Worksheet 1 – Crumble Robotic Vehicle

Name: _____

ELECTRICITY

Label the following electrical components: motor, cell, crocodile lead, battery.

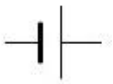
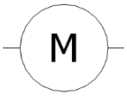



…… …….. …… ……

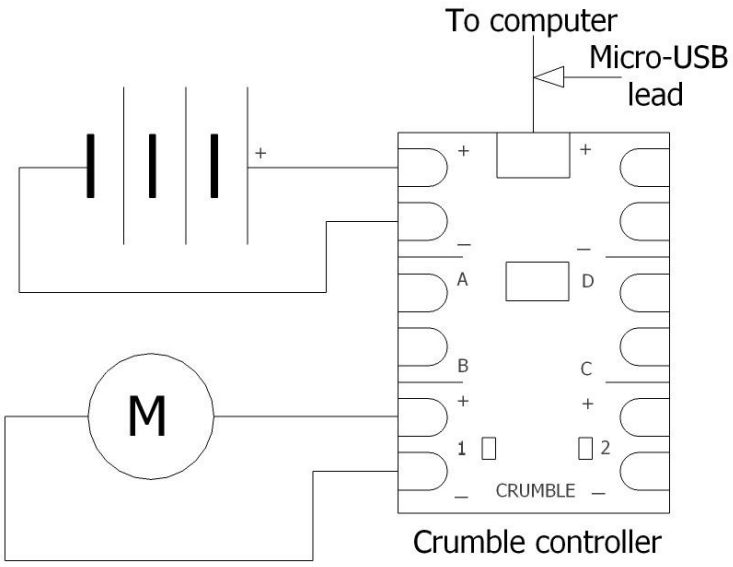
Draw arrows to connect the components to their symbols. The first one has been done for you.





Here is a circuit diagram to show you how to connect the battery and one motor to the Crumble controller. Label the motor, the battery and the crocodile leads.



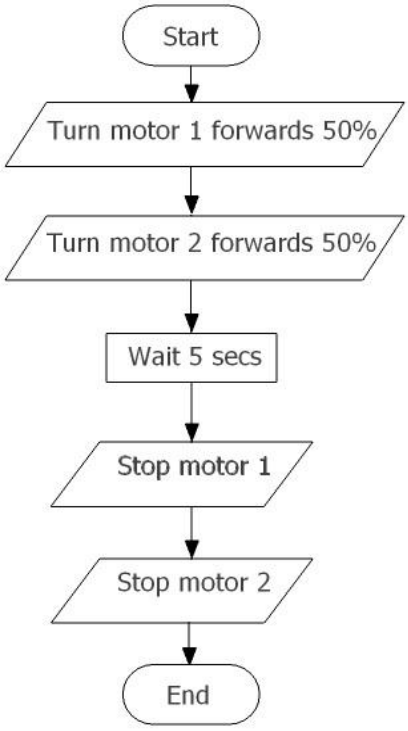
Add a second motor to the diagram and show how it connects to the Crumble controller.

Why are symbols used in a circuit diagram, instead of drawing the actual components?	

PROGRAMMING

1. **On the right is a flowchart showing the logic for you to program both motors to run at 50% power for 5 seconds and then stop. Construct a program to do this. Run the program and check the motors behave as expected.**

2. **Next, draw a flowchart below to program your motors to run forwards at 50% power for 5 seconds, stop for 2 seconds, run one forwards and one backwards at 50% power for 4 seconds, then stop both motors.**

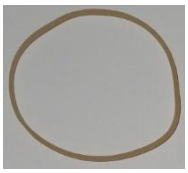


3. **Below is a program meant to carry out the sequence described in step 2. It has four bugs (errors). Circle the four bugs.**

MECHANICAL SYSTEMS

Draw arrows to connect the following mechanical components to their pictures:

wheel **axle** **bearing** **pulley** **motor pulley** **drive belt**



What is the purpose of the bearings?	
What would happen if you had high friction between the axles and the bearings?	
Why do we use a pulley system to drive the vehicle?	
Why do the vees of the pulleys need to be in line?	
Why do the pulleys and rear wheels need to attach firmly to the rear axles?	

EXTENSION QUESTIONS	
Why do you need to switch off the battery box when it is not in use?	
Suggest two ways in which you can reverse the direction of rotation of the motor.	
Why do you need to start the motors on 50% power or less?	
Why do you need to wait for at least two seconds before changing from forwards to reverse?	
What precautions did you take to avoid too much friction between the wheels/axles and the bearings?	
Suggest a problem which you encountered and explain how you solved it.	