

Student Instruction

Phase 1 Design: Graphics and Layout

QuickView

Review car designs you like and draw multiple thumbnail sketches to generate ideas for your own car. After creating at least three designs, select one and do a more detailed multiview drawing.

Materials

“Thumbnail Drawing Sheet”

“Multiview Design Sheet”

Engineering Design Process

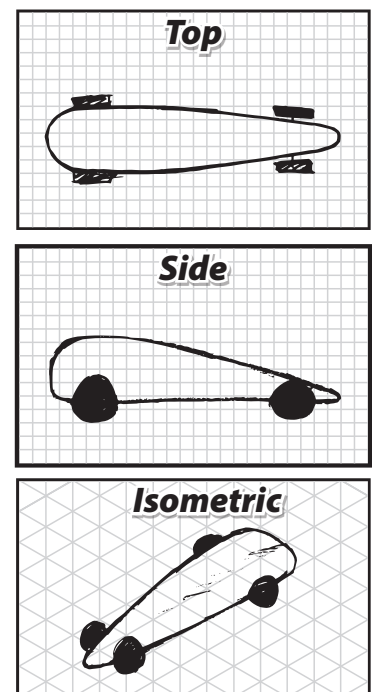
1. Determine the problem or the opportunity (idea).
2. Determine the specifications.

The Design Loop

- A. Research.
- B. Brainstorm possible solutions.
- C. Formulate a solution to implement.

Procedure

1. Look through the collection of vehicle photos, both the real-world cars and the CO₂ dragsters. You will notice that many CO₂ cars are inspired by features of real cars but that they have a form all their own. Pick out several photos of cars that you like.
2. Sketch at least three car designs on your “Thumbnail Drawing Sheet.” You can sketch more than three if you like. Each design should have a top, side, and isometric drawing. The designs you make do not need to look exactly like the cars in your chosen photos. In fact, they do not need to look like them at all. The photos are only for inspiration and ideas. The drawings you are making are only quick sketches. The point is to capture an idea, not to make a polished, perfect drawing (Figure 1).
3. After you have drawn three thumbnail sketches, decide whether you like any of these well enough to use it as a final design. If not, keep making more sketches. If one is close to being satisfactory but not quite where you want it to be, make another sketch of that design but with modifications that make it to your liking. Do not just erase sketches you have already made. Instead, create new sketches. Stop when you have at least three sketches and one that you really like.
4. When you have created all your thumbnail sketches, choose the one that you like the most. Study it and imagine how it will look from the side, from the top, from the front, and from the back.



(Figure 1)

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5. You will now transform your sketch into a series of detailed full-size drawings. Fill out the information at the top of the "Multiview Design Sheet." For Design Number, write the numeral 1. If you do another detailed drawing later, you will redraw it on another sheet with your changes and keep track of the number of designs you've made.
6. You will do a side-view and a top-view drawing. Before you begin drawing, however, look at the specifications indicated on the "Multiview Design Sheet." These tell you such things as how long or short the car may be and how far apart the wheels may be. When you make your drawings, make sure that you follow these specifications.
7. Make a detailed side-view drawing of this sketch on the "Multiview Design Sheet." You will make your drawing full scale, which means that your drawing will be the same size that you want your car to be. If your car will be 220 millimeters inches from front to back, so will your drawing. When making a side-view drawing, show only the side. You should not show any of the top, bottom, back, or front. Include the placement of the screw eyes on this drawing. (These should not be placed below the axles.)
8. Make a top-view drawing on the "Multiview Design Sheet." Just as before, the drawing will be at full scale. Show only the top of the vehicle. To do this, imagine that you are standing directly over your vehicle and looking down at it. Use the graph lines to make sure that the two drawings are aligned.
9. If time remains, you may also draw a front-view drawing and a back-view drawing. You may also add details to your car such as decals and painting ideas.
10. Save all your work in your portfolio.

Thumbnail Drawing Sheet

THE SCIENCE of Speed 2

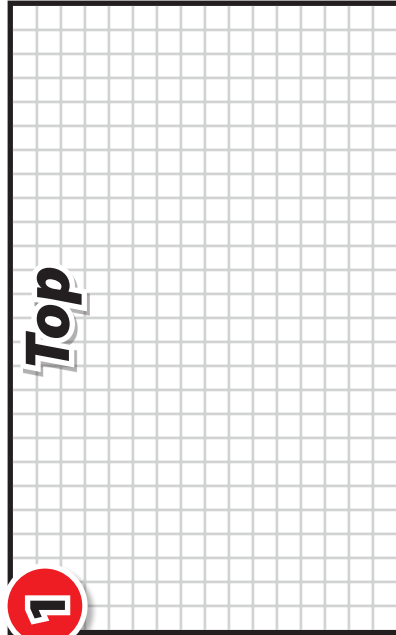
Student Designer/Engineer: _____

Teacher: _____

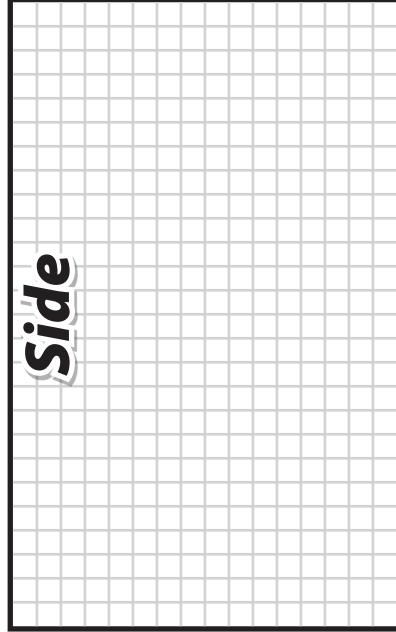
Date: _____ Car Name: _____

1

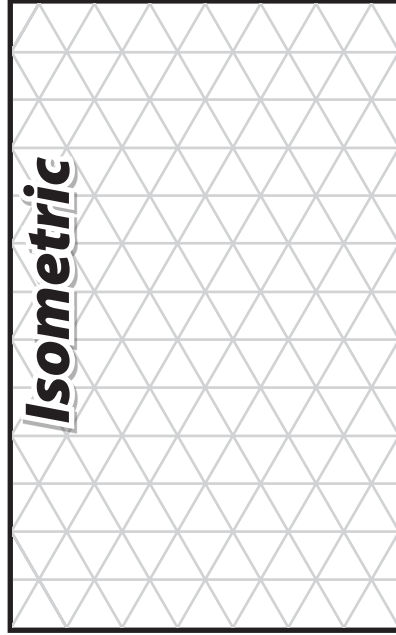
Top



Side

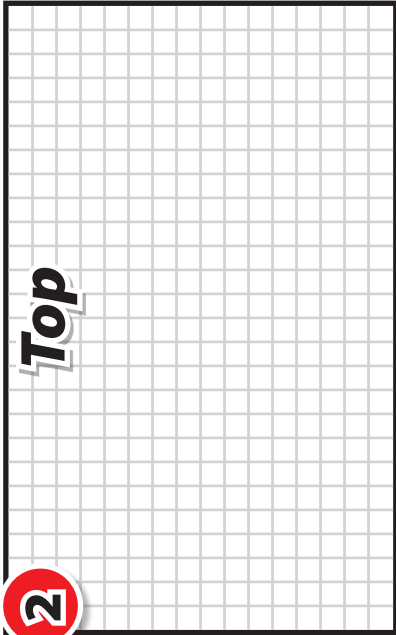


Isometric

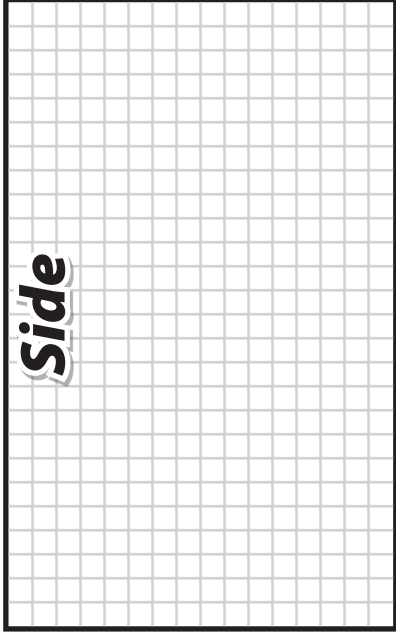


2

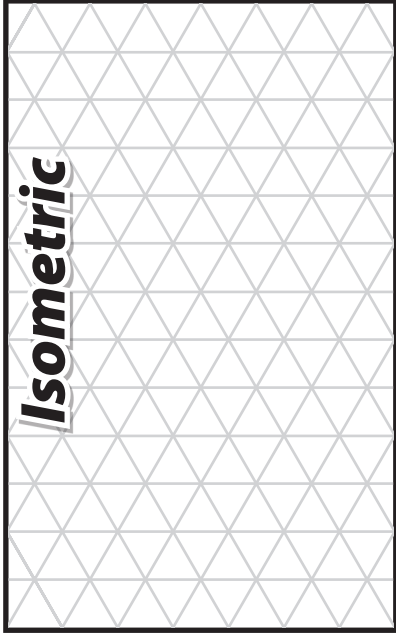
Top



Side

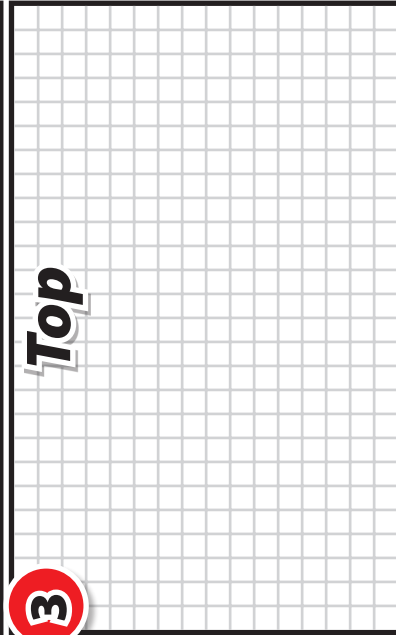


Isometric

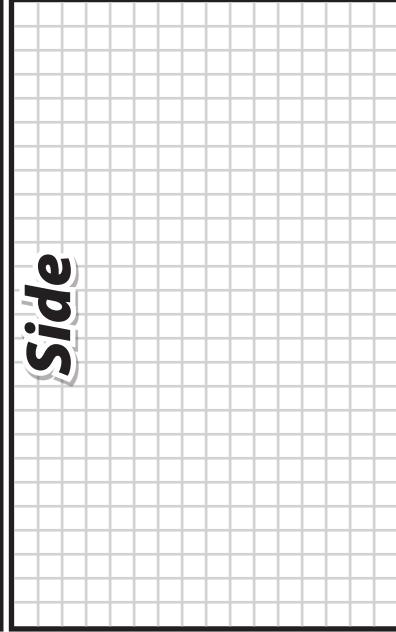


3

Top



Side



Isometric

