child if they passed the glowing germ test! What did their glowing message say?

TECHNOLOGY



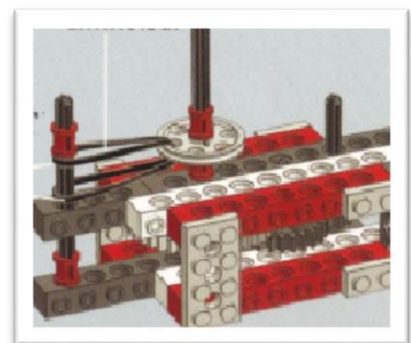
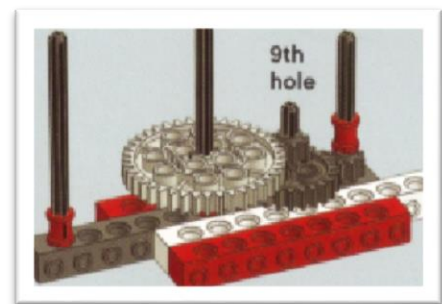
Goo Gas Great Balls of Fire is a great camp full of fun and exciting activities that we will be teaching to some happy campers this summer. The technology portion of the camp will deal with Gears, how they work and understanding the basic concepts this simple machine. Students will also use Potential and Kinetic energy to power their activities. Our students can construct several different “builds” while learning how simple machines work. Most of these projects will be attempted during the camp or class time. How many depends on the abilities of the students. The average time it takes for each build is 1 hour, but can take up to 1 and ½ hours. We hope to complete all builds offered in each camp.



We will discuss:

The Spinner is basically a **Gear Box**: A gear box is the “housing” that keeps the gears safe or protected from outside interferences allowing the gears to spin properly. Within the gear box, 4 gears are aligned in a **Gear Train**. By placing the gears in a train, force is created when the 1st gear is **Torqued** (or turned), it engages the next gear, which turns the next gear and so on. This is **Gear Transmission!**

Now, how do we **Torque** or turn the first gear? This activity uses rubber bands to create **Potential** and **Kinetic Energy**, wrapping the rubber band around an axle and through a pulley wheel. Using a crank handle, the axle with the pulley wheel will turn, causing the rubber band to stretch and stretch creating **Potential Energy**. Once released, the energy becomes **Kinetic**, actively turning the gears, one turning another and another.....**Gear Transmission!**



The **Tennessee Time Killer** does just what it says. It kills time for no reason, just because. This activity uses an **Escapement Device**. Escapement devices are generally found in mechanical clocks as a way of keeping exact time. If a gear goes around in a circle on its own there would be no way to stop it from going faster than a second in time.

The Escapement device, in this case the “swinging pendulum”, hooks a gear tooth and holds on for a full second before releasing. As it swings to the other side, it will hook onto a gear tooth from the opposite side, and hold it for a full second. The escapement device will go back and forth, side to side, continuously holding onto a gear tooth on each side, thereby holding onto time.

In this way, the pendulum holds time and kills time, at the same time. This would account for the ticking you hear coming from a mechanical watch or clock.

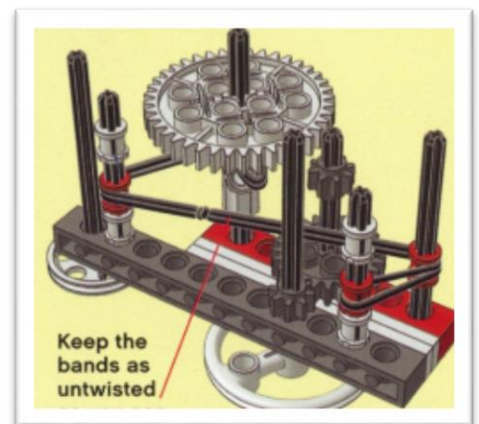
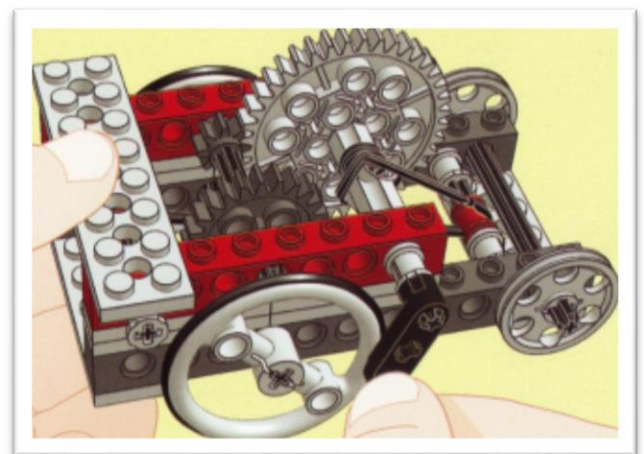
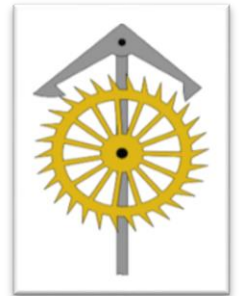
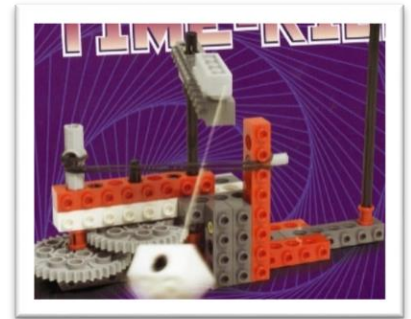
This activity will also reinforce gear concepts:

Which gear is the **Driver**? The 1st gear forced into motion by a hand crank or motor.

Which gear is the **Follower**? Technically all gears that come after the Driver are considered followers, but they do have different names.

Which gear is the **Idler**? The Idler gear is commonly placed in the middle of the **Driver** and the **Follower** gears.

The **Super Charged Speedster** runs with the same energy source as the Battle Top Spinner, implementing **Potential** and **Kinetic** energy for power. This build is more complicated and will need the teams to concentrate and focus during the building phase of the activity. Again, we will use a hand crank to stretch and stretch a rubber band, creating Potential energy. Greater tension on the band is used to get more power out of the band when released. We accomplish this by winding the band over and around more than one axle, and then winding some more with the hand crank.



You might notice the **Gear Box** or **Housing** in the pictures above. This is a much clearer view of how the housing will protect the gears from outside interference. The gear interaction is also more apparent, showing a **Gear Train**, a **Driver** and **Follower**.

Moving on, the class/camp can build with the Lego ® Education Construction Set. Projects in these boxes are the Flywheel and the Roller Conveyor. Both activities deal with the simple machine Wheels and Axles.



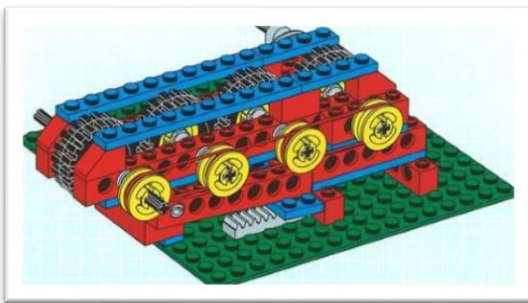
The **Flywheel** is one of the most fun activities in the construction set. Mostly because the kids get to add motors, but even better, they get to race them.

What is a Flywheel and how does it work?

Flywheel is a spinning wheel or disc with a fixed axle so that rotation is only about one axis. Energy is stored in the rotor as **Rotational Energy**. We know that most cars have wheels

and axles. They also have gears. The car changes gears to increase and decrease speed. This is called **Gearing Up (increase)** and **Gearing Down (decrease)**. A flywheel turns as the rear wheels turn. Because of Gearing Up, the flywheel is turning faster than the rear wheels. The faster the flywheel turns the more energy it stores (**Rotational Energy**). Once the car is released it will continue moving, due to the stored energy in the flywheel because it keeps spinning.

Why is the Flywheel a larger tire? A flywheel is a wheel that is made heavier with added weight. The added weight helps to store the energy.



The last project offered will be the **Roller Conveyor**. In this activity we will use the wheels as rollers. When wheels are used in a conveyor arrangement, objects are able to be moved with very little effort or force. The **Wheels** are held in a fixed position with **Axles** for added stability. The wheels roll with the help of a hand crank and the weight of objects placed on the conveyor.

What is more effective to help with motion is the use of Pulleys! Pulleys are used to help move or lift heavy objects. The pulleys used in the Roller Conveyor are called **Static** pulleys. This type of pulley is fixed and stationary, it cannot be moved. To keep them stable and fixed, a wheel and an axle is used. This pulley will help redirect force, helping to move along the object on the conveyor.

Even better, the Roller Conveyor can also be operated with the use of a motor and battery box.

With all of these great activities to build, your child will have a really good time while they learn about simple machines. We know they will have a “Gas” in this camp!

Lego ® technic boxes allow students to build the Flywheeler and the Roller Conveyor activities. The Flywheeler employs Wheels and Axles to increase the speed of the car by adding another wheel. The Roller Conveyor uses several wheels and axles to speed up transport of objects. The Flywheeler and the Roller Conveyor can both be built with, or without a battery box and motor.

Have a great time with your camp this summer and your students will too!