

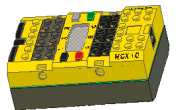
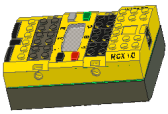
Instructors Guide to:

Dizzy Boat

A great beginning exercise to introduce the motors, RCX, and propellers. This exercise also introduces the concept of torque.

Introduce the LEGO RCX and motors. Explain how the computer, RCX, and LEGO motors communicate with each other. If the students haven't been introduced to programming, some sort of introduction will be required.

You will need a container of water with a testing area of at least 18" by 18".



In the Classroom:

Grade Level: K-8

Building Skills: Design

Time: 45 min

Programming Skills: Motors

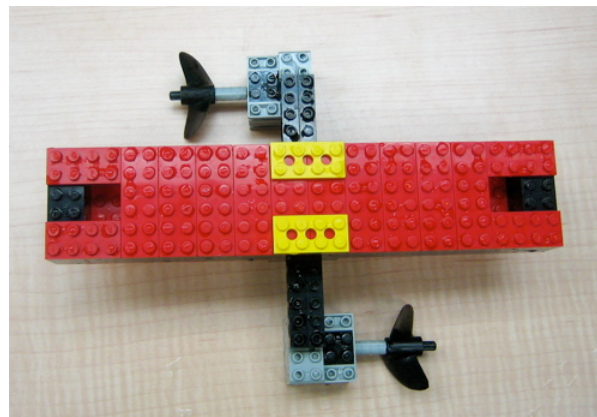
Dizzy Boat

This activity introduces the concepts of torque, propulsion, and buoyancy along with some LEGO building basics.

Challenge

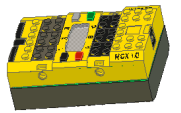
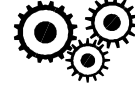
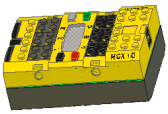
Build

Build a LEGO™ "boat" with two motors mounted in opposite directions that will spin in a circle when both motors are turned on. The boats can be tethered to the RCX with long wires. The motors should be able to be mounted at a minimum of three different distances from each other such that the distance between the motors can be adjusted. *(NOTE: A symmetric design will make for a more reliable experiment.)*



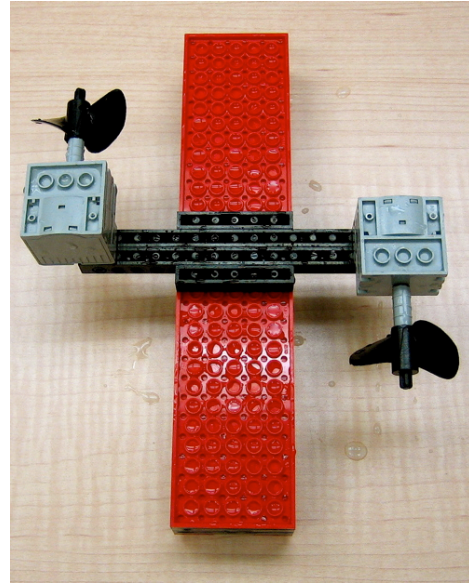
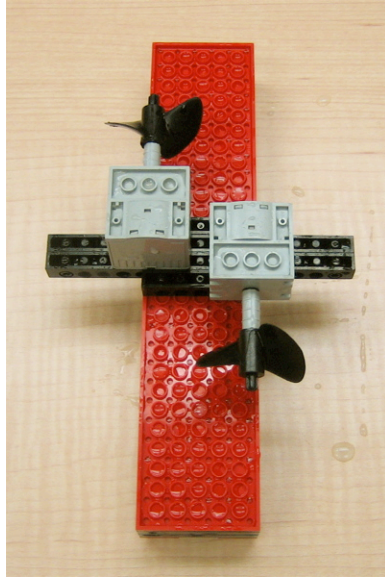
Hypothesize

Before testing hypothesize what difference there will be if you move the motors closer together and vice versa. Right down your hypothesis and explain why.



Test

With a stopwatch time how long it takes the boat to make two complete rotations. Then move the motors closer together or further apart (see below) and time how long it takes the boat to make two complete rotations. Do this for at least three different distances. (*NOTE: Pay attention to the wires and make sure they aren't getting tangled in the motors or wrapping around too tight for the boat to spin.*)



Analyze

Was your hypothesis correct? How can you explain what happened. (Possible extension: graph the results time vs. distance (motor to motor distance))

Materials

LEGO™ pieces, RCX, motors.
Styrofoam strips to help the boats float (if necessary)
Propellers (modified hobby shop propellers with LEGO axles)
Stopwatch/clock with second hand

Skills Learned

Design, Building, Testing

LEGO Tips

Snapping the LEGO bricks outside of the water traps air inside them. Likewise if the LEGOs are wet water may get trapped inside them reducing their buoyancy.