

ROBORIFIC SCIENTIFIC 2018 PARENT LETTER

Hello Imagine That Parents,

The **ROBORIFIC SCIENTIFIC** Curriculum is a favorite of the students of Imagine That! This camp is divided into Science, Technology, and Robotics. The description of the Technology and Robotics will follow the Science Description.

SCIENCE DESCRIPTION

The Science portion of this camp is broken up into three major activities, all of which have “sub-activities.” The three main activities are as followed:

- Colliding Balls
- Balls and Tracks
- Blinking Lights

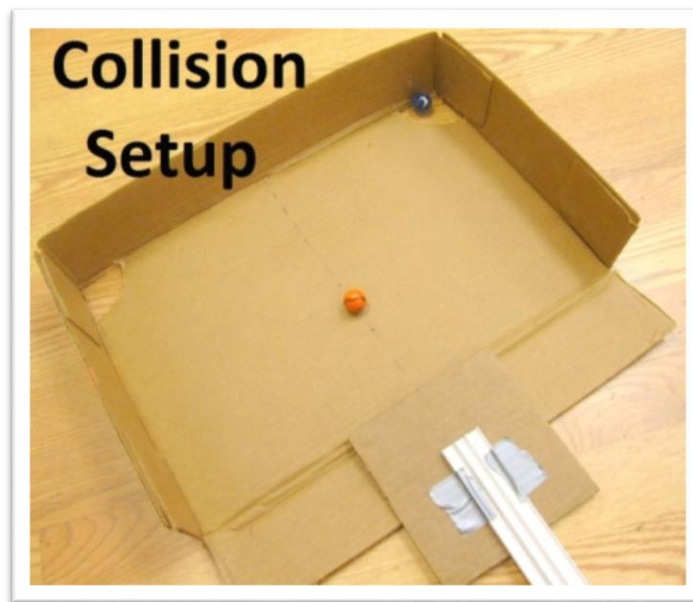
The Science portion of this Parent Letter will be divided into the three main activities. These three main include various sub-activities. Our teachers will decide when these activities are done – meaning they can be done in morning or afternoon, as the Science portion of this camp will interchange with the Technology portion. We hope the below descriptions make you and your child as excited as we are for the week ahead!

DAY 1 – COLLIDING BALLS, WATER BALLONS AND BOUNCING BALLS

The Colliding Balls curriculum focuses on what happens when balls, such as marbles, collide with each other. It sounds simple, but campers will have a ‘*ball*’ discovering the Science behind the collision of balls. They will be introduced to several activities and experiments. Colliding Balls will be divided into the following activities:

- Activity 1: Glass Marbles
 - Student groups will be instructed to build their own U-shaped track, and test out different marble-collisions, while recording measurements and observations.
 - **Discovery Question:**
 - *What happens when balls on a track hit one another?*

- *Which kinds of balls, and which combinations, send a resting ball the farthest up the track?*
 - *Does it matter if the track is steep or shallow?*
- Activities 2 and 3 : Here the students will investigate and test how different size and weights of the balls affect the results.
- Activity 4: Weighing The Balls
 - Student groups will be instructed to invent their own scales, in order to measure all the different balls they are experimenting with.
 - **Discovery Question:**
 - *How do the weights of the balls compare to one another?*
 - *Which kinds of balls, and which combinations, send a resting ball the farthest up the track?*
 - *Does it matter if the track is steep or shallow?*
- Activity 5: The Crash Test: Yes, they love this one!
- Activity 6: Simple Billiards
 - Scientist will make simple billiard to expand their knowledge of colliding balls, even more!
 - **Discovery Question:**
 - Can you get the resting ball into either of the 2 far corners of the box?
 - Can you do this several times in a row?
 - Does it matter which ball hits the resting ball?



To instill their new knowledge of bouncing balls, your students will be delighted to hear that they will also be making bouncing water balloons, through the activity Water Balloons and Bouncing Balls! Through this activity they will learn the affect force has on bouncing balls. These forces are as follows:

1. Friction between the ball and the air as it falls and rises.
2. Friction between the ball and the ground.

3. Conversion of energy into sound (small amount).
4. Deformation of the ball when it hits the ground.
5. The force of gravity pulling the ball back to the earth, even as it bounces back up.
6. The friction and the deformation, convert kinetic Energy (the energy of motion) into heat energy.

DAY 2&3 – BALLS AND TRACKS

Our budding engineers will get to make their own roller coasters that can send a marble over jumps, round curves, and spiral upside down. They'll have a blast doing it. They will also learn the concepts of:

- Action and reaction by working with balls of different mass and size and prove for themselves that the mass of an object does NOT affect its velocity due to gravity! Ask your child what DOES affect the speed that an object drops. (Hint: Air resistance)
- Centrifugal force
- Acceleration, Friction and resistance
- Learn about design concepts and problem solving.
- Potential and Kinetic energy



DAY 4 & 5 – BLINKING LIGHTS

Blinking Lights will teach your children all about the world of circuitry. Their end product will be a take-home flashlight! Along the way they will do several activities with the object of teaching them:

- simple circuitry through learning how to make flashlights and traffic lights,
- how electricity works and simple circuit designs,
- a good concept of insulators and conductors,



- what a switch is and how to create one,
- the difference between series and parallel circuits,
- how to create a Circular (Rotary) Switch.

This curriculum is all hands-on and all fun!

TECHNOLOGY, CODING AND ROBOTICS

Lego® WeDo Construction Set has so many fun and exciting building activities in this camp. Our goal is always to complete as many of the offered builds as the kids are able, but this is not always possible. These are descriptions of all the builds that your student has the opportunity to experience.

The Bulldozer: Students will have a great time building, programming and playing with the bulldozer.

This motorized vehicle uses a gear box with cam gears attached to the outside of the housing and lifts the front end of the dozer up and down. What are your students going to pick up with this build?



The Forklift: Here's another motorized machine that lifts things. This one uses a series of gears including a gear rack and crown gear to lift the platform. Once students have completed the builds they will program the forklift and the bulldozer using the computer and WeDo software.

The Jackhammer: With this building activity your student will experience gear ratios. A Jackhammer needs to be powerful to break up concrete and other stuff. Sometimes this can be accomplished by switching gears up and down. Using cam gears to lift the Jackhammer up and down, the speed can be increased or decreased using WeDo programming software. Does the speed of the gear rotation influence power?





The Wrecking Ball: Ha! The name alone screams fun!! With the Wrecking Ball your student will create linear motion in the build, allowing the ball to smash into Lego brick walls and knock them down. This build uses a serious array of gears to accomplish “wrecking”! A spur gear, crown gear, 24 tooth gears, worm gear and cam gears. Housing holds gears attached to the motor that mover the crane arm. Using a lever attached to the cam gears the crane arm will swing back and forth with the WeDo programming. This is going be a blast!

The Loader: A loader lifts very heavy weights, usually on construction sites, moving debris that has been demolished by the Wrecking Ball or the Bulldozer and dropping onto another machine. Like the Forklift, it picks up the heavy stuff and gets it out of the way, so construction can continue.



A gearbox will add torque so that the loader can lift heavier loads. The gear housing holds a worm gear on the bottom which meshes with the teeth of the 24-tooth gear. Again, the Loader will be operated using the WeDo software programming.



CODING:



After all the building and experimenting students can have a great time with **Scratch!**

Scratch programming is a fun and entertaining way to learn more about the thought processes needed for clarity and precision to create productive command sequences. We know, it sounds like a mouthful! It’s surprising to think that we use sequences of steps every day without even thinking about it, like, just getting out of bed!

So easy to do when you don't have to think about it. But when you try to tell a computer to do something you need to be very clear with a command and its parameters.

Well, how do you teach children to use sequence thought to make something happen? You disguise it as fun!!

Scratch the website is https://scratch.mit.edu/scratch_1.4/. This is a free download!