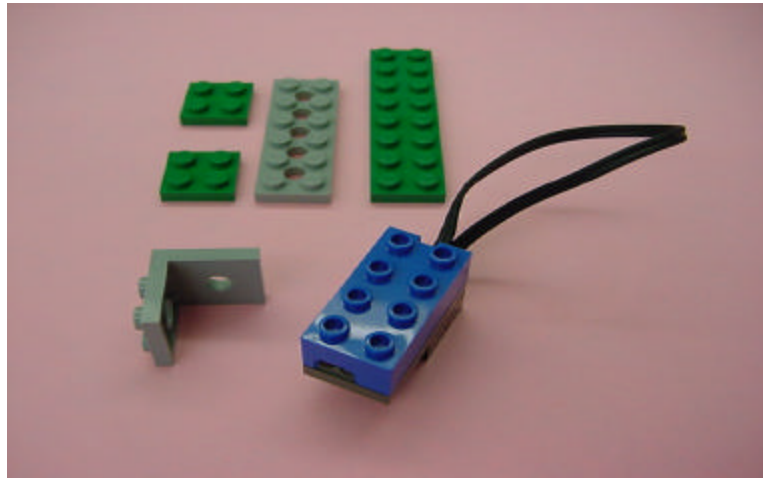# Light Sensor Attachment

Building Instructions
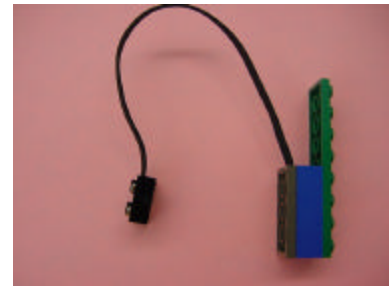

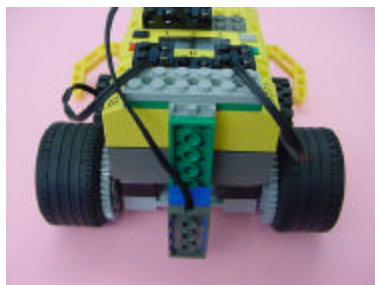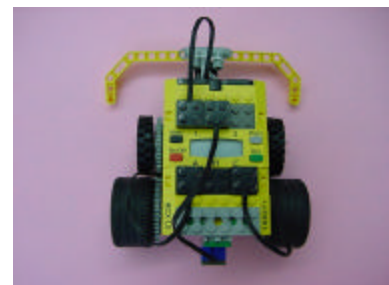| Step One	Step Two	Step Three

Step Four	Step Five	Step Six

Light Sensor

A light sensor measures the amount of light that it sees. It reports the amount of light to the RCX as a number between 0 (total darkness) and 100 (very bright). The light sensor uses its own light source, a red Light Emitting Diode (LED), to illuminate a small area in front of its receiver. With your light sensor connected to your RCX, press the View button on the RCX until you see the triangle is pointing to port 2 where your light sensor is connected. The number the light sensor is reading is now displayed on the screen. The light sensor can determine if it is seeing a white piece of paper or a black piece of paper. When the light sensor is over the white paper, it reads a value around 50. When it is over the black paper, it reads a value around 30. Move the light sensor around. Aim it at 4 different colors of paper and notice how the number changes.
Record the number for each color in the table on your worksheet.

Color	Number displayed
Red	
White	
Green	
Black	

The light sensor detects light from a very wide angle. You can narrow its detection field by placing a 1x2 beam with a hole in front of the sensor. Now the light sensor will only detect light that is directly in front of it.

Programming a Light Sensor

Light sensors can be programmed to detect a certain level of light between 0 (dark) and 100 (bright). You can use a light sensor in your program to control the robot's motors. There are two different light sensor icons.

This icon waits until the light sensor has detected a level of light above a certain threshold. In this case 50.

This icon waits until the light sensor has detected a level of light below a certain threshold, 30 in this example.

There is also a light sensor fork. This program turns on motor A if the light level is above 50 (top branch) and turns on motor C if the light level is 50 or below (bottom branch). Remember that all forks need a fork merge icon at the end of the decision.
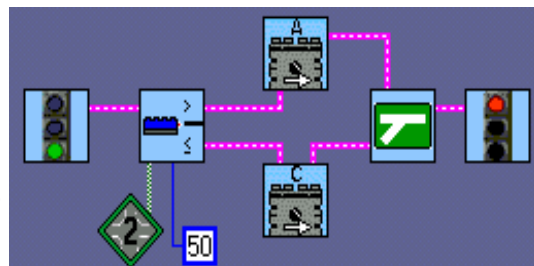
Name _____ Hour _____

Light Sensor Worksheet

Color	Number displayed
Red	
White	
Green	
Black	

1. Write a program that does the following:

   A. The robot starts on a black piece of paper.
   B. The robot drives forward for 2 seconds.
   C. When it sees the white paper it reverses both motors for two seconds
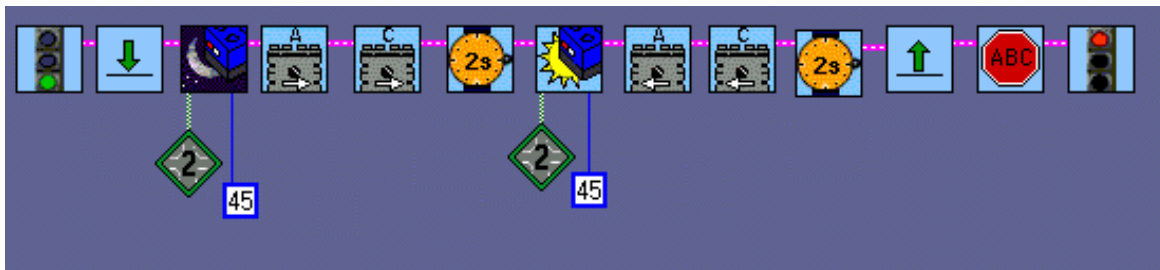   D. The robot should do this forever.

2. Get the white poster board with the black line on it from your teacher. Write a program that does the following:

   A. If the light sensor is over a white piece of paper turn on only motor A.
   B. If the light sensor is over a black piece of paper, turn on only motor C. .
   C. The robot should do this forever.

3. Get the white poster board with the black square on it from your teacher. Write a program that does the following:

   A. The robot starts in the middle of the square facing any direction.
   B. The robot drives forward until it sees the black line.
   C. When it sees a black line, the robot should stop and play a sound.
   D. The robot should then back up for 1 second, and turn either to the left or right (your choice) for 1 more second.
   E. The robot should then continue to drive forward.
   F. The robot should do this forever.
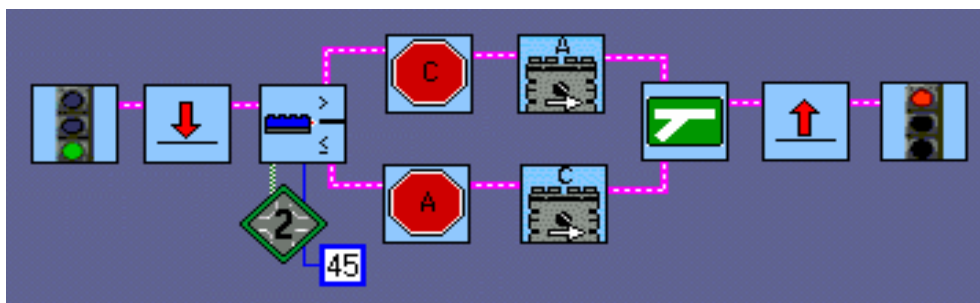
Name _____ Hour _____
Light Sensor Worksheet Solutions

Red — 27	White — 30	Green — 25	Black — 21

1. Write a program that does the following:
   A. The robot starts on a black piece of paper.
   B. The robot drives forward for 2 seconds.
   C. When it sees the white paper it reverses both motors for two seconds
   D. The robot should do this forever.

2. Get the white poster board with the black line on it from your teacher. Write a program that does the following:
   A. If the light sensor is over a white piece of paper turn on only motor A.
   B. If the light sensor is over a black piece of paper, turn on only motor C. .
   C. The robot should do this forever.

3. Get the white poster board with the black square on it from your teacher. Write a program that does the following:
   A. The robot starts in the middle of the square facing any direction.
   B. The robot drives forward until it sees the black line.
   C. When it sees a black line, the robot should stop and play a sound.
   D. The robot should then back up for 1 second, and turn either to the left or right (your choice) for 1 more second.
   E. The robot should then continue to drive forward.

Name _____ Hour _____

Light Sensor Challenge

Programming Specifications:

Write a program that immediately ends if the light sensor reads a value of greater than 35.

- If the light value is 35 or less, then the motors should turn on in the forward direction for 2 seconds and turn off.

- After the motor has run for 2 seconds, the light sensor should be checked again.

- If the light level is greater than 35, then the program should end.

- Otherwise, the motors should run in the reverse direction for 4 seconds, turn off and the program should end.

Name _____ Hour _____

Light Sensor Challenge Solution

Programming Specifications:

Write a program that immediately ends if the light sensor reads a value of greater than 35.

🚌 If the light value is 35 or less, then the motors should turn on in the forward direction for 2 seconds and turn off.

🚌 After the motor has run for 2 seconds, the light sensor should be checked again.

🚌 If the light level is greater than 35, then the program should end.

🚌 Otherwise, the motors should run in the reverse direction for 4 seconds, turn off and the program should end.