

## SOAPBOX DERBY

Congratulations! Your team has just been awarded an entry slot in the prestigious Soapbox Derby, widely considered to be the most prestigious soapbox derby in Austin.

The derby is this afternoon at 3pm at the Circuit of the Americas (COTA) track in East Austin. Before that time, you must build your car, as well as train a driver and a pit crew mechanic. Fortunately, **Red McComb's Soapbox Emporium** is open and fully stocked with parts.

### Competition Structure

The Soapbox Derby has three separate competitions. The main race is one lap around the 3.4 mile track. While there are some turns, raw speed is the important factor. Following the main race, there is a competition on vehicle aesthetics and design. At the end, there is an optional stunt competition, in which maneuverability is key.

Your competition is the other teams in the room. Prize money is awarded as follows:

- Main race, 1<sup>st</sup> place: \$10,000
- Main race, 2<sup>nd</sup> place: \$5,000
- Main race, 3<sup>rd</sup> place: \$1,000
- Stunt competition: \$8,000
- Design competition: \$3,000

### Task 1 and 2: Assign your Crew

You'll need a driver and a chief pit crew mechanic. Those two people will stay behind to learn the course as the rest of the crew heads to the store to buy parts and build the car.

- It's a well-known fact that women's faster reflexes and better spatial awareness make them better drivers than men. However, either a man or a woman may be the driver.
- The extra parts shelf at the repair station is quite tall. Thus, taller mechanics tend to be faster workers, which is critical in the main race event.

**Task 1: Designate a driver.**

**Task 2: Designate a pit crew mechanic.**

### Task 3: Build your Car

All of your remaining crew should head to Red's Emporium. He trusts you, so he'll extend a \$200 credit per person that goes to the store – but no more. With that budget, you'll need to buy an engine, a chassis, wheels, a roll cage, and a body. He'll help you put it all together.

Red offers three models of each component: the higher the price point, the higher the quality.

Red McCombs' Soapbox Emporium									
Engine		Chassis		Wheels		Roll Cage		Body	
SpeedMax	\$300	Titanium	\$200	Deluxe	\$200	Protecto	\$200	Fiber	\$200
PowerGo	\$100	Aluminum	\$100	Econo	\$100	Standard	\$150	Plastic	\$100
HuffNPuff	\$50	Steel	\$50	Used	\$0	Basic	\$100	Wood	\$0

Red gives you some helpful advice to think about as you're shopping:

- The most important factor in vehicle speed is the engine. Wheels (traction) and chassis (rigidity) are also important. You aren't going fast enough for the body to matter, and the weight of a top of the line roll cage will probably slow you down.
- The most important factor in maneuverability are the wheels and the chassis. Having good components here are critical for stability and traction.
- The design judges aren't racers themselves, so they won't look under the hood. All they care about is how nice the body and wheels look.
- The biggest jump in quality is usually between the middle of the line and the top of the line components: the manufacturers know that the pros will pay for the best!

**Task 3: Determine which components you'd like to buy, making sure you stay under your team's collective budget.**

The Race

Once you've bought your components, built your car, and trained your crew, head to the race track to face your competition. Bonne chance, racers!

Additional Information

At the store, the clerk (who is quite the accomplished racer herself) gives you a few helpful tips.

1. In order to participate in the stunt competition, you must have a top of the line roll cage. Even with a top of the line roll cage, though, as many as 50% of drivers still crash (crashing won't affect your performance in either of the other events).
2. Roll cages are built to keep the driver safe. Thus, the higher quality cages tend to weigh more, which may make the vehicle slower.
3. In the event of a tie in any competition, the win goes to the team in the earliest starting position (e.g., Team 2 will beat Team 3 in a tie).