

IT Girls Robot Crawler

**BERKELEY LAKE
ELEMENTARY**



IT Girls

INSPIRING GIRLS TO PURSUE THEIR PASSIONS

LET'S GET STARTED!

[ROBOT CRAWLER FROM KIWICO](#)

Scientific idea's that will drive our robot



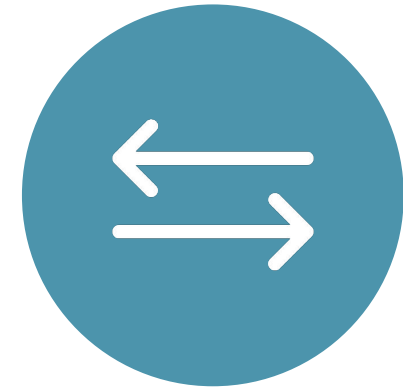
ELECTRICAL ENERGY

The ability of Electricity to do work.



MECHANICAL ENERGY

The energy an object has while it's moving



FRICTION

A force that can slow down or stop slipping and sliding when two surfaces rub against each other.

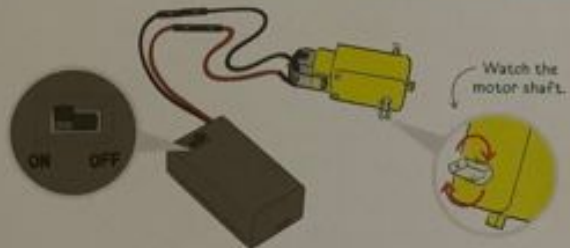


ROBOT CRAWLER

Today we are going to build a robot crawler. The goals of our project are to:


- Build, modify and optimize a robot crawler that uses energy to walk
- Modify our robot for experimentation to walk backward or forward
- Modify the robot to walk as fast as possible
- Look at the variables to improve the robots performance.

3 Turn the switch to ON. What happens?



Watch the motor shaft.

4 Turn the switch to OFF. Switch the wires, so **red** is connected to **black** and vice versa.



Turn the switch to ON. What happens now?

STOP & CHAT!
 How did the motor spin when the wires matched?
 How did the motor spin when they were switched?

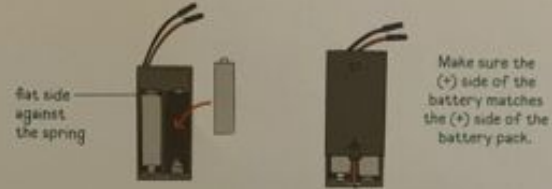
1. Motor Build

This motor will power your robot.

You'll need:

- battery pack
- batteries
- motor

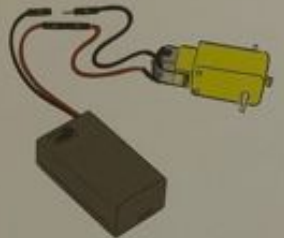
1 Open the **battery pack** and place the two **batteries** inside. Then close the lid.



fat side against the spring

Make sure the (+) side of the battery matches the (+) side of the battery pack.

2 Plug the **red wire** from the **motor** to the **red wire** from the battery pack. Do the same for the **black wires**.



Flip to the other side to finish building.

MOTOR BUILD

ROBOT BODY BUILD


2. Robot Body Build

Create a robot body to put the motor in.


You'll need:

- body panel
- white sticky foam
- motor
- battery pack
- scratchy rectangles
- fuzzy strip
- tube
- dowel

1 Punch out the holes in the **body panel**. Fold and unfold on all the lines.




2 Unplug the motor. Line it up with the outline on the body panel. Poke one wire through the hole, then the other wire.



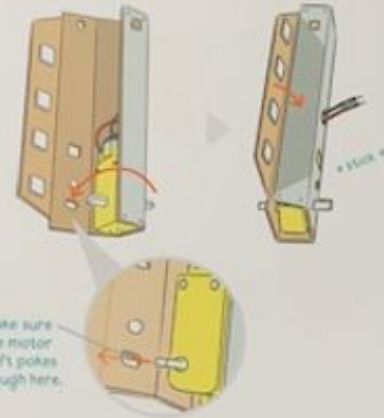
motor shaft goes here

be gentler!
Don't put on the motor wires!

3 Stick four pieces of **white sticky foam** on the square outlines. Peel off the backings.



1 Fold the body panel so the sides wrap around the motor. Press **firmly** on the last flap to stick it down.



Make sure the motor shaft pokes through here.

Stick

Flip to the other side to finish building.

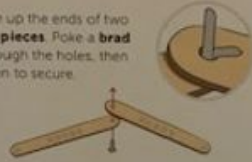
3. Robot Leg Build

Create a leg for each side of the robot body.

You'll need:



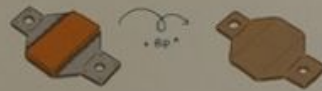
- 1 Line up the ends of two leg pieces. Poke a brad through the holes, then open to secure.



- 2 Find a robot foot and stick a piece of orange sticky foam to the gray side.



- 3 Flip the robot foot over.



- 4 Use a brad to attach the foot to the leg.

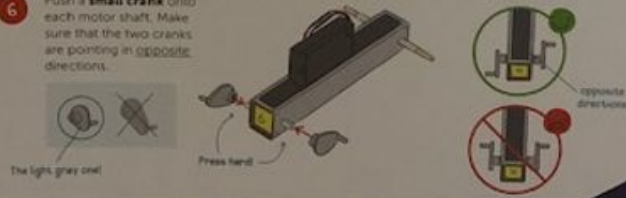


brad goes through all the holes

- 5 Repeat Steps 1-4 to make a second leg.



- 6 Push a small crank onto each motor shaft. Make sure that the two cranks are pointing in opposite directions.



The light gray one

Press hard

opposite directions

Flip to other side to finish building.

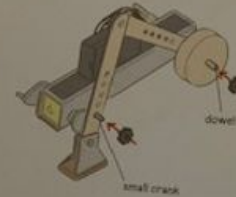
- 7 Slide a leg onto one side of your robot body.



- 8 Slide a wheel onto the dowel.



- 9 Hold the leg and wheel in place, then slide on two foam gears.



- 10 Repeat Steps 7-9 to attach a leg to the other side of the body.



- 11 Turn your robot on and watch it walk!

high five!
you made a robot crawler!



STOP & CHECK!

- The legs should wiggle a bit. If not, loosen the brads. **Step 4**
- Check that you're using the small cranks. **Step 6**
- Make sure the wheels can spin. If not, loosen the gears. **Step 9**
- If your robot walks backward, try swapping the wires. **Step 11**

NEXT TIME [November 30th]

- Explore concepts of speed and time
- Describe impact of variables on the robot's motion
- What to expect for the wrap up session