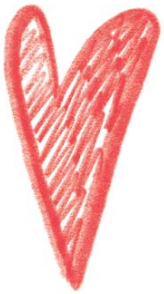
Siyanse

The Captain Siyanse GUIDE

SAFETY INSTRUCTIONS

WARNING

- **Not suitable for children under 3 years of age, as the kit includes small parts that may pose a choking hazard.**
- **Designed for children aged 5 and up.**
- **Parental supervision required!**
- **Do not swallow any of the kit components.**
- **Do not place the kit or its components near an open flame or any heat source.**



Hey, Captain Siyanse!

Here's a challenging new mission for you! You need to build a wind-powered boat using the principles of floating objects discovered in ancient times!

Let's build a wind-powered boat!

You will learn:

- What buoyancy is and why boats float
- What influences the ability of objects to float
- How to use a compass
- How to build a wind-powered boat

Compass

A compass is a navigational instrument for determining direction of travel relative to the Earth's magnetic poles. It consists of a magnetized pointer that is free to align itself with the Earth's magnetic field.

When people in the past first learned how to make magnetic compasses, they discovered that when a magnetized bit of iron was floated in water, it automatically pointed north. Sailors then began to use compasses to navigate, or find their way, at sea. This made travelling more efficient and safer.

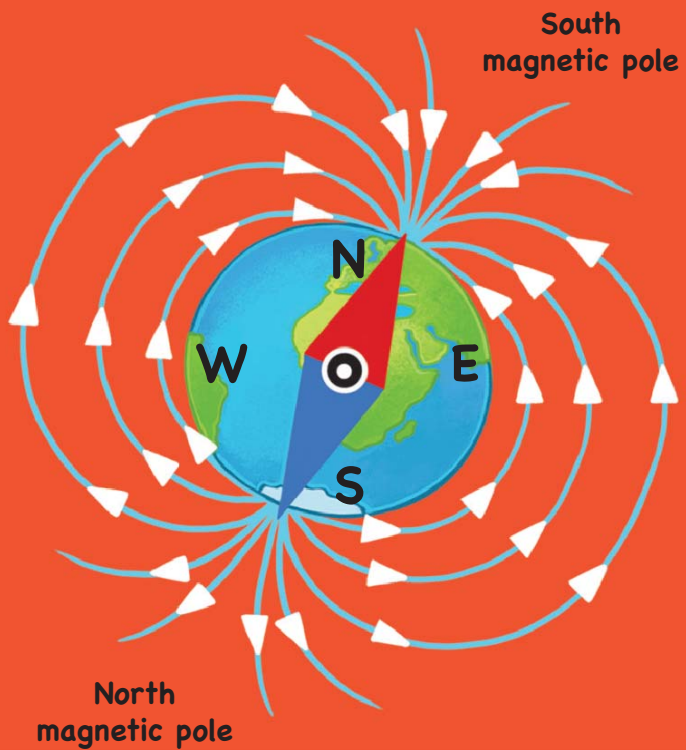
Now let's practice using a compass.

N - north
E - east
S - south
W - west

Take a look at the dial. You will see four letters; they stand for the cardinal directions. Place the compass so that the letter N is on the top and read around the dial clockwise.

The red end of the arrow always points to the north. Take your compass and find where north is. You can turn yourself around and note the direction the compass points.

Now let's try to find directions other than north. South is the easiest - you just need to walk the opposite way the compass is pointing. To go east, you need to go to the right of the direction in which the compass points, and to go west you need to go to the left of the direction in which the compass points.



EARTH'S MAGNETIC FIELD

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How will you control your wind-powered boat?

Wireless remote control is used in many aspects of our lives, like TV remote control. This wireless remote controlled wind-powered boat uses radio waves to transmit signals; it has four wireless channels that can make the boat move forward and backward, and turn left and right.

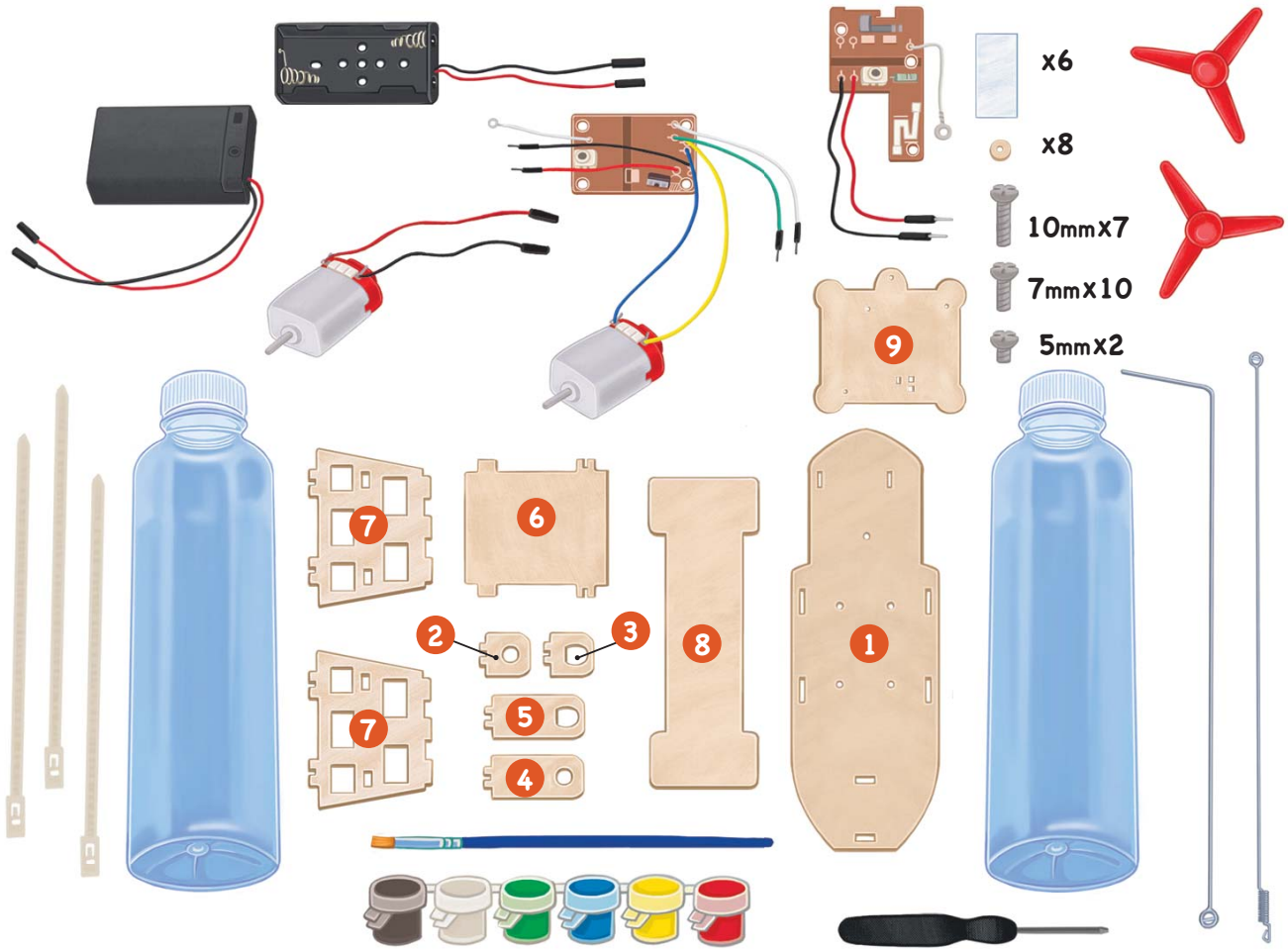
Precautions:

- Please build your wind-powered boat with your parents – it may be dangerous to make it alone. Children under 6 years of age are advised to assemble under adult supervision.
- Please unpack the package carefully to avoid losing small parts. If any small parts are lost, the boat may not work correctly.
- Please read the instructions carefully and follow every step. If you don't understand any of the instructions, please ask your parents or teacher for help.
- **Note:** You will need a total of **5 AA** batteries – three for the boat and two for the remote control. **Batteries not included.**

Put on your Captain Siyanse hat and let's get started!

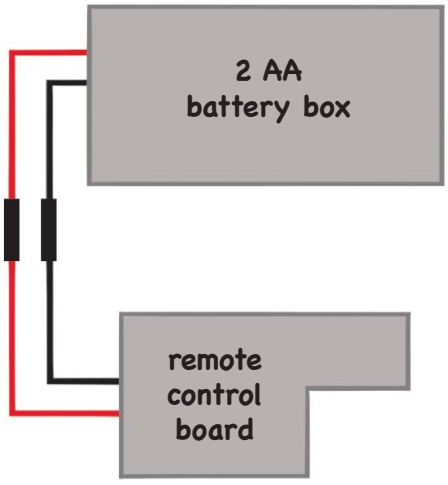
1

Prepare all the materials needed for assembly.

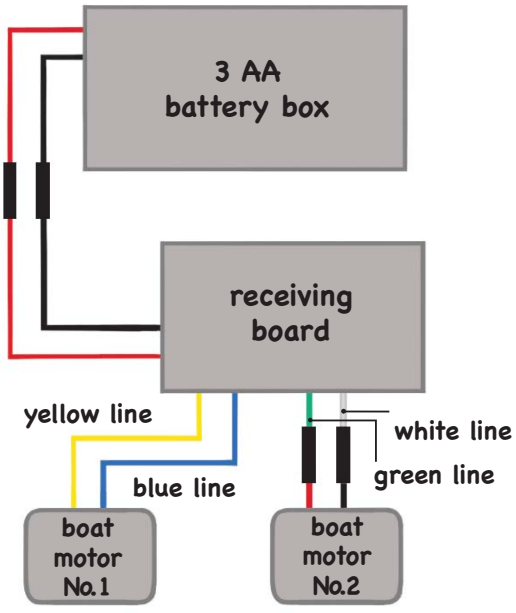


2

Review the circuit wiring diagram.



REMOTE CONTROL WIRING DIAGRAM



BOAT WIRING DIAGRAM

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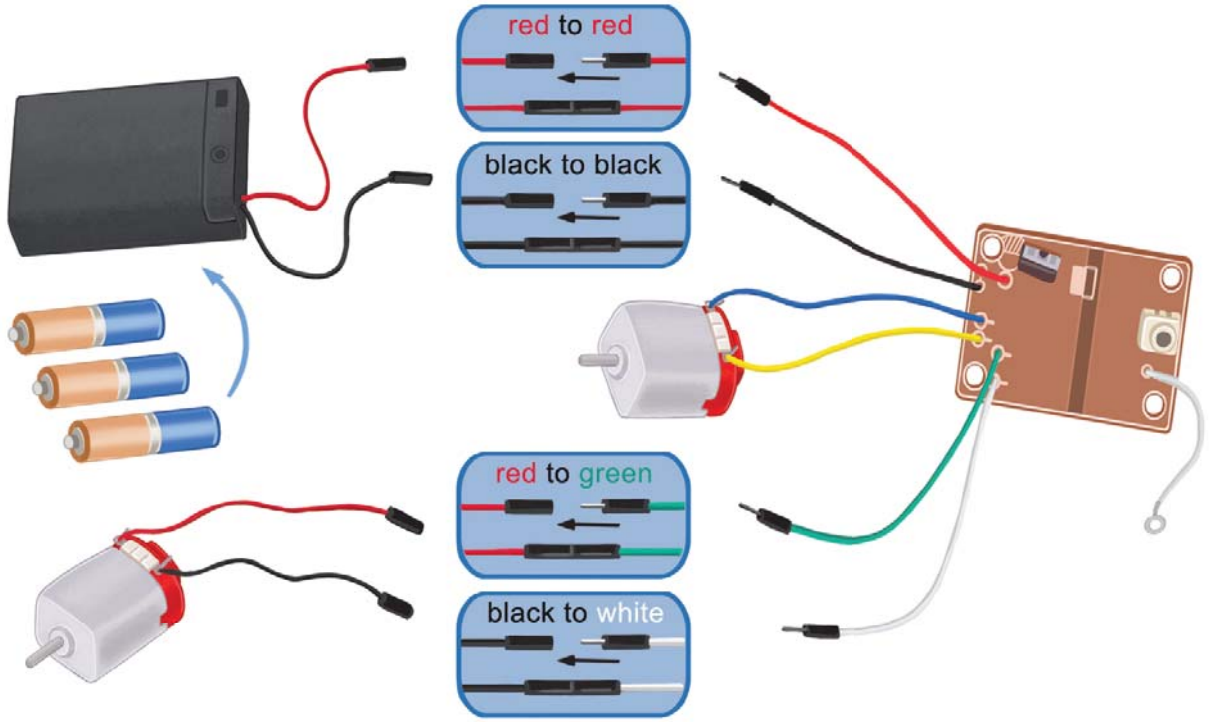
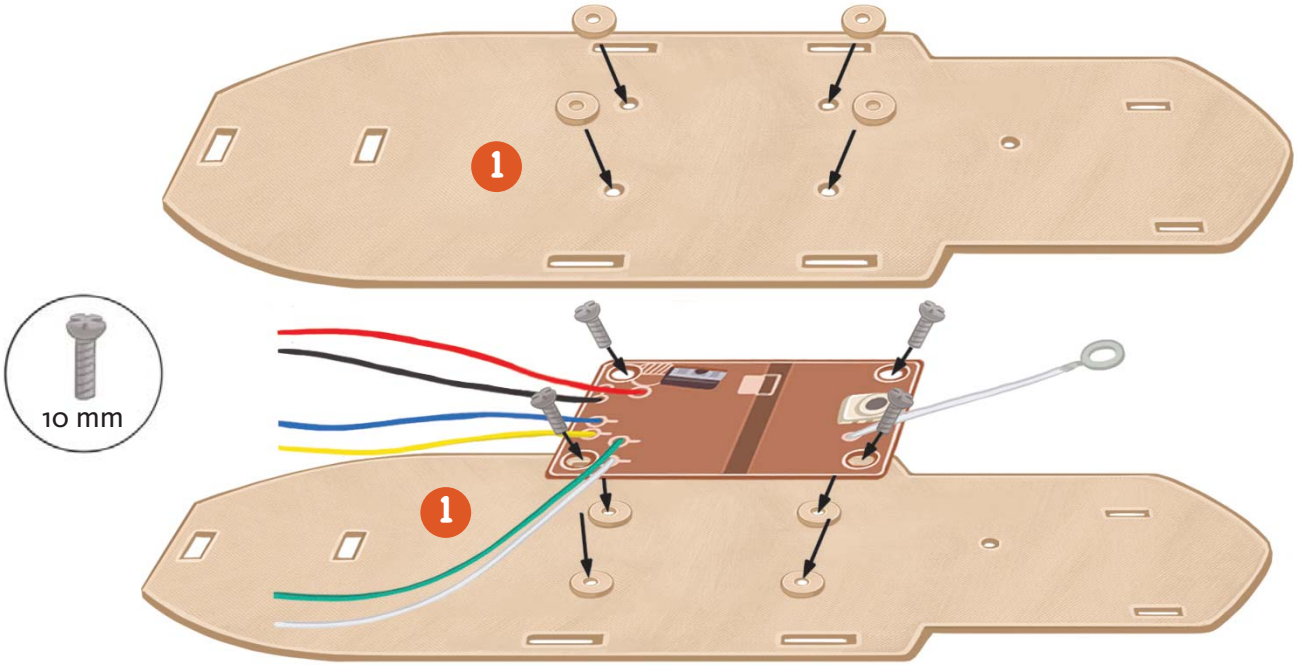
3

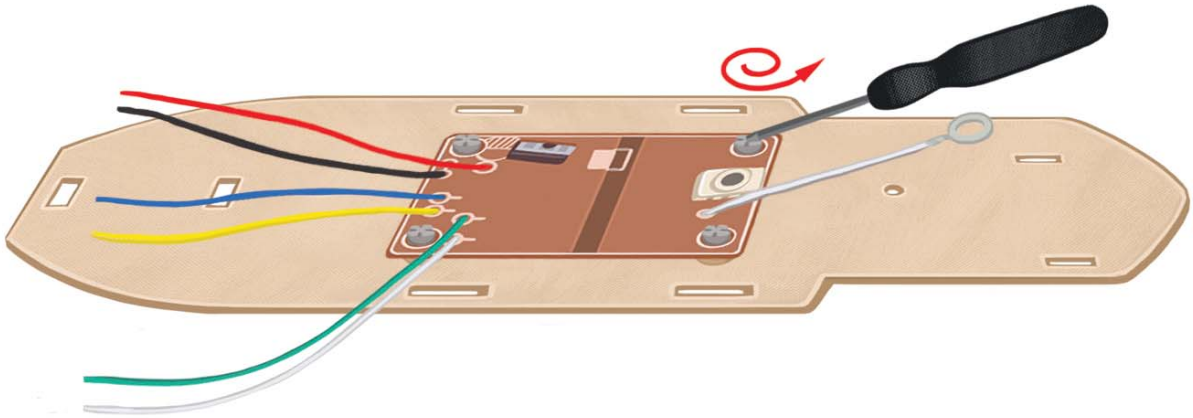
Connect the wires by following the circuit wiring diagram. Install **3 AA** batteries in the battery box.



4

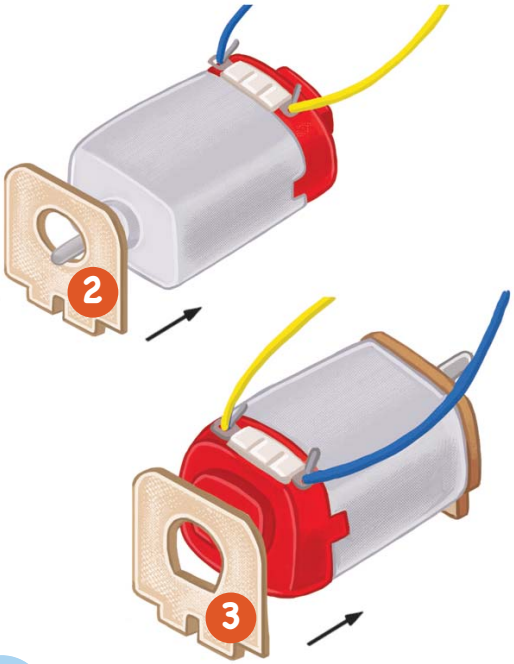
Place the round hole plate and receiving board on the **#1** board with a **10mm screw**. Note that the round hole plate should be in the middle of the receiving board and **#1** board.





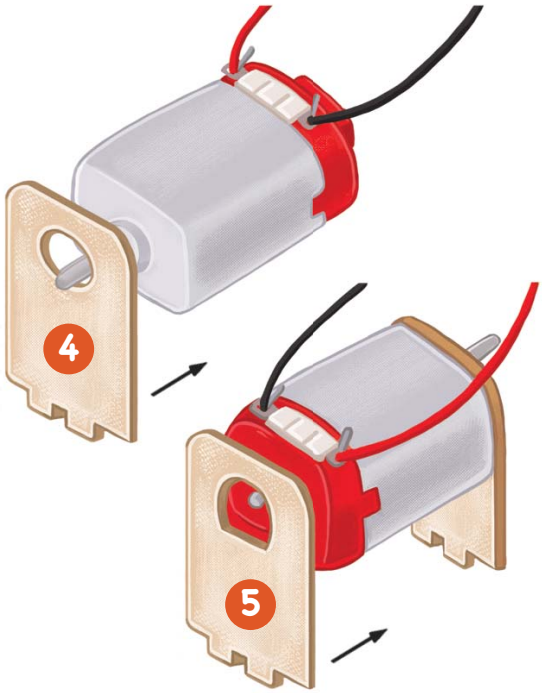
5

Connect the **#2** and **#3** motor boards to the back of the motor.



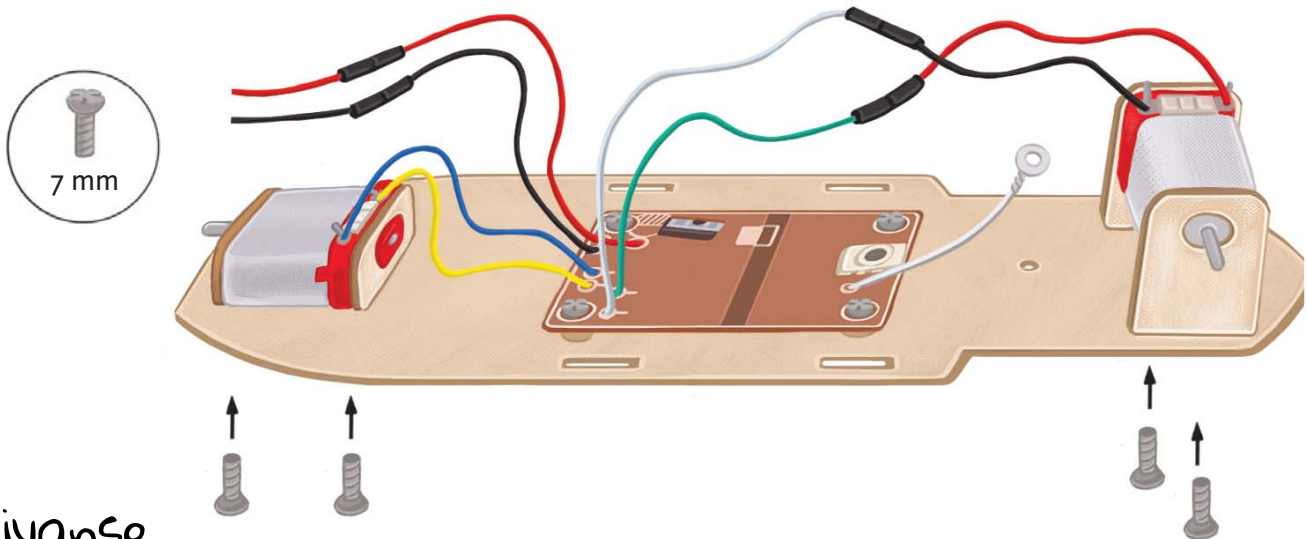
6

Connect the **#4** and **#5** motor boards to the front of the motor.



7

Connect the **#2, #3, #4**, and **#5** motor boards to the **#1** board.



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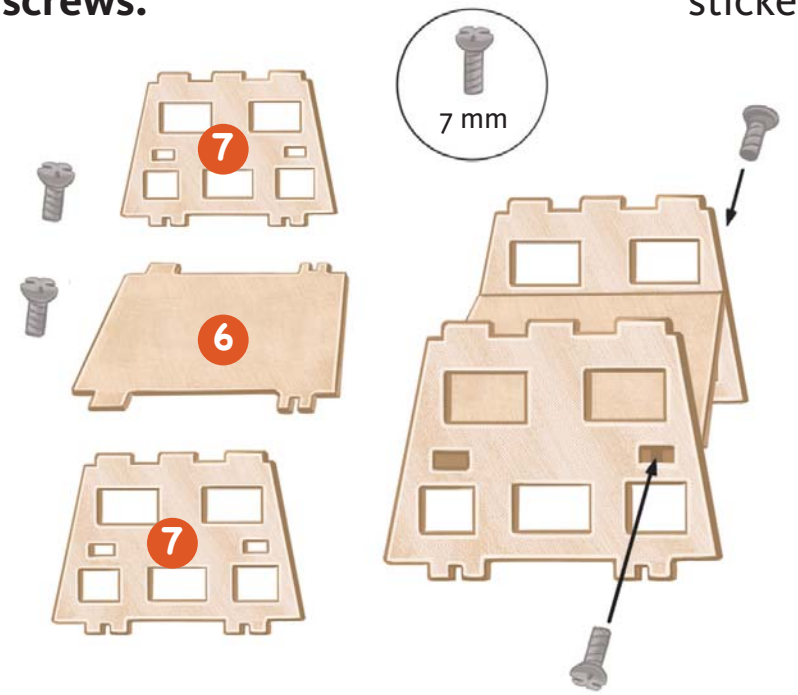
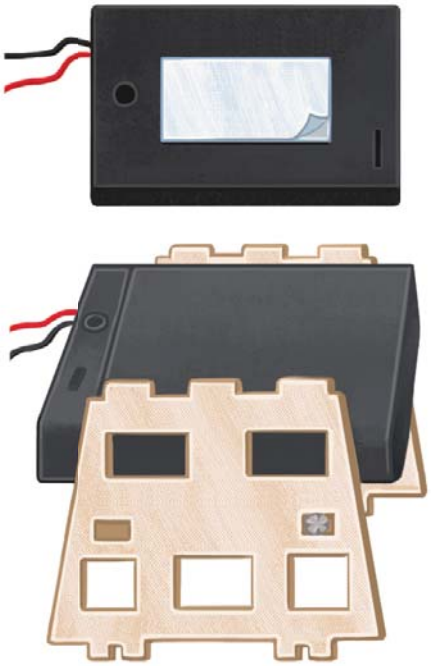
8

Assemble the **#6** and **#7** boards to make a cabin using **7mm screws.**



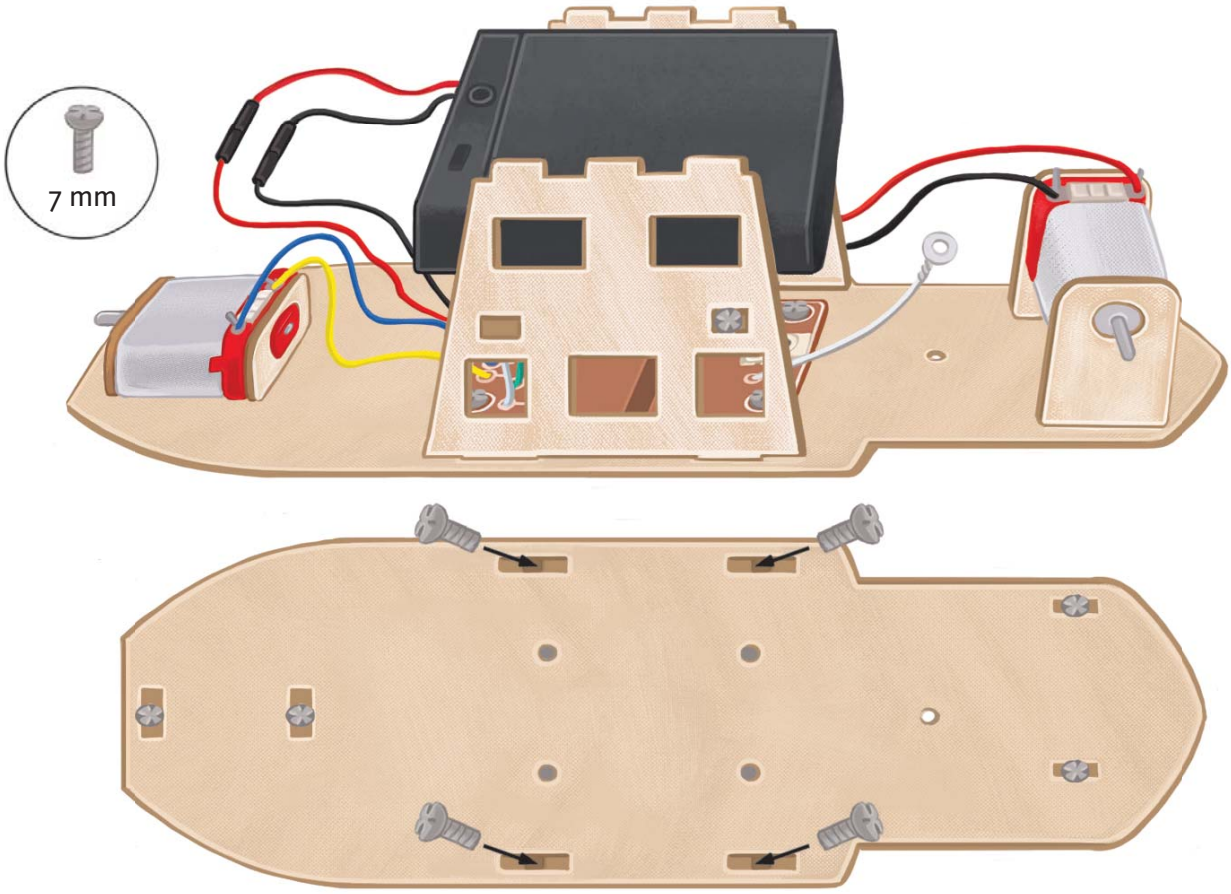
9

Attach the battery box to the **#6** board using a double-sided sticker.



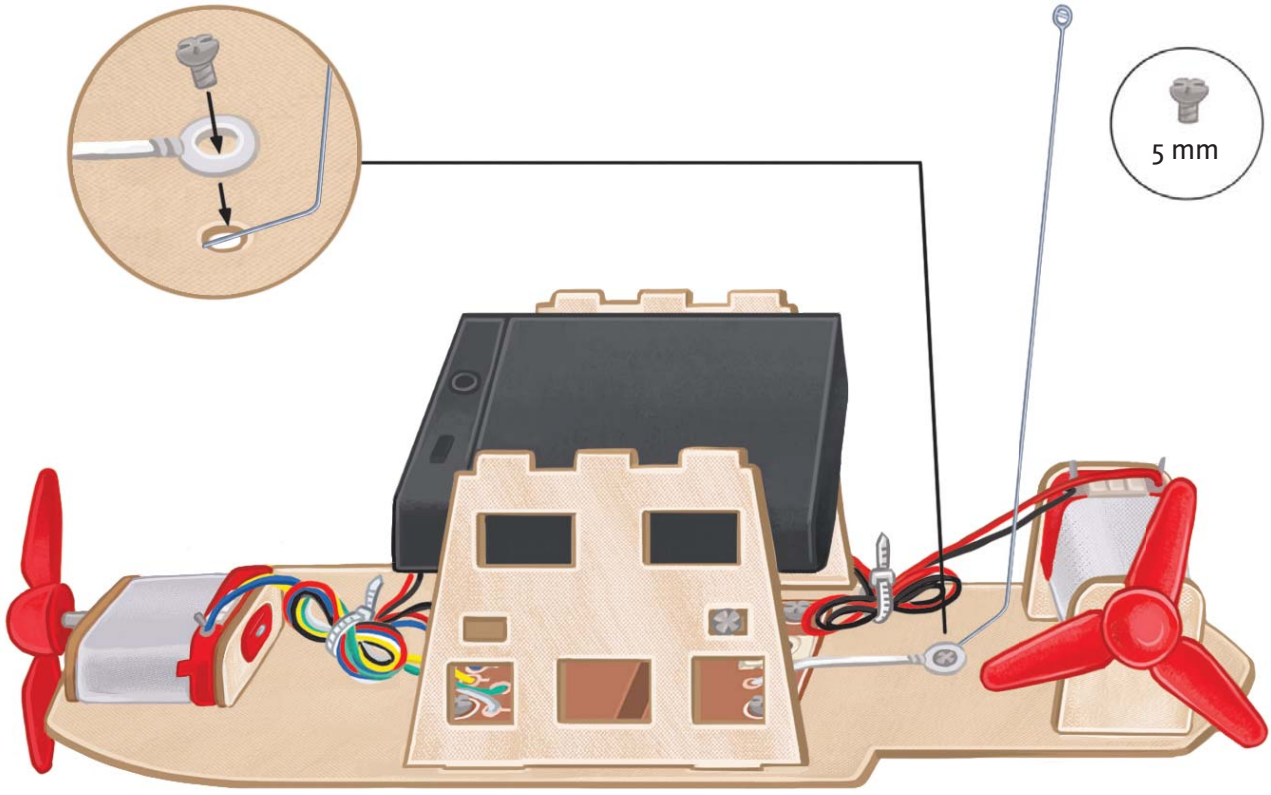
10

Connect the bottom of the cabin to the **#1** board using **7mm screws.**



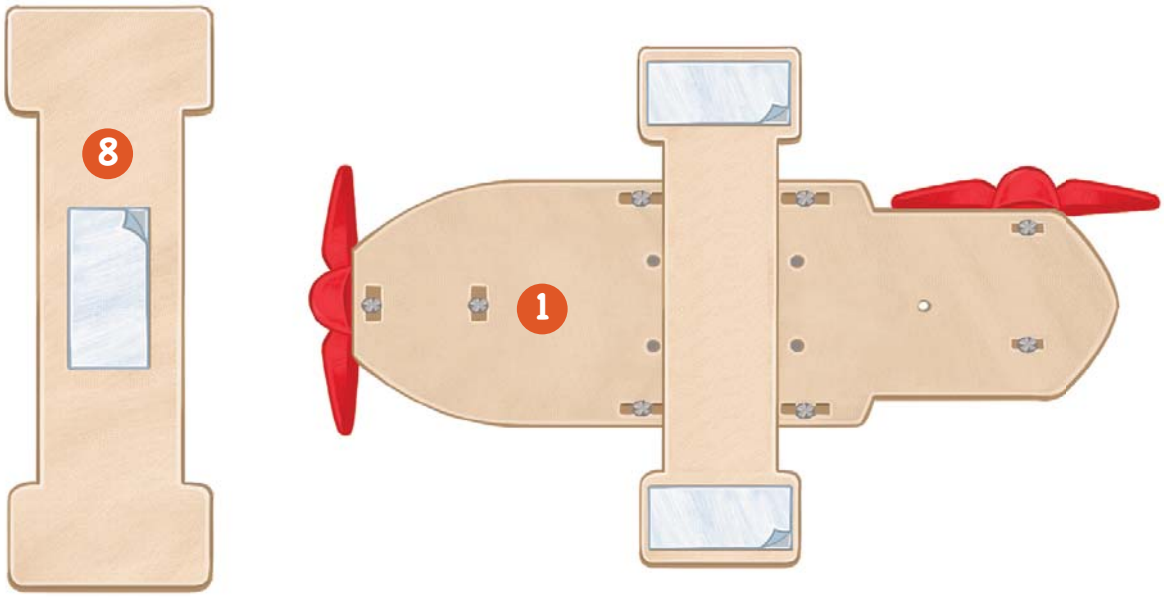
11

Install **the L-shaped antenna** and the top of the white wire to the **#1** board (the white wire should be above the L-shaped antenna), and then fasten the wires in place with **ties**. Put **the red propeller** on the shaft of the motor.



12

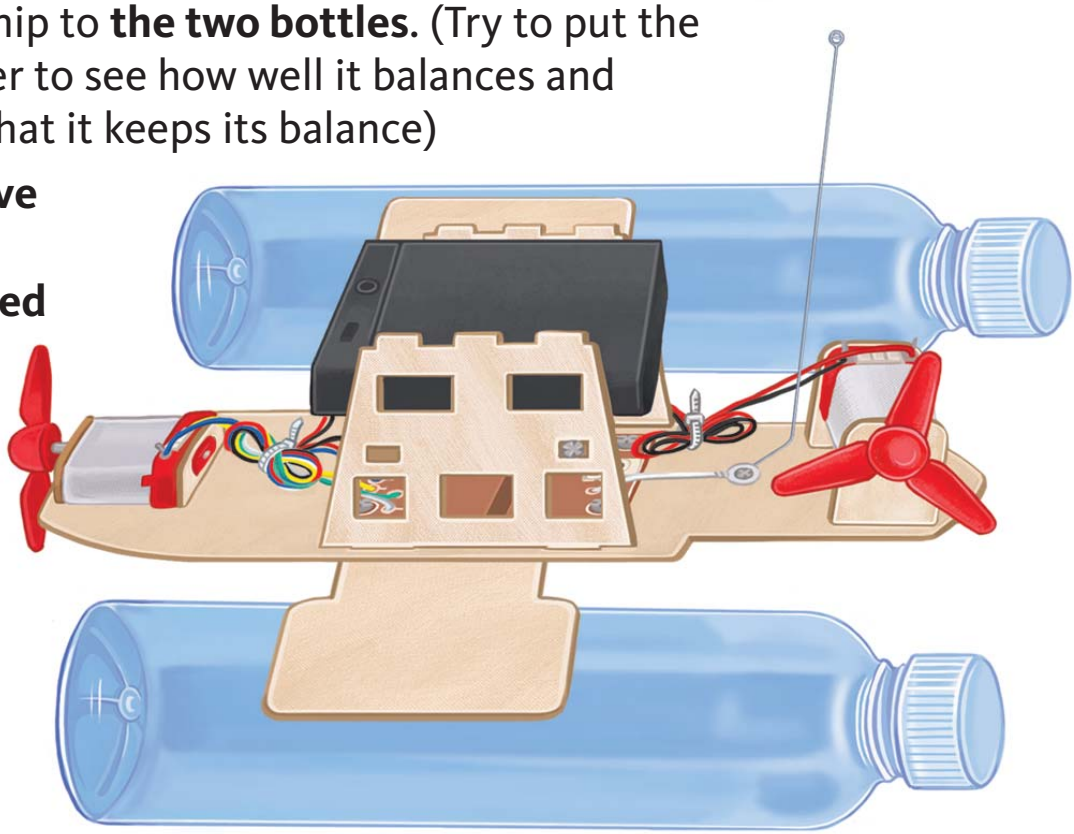
Glue the **#8** board to the **#1** board with **a double-sided sticker** and then put one sticker on each end of the **#8** board.



13

Attach the ship to **the two bottles**. (Try to put the boat on water to see how well it balances and adjust it so that it keeps its balance)

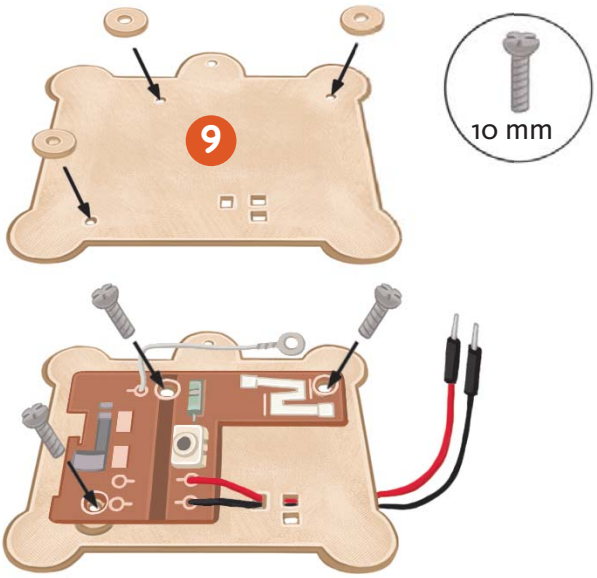
Now you have a functional wind-powered boat!



Build the Remote Control

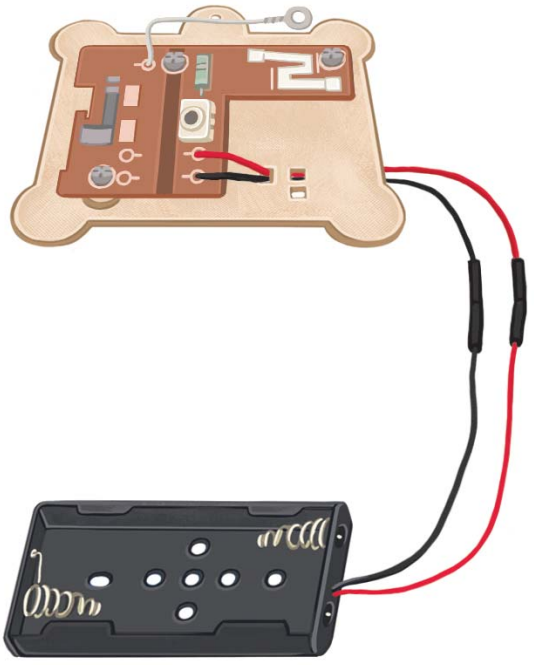
14

Install the remote control board and round hole board on the **#9** board, then insert the wires on the remote control board through the hole in the **#9** board.



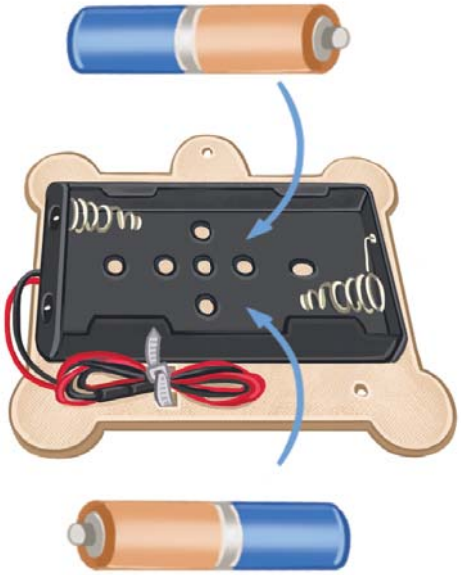
15

Connect the wires **(black to black)** and **(red to red)** .



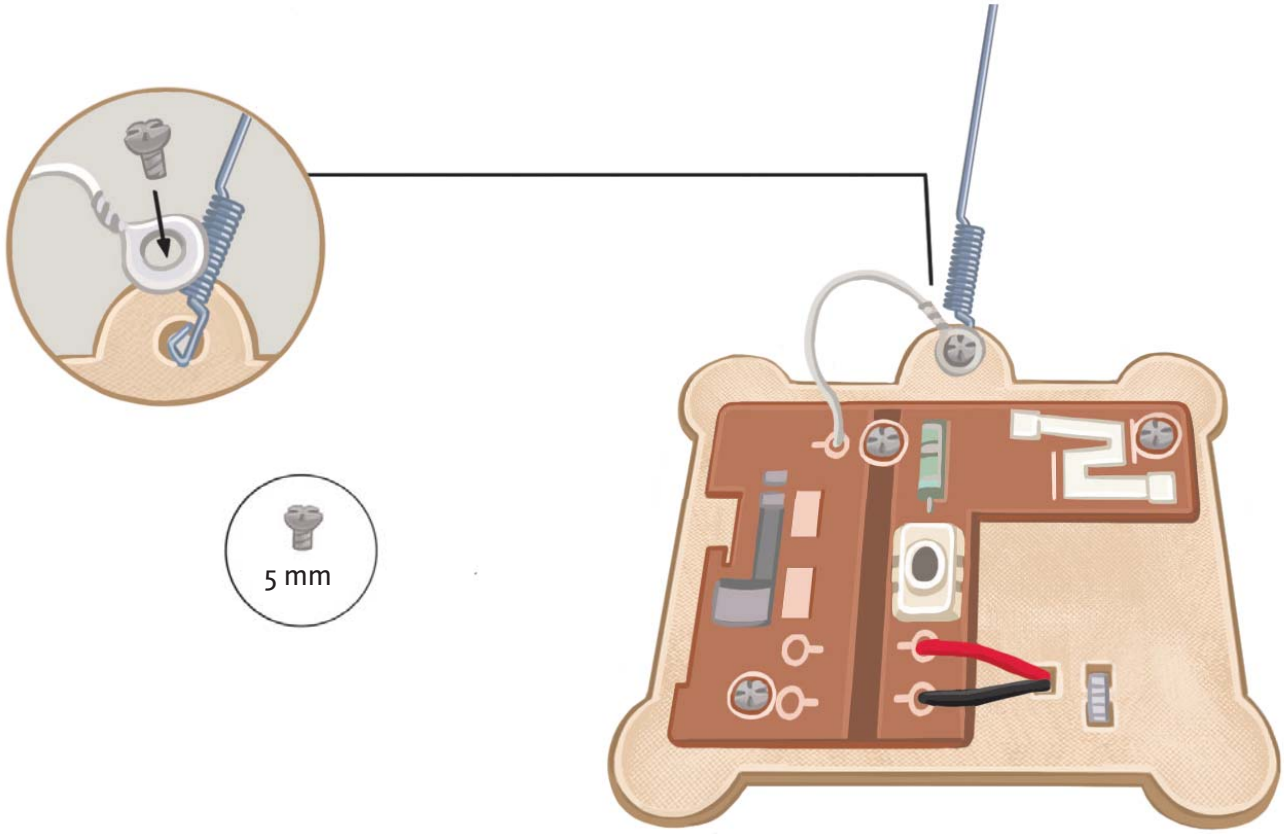
16

Attach the battery box on the **#9** board with double-sided tape and fasten the wires with **the zip tie**. Install **2 AA** batteries in the battery box.



17

Connect **the straight antenna** and the top of the white wire to the **#9** board (the white wire should be above **the straight antenna**)

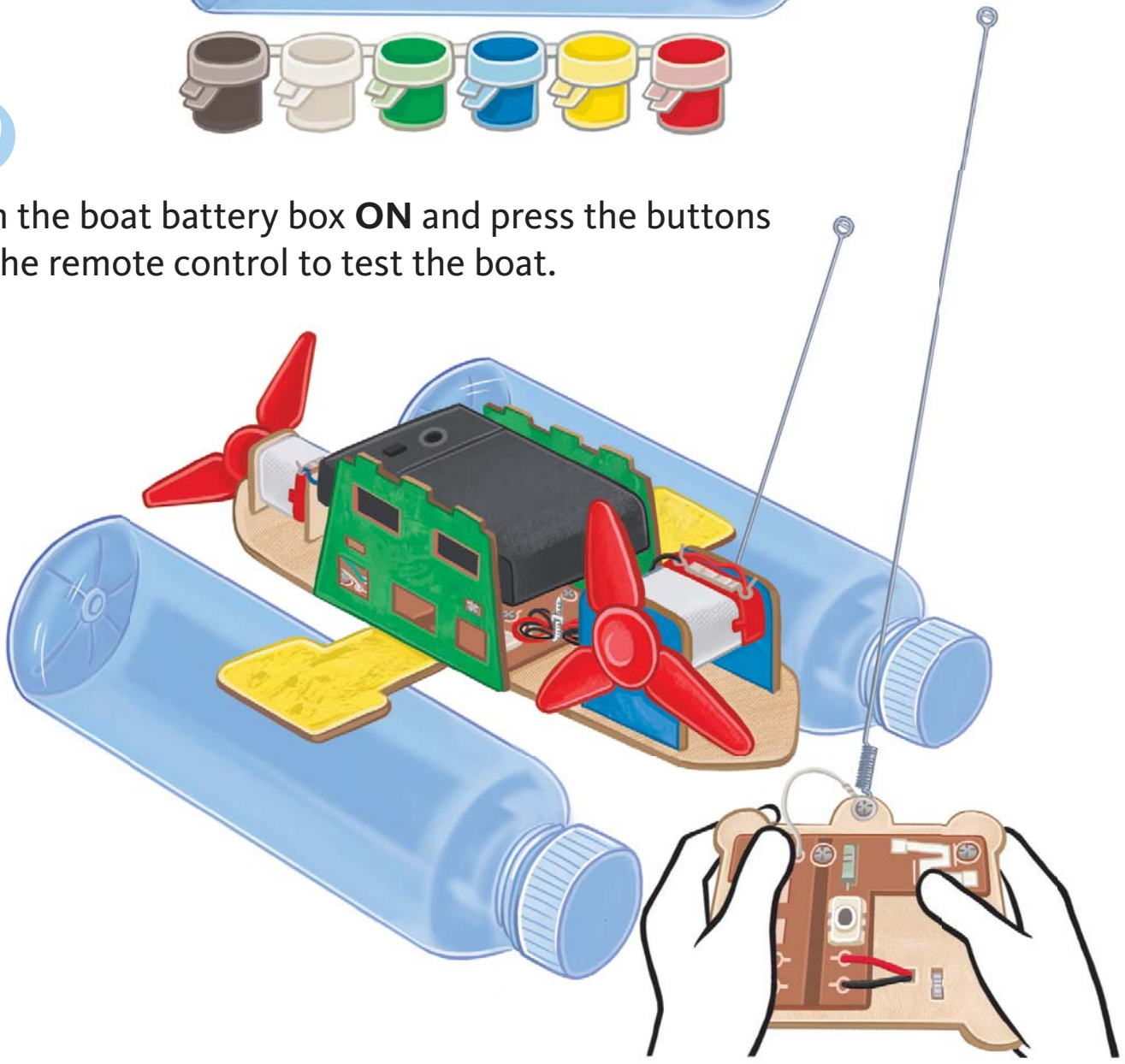


18

Custom-decorate your boat and style it your way using the paint and paintbrush provided.

19

Turn the boat battery box **ON** and press the buttons on the remote control to test the boat.



Q&A

After the boat is assembled, why doesn't it move?

1. You need to use the remote control (hold down the patch button on the remote control), and your hands must not touch the remote control antenna during remote control.

2. Check whether the switch on the battery box is turned on and if the battery is low.

3. Check whether the wires are connected properly and if the connection might be loose.

Consider the environment in which the boat is being used:

You will need a calm water surface, the boat cannot sail in strong wind or rain, the circuit board is not waterproof, and the chip on the circuit board will be damaged if it gets wet.

How far away from the remote control is the boat?

The maximum working distance of the remote control is 25 meters, and the maximum distance during remote control operations should not exceed 25 meters. Between 25 and 30 meters, the boat's movements may not be predictable. If the maximum remote control distance is exceeded, the boat will not be able to return home.

Can multiple remote-controlled boats be controlled separately?

Remote control boats on the same frequency cannot be used together, as they will interfere with each other.

Operating The Boat

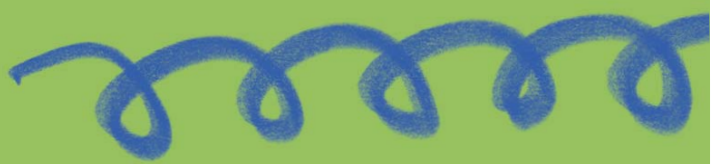
A great place to try out your boat is the bathtub. Fill your bathub halfway, place your boat in the water and make sure it floats. Adjust your boat to be sure it is floating evenly on the water. Flip the power switch on top of the battery box.

Boat Notes:

- Don't submerge the boat. Water can damage the circuitry and the boat may not function.
- Don't touch the remote control antenna while operating the unit.
- Don't try to control two boats at once, as they are operating on the same radio frequency.
- Stay within 25 meters of your boat while operating it; beyond this distance, the remote control may not work.

Using your thumb, depress one of the four silver tabs on the remote control. Which direction does your boat move? Try all four and experiment with operating your boat. What happens when you press one tab on one side of the remote and one tab on the other?

Every great seafaring vessel has a name. Pick one that you like, write it on a note card and tape it to the top of the battery box. S.S. Siyanse Voyager, anyone?



Why and How Boats Float

Your boat is floating on the water. We can say that it is buoyant. **Buoyancy** is the ability of something to float on top of a liquid. It has to do with two characteristics: **density and displacement.**

Density

Density is how heavy something is relative to how much space it takes up.

For example, an empty bottle and a bottle full of sand take up the same amount of space. But the bottle filled with sand is much heavier than the empty one. If we put it in water, it will sink. The empty bottle will float. So we can say that the bottle containing sand is much more dense than the empty bottle.

Displacement

The second thing that influences buoyancy was first discovered by an ancient Greek mathematician called Archimedes. He noticed that every time something is put in water, it has to make room for itself by pushing the water aside as it enters.

So he figured out that if the weight of the object being placed in the water is less that the weight of the water displaced, the object will float. This displacement is known as the Archimedes principle.

For example, if an object like an empty bottle is lighter than the amount of water it displaces, then the object floats. This tends to happen with less dense objects. If an object like the bottle with sand is heavier than the amount of water it displaces (if it's really dense), then it sinks.

How do ships float on water?

You may wonder why a ship, which seems to be so heavy and dense, doesn't sink.

A heavy ship becomes buoyant thanks to its design. How is this possible? First, it is hollow inside, so it is not as dense as you might think. And second, the bottom of the ship is also designed to displace a lot of water. These engineering designs make the ship lighter than the amount of water it displaces so it can float.

Scientists and Engineers all over the world work to make our lives easier. Using what you learned from this project, maybe you can help design a safer and more efficient type of ship!

Congratulations!

You have built a wind-powered boat with wireless remote control. Well done!

Everything is...

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NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to ry to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Model: SYS-BOAT-01
Brand: Siyanse
Responsible Party: Siyanse, LLC
Company Name: Siyanse, LLC
Address: 3246 N. Miami Ave#370892Miami, FL 33137
Tel: (786)-543-8826
E-mail: explore@siyanse.com