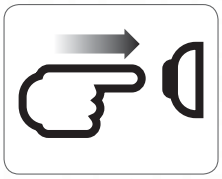
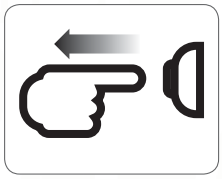
Touch Sensor

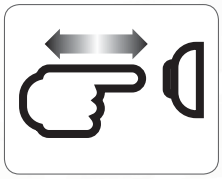
The Touch Sensor is a switch: it can be pressed or released.



Pressed



Released



Bumped

Suggestions for use

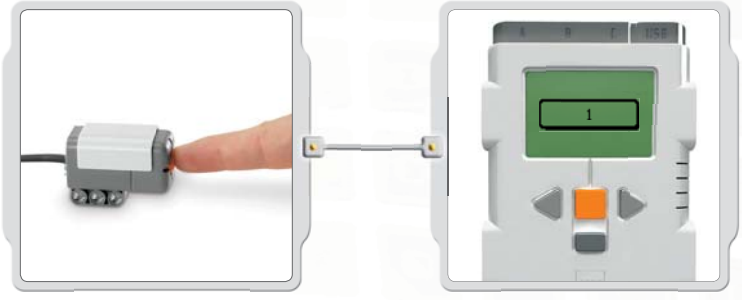
You can add the Touch Sensor to an NXT model and then program the model behavior to change when the Touch Sensor is pressed or released.

Programming ideas using the Touch Sensor are included in the Robot Educator.

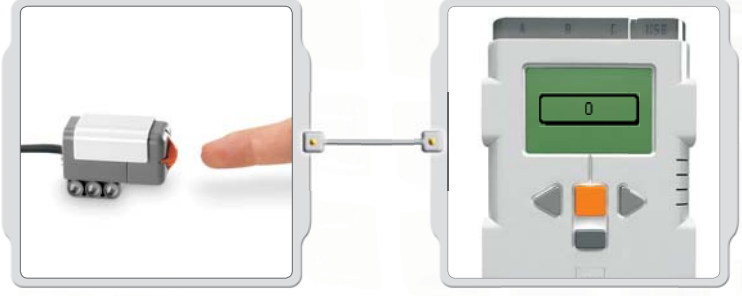
View

See the current Touch Sensor response on the display using View. A zero [0] means the Touch Sensor button is not pressed. A one [1] on the display means the Touch Sensor button is pressed.

Connect the Touch Sensor to NXT port 1.
Select View in the NXT display.
Select the Touch icon.
Select port 1.



Press and hold the Touch Sensor button while watching the NXT display. You should see a one (1) on the display.



Now release the Touch Sensor button. You should see a zero (0) on the display.

Touch Sensor

Try Me

Use the appropriate program in the Try Me submenu (see page 17) to quickly see how it works.

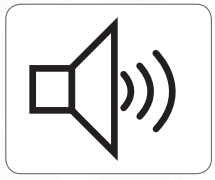
Program

You can also use the Program [Program] feature to create programs right on the NXT without using a computer. See the Program section on page 15 to create a program using the Touch Sensor to turn on and turn off a sound.

Sound Sensor

The Sound Sensor detects the decibel level: the softness or loudness of a sound. The Sound Sensor detects both dB and dBA.
dBA: the sounds human ears are able to hear.
dB: all actual sound, including sounds too high or low for the human ear to hear.

The Sound Sensor can measure sound pressure levels up to 90 dB – about the level of a lawnmower. Sound sensor readings on the LEGO® MINDSTORMS® NXT are displayed in the percentage [%] of sound the sensor is capable of reading. For comparison, 4-5% is like a silent living room and 5-10% is about the level of someone talking some distance away. From 10-30% is normal conversation close to the sensor or music played at a normal level and 30-100% represents a range from people shouting to music playing at high volumes. These ranges are assuming a distance of about 1 meter between the sound source and the Sound Sensor.



Suggestions for use

You can add the Sound Sensor to an NXT model and then program the model behavior to change when the Sound Sensor is activated.

Programming ideas using the Sound Sensor are included in the Robot Educator.

View

Test the Sound Sensor's ability to measure sound volume using View. Connect the Sound Sensor to NXT port 2.

Select View in the NXT display.
Select the Sound dB icon.
Select port 2.

Make sounds into the microphone (Sound Sensor) and see the readings on the NXT. Try also to read the sounds around you: How loud are the nearest voices?

Sound Sensor

Try Me

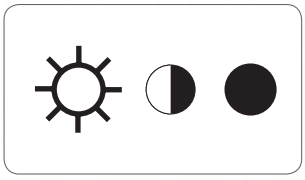
Use the appropriate program in the Try Me submenu (see page 17) to quickly see how it works.

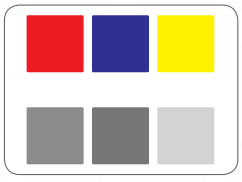
Program

You can also use the Program feature to create programs right on the NXT without using a computer. See the Program section on page 15 to create a program using the Sound Sensor to control a sound.

Light Sensor

The Light Sensor enables the robot to distinguish between light and darkness, to read the light intensity in a room, and to measure the light intensity on colored surfaces.





This is what your eyes see.

This is what your robot sees using the light sensor.

Suggestions for use

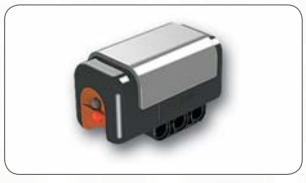
You can add the Light Sensor to an NXT model and then program the model behavior to change when the Light Sensor is activated.

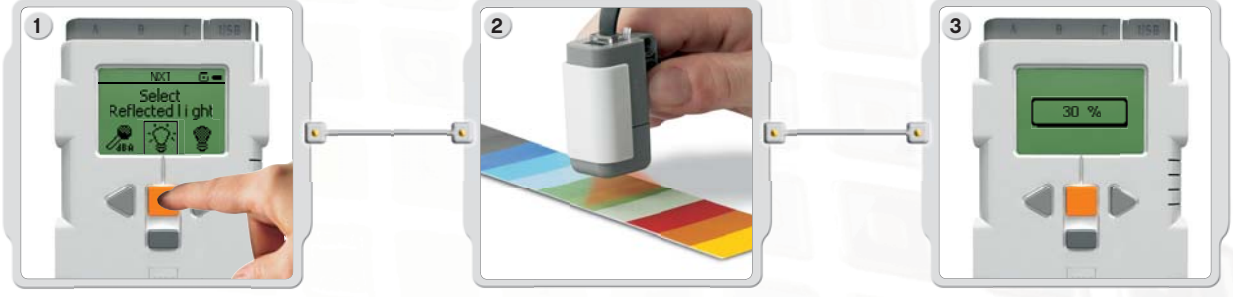
Programming ideas using the Light Sensor are included in the Robot Educator.

View

You can test the Light Sensor in different ways using View.
Viewing reflected light turns on the flood light in the sensor.

Viewing Reflected Light to see Colors
Connect the Light Sensor to the NXT.
Select View in the NXT display.





Select the Reflected light icon.
Select the port in which you have placed the sensor.

Hold the Light Sensor close to the different colors in your surrounding and see the different readings. You can use the color chart on page 66 of this guide or page 69 of the NXT Building Guide.

Light Sensor

Viewing Ambient light
Viewing Ambient light turns off the flood light so that the sensor reads only the light around it.Connect the Light Sensor to the NXT.
Select View in the NXT display.

Select the ambient light icon. Select the port in which you have placed the sensor.

Test the Light Sensor's ability to read the surrounding light by measuring the light level in different parts of the room. For example, first hold the sensor against the window, then hold it under the table. Notice the difference in the readings. Higher numbers indicate more light (as a percentage of the light the sensor can read). Lower numbers indicate a lower amount of light.

Try Me

Use the appropriate program in the Try Me submenu (see page 17) to quickly see how it works.

Program

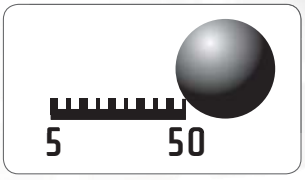
You can also use the Program [Program] feature to create programs right on the NXT without using a computer. See the Program section on page 15 to create a program using the Light Sensor to control a Motor.

Ultrasonic Sensor

The Ultrasonic Sensor enables the robot to see and recognize objects, avoid obstacles, measure distances, and detect movement.

The Ultrasonic Sensor uses the same scientific principle as bats: it measures distance by calculating the time it takes for a sound wave to hit an object and come back – just like an echo.

The Ultrasonic Sensor measures distance in centimeters and inches. It is able to measure distances from 0 to 2.5 meters with a precision of +/-3 cm.



Large-sized objects with hard surfaces provide the best readings. Objects made from soft fabrics, from curved objects (e.g. a ball), or from very thin and small objects can be difficult for the sensor to read.

Suggestions for use

You can add the Ultrasonic Sensor to an NXT model and then program the model behavior to change when the Light Sensor is activated.

Programming ideas using the Ultrasonic Sensor are included in the Robot Educator.

Note: Two Ultrasonic Sensors in the same room may interfere with each other's readings.

View

Test the Ultrasonic Sensor's ability to measure distance using View.
Connect the Ultrasonic Sensor to the NXT.
Select View in the NXT display.

Select the Ultrasonic Sensor icon. Select the port in which you have placed the sensor.

Try to measure the distance to an object. Move the object closer and see the different readings.

Ultrasonic Sensor

Try Me

Use the appropriate program in the Try Me submenu (see page 17) to quickly see how it works.

Program

You can also use the Program feature to create programs right on the NXT without using a computer. See the Program section on page 15 to create a program using the Ultrasonic Sensor to control a Motor.