

**LEADER**  
**CUB SCOUT MEETING GUIDE**  
**INVENTORS**



# PRE-MEETING EMAIL

## SEND 1 WEEK PRIOR + A REMINDER DAY OF:

Pack (enter #) Families,

Our next meeting is (enter date) at (enter time). Please log-in using this Zoom Code (enter zoom code). I, (enter name), will be the meeting host. Our meeting theme is Inventor's Lab! We will cover activities from the following adventures:

- Lion: Gizmos and Gadgets
- Tiger: Floats and Boats
- Wolf: Motor Away
- Bear: Make It Move
- Webelos: Engineer

Please look at the meeting information (enter hyperlink), to make sure you prep your pre-meeting activities and complete any activities you wish to from home. We will ask \_\_\_\_\_ to share \_\_\_\_\_ during the meeting (requirement \_\_\_\_). Remember, DO YOUR BEST and have fun with it!

You'll want to bring: **6+ popsicle sticks, a pulley (a carabiner or something similar would work as well), a short piece of rope or twine, and a few sheets of printer paper to the meeting.**

See you at our meeting,

(Your Name)

# ZOOM MEETING TIPS

## WHEN SETTING UP YOUR MEETING:

- Prior to meeting:
  - Set up your meeting and email meeting code, only email to those in your Cub Scout Pack, set up a new meeting in Zoom for each meeting, so there is a new secure code
  - Pre-assign other adults to help as co-hosts, ask them to do specific tasks (monitor chat room, help present w/assigned slides)
  - Take a look at the slide deck, you could pre-assign older Scouts to present slides 7-17
- In settings turn off:
  - Annotation (prevents Scouts from writing on screen)
- At beginning of meeting
  - Mute everyone and select "do not let participants unmute themselves"
  - Make additional adults co-hosts
  - You can keep the chat open, but likely you will want to close the chat to "host only", the Scouts tend to spam the chat

# SLIDE DECK SCRIPT

## SLIDE 1

Welcome to our Cub Scout Meeting! We will start at (enter time)

## SLIDE 2

In today's meeting we will learn about the importance of engineering. We'll learn about levers, and pulleys, we'll explore motion and force. We'll also be building a popsicle stick explosion, and we'll build two different types of pulleys.

## SLIDE 3

Requirement 1 of the Gizmos and Gadgets adventure for Lions, is to learn about the properties of motion. Before we learn about the properties of motion, we first need to know what motion is. Any object that is moving has motion. That motion can be described in three different ways. Those three different ways are the object's "properties of motion." Those three properties are speed, direction, and change in position.

## SLIDE 4

The Speed of an object is just what it sounds like. How fast it is moving. As an example, a car driving on the highway of 55 miles per hour has a speed of 55 mph. The Direction of an object is also just what it sounds like. If that same car from the last example is moving north on the highway, then it has a direction of north. The third property of motion, change in position is a little different. Change in position happens when an object rotates or spins. An example of that would be a spinning top. It's not moving anywhere, so it has no speed or direction, but it still has motion as it spins around itself. You can get another property of motion if you combine two types of motion. If you combine speed and direction, you get something called velocity. velocity is represented by a speed in a certain direction. So with the car we have used as an example already, if it was still traveling north on the highway at 55 miles per hour, it has a velocity of 55 miles per hour to the north.

# SLIDE DECK SCRIPT

## SLIDE 5

Now let's talk about force, which is the second requirement in the Gizmos and Gadgets adventure. Whenever you push on something, pull something, or it pushes or pulls on you, that push or pull is called force. How much force you have when you push something is calculated with two things. How heavy you are, and how fast you are moving. Those two things are represented by your mass, which is how much "stuff" you are made of, and your acceleration, which is basically how fast you are moving. The bigger you are, or faster you are moving, the more force you will have. Now, let's take a break and do something fun. We're going to be using our popsicle sticks to make a small explosion. Let's watch this video to see how to do it, and then we will build them together.

## SLIDE 6

VIDEO AUTO-PLAYS Let's grab our popsicle sticks and get working on this. Remember to hold on to the last stick you put in when you are picking up the next stick, or you might just set your explosion off too early.

## SLIDE 7

(Show them how to build the popsicle stick explosion, work on this for a few minutes and encourage them to work on it outside of meeting)

## SLIDE 8

Now that we've learned a bit about force and motion, let's look at something that helps us change how we apply force to an object. That's exactly what pulleys do. They change the direction that force is applied to an object, and they can sometimes give you something called a "Mechanical advantage."

Mechanical advantage happens when you have pulleys set up so that if you pull on the rope, the rope will pull further for you than the object moves. The higher the mechanical advantage a set of pulleys gives you, the easier it is to pull something.

# SLIDE DECK SCRIPT

## SLIDE 9

VIDEO AUTO-PLAYS We are going to build two different types of pulleys, this video showed us the two different types.

## Slide 10

Now that we know a bit more about them, let's build our first simple pulley. This is called a "Movable Pulley" and it has a mechanical advantage of 2, but does not change the direction that the force is applied to the weight. With this mechanical advantage, you have to move the rope twice as far as you would if you were just pulling the weight up, but you only have to pull half as hard.

For Example, with a mechanical advantage of 2, if you wanted to move a 20 pound weight 2 feet, you would have to pull the rope 4 feet, but you would only be pulling what would feel like 10 pounds.

For this pulley, the pulley is attached to the weight, and the rope attaches above the weight, goes through the pulley, and then the other end goes back up above the weight and is used to pull the weight up.

## Slide 11

Let's build our movable pulleys together. we will go through it step by step. Step 1 of the movable pulley: Get your object that you want to lift, and your pulley or carabiner.

Step 2: clip the carabiner or pulley onto the object. If you are using a pulley, make sure that you don't put the wheel part of the pulley on the weight.

Step 3: tie one end of your rope up above your object. in the picture, they tied it to their shower curtain rod, but anything that is above where your object will be would work.

Step 4: run the rope around the wheel part of the pulley, or through the carabiner and then pull back up towards where you tied the rope off. now you have a movable pulley system.

An example of a movable pulley in real life would be an elevator. elevators use a lot of pulleys to make it easier to lift, but they often use a movable pulley as the base for how they work.

# SLIDE DECK SCRIPT

## SLIDE 12

The second type of pulley that we will look at and build is a fixed pulley. a fixed pulley has a mechanical advantage of 1, and changes the direction that the force is applied to the object. With this pulley, the pulley is attached to the top of something, and the rope is attached to the weight. The rope then goes through the pulley, and goes back towards the weight. With this pulley, as you pull down on the rope, the weight will go up.

## Slide 13

Alright, now let's build our pulleys. We'll walk through it step by step. If you have to take your first pulley apart, that's fine.

Step 1 of the fixed pulley: get your carabiner or pulley, in one hand, and the middle of your rope in the other.

Step 2: clip the carabiner or pulley over the rope so the rope goes through the carabiner or pulley.

step 3: tie one end of your rope to the weight or object you want to lift

step 4 lift the carabiner or pulley above the object you want to lift, with both ends of the rope hanging below the pulley.

you now have a fixed pulley system.

Two examples of this type of pulley are a flag pole and a well. As you pull on the rope to pull up a bucket from the bottom of a well, or raise a flag up a flag pole, you have to pull the whole weight of the object you are pulling, but if you are a bucket up from the bottom of a 30 foot well, you only have to pull the rope 30 feet. unlike with the movable pulley. with a movable pulley, the bucket would feel less heavy, but you would have to pull twice as far to bring it up to the top of the well.

# SLIDE DECK SCRIPT

## SLIDE 14

All of these cool and useful things that we have been looking at so far wouldn't have been possible without engineers. Engineers are the people who design and build all of the pulleys, levers, cars, planes, and everything else that we use today to make our lives easier and more fun.

There are many types of engineers too.

Aerospace engineers design all the things that fly like planes, spaceships, and even things like missiles

Civil engineers design things like bridges, buildings, airports, and roads

Computer Engineers can design things like new phones, laptops, and computers, or they can design the software, games, and programs that run on those computers

And Robotics engineers work on robots that can do things that humans can't do, or make robots that can do things we can do, just faster and better.

## Slide 15

**\*If the meeting is running long, this would be the easiest slide to skip\***

There are so many different types of engineers, and they all do important things for us let's watch this video about all those different types of engineers we saw on the last page. <Play Video>



# SLIDE DECK SCRIPT

## SLIDE 16

But how do all these different engineers design the things that they are working on and building? Well, a lot of them use blueprints. Engineers like civil engineers, computer hardware engineers, and aerospace engineers all use blueprints all the time when they are working. The blueprints are how the engineer who is designing a project can show how they want the project to look when it is done, and how big it is. That means that the blueprints need to be super detailed and very specific. There are a lot of things that you have to do to have a good set of blueprints. On the screen now, you can see a simple version of a set of blueprints for both a light bulb, and a dump truck.

## Slide 17

Let's look at one particular set of blueprints and learn a bit more about them. Here is a set of blueprints for a boat. The blueprints for the boat is a 2D drawing of what the boat will look like. The blueprint shows the boat from multiple different sides. It has measurements of how long all the parts are, angles of some of the places where pieces come together, and the materials you need to build the boat. The blueprints are detailed and accurate. The blueprints should be made in a way that if the engineer who made the blueprints wasn't around to tell someone how to build the boat, that person could use just the blueprints and be able to build the boat exactly how the engineer wants it to be built.

# SLIDE DECK SCRIPT

## SLIDE 16

Now that we know a bit more about how many types of engineers there are, the next step is to pick a type of engineer and learn about them. After the meeting, using the internet, your library, or an engineer you already know. discover three things that describe what that engineer does. After you have learned a bit more about that engineer, share what you learned with the rest of the den.

## Slide 17

**\*Optional Breakout Rooms for Engineer requirement\***

## SLIDE 18

We covered requirements from the Lion adventure Gizmos and Gadgets, The Tiger adventure Floats and Boats, the Wolf adventure Motor Away, the Bear adventure Make it Move, and the Webelos adventure Engineer. Scouts, if you want to complete any of these adventures, you can finish the last requirements at home easily with a little bit of help from a parent or guardian.

## SLIDE 19

Thanks for coming to this week's meeting. I hope you had as much fun as i did this week! See you next time!



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