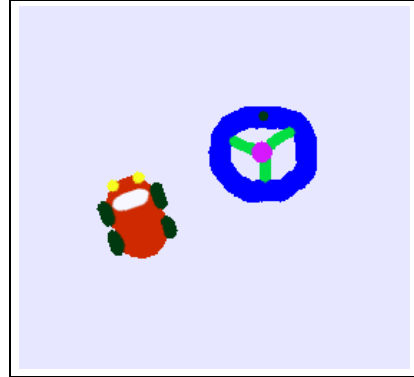# Controlling the Car with a Steering Wheel

In this project learners will create two objects and make them interact. Prior to this they've been manipulating a single object with an accompanying script. In this project learners will have to take tiles from one object (the steering wheel) and add them to another object's (the car's) script. This requires an escalation in the learner's thinking and may take a little more time for some.

This project requires creating an Etoy with multiple objects, as well as creating scripts for those objects. Some scripts will contain properties from two objects. This project also requires the learner to switch from one object's viewer to another and to think about multiple viewers within a project.

Once this project is completed learners can be challenged to create other projects using multiple objects with similar scripts. At this point children often change their objects from cars to animals, airplanes or other small figures as they discover that Squeak's capabilities are as broad as their imaginations.
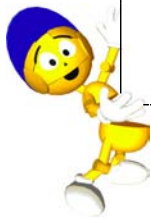
**Project Prerequisites: Squeak**

- Painting.

- Naming objects.

- Setting an object's forward direction.

- Creating scripts.

**Related Math Concepts**

- The concept of positive and negative numbers.

- The concept of heading.

**Curricular Objectives**

- Understanding how the turn of the car relates to the heading of the steering wheel.

- Understanding how numeric feedback from the steering wheel's heading can help steer the car.

- Understanding how textual tiles are representations of values.

- Forming hypotheses based on findings to make predictions.

In this project you will learn how to drive the car with a steering wheel.

Paint a car and a steering wheel. These objects must be painted separately. An example of each is shown above. Name both the car and the wheel.

The goal of the lesson is to use the concept of positive and negative numbers (as on a number line) to help steer the car. To do this you will need to connect the car and the steering wheel together. The car will be the scripted object.

Open the car's viewer to reveal its tiles and drag the "forward by" tiles onto the world. Drag the "turn by" tiles and place them below the "forward by" tiles in the same script.

Bring up the handles for the steering wheel and reveal its tiles by clicking on the turquoise "eyeball" 👁 handle. Click and hold the blue "rotation" handle of the steering wheel to turn the wheel to the right and to the left. Look at the viewer and notice what is happening to the numeric value of the steering wheel's heading as you rotate the wheel.

**Blue Rotation Handle** ⟶
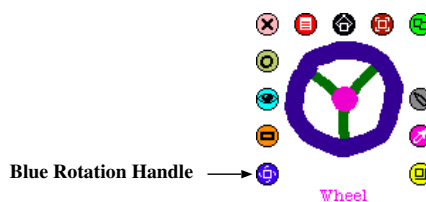
Wheel

It is important to understand that once the two objects are connected together and the heading of the steering wheel is indicating zero, the car will go straight. When the heading of the steering wheel indicates a negative number, the car will turn to the left; when the heading of the steering wheel indicates a positive number, the car will turn to the right.

The next step is to connect the turn of the car to the heading of the steering wheel. This is done by dragging the "heading" tiles of the steering wheel and placing them on the *value* of the "turn by" tiles of the car.
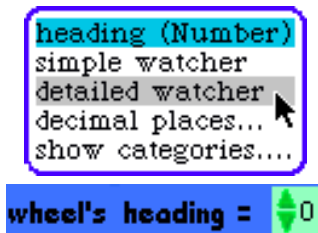


**Blue Rotation Handle**
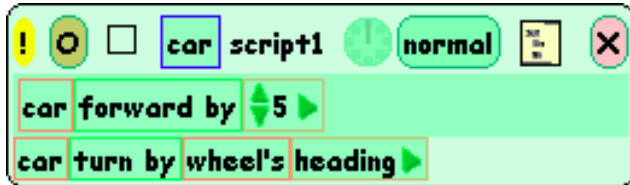
When the script is created, you are ready to drive the car. In the steering wheel's **basic** category, set the value of the steering wheel's "heading" to 0. Start the script and quickly bring up the handles of the steering wheel. MouseDown on the blue "rotation" handle and begin steering the car.

Once the two objects are connected and you move the steering wheel to the right and to the left using its blue "rotation" handle, the car will respond and turn in the same direction.

If you are having difficulty with the car's directional turns, visualize yourself as the driver inside the car. You may need to slow down the car by changing the value of the "forward by" tiles. A *detailed watcher* is another tool in Squeak that can help. To get a detailed watcher, click on the tiny menu found to the left of the "wheel's heading" tiles.
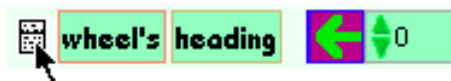


Select "detailed watcher". Place the watcher on the world. Now, as you steer the car, use the watcher's changing value as a guide. Remember, a zero value for the heading means the car will go straight. Have fun driving!!!



**Challenge**

- Build an obstacle course. Successfully steer the car through the course without touching any of the obstacles. Use pen trails to mark the car's path.



- Earn yourself a "Squeak Driver's License."