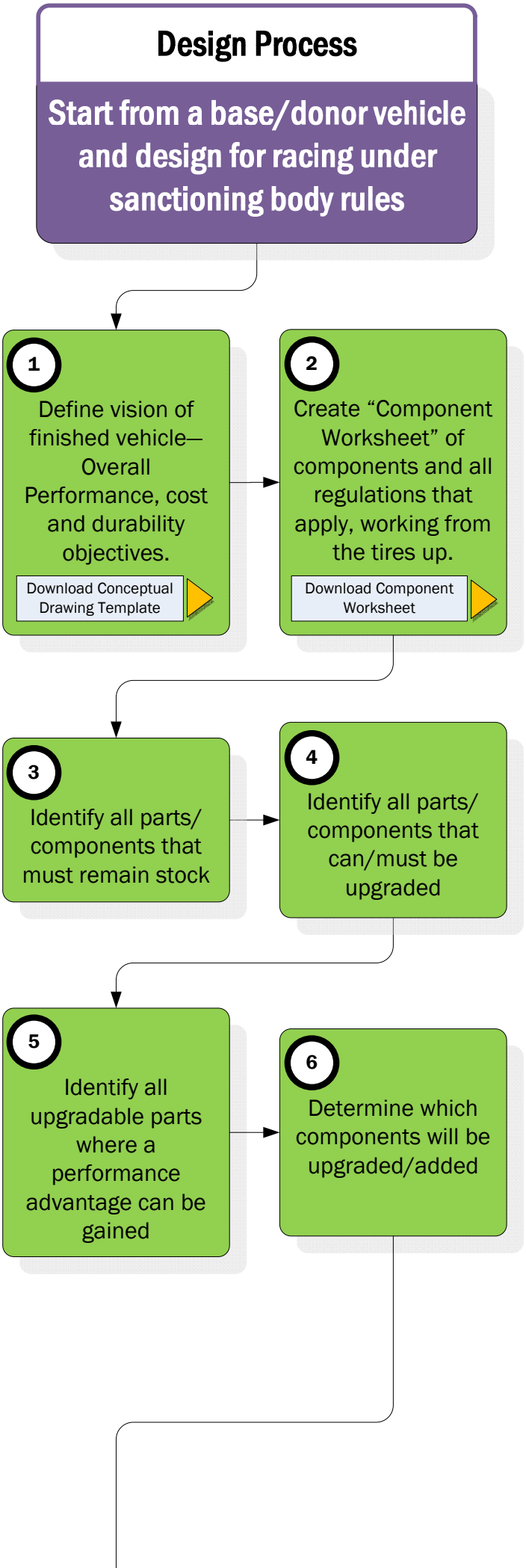


Build Your Own Race Car!

PLEASE NOTE: The Conceptual Drawing Template (CDT) and Component Worksheet (CW) documents are provided free to help you create a visual layout and manage components in your race car design. Please download them at your convenience and use them where noted below by the highlighted "**CDT**" and "**CW**" text.

1. **(CDT)** The first step is to define ideals and specific objectives for the race vehicle you want to build, within the framework of the regulations you are building to. A combination of vision statement and requirements, you need to layout via words and a conceptual drawing what you wish to see in the final product. This "Vision" for your vehicle will be the reference point when making decisions later. For example:

a. DESIGN - The car shall have a maximum weight of 1800 lbs as per minimum weight regulation 2.1.1

b. PERFORMANCE – The vehicle shall have a speed of 200 km/h at the end of 1 km from a standing start.

c. COST – The total cost of parts should be no more than $4,000.

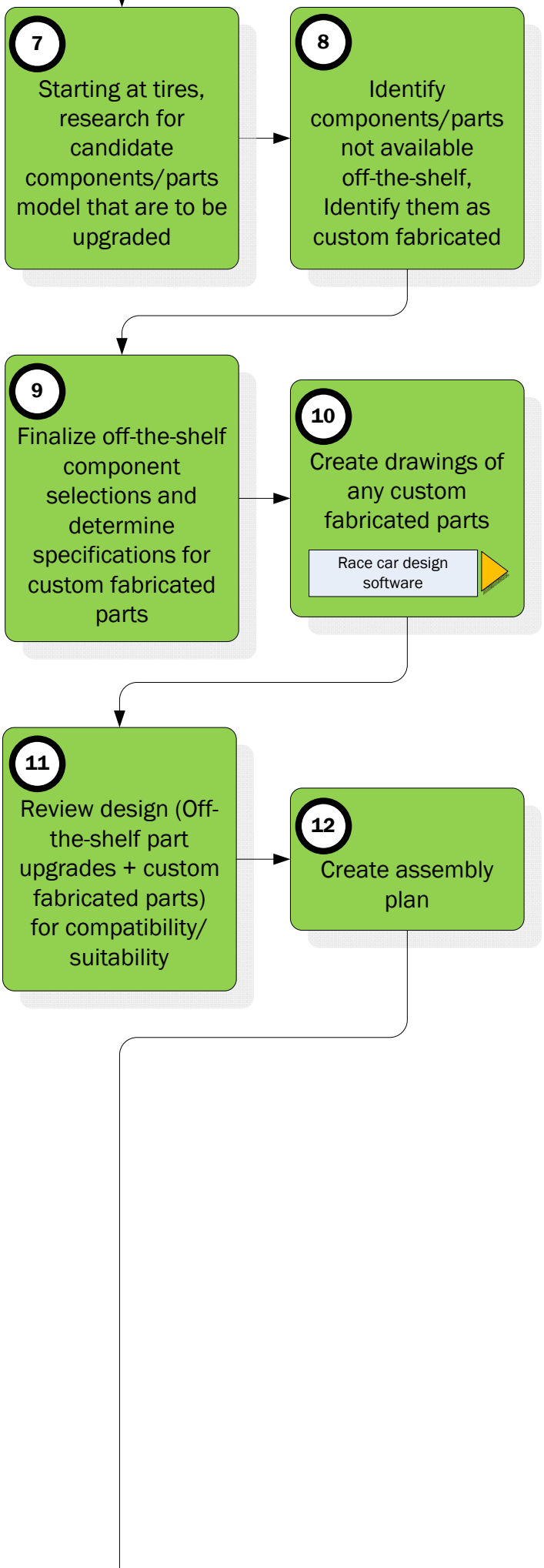
2. **(CW)** Regulations are applied to each area of the race vehicle when racing under a sanctioning body. To help manage the requirements of the regulations, the regulations can be noted in the "Component worksheet". Later, when designing, these regulations are able to be quickly referenced next to the component in the worksheet without the need to scan a complex book of rules.

3. **(CW)** Depending on the regulations, there may be components which must remain as stock. These should be noted in the worksheet

4. **(CW)** Identify the parts that can/must be upgraded to meet regulations (and your vision for the vehicle.) At this stage, whether they are off-the-shelf or custom fabricated is not important. The immediate goal is to identify what component changes support the regulations (and your vision if possible.)

5. **(CW)** Identify from the upgradable components in #4, which parts will provide a performance advantage. The immediate goal here is to determine what value a component upgrade or addition has regardless of whether it is mandated by regulations.

6. **(CW)** Based on the list of components from #4 and #5, choose which components will be upgraded or added to the vehicle. This list should include both components which are required by regulations and components which support your vision and are not banned.



7. **(CW)** Research the available off-the-shelf brands/models of components and assess their performance value and cost. The goal here is to find "candidates" that would perform as needed and fall within budget.

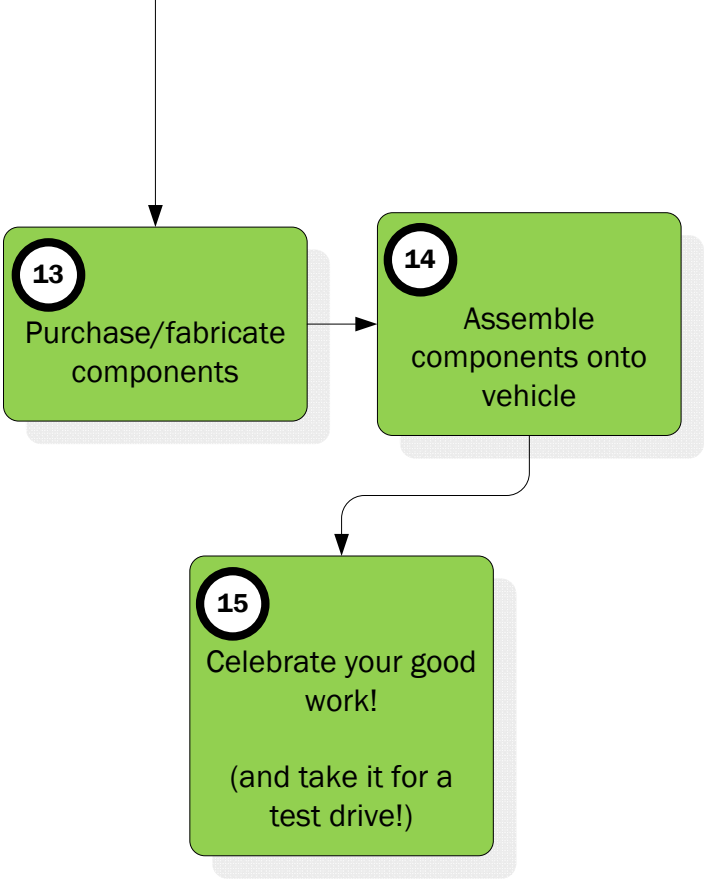
8. **(CW)** Identify components not available off-the-shelf. Weigh the performance gained by using them against the additional costs of custom fabrication. If the cost is too high for the benefit, drop these components off the list of upgrades/additions.

9. **(a)** **(CW)** This can be one of the more time-consuming steps. In #7 above, the available brands/models for each component were researched and listed. Now is the time to choose the most promising brand/model from the list. Each component must be assessed for its compatibility with other components, which can be time consuming. For example, when selecting wheel hubs, they must have a bolt pattern and bolt center that matches the wheels I select. Therefore, both components must be selected with the other in mind. If I change wheels, I may wind up changing the hubs and so on.
(b) **(CW)** Using the list of components to be custom fabricated, begin laying out specifications/requirements for those components so that when they are being designed, the specifications are available.

10. **(CW)** Create your drawings for the custom fabricated components. These must fit with the off-the-shelf selections from #9a above and with the donor vehicle. If the donor vehicle chassis requires modifications, you will need to create a vehicle design to model these changes and incorporate the off-the-shelf and custom fabricated components.

11. **(CW)** **(CDT)** At this stage, the overall vehicle design must be reviewed for completeness, component fit, suitability and safety. If parts do not work, you may need to return to steps 9 and 10 to revise your component selections and vehicle design. If everything is OK, it would be a good idea to create a full 3D model of all components and the vehicle design or to use the classic pencil and paper to draft various views of the component assemblies and the overall vehicle design. It is at this stage that the full shape of components should be understood so that they don't interfere with each other.

12. **(CW)** An assembly plan is used to determine the order of assembly. It is just like the instructions you find in the box with most "Some assembly required" products from a store. The plan is created to ensure you don't spend hours assembling components only to find out you left out a key step and need to start over. It is also useful in long term maintenance documentation.



13. **(CW)** Assuming all is well with design and the assembly plan for it, the build portion of the project begins. Purchase the off-the-shelf components and fabricate the custom designed components

14. Using the assembly plan, assemble components onto the chassis and perform a full fastener inspection to confirm everything is bolted/fastened on as it should be.

15. Don't forget to photo document your vehicle as you are building it and when it is completed. Invite your friends and family to celebrate.