

E. TROUBLE SHOOTING:

If your Robug does not vibrate when you activate the battery pack:

- Check if the batteries are installed in correct polarities.
- Replace the batteries (be sure they are inserted properly).
- Check that all connections are intact and are connected in correct polarities.

If your Robug does not move to the intended route:

- Try gently bending the metal legs in different directions. It will cause the Robug to move in different routes.

E. FUN FACTS

How does it work? The batteries provide power to the motor causing it to rotate. This rotation occurs at a frequency of 10,000 revolutions per minute (rpm). The "off center spin plate" attached to the motor spin shaft creates a vibration force when rotated by the motor. This causes the whole system to vibrate in high frequency. If, on the other hand, the spin plate was symmetrical or designed as a full circular plate with a hole at the center, the spin action would be balanced and would not produce a vibration. Without the vibration, the Robug would not move across the floor as you see it now.

Why does it buzz louder with the soda can? Do you notice how much louder the buzzing sound is when you install a soda can? The hollow soda can resonates with the vibration, which serves to amplify the sound produced. To achieve a different sound, replace the soda can with a plastic bottle or put a small amount of water in the soda can. Can you hear the difference? What happens if you drop a couple of paperclips in the can or a couple of small coins?

Think Green Science - Recycle! Tin can recycling is a great success story! In several countries, more aluminum beverage cans are recycled than any other consumer packaging materials. In the United States alone, over 130 billion cans are produced each year and almost 50% of them are recycled! Several factors contribute to the success of aluminum recycling. First, it is extremely cost-effective for companies to recycle aluminum. Recycling takes only 5% of the energy required to dig up and process the ore - said another way, that's 95% less energy to recycle! This saves companies a lot of money and is much better for the environment. Many countries also offer some type of 'reward' if you return the can to a recycle center. Do you get money back for your soda cans? Aluminum is also a very soft metal making it malleable or easy to use and it resists corrosion. All of this combined makes aluminum incredible stuff! Efforts are underway across the globe to increase recycling, and you have just taken a step to do your part by recycling a can and putting it toward another use!

Did you know.... A growing number of people have taken up a new hobby: collecting tin cans! Companies that produce special designs or limited edition cans have sparked a lot of attention. Best of all, the cans are being recycled and it is inexpensive and fun.

How many empty soda cans does it take to equal one kilogram? Answer: Approximately 65.

What is that buzzing noise? Bees, mosquitoes and many other insects emit a buzzing noise. But do you know how they do it? With their wings! In the insect world, vibration is caused by the insect's wingbeats. Each time the insect moves its wings, it causes a vibration. The more wingbeats, the greater the vibration! Moreover, it is that vibration that we hear.

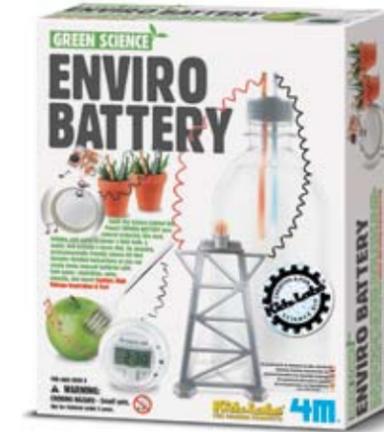
However, increasing the vibration does not necessarily mean the bug is louder - even though a bug might have more wingbeats it may not be as loud as another insect with less wingbeats. For example, compare a mosquito to a bee. A mosquito beats its wings much faster than a bee, but a bee is louder because its wings are larger.

Over 70% of insects that use sound to communicate do so through vibration and many insects have vibration receptors that enable them to 'hear' the vibrations. These vibrations are used for different purposes, among them:

- Attracting a mate
- Informing others of new food sources
- Alerting others to danger

GREEN SCIENCE

Build a better tomorrow through education & awareness. You will like the other great Green Science kits:



00-03261 Enviro Battery

Learn the Science behind the Power! ENVIRO-BATTERY uses natural materials like mud, lemons, and water to power a light bulb, a watch, and activate a music chip. An amazing, environmentally friendly science kit that includes detailed instructions so you can create many unusual batteries with fruit juices, vegetables, coins, utensils, and more!



00-03263 Dynamo Torch

Turn a simple toy motor into a generator that converts hand motion into electrical energy and powers a light bulb. No battery, no pollution, just amazement. The generator could be used as an awesome emergency torch. Caution: High Voltage Inspiration & Fun!

Questions & Comments

We value you as a customer and your satisfaction with this product is important to us. If you have comments or questions, or you find any part of this kit missing or defective, please do not hesitate to contact our distributor in your country. You will find the address printed on the package. You are also welcome to contact our Marketing Support Team: Email: infodesk@4m-ind.com, Fax (852) 25911566, Tel: (852) 28936241, Web site: WWW.4M-IND.COM

41-03266/1

©2007 4M Industrial Development Limited. All rights reserved.

GREEN SCIENCE

WARNING:
CHOKING HAZARD - Small parts.
Not for Children under 3 years.

SODA CAN ROBUG



A. BEFORE YOU START

1. Please read through these instructions before you start.
2. Adult assistance and supervision recommended.
3. This kit is intended for children ages over 8.
4. This kit and its finished product contain small parts which may cause choking if misused. Keep away from children under 3 years old.
5. Metal wire plate and wires may contain sharp points. Adult assistance required during connection.
6. Never touch the contacts inside the battery case to prevent possible short circuit.

B. USE OF BATTERY

1. Requires two "AAA", 1.5V batteries (not included).
2. For optimum operation, always use fresh batteries.
3. Insert batteries according to the correct polarities.
4. Make sure that the supply terminals are not short circuited.
5. Do not leave batteries in the kit if it is not in use.
6. Remove exhausted batteries from the kit.
7. Do not recharge non-rechargeable batteries.
8. Rechargeable batteries should be removed from the kit before being charged (if removable).
9. Rechargeable batteries should only be charged under adult supervision.
10. Do not mix old and new batteries.
11. Do not mix alkaline, standard (Carbon-Zinc) or rechargeable (Nickel-Cadmium) batteries.

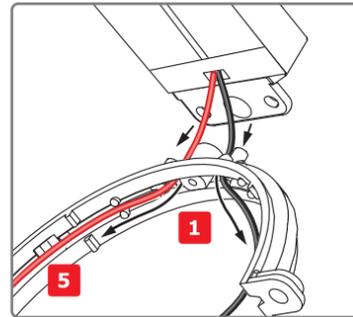
C. CONTENTS



1 motor casing, 1 toy motor with spinner (wires attached), 1 body plate, 4 body rims, 1 battery casing (wires attached), 4 large screws with bolts, 10 small screws, 2 plastic terminal caps, 3 wire legs, 2 wire wings and detailed assembly instructions with fun facts. Requires two "AAA", 1.5V batteries (not included). Screw driver for cross head screws required from home; please ask an adult for assistance. You need to recycle a used soda can to complete the project.

D. ROBUG ASSEMBLY - To assemble your Robug, follow these steps:

BATTERY CASING & BODY RING ASSEMBLY



- 1 Thread the two wires extending from the battery casing through the two holes on either side of the screw stem.
- 2 Gently pull the wires through the two holes until the battery casing is drawn to the base of the body half ring and the two protruding guide pins are inserted into the holes of the battery case.
- 3 Use a screwdriver to insert a small screw into the battery casing and attach it to the body half ring. Note: To avoid “stripping” the grooving into which the screws are inserted, do not exert unnecessary force. Screws simply need to be snug.

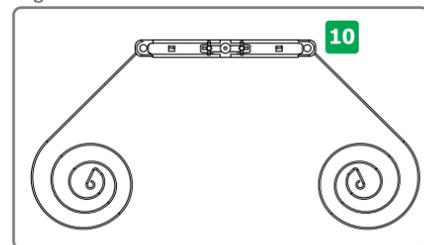
4 Connect a second body half ring to the first using 2 large screws and bolts. When the two half rings are connected, they will form a complete circle.

5 Gently insert the wires into the groves located on the inside of the half rings. When done properly, the red (positive) wire will line one side of the completed body ring and the black (negative) wire will line the other side of the body ring.

6 Thread each of the two wires through the opening at the opposite end of the body ring. Do not cross the wires. Set the completed battery casing & body ring side.

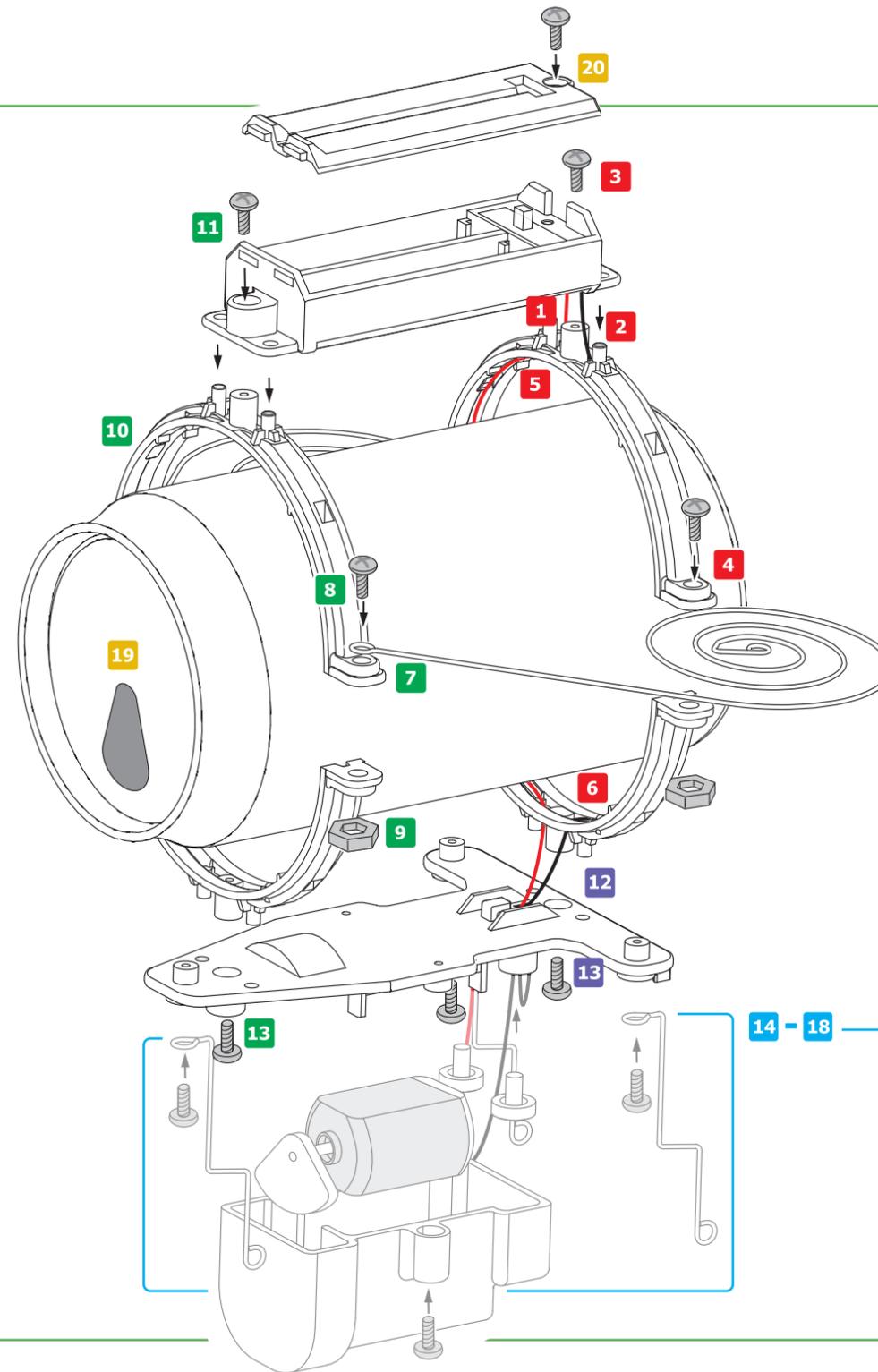
SECOND BODY RING ASSEMBLY WITH WINGS

- 7 Place a wire wing onto the other body half ring. Align the holes of both parts.
- 8 Insert a large screw through the aligned holes.
- 9 Connect the second half ring by placing it over the screw; use a nut to secure the two halves together.

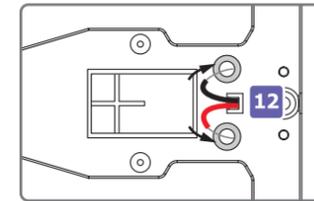


10 Repeat the same with the other side. The two wings should protrude from the body in the same direction.

11 Attach the completed section body ring to the battery casing using a small screw. You should now have assembled both body rings and attached them to the battery casing.

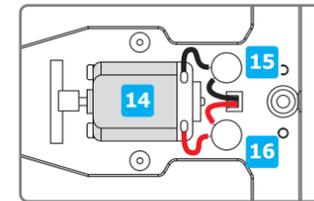


CONNECTING BODY RINGS TO THE BODY PLATE



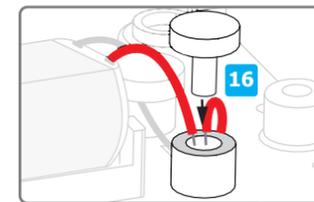
- 12 Gently thread the two wires (from battery casing) through the rectangular hole located on the body plate.
- 13 Afterwards, attach the body plate to both the body rings using the small screws.

CONNECTING WIRES



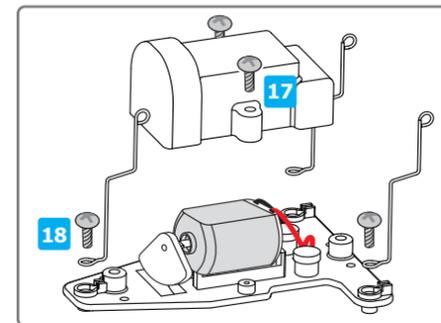
14 You need to connect the wires from the battery casing to those attached to the motor. To do this, place the motor in the housing located on the underside of the body plate and ensure that it is fully inserted.

15 Then connect wires of same colour (e.g. red to red, black to black). Place both the black colour wires into one of the holes with metal eyelet. Press the plastic pin into the eyelet to hold the wires in place.



16 Repeat this process for the red colour wires pair. Note: Do not use the same hole for both sets of wires as this will cause a short-circuit.

ASSEMBLING THE MOTOR HOUSING & CONNECTING LEGS TO THE BODY PLATE



- 17 Attach the motor casing cover using two screws.
- 18 Notice that each of the 3 legs has a short “L” shape at one end: you will attach this end to the body plate. Insert each leg into the body plate grooves and secure them in place using the small screws.

FINAL ASSEMBLY

19 Insert a soda can to the body rings. You may need to loosen a bit the long screws at the wings when inserting the soda can. Afterwards, tighten them again after the soda can is inserted.

20 Insert 2 AAA size, 1.5 V batteries into the battery casing. Attach the cover by using a screw. Congratulations, your Robug assembly is now complete! Slide the switch to “ON” position and place your Robug onto a smooth surface (wooden floor or table top etc). It will vibrate and move across.