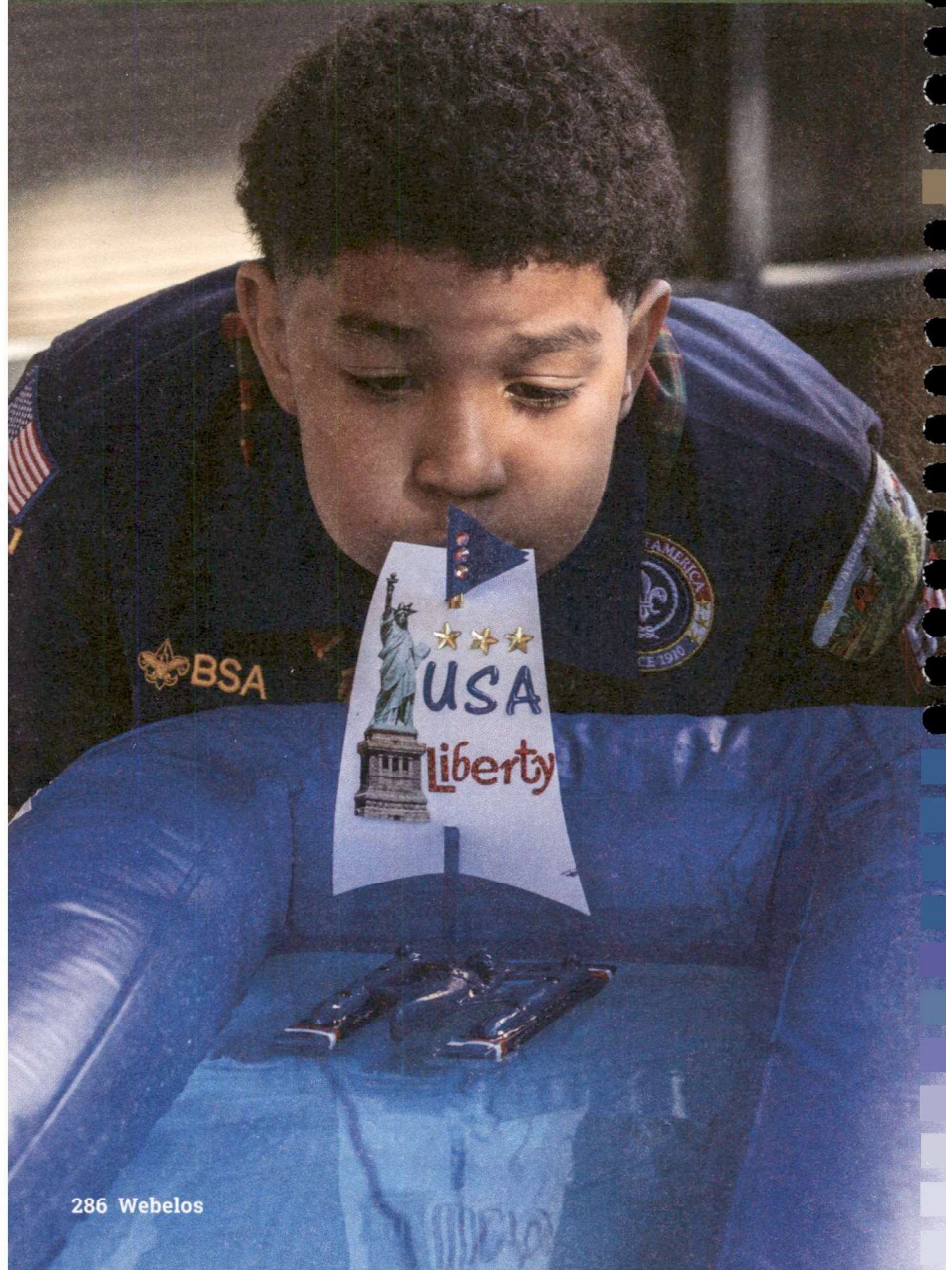


RACE TIME

ELECTIVE ADVENTURE



SNAPSHOT OF ADVENTURE



Propulsion is what gives an object (such as a plane, car, or boat) the power to move. Friction is what causes an object to stop. In this Adventure, you'll learn different ways to make and propel vehicles.

Think about how the shapes of cars, boats, and planes affect the distance they can go. You'll explore how you can use the air in your lungs, the force of gravity, and the power of your imagination to make things go.

REQUIREMENTS

Approved by _____

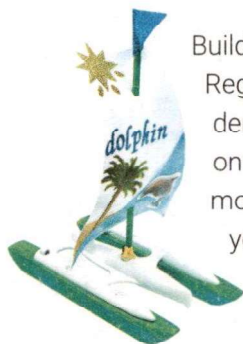
1. With an adult, build either a Pinewood Derby® car or a Raingutter Regatta™ boat. _____
2. Learn the rules of the race for the vehicle chosen in requirement 1. _____
3. Explore the properties of friction and how it impacts your chosen vehicle. _____
4. Before the race, discuss with your den how you will demonstrate good sportsmanship during the race. _____
5. Participate in a Pinewood Derby or a Raingutter Regatta. _____



- Elective Adventure
- Scan for this Adventure page

REQUIREMENT 1

With an adult, build either a Pinewood Derby car or a Raingutter Regatta boat.



Building a Pinewood Derby car or Raingutter Regatta boat is a fun way to spend time with your den or family. Here are some basic instructions on how to make these vehicles. You may find more advanced tips and tricks with your den or family online.



PINEWOOD DERBY CAR

A Pinewood Derby car is made out of wood and runs on a downward track. The car uses the force of gravity to run down the track. Read all the basic instructions first before starting to make your car.

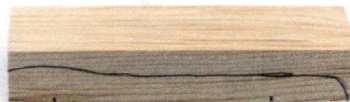
Materials and Tools

- ▶ Pinewood Derby car kit
- ▶ Saw
- ▶ Hammer
- ▶ Sandpaper (200 grit)
- ▶ Paint
- ▶ Paintbrushes

Instructions

1. Draw a design for your car.

Take the block of wood in your Pinewood Derby car kit and place it on its side. Draw an outline of the wood on paper. Now draw the profile (side view) of your car.



2. Cut out your car from the block of wood. You can use a

handsaw, or you can have an adult use a power tool to cut it out.



3. Sand your car. Sanding will remove any sharp corners and will allow paint or any other decoration you add to your car to stick better.

4. Paint and decorate your car.

Pinewood Derby cars are made of soft wood and when you paint them, it may take a couple of layers or coats of paint. Paint the car once, and then, when the paint is dry, use sandpaper to lightly sand it. Clean off any dust from sanding and paint it again. You can repeat this over and over until you get the look you want.



5. Assemble your car. Using the nails that came in your kit, attach the wheels that came

in the kit to the car in the pre-cut areas on the bottom of the car.



6. Check the weight. Do this step last as everything else you do will either add or subtract weight from your car. You want your car to be exactly 5 ounces. If it weighs less, you can simply glue pennies to the car to get it just right.

Here is a tip: Make sure your axles are square (at a 90-degree angle). This will keep your car straight when going down the track. If your axles are not square, your car might turn and rub against the track, causing it to slow down. You can test your car by simply pushing it across the floor to see if it goes straight.



RAINGUTTER REGATTA BOAT

The Raingutter Regatta kit comes with everything you need to make your boat. The Raingutter Regatta boat is raced in either a homemade track made by capping the ends of two 10-foot-long rain gutters or an inflatable track your pack may buy. Two Cub Scouts race their boats by blowing into the sails.

Materials and Tools

- ▶ Raingutter Regatta kit
- ▶ Phillips head screwdriver
- ▶ Sandpaper (200 grit)
- ▶ Paint
- ▶ Paintbrushes
- ▶ Glue

Instructions

1. Sand the wooden hulls. It is easier to sand the wooden hulls before you assemble your boat.



2. Attach the plastic cabin to the two wooden hulls.

3. Paint and decorate your boat. If you're painting, it's best to use a primer first. This will help the paint stick to the plastic parts of the boat. You can decorate the sail, too.

4. Assemble the sail and mast. Use a small bit of glue in the hole where the mast will go, then place the mast into the hole. Allow the glue to dry before you attach the sail.



Here's a tip. You can add wax to the bottom of your boat, the hull, to make it extra smooth. The smoother the hull, the faster your boat can go.

REQUIREMENT 2

Learn the rules of the race for the vehicle chosen in Requirement 1.

Rules are important so that everyone knows how to play. The rules to the Pinewood Derby or Raingutter Regatta should be kept short and simple so everyone can know and understand them. Rules for the Pinewood Derby and Raingutter Regatta are included in each kit. You can also find the rules online by following this QR code.



Pinewood Derby



Raingutter Regatta

Your pack may have additional rules. You should ask for these rules before you start building. Most of the rules about Pinewood Derby and Raingutter Regatta are about what you can and cannot do when building your car or boat.

Next is knowing how your race will be conducted. You may have a race with just the members of your den first, and the winner of each den competing for the pack championship. Your pack may run races based on the fastest time. Understanding how your pack will conduct the race will help you understand what is going on during the race and how many times you might be racing.

REQUIREMENT 3

Explore the properties of friction and how it impacts your chosen vehicle.

To know how to make your vehicle go faster, you'll need to know what things make it move. There are a lot of different ways to make your vehicle go fast, and each of those ways is based on a science known as physics. Physics is the scientific way to understand how the universe and the things in the universe act. When you discover ways to make your vehicle go faster, you're exploring the physics of your vehicle.

There are things that your Pinewood Derby car, your Raingutter Regatta boat, or anything that moves have in common: force and friction. Learning about these two things will help us understand how to make our vehicle go faster.

In physics, a force is what causes the motion of an object to change its speed. If you take a ball and place it on the floor, it may roll around for a while, but eventually, it will stay in one place. If the wind blows, the ball will move. The wind is the force causing the ball to move. If you kick the ball, your foot provides the force causing the ball to move.

For the Pinewood Derby, there is only one force that is applied to your car. It is one of the most powerful forces in the universe. Gravity is the force that makes your Pinewood Derby car move. Gravity is the same for every Pinewood Derby car. You can't change gravity.

For the Raingutter Regatta, the force that makes your boat move is you, your breath, or air pump. Each Cub Scout is different, and the force that they put on their boat will be different. You can change the force for each Raingutter Regatta boat by how much force a Cub Scout can apply to it.

Friction is a type of force. When a force is applied to something that is moving one way and the force is going another way, it is called friction. Let's use the ball as our example. When you kicked the ball, the ball had to move through the air which caused friction, slowing down the ball. Gravity acted on the ball, too, by pulling the ball toward the ground. Gravity is a form of friction.

Any place where one thing is moving is going to have some type of friction. You may not be able to get rid of all the friction, but you may discover ways to lower it.



What could cause friction to the way your car moves down the track?

What could cause friction to the way your boat moves in the water?

REQUIREMENT 4

Before the race, discuss with your den how you will demonstrate good sportsmanship during the race.



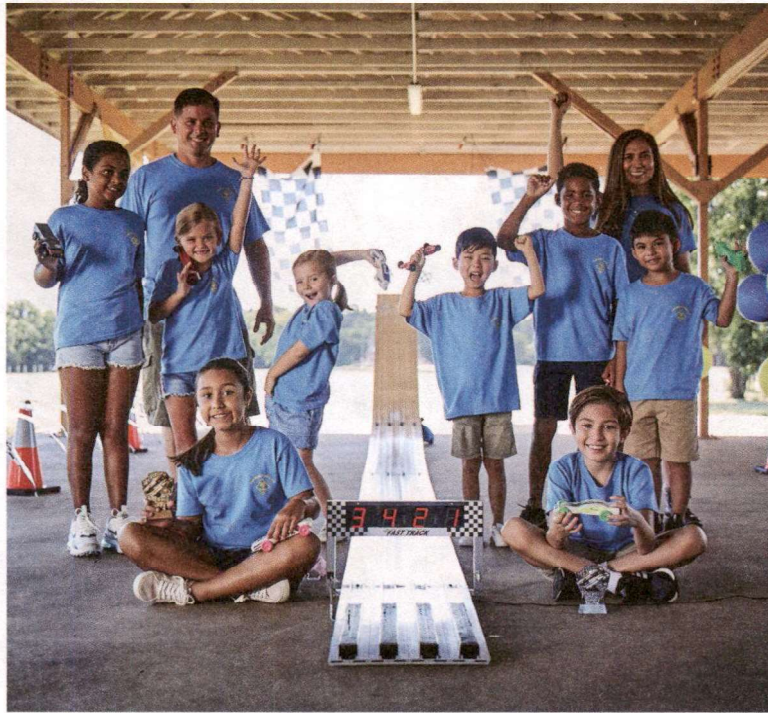
What really matters is having fun when building your car or boat. Just like any race, there is going to be someone with the fastest car or boat. Remember that the race is done to add excitement and fun. If you worked hard on your car or boat and can say that you did your best, then you have lived up to the Cub Scout motto — Do Your Best.

Think about the Scout Oath and the Scout Law. With your den or family, point out the parts of the Scout Oath and the Scout Law that will be helpful for everyone to follow during the race.

REQUIREMENT 5

Participate in a Pinewood Derby or a Raingutter Regatta.

It's race day! Time to take everything you have learned in this Adventure and have a great time with your den or pack.



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