

# TEACHER INSTRUCTIONS

**ACTIVITY SHEET 1: DRAG**

NAME \_\_\_\_\_

## START YOUR ENGINES

**What limits how fast a race car can go?**  
One factor is **drag**—a slowing force created when air pushes against an object. Try this activity to test how drag affects motion.

**PROCEDURE**

- 1 Fold up both edges of a sheet of card stock. Lift one end of the card stock onto a stack of books to form a ramp.
- 2 Place your car at the top of your ramp so that it rolls forward. Measure the distance it travels. Repeat for a second test run. Record both results.
- 3 Tape an index card to the back of your car so that it sticks up above the car's roof. Repeat Step 2 again for two more test runs. Record the results of both runs.

**GATHER YOUR MATERIALS**  
Completed car, ruler, tape, index card, card stock

**DISTANCE TRAVELED RACE CAR WITHOUT INDEX CARD**

Test Run 1	Test Run 2

**DISTANCE TRAVELED RACE CAR WITH INDEX CARD**

Test Run 1	Test Run 2

**CONCLUSIONS**  
Answer these questions on a separate sheet of paper.

- 1 Which car went farther? Explain why you think this happened.
- 2 How did adding the index card affect the car's drag?
- 3 Why might NASCAR engineers modify race cars to create the type of drag your race car experienced? Look at Resource Sheet A for clues.

**CAR TEMPLATE**  
Cut along the dotted lines, then follow the directions on Assembly Sheet A to put your car together.

**CAR TEMPLATE**

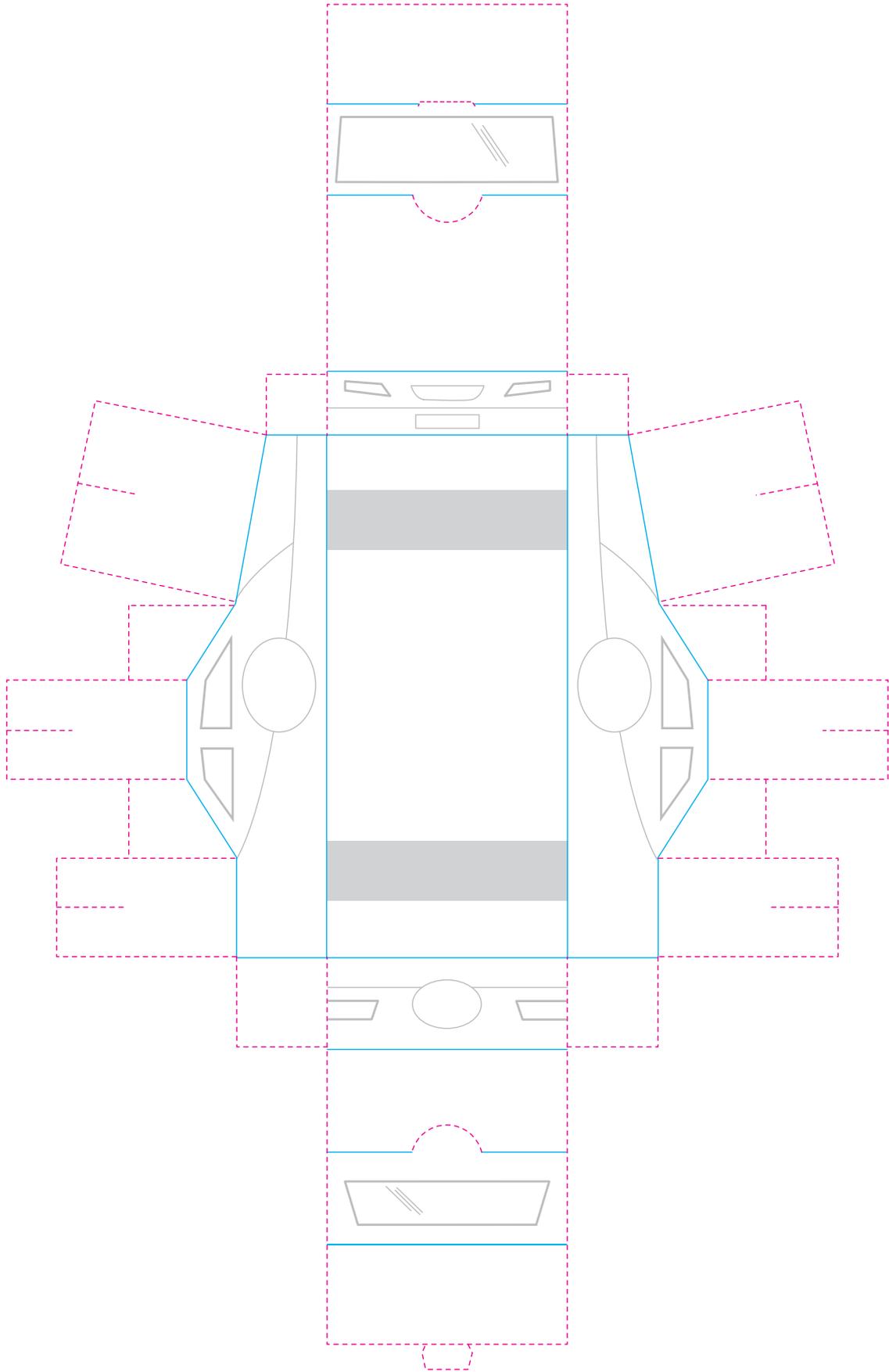
**COMPLETED CAR**

## TEACHERS,

Please use the template on the next page to create cars for the Lesson 1: Drag experiment in Unit 1: Aerodynamics. Start by photocopying the templates on card stock or some other heavyweight paper. Be sure to make one copy per student, with a few extras in the event of cutting errors. Before passing out the templates, you may want to use an X-Acto knife to cut along the red dotted lines that form the two semicircles and the slot on the bottom flap of the template. After the students have decorated their cars, have them cut them out along the dotted lines and fold along the solid lines to create creases. They can then follow the directions on **Assembly Sheet A** to assemble their cars.

# **CAR** *TEMPLATE*

Cut along the dotted lines, then follow the directions on Assembly Sheet A to put your car together.



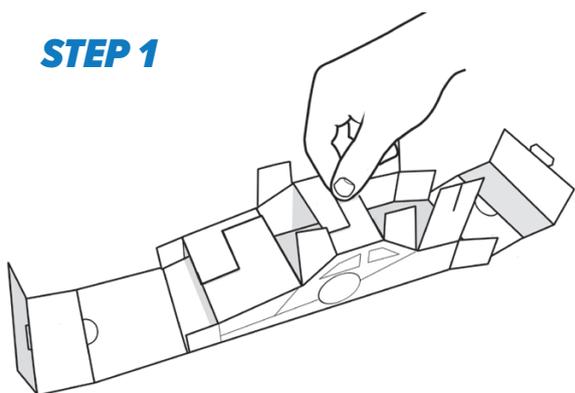
# BUILD A RACE CAR

## GATHER YOUR MATERIALS

Car template, plastic straw, scissors, ruler, four round candies with holes in their centers, tape, markers

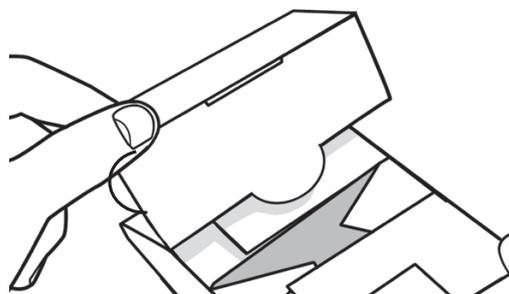
**BEFORE YOU BEGIN** Color or personalize your race car.

### STEP 1



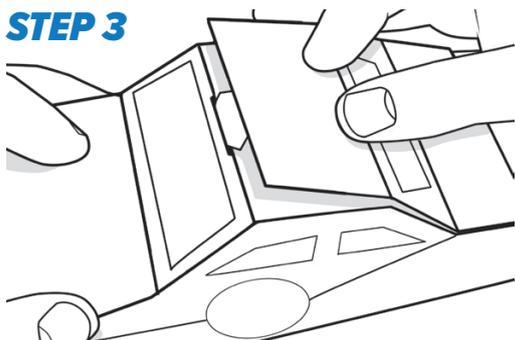
Flip the car over. Fold up the sides and connect the tabs using the split ends.

### STEP 2



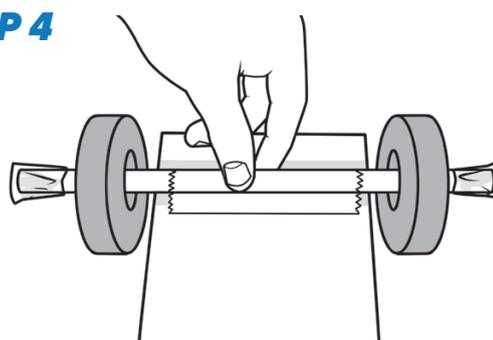
Fold up the front and the back of the car to cover all the tabs. Secure the hood and trunk by tucking the semicircles into the front and back openings.

### STEP 3

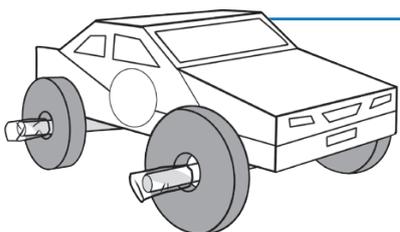


Connect the front and back of the car by sliding the top tab into the top slot. Reinforce the roof of your car with tape.

### STEP 4



Cut two 3-inch pieces from the plastic straw. *(Note: Save the final piece of straw for the Lesson 2 experiment.)* Flip the car over and tape the straw pieces along the guidelines on the bottom of the car.



### COMPLETE YOUR CAR

Thread a candy over each straw end. Fold a small piece of tape over the end of each straw to keep the candies in place. *(Note: The tape shouldn't prevent the candies from spinning.)* **Now your car is ready to roll.**