

Solar Car Fact Sheet

You will have 4 major hurdles to get over on your way to creating a great solar race car. This list IS in order of importance.

1. **Friction:** You must reduce as much friction as you can, especially around the axles and wheels.
2. The car must run **straight** and true.
3. **Weight:** Your car must be as **light** as it can be and still carry the solar panel, motor and battery pack.
4. The car must have the axles positioned and the solar panel mounted so that it is **balanced**.
5. The power wheels have good **traction** or your car will not go anywhere.

CHASSIS

The chassis is the frame of the car. You will use that frame to attach all the other parts of the car together. Without a chassis, your car would just be a bunch of parts lying on the ground!

1. You have to find a balance between weight, strength and wheel base.

A longer wider chassis is easier to mount axles and get to roll straight but is heavier.

Option 1: Cut away all parts of the chassis not needed.

Option 2: Create a narrow or short chassis but getting them to run straight will be harder.

Option 3: Be creative and use a completely different type of chassis. This can be the most frustrating and most rewarding choice.

2. You must have a space to put a double AAA battery holder.

3. You must think ahead to how the axles and body are to be connected.

Where do you want the gears and motor to be (front or rear wheel drive).

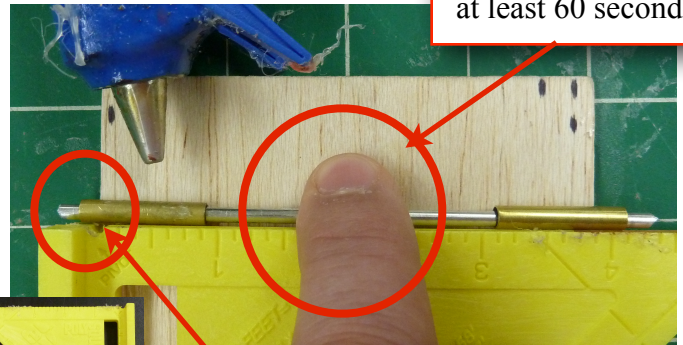
Rear wheel drive is MUCH easier.

4. Bearings must extend out beyond the chassis.

Whichever bearing you use the tubing must extend a little beyond the side of the chassis so that the wheels or gear will not make contact with the chassis.

- 6) Use the T-square too to mount the bearings to the chassis.

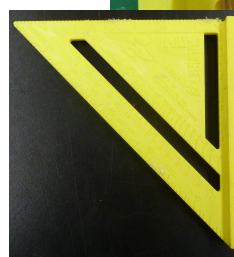
The finger holds the axle in place while the glue dries. Don't move your finger for at least 60 seconds!



Notice that the bearing extends beyond the chassis.

Friction Alert!

There are a lot of places to find friction near the chassis. There is potential friction between the wheels and the chassis, between the bearings and axles and even the axles and the chassis if your axle is bent.



T - square

WHEEL AND AXLES

1. Axles must be straight! You have two options here.
 1. Steel: Steel axles are heavy, but they are hard to bend.
 2. Aluminum: Light, but they bend VERY easily.
2. Some type of bearing system is needed. Small pieces of the brass or plastic tubing will work.

3. The wheels and the gears should never touch the chassis. (this is why you should have your bearings extend past the edge of the chassis).
4. NEVER get glue on the axles! It is easy to do and will slow your car down a lot.
5. Wheel diameter matters. A larger wheel will be harder for the motor to turn, but will have a higher top speed.

Friction Alert!

It is essential to have friction between the wheel and the ground or your car wheels will only spin and not move. You also need friction between the wheels and the axles. However bent axles are one of the worst sources of friction in your car!

GEARS, MOTOR AND BATTERY

1. Most cars will use the medium size gear or the gear that is built into the black wheel. You will need to decide which is better.
2. The gear needs to be tight on the axle! If it is easy to get the gear on, it will likely spin on the axle and you will lose power.
3. Positioning of the motor is very important. If the gears are too close there will be a lot of extra friction. If they are too far apart they will make a very loud noise and your car will go nowhere.
4. Never get glue, paint or anything else on the gear teeth. This adds more friction.
5. Concept and hill climb cars may need a larger drive gear in order to give more torque.
6. Space for double AAA battery holder must be easily accessible and close to motor
7. You can change the tension between the gears by moving the motor slightly. Start with less glue on the motor and a weak battery.

Friction Alert!

There is always a balance to be had with friction and the gears. If the gears are too close, there is too much friction. Too far apart and there is not enough to make the wheels move. Also be careful that wires are not rubbing against any wheels or gears!

BODY SHELL (for concept car)

1. Weight and friction are still very important for your car! Concept cars are heavy and will need all the power they can get.
2. You need to think about how the solar panel will be attached and stabilized. All concept cars need the solar panel!
3. You still must be able to access the battery pack and wires to attach the solar panel.
4. Your car MUST be smaller than 30 cm by 60 cm by 30 cm.

SOLAR PANEL

1. Solar panels are your power source. The more energy they produce the faster your car will go.
2. You can use mylar to reflect more light on to the solar panel.
3. Mylar reflectors create more wind resistance. Is it worth it?
4. If the sun is hitting the panel at 90 degrees you will get the most power output. However the sun moves throughout the day. One option is to make a movable solar panel. Is the extra weight worth the trouble?
5. A solar panel 45 degrees to the sun is a fairly high angle. Is it worth the wind resistance?
6. In my experience it is better to worry about friction and weight, but it is your car!
7. **NO GLUE** may be used to attach your solar panel to the chassis. You must use velcro.

