Junior Solar Sprint

Student worksheet

Name: _____

Date: _____

Directions: Use this packet to document your solar car project.

A basic solar car includes the following parts:

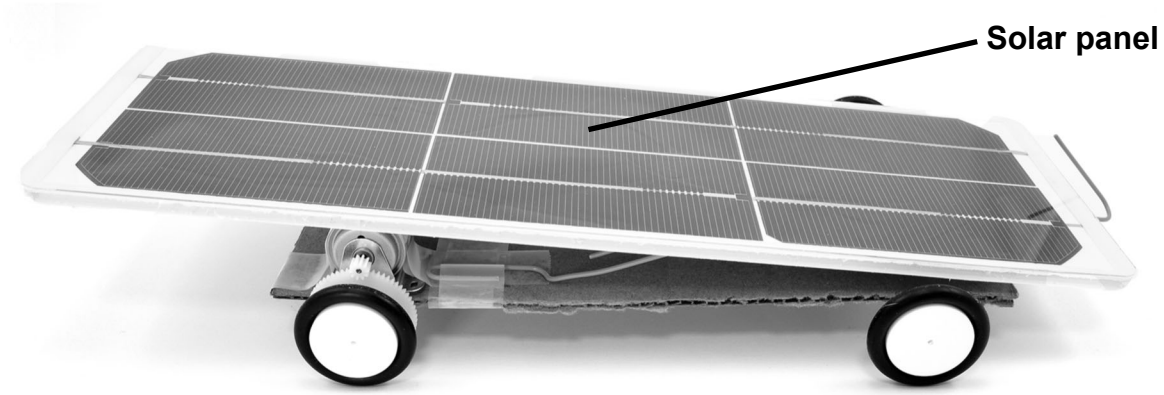
The **chassis** is the car's frame, or body.

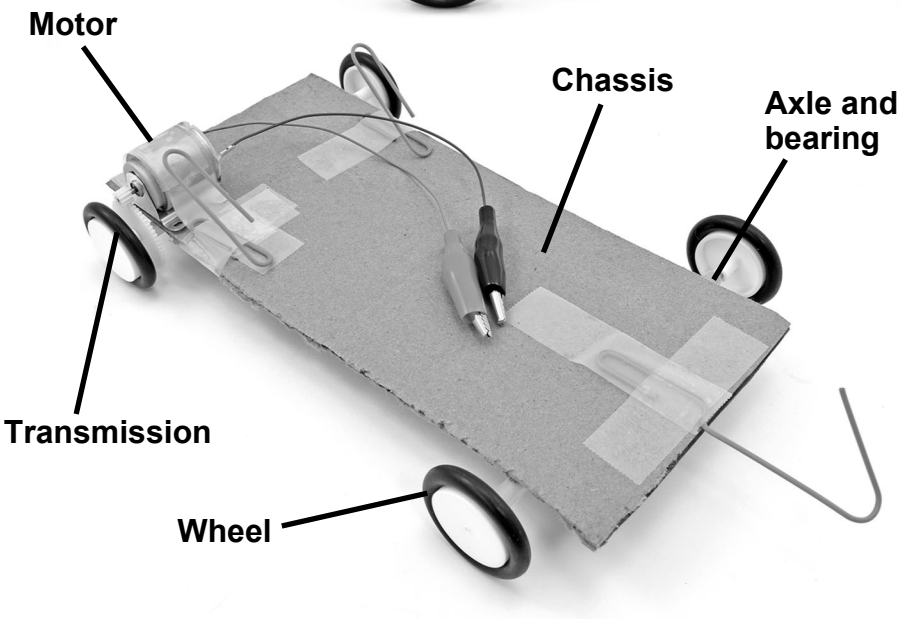
The **axles** are straight, rigid rods that support the **wheels**.

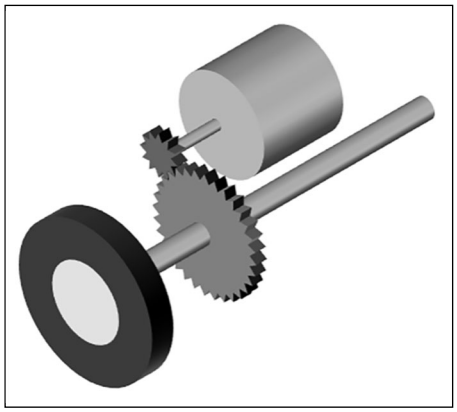
The **bearings** connect the axles to the chassis and allow them to spin.

The **motor** converts electrical energy from the solar panel into spinning motion. It has a metal shaft that spins.

The **transmission** transmits rotating motion from the motor's **shaft** to an axle.







Gear drive

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Name: _____

Rules

Follow all these rules when designing and building your car:

Category	Rule
Car Materials	Cost cannot exceed $50 (not including recycled materials). Keep all receipts.
	Do not modify (cut, drill, disassemble, etc.) solar panel or motor.
Car Design	Solar panel cannot be used as chassis/body of car. Axles and wheels cannot be directly attached to solar panel.
	Dimensions (with solar panel attached) cannot exceed 60 x 30 x 30cm.
	Motor leads must be accessible order to connect 2xAA battery pack if there is not enough sunlight on competition day.
	Car must be able to attach to a guide wire that is 1.5cm off the ground, without untying one end of the guide wire.
Process	Every time you work on your solar car project, make an entry in your log.
	Use the pages in this packet to help you design your car.

Design Sketches

Use the space on the next page to sketch an initial design idea for your car. Your design must include:

- ☐ Chassis
- ☐ Wheels
- ☐ Axels
- ☐ Bearings
- ☐ Motor
- ☐ Transmission
- ☐ Solar panel
- ☐ Way to attach solar panel to chassis
- ☐ Way to attach car to guide wire

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Name: _____

Build, Test, and Re-design

After building and testing an example car with your class, look at your design above again. How could you improve your design based on what you learned? Make a sketch of your improved design on page 4.

 Name: _____

Build

Once you agree on a design with your group, build it. Keep track of all the parts you use in the components list (see page 7).

Test

Once you have finished building your car, test it. Keep track of all your testing, results, and changes you make in your project log (see page 9).

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Name: _____

Final Design Drawings

Use this page to make sketches of your final car design. Use the graph paper on the next two pages to make formal engineering drawings of your car from at least two views (for example, a top view and a side view). Engineering drawings are different from sketches. Make sure you:

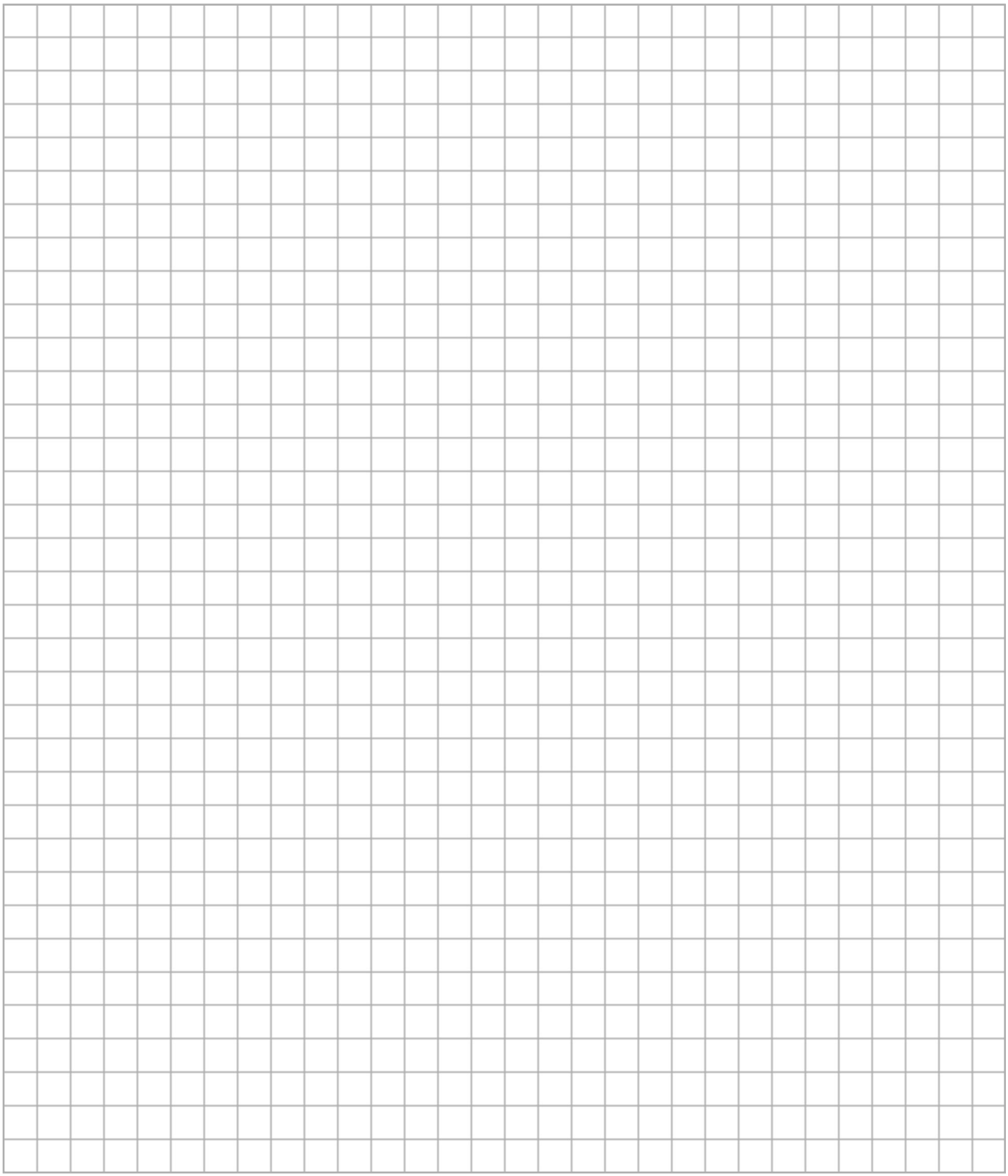
- Use a ruler and draw neatly.
- If you have a compass, use it to draw circles instead of free-handing them.
- Make the drawing to scale.
- Label the main parts of your car.
- Label the important dimensions of your car. Include all the dimensions that somebody would need to know if they wanted to build your car based on the drawing. For example, how long and wide is the body of the car? What is the diameter of the wheels? How far is the motor mounted from the end of the car?

Optionally, you can use a computer-aided design (CAD) program to make your final drawings instead of drawing them by hand.

To learn more about technical drawings, see Example Technical Drawings for the Junior Solar Sprint Competition (https://sbgo.org/jss-technical-drawings).

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Name: _____

Design Details

Use this page to record important details about your design. Here is a list to get you started, but you can add more information if you think it is important. Remember to include units (like centimeters, grams, etc.) when needed!

Car dimensions (length x width x height):	
Car weight:	
Wheel size:	
Gear ratio:	

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Name: _____

Use this table to fill in a list of all the parts for your car, including both materials you purchased and recycled materials (for recycled materials, the cost is $0). Keep track as you build. Cross out anything you end up not including in your final design.

Part	Use	Quantity	Cost (each)	Cost (total)	Source
Example: Bottle caps	*Wheels*	*4*	*Free*	*Free*	*Classroom recycle bin*

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Name: _____

Design Process Description

Use this section to write about your design process from start to finish. In other words, how did you get from your initial brainstorming to your final design? What testing did you do? How many revisions or changes did you make? The notes you kept in your Project Log will be useful in writing this section.

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Name: _____

Date	Task	Time Involved	Team Member Responsible	Obstacles Encountered	Modifications Made	Comments

SCIENCE BUDDIES