

anko

Build Your Own Intelligent Vacuum Cleaner

PHYSICS

> navigates automatically on a table or the floor
> place the foam ball above the blow-nozzle and watch the vacuum cleaner in action

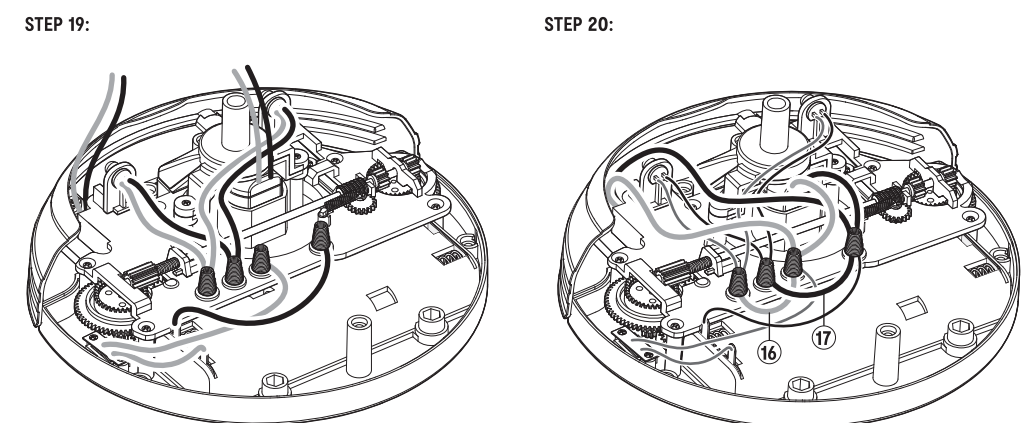
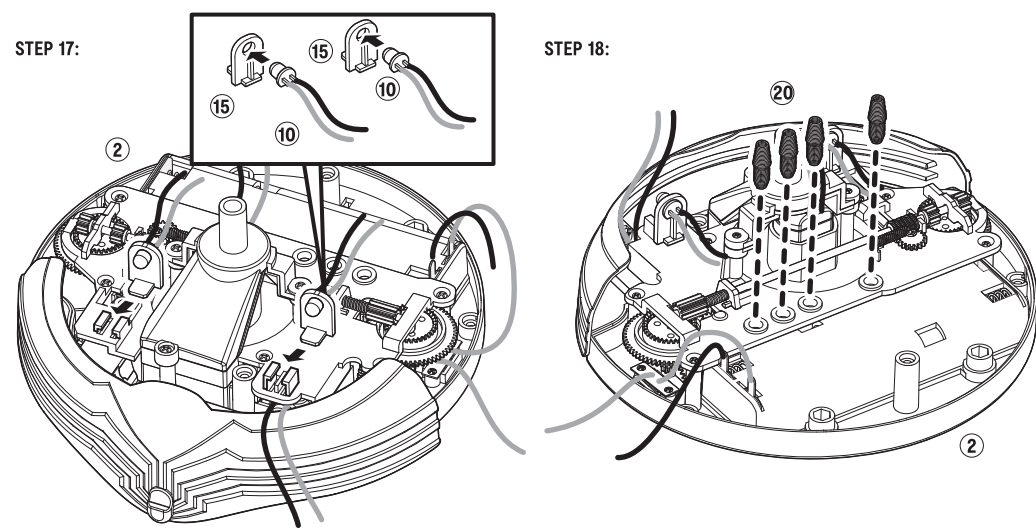
8+ years

STEM
SCIENCE
TECHNOLOGY
ENGINEERING
MATHS



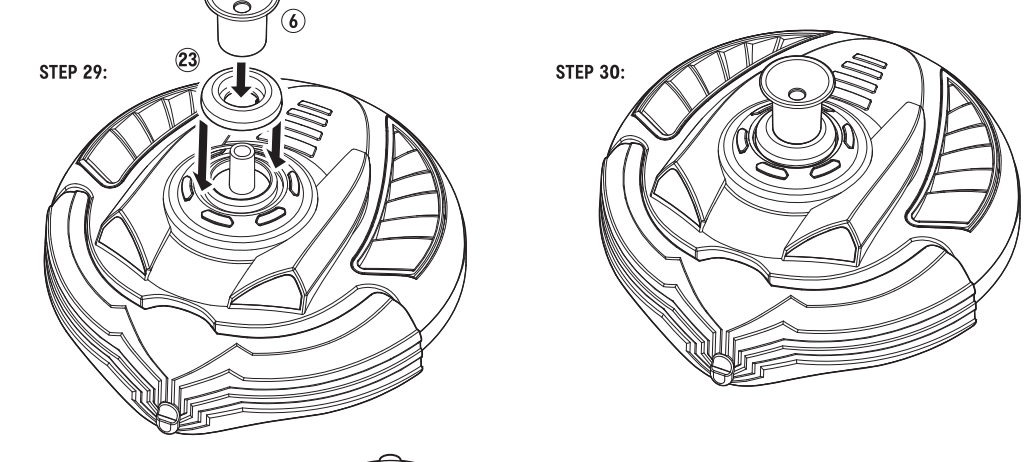
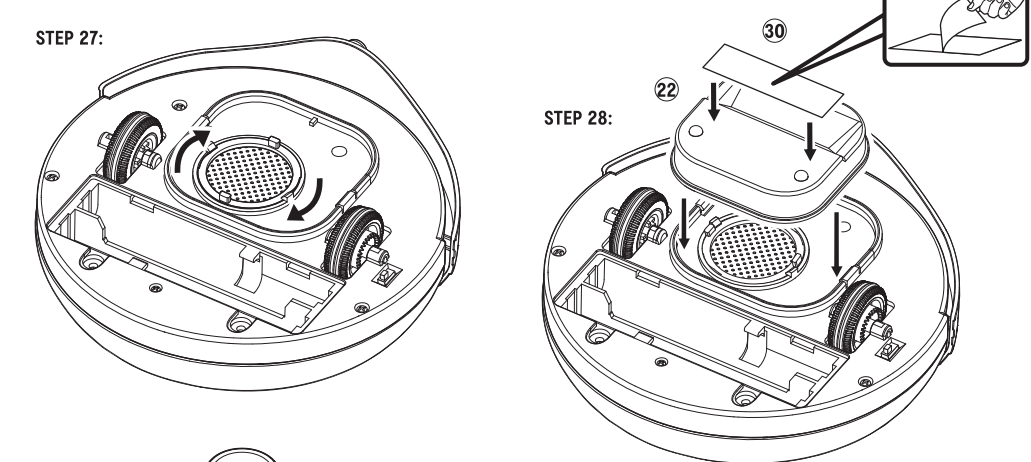
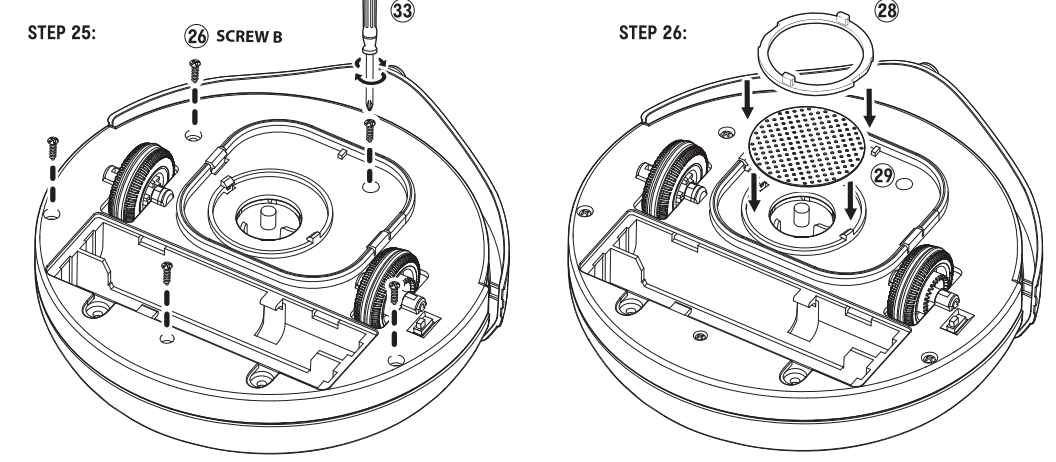
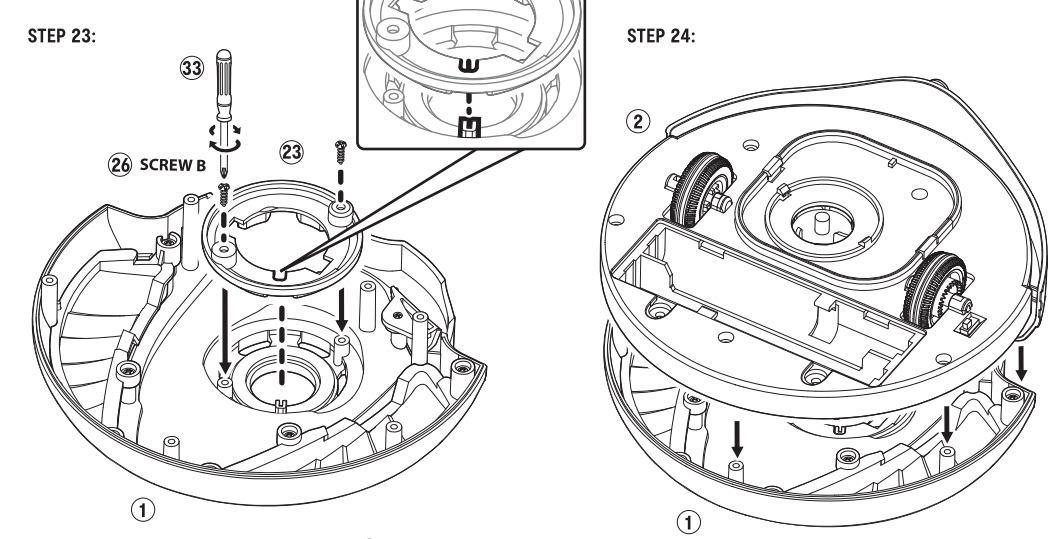
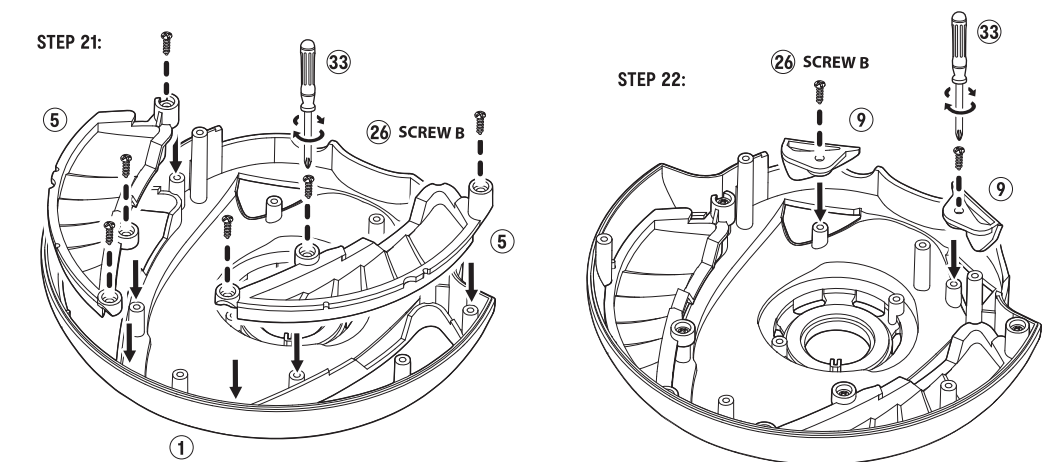
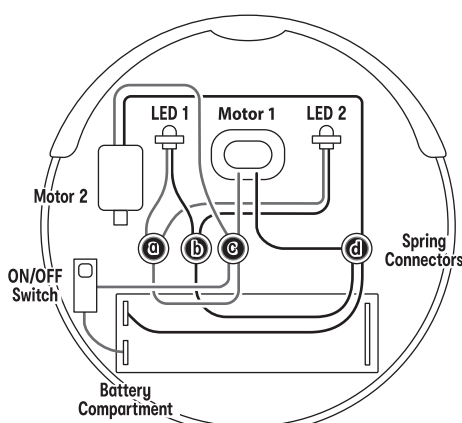
Components

- | | | | | | | |
|----------------------------|----------------------------|-----------------------------------|--------------------------|---------------------------|--------------------------|-----------------------|
| 1. 1x cover | 2. 1x bottom | 3. 1x circuit board | 4. 1x bumper | 5. 2x cover ornaments | 6. 1x blow nozzle | 7. 1x foam ball |
| 8. 3x metal contact plates | 9. 2x led light covers | 10. 2x led lights | 11. 2x large red gears | 12. 1x medium red gear | 13. 1x small red gear | 14. 1x steering gear |
| 15. 2x led light holders | 16. 1x red wire | 17. 1x black wire | 18. 1x spring | 19. 1x motor | 20. 4x spring connectors | 21. 1x axle with gear |
| 22. 1x dust holder | 23. 2x blow nozzle holders | 24. 2x blow nozzle bottom holders | 25. 3x screws a | 26. 27x screws b | 27. 2x axles | |
| 28. 1x cotton pad presser | 29. 1x cotton pad | 30. 1x velvet sheet | 31. 2x bumper supporters | 32. 1x battery case cover | 33. 1x screw driver | |



BASIC CONNECTION PRINCIPLE

Wiring connections	Spring (a)	Spring (b)	Spring (c)	Spring (d)	Pre-assembled
Battery compartment				black	
ON/OFF switch			red	black	red
Motor 1			red	black	
Motor 2			red	black	
LED 1	red	black			
LED 2	red	black			
Red wire	red	red			
Black wire		black		black	



How to play

1. Insert 4 x AA size batteries into the battery compartment.
 2. Turn the switch on and put the foam ball above the blow-nozzle. Now watch the Intelligent Vacuum Cleaner in action!
- Tips: The rotation of vacuum cleaner can only perform when both wheels are on the table. After carrying out experiments, the finding shows this vacuum cleaner works better on a round table as compared to a rectangular one. The geometry plays a vital role in it. Try it out and figure out the reason behind it! Happy Cleaning!
- Warning!** Do not short-circuit the battery terminals, otherwise it may cause overheating. Do not lock the motor or other moving parts, otherwise it may cause overheating.

WARNING:
CHOKING HAZARD - SMALL PARTS.
NOT FOR CHILDREN UNDER 3 YRS.

WARNING:
CHOKING HAZARD - TOY CONTAINS A SMALL BALL.
NOT FOR CHILDREN UNDER 3 YRS.

WARNING:
NOT SUITABLE FOR CHILDREN UNDER 3 YEARS AS FOAM PIECES MAY BREAK OFF AND CAUSE A CHOKING HAZARD.

WARNING: CONTAIN LEADS WITH FUNCTIONAL SHARP POINT.

WARNING: HAIR ENTANGLEMENT MAY RESULT IF THE CHILD'S HEAD IS TOO CLOSE TO THE MOTORISED UNIT OF THIS TOY. ADULT SUPERVISION AND ASSISTANCE IS REQUIRED.

WARNING: FOR SAFETY REASONS, REMOVE ALL TAGS, LABELS AND PLASTIC FASTENERS BEFORE GIVING THIS TOY TO YOUR CHILD.

WARNING: BATTERIES ARE TO BE INSERTED WITH THE CORRECT POLARITY. DO NOT MIX DIFFERENT TYPES OF BATTERIES OR NEW AND USED BATTERIES. NON-RECHARGEABLE BATTERIES ARE NOT TO BE RECHARGED. RECHARGEABLE BATTERIES ARE ONLY TO BE CHARGED UNDER ADULT SUPERVISION. RECHARGEABLE BATTERIES ARE TO BE REMOVED FROM THE TOY BEFORE BEING CHARGED. THE SUPPLY TERMINALS ARE NOT TO BE SHORT-CIRCUITED. REMOVE BATTERIES FROM THE TOY WHEN NOT IN USE FOR EXTENDED TIME OR WHEN BATTERIES BECOME EXHAUSTED. BATTERY INSTALLATION BY AN ADULT IS REQUIRED. DISPOSE OF BATTERIES RESPONSIBLY. DO NOT DISPOSE OF IN FIRE.

PRODUCT MAY VARY SLIGHTLY FROM IMAGES SHOWN. PLEASE KEEP THE INSTRUCTION MANUAL FOR FUTURE REFERENCE. READ THE INSTRUCTION MANUAL BEFORE USE.

4 X
REQUIRES 4 X 1.5V AA BATTERIES (NOT INCLUDED).

If at any time in the future you should need to dispose of this product please note that waste electrical products should not be disposed of with household waste. Please recycle where facilities exist. Check with your local authority or retailer for recycling advice. (Waste Electrical and Electronic Equipment Directive)
42-887-973

MADE IN CHINA
FOR AU/NZ: IMPORTED FOR KMART STORES IN AUSTRALIA AND NEW ZEALAND.
FOR USA: IMPORTED BY ANKO RETAIL INC. 19500 ALDERWOOD MALL PARKWAY LYNNWOOD WA 98036 USA.

How does the vacuum cleaner work?
When electric power is added to the motor, the motor spins the fan. The motor fan's spinning motion pushes the air outwards and forces the air out of the vacuum cleaner. This creates a "partial vacuum" at the fan's spinning region. As a result the atmospheric pressure of the air outside will push the air into the "partial vacuum" region (through the entrance of vacuum cleaner). This is where the "suction power" comes into existence. As the motor fan keeps spinning, the suction process continues. Dust will be sucked up with the air. For an ordinary household vacuum cleaner, there will be a filter bag inside. Air can flow through the bag while dust particles cannot pass through the bag. Consequently, dust is collected and the floor is cleaned. For this vacuum cleaner kit, dust or scrap paper will be held at the entrance. The entrance is located at the bottom and the exit is located at the top. The exit is also a blower which can make a foam ball float into the air. At the beginning, the ball can float high when the batteries are fresh and when the entrance is not blocked by dust or scrap paper. However, when the ball floats lower, this indicates that either the battery power is low, or there is dust and scrap paper blocking the entrance. You will need to clean it out in the latter case.

Why this vacuum cleaner kit is intelligent?
When this vacuum cleaner reaches the rim of a table, or its path is blocked by a wall, it will change its direction by turning around. This vacuum cleaner kit is intelligent by the fact that, it does not make use of any IC or modern electronics. It makes use of some cleverly designed mechanical tricks! When it encounters an obstacle (e.g. wall), or reaches the edge of a table, the bumper is pressed or is lowered down. Then this will prompt the "turning around mechanism", which switch the motor to connect to another set of gear mechanism that makes it turn around! Once it has turned around, the triggering gear will switch back to its natural position and the motor will be connected to the original gear mechanism again. It will continue to move ahead. To truly understand how it works, it is better by assembling the unit by yourself and see the smart mechanism inside!

ASSEMBLY

