

KidzLabs - Tornado Maker

WARNING:

CHOKING HAZARD - Small parts.

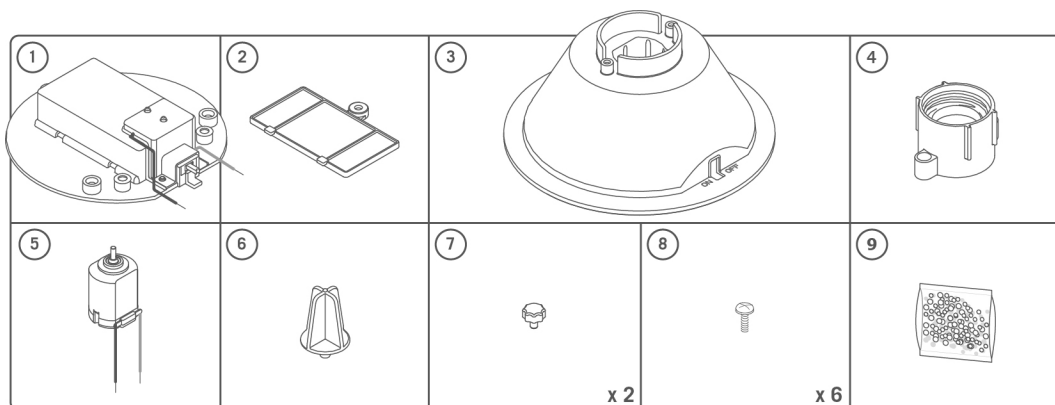
Not for Children under 3 years.

A. SAFETY MESSAGES

1. Adult supervision and assistance are required at all times.
2. This kit is intended for children 8 years or older.
3. This kit and its finished product contain small parts which may cause choking if misused. 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 BATTERIES

1. Requires 2 x 1.5V AA batteries (not included).
2. For best results, always use fresh batteries.
3. Make sure you insert the batteries with the correct polarities.
4. Remove the batteries when not in use.
5. Replace exhausted batteries straight away to avoid possible damage to the kit.
6. Rechargeable batteries must be removed from the kit before recharging.
7. Rechargeable batteries should be recharged under adult supervision.
8. Make sure that the supply terminals in the battery case are not short circuited.
9. Do not attempt to recharge non-rechargeable batteries.
10. Do not mix old and new batteries.
11. Do not mix alkaline, standard (carbon-zinc), or rechargeable (Ni-Cd) batteries.



C. CONTENTS

Part 1: Base,

Part 2: Battery cover,

Part 3: Base cover,

Part 4: Bottle holder,

Part 5: Motor with water-resistant ring installed,

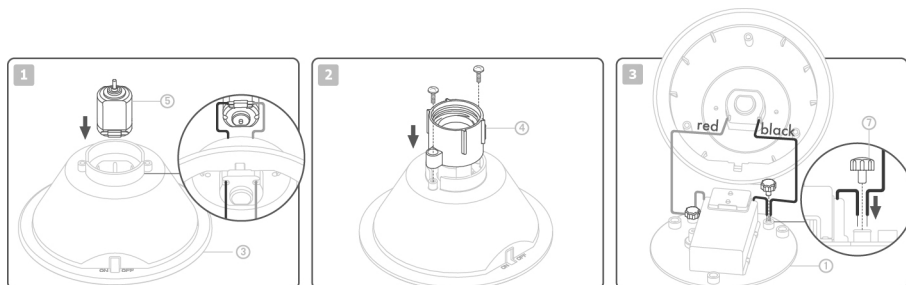
Part 6: Propeller,

Part 7: Terminal cap x 2 pcs,

Part 8: Screw x 6 pcs,

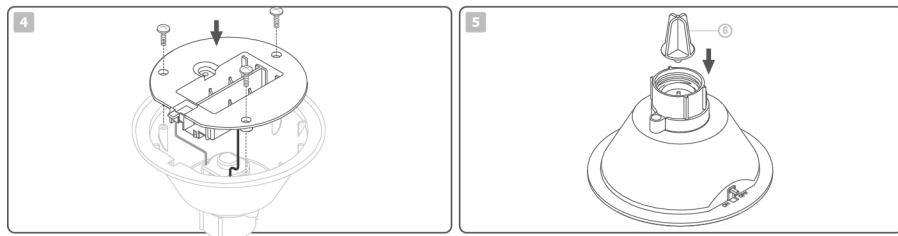
Part 9: Foam ball pack.

Also required but not provided: a small crosshead screwdriver, 1.5V AA battery x 2 and a water bottle.



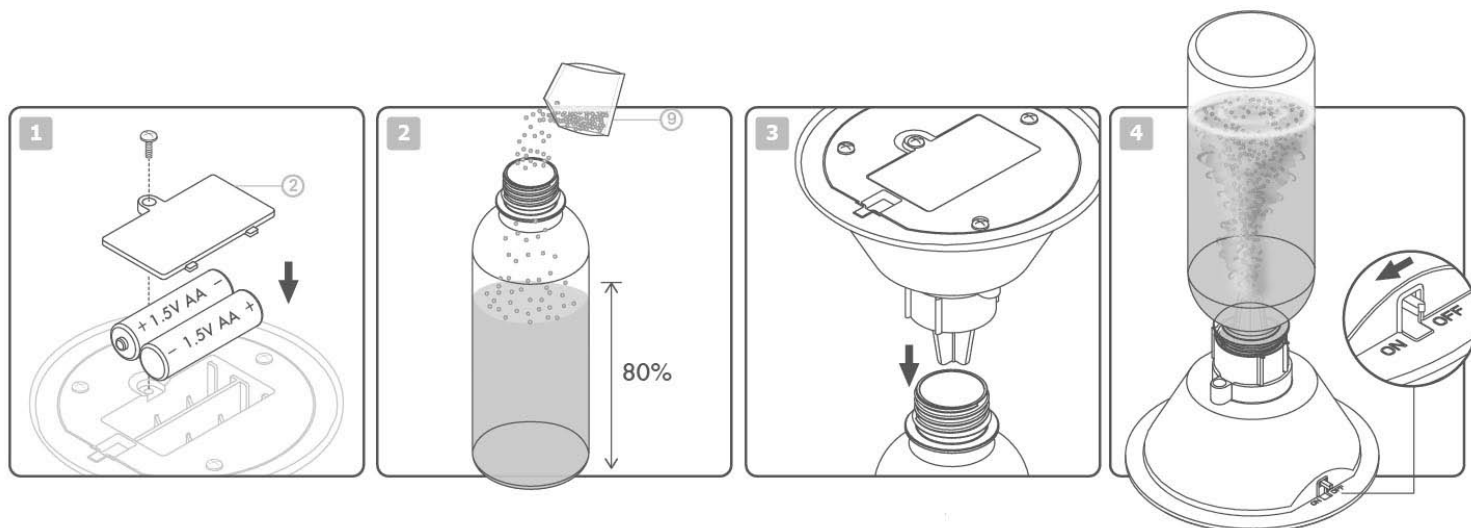
D. ASSEMBLY

1. Thread the motor wires through the holes in the base cover as shown. Push the motor, with the spindle facing up, into the opening of the base cover. Around the motor spindle there should be a red water-resistant ring. The spindle has been treated with water-resistant oil, and may be slightly greasy.
2. Place the bottle holder over the motor and use two screws to secure it. Be sure to screw them in tight: there should be no gap between the bottle holder and the base cover.
3. Turn over the base cover so that the ON/OFF switch opening is face-down. Place the base next to the base cover, with the ON/OFF switch pointing towards it. Take a wire from the motor and the same coloured wire from the battery case and insert both into one of the terminal holes next to the switch. Secure both wires with a terminal cap. Repeat with the other two wires in the other terminal hole.



4. Connect the base and the base cover, making sure the wires are kept inside, by using three screws on the underside of the base.

5. Turn the finished base upright. Push the propeller onto the motor spindle. Congratulations! Your Tornado Maker is ready.



E. OPERATION

1. Put two 1.5V AA batteries into the battery case, with the negative terminal (the flat end) touching the springs. Install the battery cover and secure it with one screw.

2. Take a plain transparent water bottle no larger than 1.25 litre and remove any wrapping or labels. Fill the bottle no more than 80% full with water, leaving it at least 1/5th empty (If you fill the bottle too full, the vortex will not form.) Cut off a corner of the bag of foam balls and pour some into the water bottle.

3. Place the Tornado Maker upside down onto the mouth of the bottle and turn clockwise to screw it on. Be sure it is on tight!

4. Turn the set-up upright, with the base at the bottom. (If any water leaks from the bottle, turn it upside down, remove the Tornado Maker, dry it and tighten the two screws attaching the bottle holder. Then reattach the Tornado Maker and turn it over again.) Turn on the Tornado Maker using the ON/OFF switch. Watch the water swirl to become a tornado! See how it changes in shape when you tilt it!

For more fun, try bottles of different shapes and sizes (but no larger than 1.25 litre). You can also add food colouring or glitter, and shine a torch through the bottle! Make it look like a really destructive tornado by adding some coffee grounds to the water. You can even decorate the Tornado Maker and bottle to make it completely unique!

When it is not in use, turn the whole set-up over, or take off the Tornado Maker from the bottle.

After a few times of operation, uninstall the propeller and unscrew the bottle holder, apply some cooking oil or vaseline as water-resistant oil to the water-resistant ring for better performance.

F. TROUBLESHOOTING

If water leaks from the bottle, make sure:

- The bottle holder is secured tightly to the base cover;
- The water bottle is screwed tightly into the bottle holder;
- The red water-resistant ring is installed around the motor spindle;
- The water bottle is in good condition.

If the propeller does not run, make sure:

- The batteries are new or still usable;
- The batteries are correctly installed;
- The motor, bottle holder, and propeller are all correctly installed (refer to sections D1, D2 & D5);
- The wires are correctly connected (section D3).

If no vortex appears, make sure there is enough empty space left in the bottle. If in doubt, empty a little water from the bottle and try again.

If the vortex cannot be formed completely, try using another bottle, as the difference in shapes and sizes could affect the outcome.

If the propeller slows down after operating for some time (the water pressure can cause the motor to overload), turn over the set-up and switch it off for 15 minutes. It is also not recommended to use the Tornado Maker for long periods of time.

G. HOW DOES IT WORK?

If you spin a bottle of water in a circular motion, it creates a water vortex that looks like a mini tornado. The motor of your Tornado Maker works in the same way. It turns electric energy from the batteries into physical energy and runs the propeller. The propeller swirls the water in a circular motion and creates a vortex. The vortex forms due to centripetal force, an inward force that directs an object (such as foam balls) or fluid (such as water) towards the centre of its circular path. Vortexes found in nature include tornadoes, hurricanes and waterspouts (a tornado that forms over water).

H. FUN FACTS

- Tornadoes are one of the most dangerous forces of nature. Extreme tornados can reach wind speeds of over 483 kilometres per hour (300 miles per hour), and can easily flatten houses and lift cars off the ground. Be careful!
- When warm wind from the south meets cold wind from the north, the energy of both winds creates a thunderstorm, and the turbulent air begins to swirl – sometimes creating tornadoes!
- Tornadoes are classified using the Fujita Scale – between “F0” and “F5” based on the damage they cause. F0 tornadoes aren’t very dangerous, and just stir up dust and break a few tree limbs. F5 tornadoes are highly destructive and potentially deadly, destroying houses, throwing around cars and causing damage to towns and cities that can take years to repair.
- In 1989, the deadliest tornado ever recorded in the world killed around 1300 people in Bangladesh.
- The safest place to be during a tornado is underground, which makes basements and cellars the ideal place to take shelter when the weather forecast predicts possible tornado-producing storms.

QUESTIONS & COMMENTS

We treasure you as a customer and your satisfaction with this product is important to us. In case you have any comments or questions, or you find any parts of this kit missing or defective, please do not hesitate to contact our distributor in your country, whose address is printed on the package. You are also welcome to contact our marketing support team at Email: infodesk@4M-IND.com, Fax (852) 25911566, Tel (852) 28936241, Web site: WWW.4M-IND.COM

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