Doodling Robot

A. SAFETY
1. Adult supervision and assistance are required at all times.
2. This kit is intended for children of age 8 and older.
3. This kit and its finished product contain small parts which may cause choking if mishandled. Keep away from children under 3 years old.
4. To prevent possible short circuits, never touch the contacts inside the battery case with any metal.

B. USE OF THE BATTERY
1. Requires one 1.5 V "AAA" battery (not included).
2. For best results, always use a fresh battery.
3. Make sure you insert the battery with the correct polarities.
4. Remove the battery from the robot when not in use.
5. Replace an exhausted battery straight away to avoid possible damage to the kit.
6. A replaceable battery must be removed from the kit before recharging.
7. Rechargeable batteries should be recharged under adult supervision.
8. Do not attempt to recharge non-rechargeable batteries.
9. Make sure that the supply terminals in the battery case are not short circuited.

C. CONTENTS

1. 1 motor with wires
2. 1 motor cover
3. 1 weight
4. 1 transparent cover
5. 2 arm supports
6. 2 pen holders
7. 1 sheet of drawing paper
8. 2 sets of pens
9. 2 screws
10. 2 adhesive pads

D. SETUP
1. Remove the battery case. The armature is on the side with the battery case. There are six small holes for the motor on this side. Push the motor into the armature. The armature is on the side of the baseplate. Make sure that the small metal ring around the motor's spindle fits right into the hole in the armature.
2. Fit the paper cover over the motor, with the square side over the wire connections. Secure the cover with two screws.
3. The weight has a small hole on its underside. Push the small hole over the motor's spindle.
4. The Robot Doodler has three arms connected to the rim of the baseplate. Push one end of an arm support over a hole in the edge of the baseplate. Secure the support with a nut and bolt. The arm should be firmly attached to the plate but it should still be able to turn from side to side. Attach the other two arm supports to the other holes on the baseplate.
5. Hold two halves of a pen holder together and slot the narrow ends into one of the arm supports. Push a bolt through the hole in the pen holder and the arm support and put a nut on the bolt. Tighten the bolt until the joint is tight but can still move. Add a pen holder to the other two arm supports.
6. Two arm supports end in the end of each arm, and secure them with nuts and bolts.
7. Now you need to connect the wires from the battery to the wires from the motor. There are two terminal holes on the underside of the baseplate. Push the bare ends of the red wire from the battery case and the red wire from the motor into one hole. Push a terminal cap into the hole to hold and connect the wires. Repeat with the black wires in the other terminal hole.
8. Put the transparent cover over the weight and secure it with two screws in the holes in the baseplate.
9. Insert a 1.5 V "AAA" battery into the battery case. The negative terminal (the flat end) of the battery goes against the spring in the battery case. If the motor runs, switch the switch to turn it off.
10. Push a felt-tip pen into the pen holder inside of the arm. The tip of the pen must point down, so it must be on the underside of the baseplate (below the battery case). Congratulations! Your Doodling Robot is ready to draw!

E. OPERATION
Always cover your working area with sheets of newspaper so that the working surface is not stained by ink. If the Doodling Robot leaves the drawing paper, place a large sheet of drawing paper under it. Use the pen cap to cover the nib. When you are happy with the pattern, the Doodling Robot should be switched off. Lift the Robot off the paper. Switch off the motor to remove the pens and replace the pen caps. You can also use the pens in the base of the drawing paper with an adhesive pad. The Robot will now revolve around this pen, drawing larger circles with its two other pens.

1. To draw a circle line pattern: Check that the arms are all pointing straight outwards and are level, so that the pens are vertical. Remove the pen caps and switch on the motor. Gently push the Robot Doodler onto a large sheet of paper and let it roll. It should move in a circle, drawing three coloured circles. When you are happy with the pattern, push the Robot Doodler back over. Lift the Robot off the paper. Switch off the motor and replace the pen caps. You can also use all of the pens in the base of the drawing paper with an adhesive pad. The Robot will now revolve around this pen, drawing larger circles with its two other pens.
2. To draw straight line patterns: Turn the pen holders so that they are all parallel, and lift the pen arms slightly upwards (see diagram). The Robot should run along a straight line, drawing lines as a pen.
3. To install the motor in the other slot (labelled "off-centre in the baseplate") your Doodling Robot will tend to spin in a more visible direction than when the motor is in the centre, and will draw a more random pattern.
4. To adjust the height of the baseplate by moving the pens up and down in their holders. Doodling Robot will spin faster if the baseplate is higher than shown or if it is lower.
5. To adjust different combinations of angles of the pen holders, you might make Doodling Robot draw some new and interesting patterns. There are endless possibilities.

F. TROUBLE SHOOTING
8. Remove all the pens and turn down the arm ends. Doodling Robot becomes a vibro that slides across smooth surfaces.

H. FUN FACTS
8. Do not attempt to recharge non-rechargeable batteries.
9. Insert a 1.5 V "AA" battery into the battery case. The negative terminal (the flat end) of the battery goes against the spring in the battery case. "AA" batteries provide electricity to the motor, which turns the weight at high speed. The centre of gravity of the weight is off centre – it is not in line with the motor's shaft. As the weight moves around it pulls the centre of gravity lower and faster.

G. HOW DOES IT WORK?
8. Put the transparent cover over the weight and secure it with two screws.
9. Insert a 1.5 V "AA" battery into the battery case. The negative terminal (the flat end) of the battery goes against the spring in the battery case. The batteries provide electricity to the motor, which turns the weight at high speed. The centre of gravity of the weight is off centre – it is not in line with the motor's shaft. As the weight moves around it pulls the centre of gravity lower and faster. The vibrations make them move along. If the nibs did not jump up and down, friction with the paper would stop them from moving.

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To Parents: Please read through these instructions before giving guidance to your children.

D. INSTALLATION

1. To draw a circle line pattern: Check that the arms are all pointing straight outwards and are level, so that the pens are vertical. Remove the pen caps and switch on the motor. Gently push the Robot Doodler onto a large sheet of paper and let it roll. It should move in a circle, drawing three coloured circles. When you are happy with the pattern, push the Robot Doodler back over. Lift the Robot off the paper. Switch off the motor to remove the pens and replace the pen caps. You can also use all of the pens in the base of the drawing paper with an adhesive pad. The Robot will now revolve around this pen, drawing larger circles with its two other pens.
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