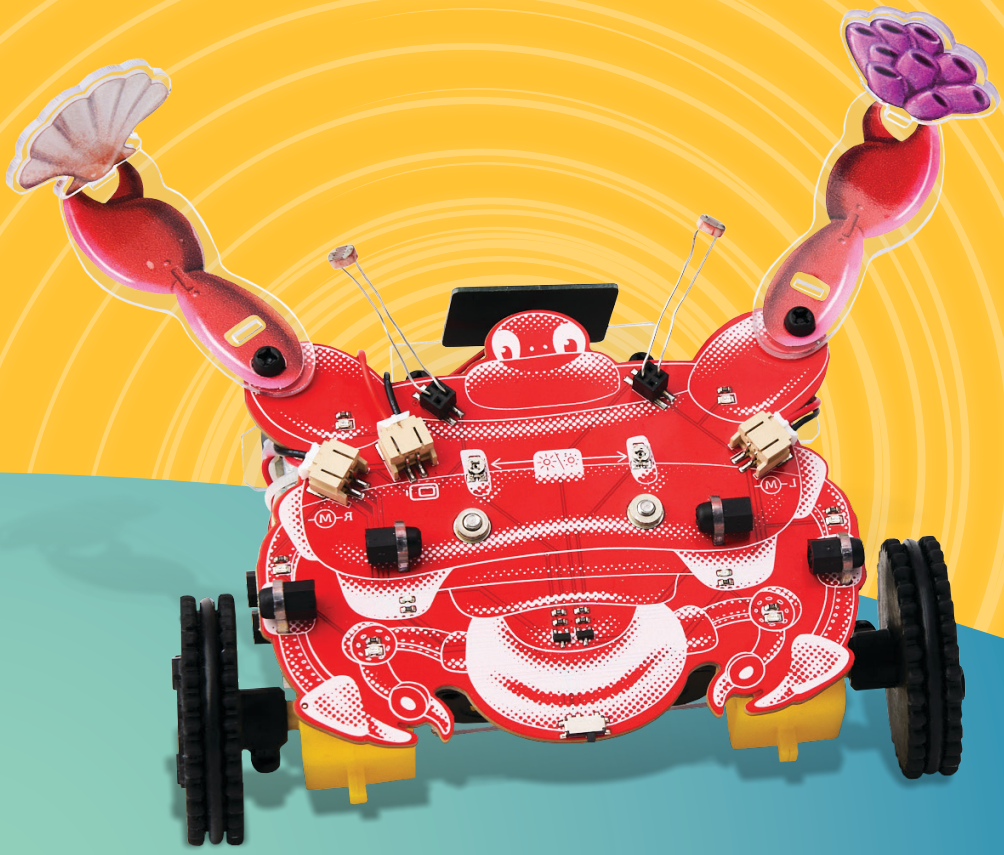
CREATOR'S BOOKLET



DUSTY

CircuitMess

WACKY ROBOTS

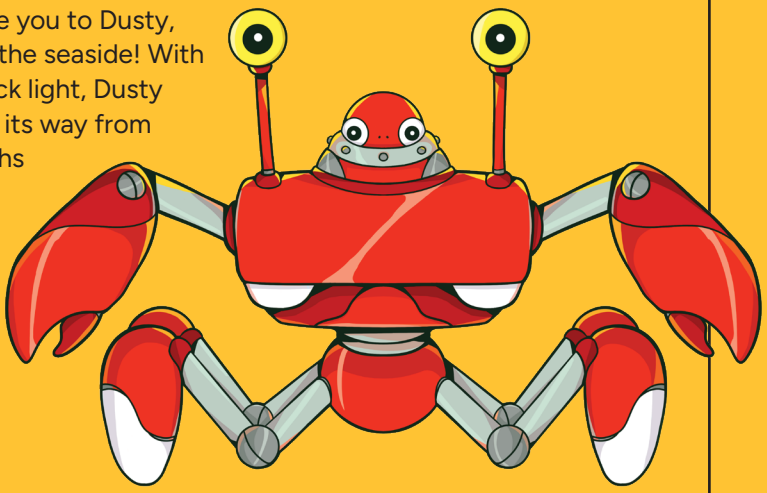
Scan the QR code for instructions in your language

Wacky Robots are a quirky group of mini-robots that will help you master the basics of robotics and electronics.

UNLOCK ALL VIDEO GAMES

Meet Dusty

Let us introduce you to Dusty, the robot from the seaside! With its ability to track light, Dusty will quickly find its way from the ocean depths to the surface.



How does it work?

- Follow the guides and assemble your Dusty
- Find out how transistors and photoresistors work
- Take Dusty for a walk and have some fun following the light

What is CircuitMess?

CircuitMess started in 2016 when Albert (our CEO) was 17 years old.

Albert loved tinkering with electronics and one of his first projects was a DIY game console.

People really liked the idea so he decided to launch it on Kickstarter where it raised $100,745!

After that, CircuitMess was born. We are a small and fast–growing team of tech lovers who wish to share our love of creating new technology with the rest of the world!

Behind the name

CircuitMess

a reference to electronic circuits

what best describes our workplace

All of our kits are designed, manufactured, and packed in Croatia!

The mission

Everybody knows how important technology is, but less than 1% of the population knows

HOW TO MAKE

new technology.

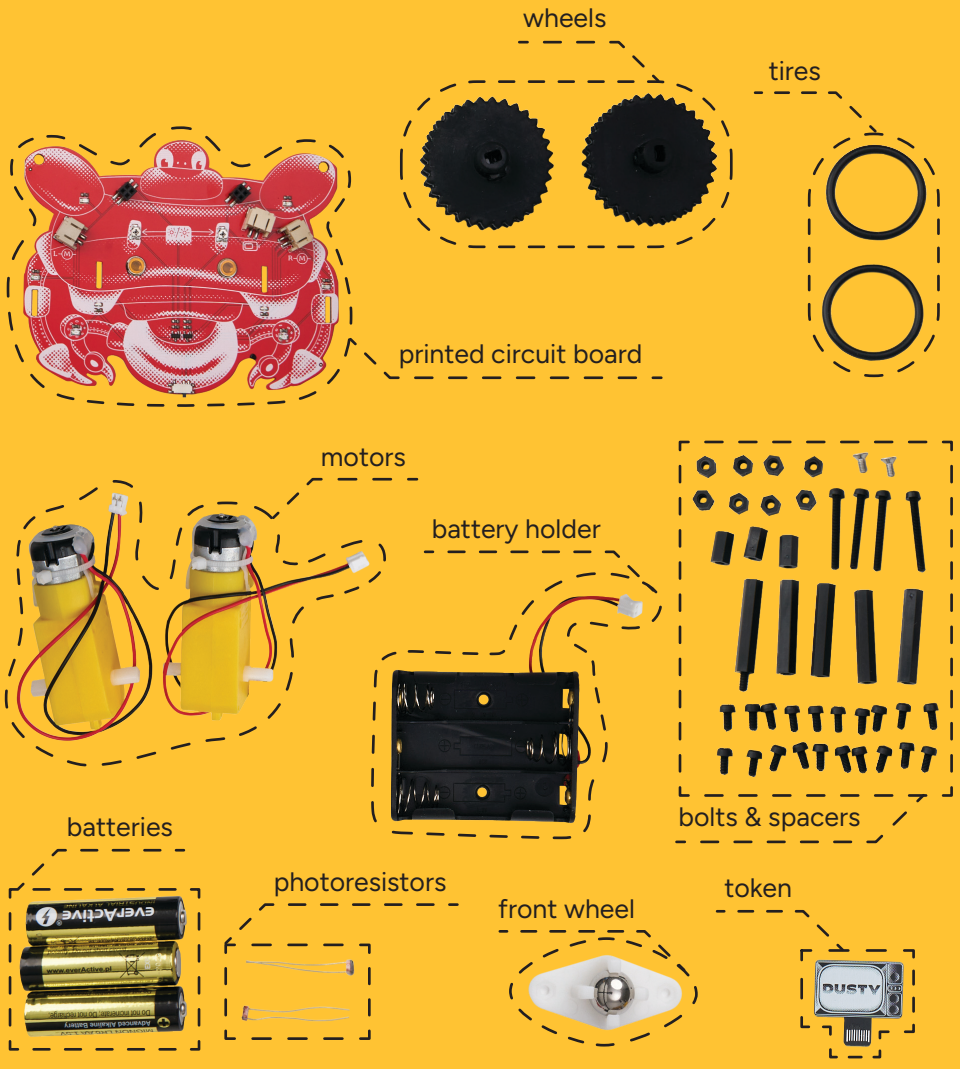
We're here to change that! With our kits, we want to inspire people to be

CREATORS

instead of just consumers.

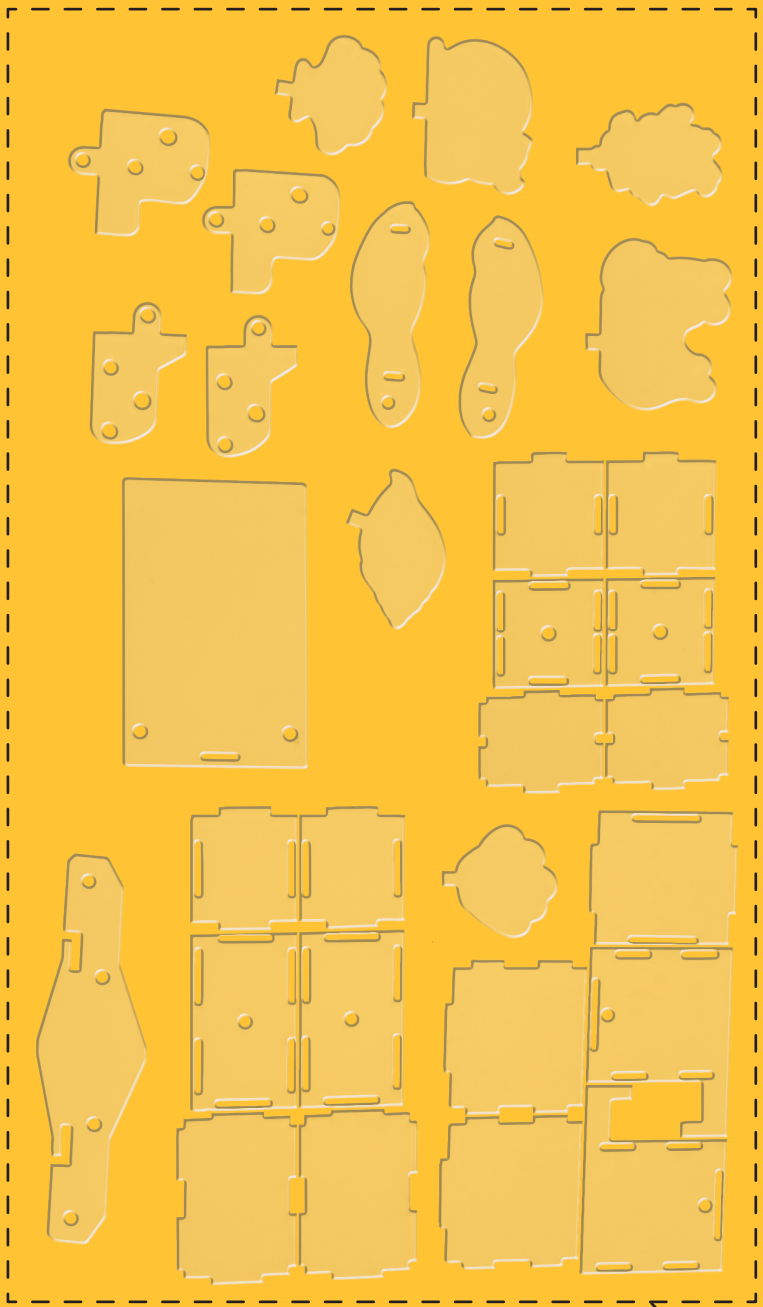
CircuitMess
BiT
CircuitMess
STEM
BUILD YOUR
OWN GAME
CONSOLE!
BiT
7+
LEARN THE BASICS
OF CODING
& ROBOTICS!
CONNECT IT WITH
WACKY ROBOTS
See it in action!
ROBBY

What's inside the box?



You'll learn about

- Transistors
- Photoresistors & their sensitivity

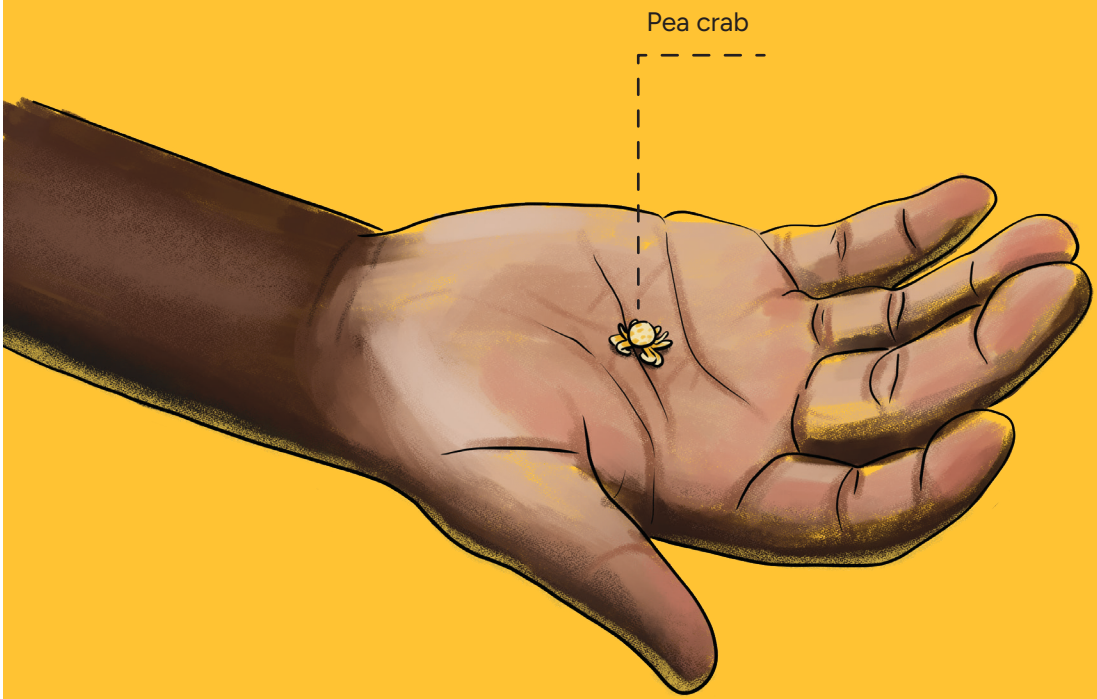


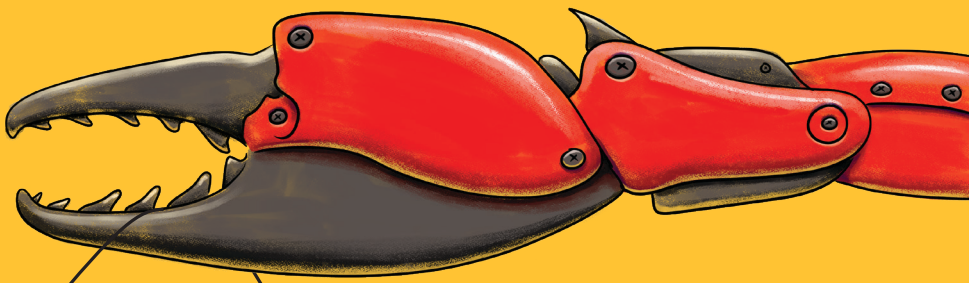
plexiglass parts

Did you know your Dusty is a mechanical crab?

Crabs are incredible animals that inhabit various environments worldwide. While many live in the **ocean,** you can also find them in **freshwater** and even on **land.**

Crabs come in all shapes and sizes. Some, like the **Pea Crab,** are tiny, while others, like the **Japanese spider crab,** can grow to be enormous. In fact, the Japanese spider crab boasts the largest leg span of any known arthropod (insects, spiders, crabs, and centipedes), reaching up to **3.7 meters (12.1 feet),** with bodies that can measure up to **40 centimeters (16 inches)** across.





Just like your Dusty, crabs typically have **two pincers** at the front of their bodies. These pincers serve various purposes, including **grabbing food, defending themselves, and communicating with other crabs.**

While your Dusty doesn't require food, real crabs are **omnivores,** which means they eat a variety of foods, including plants and other animals, in their natural habitats.

Biomimetics

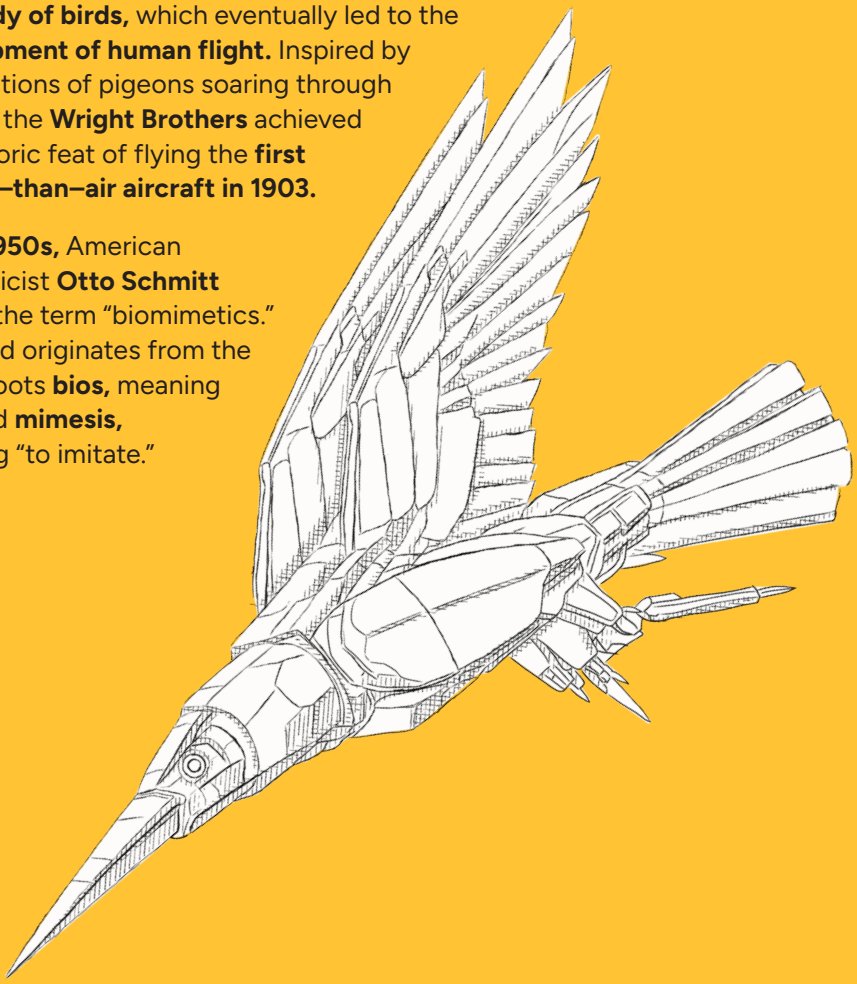
Innovation inspired by nature

Imagine taking inspiration from real–life creatures like crabs to build your very own DIY robot, just like Dusty! Well, scientists have been doing exactly that for centuries, drawing ideas from nature to solve complex human problems.

This fascinating process is called **biomimetics.** It involves studying the models, systems, and elements found in nature and applying them to human innovations.

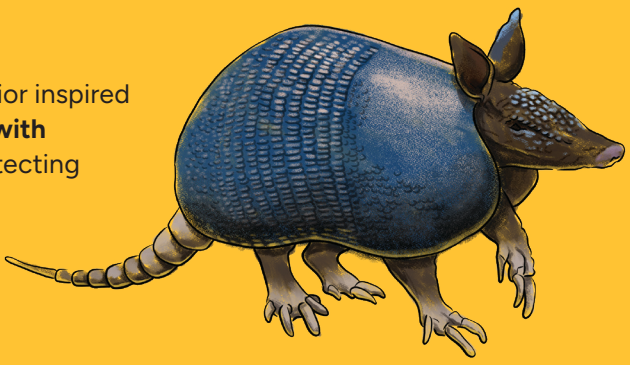
One of the earliest examples of biomimetics was the **study of birds,** which eventually led to the **development of human flight.** Inspired by observations of pigeons soaring through the sky, the **Wright Brothers** achieved the historic feat of flying the **first heavier–than–air aircraft in 1903.**

In the **1950s,** American biophysicist **Otto Schmitt** coined the term "biomimetics." The word originates from the Greek roots **bios,** meaning "life," and **mimesis,** meaning "to imitate."



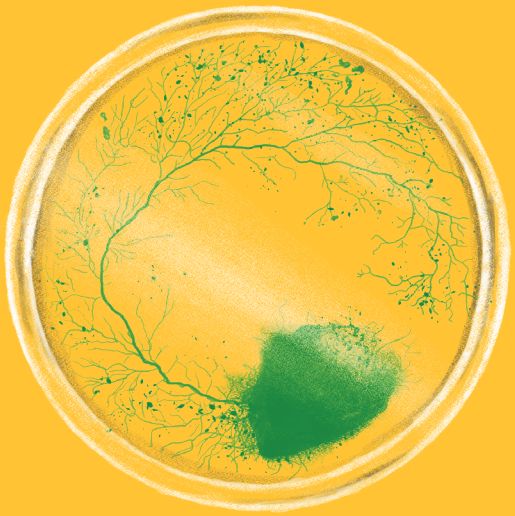
What are some of the coolest inventions we've gained from nature's inspiration?

The **armadillo's** tough exterior inspired the creation of **backpacks with hard shells,** perfect for protecting items from being squished.



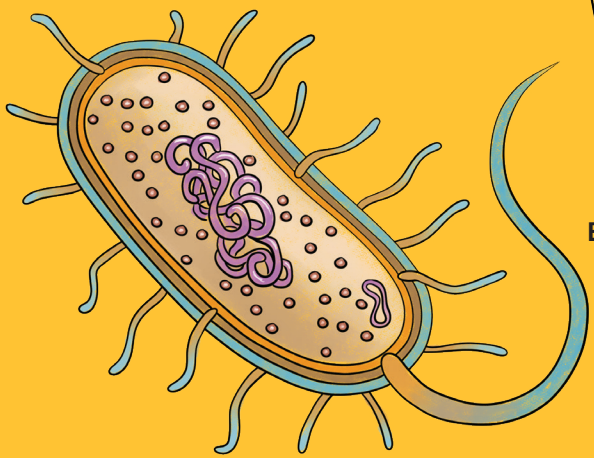
The **cocklebur plant's** clinging mechanism gave rise to **Velcro,** revolutionizing fastening systems.

By studying **prairie ecosystems,** we've learned valuable lessons in **sustainable agriculture** on a large scale.



Slime mold has shown us efficient ways to **map out cities, roads, and rail systems** quickly and adaptively.

The **mosquito's** painless bite has inspired the design of **less painful needles** for medical procedures.



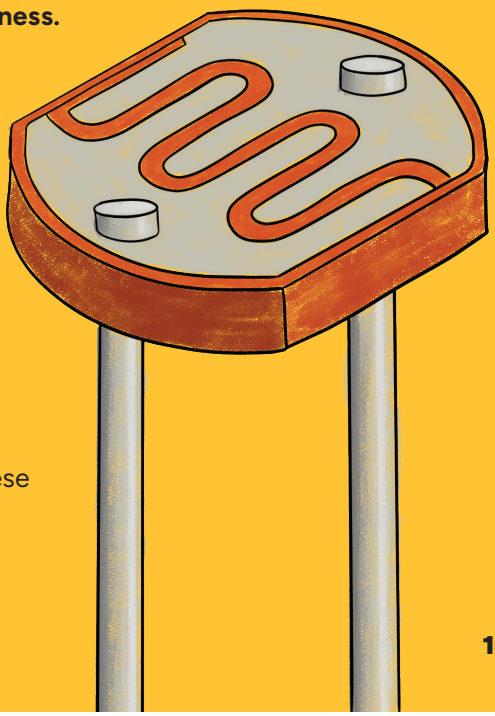
Bacillus bacteria has inspired the development of **self–repairing concrete.**

Shedding Light on Photoresistors!

Let's learn about an important technical component on your mechanical crab — **photoresistors!**

Photoresistors are electronic parts that **change their resistance based on how much light they receive.** On Dusty, we use them to help the crab follow light sources.

Understanding the exact resistance of a photoresistor can be tricky because it depends on the amount of light it receives. But here's a handy tip: **in bright light, the resistance is low, and it increases in darkness.**

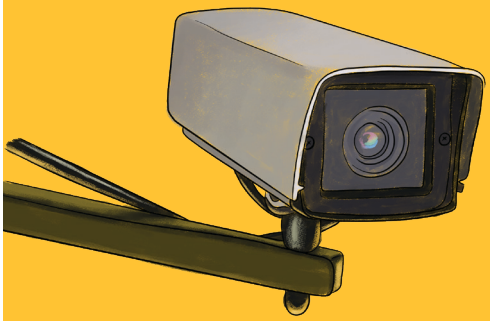


Photoresistors come in various types, and the great thing is they're **not polarized.** That means unlike LEDs, where we have to worry about positive (+) and negative (–) sides, photoresistors work regardless of orientation.

The concept of photoresistors traces back to the discovery of **photoconductivity** in Selenium way back in **1873.** Scientists found that certain materials behaved differently when exposed to light. They discovered that these materials' electrical conductivity changes when illuminated, laying the groundwork for the invention of photoresistors.

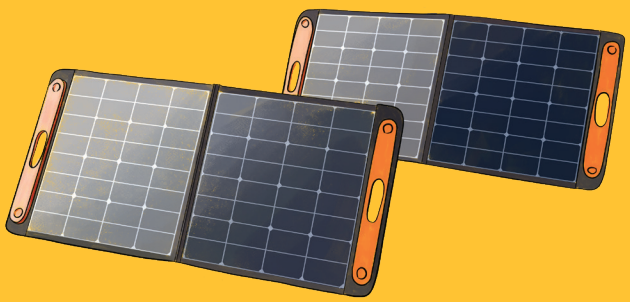
Where do we find photoresistors in use today?

Automatic lighting control systems, like street lights and yard lights.



Security systems that detect changes in light conditions.

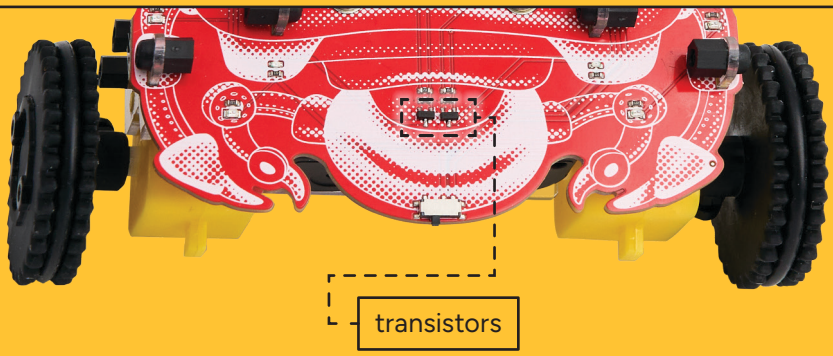
Solar–powered devices that harness light energy for power.



Window blinds that adjust based on the amount of sunlight.

Tiny Titans: Transistors

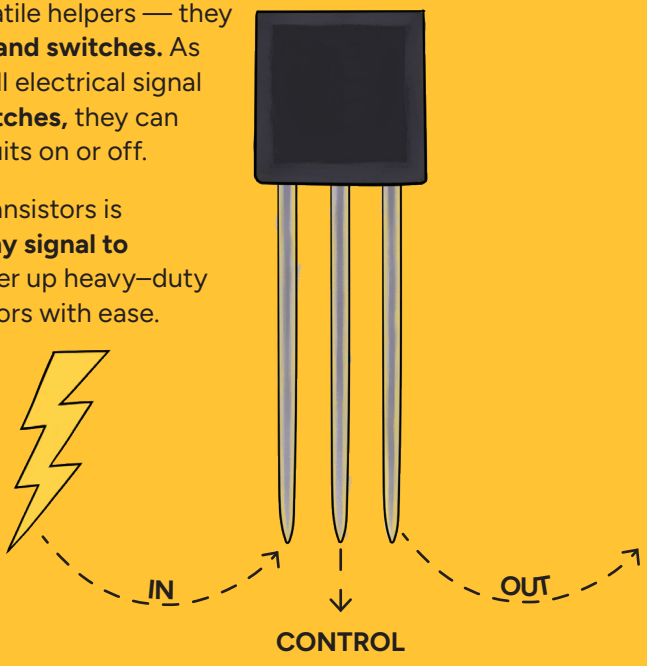
Let's explore another essential component of Dusty — **the transistor!**



Transistors might be **tiny,** but they play a huge role in controlling and amplifying electrical signals in Dusty's circuits. They're like miniature gatekeepers, regulating the flow of electricity to make Dusty move and react.

Think of transistors as versatile helpers — they can act as both **amplifiers and switches.** As **amplifiers,** they turn a small electrical signal into a stronger one. As **switches,** they can swiftly turn electronic circuits on or off.

What's really neat about transistors is how **they require only a tiny signal to activate,** yet they can power up heavy–duty devices like lamps and motors with ease.



You'll find transistors **packed into all sorts of gadgets,** from MP3 players to smartphones and electronic games. They're powering the technology we use every day.

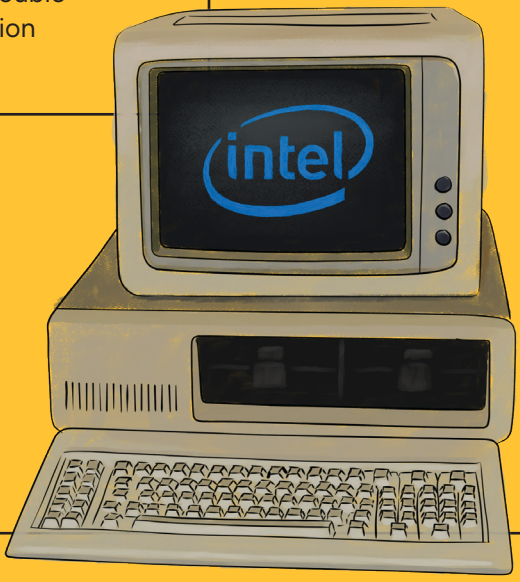
Before transistors came along, people relied on bulky **vacuum tubes,** which were less efficient and consumed a lot of power. Transistors changed the game by lasting longer, being more energy–efficient, and costing less.

Here are some fun facts about transistors

Scientists John **Bardeen,** Walter **Brattain,** and William **Shockley** won the **Nobel Prize for Chemistry** in **1956** for inventing the transistor.

The **first commercial** device to use transistors was the **Sonotone 1010 hearing aid.**

Gordon Moore, a co–founder of Intel, predicted that the number of transistors on a chip would double every two years. This prediction is known as **Moore's Law.**



Computers rely heavily on transistors. In fact, the first Intel computer had **2,300** transistors, while the latest models boast a staggering **820 million!**

Quiz time!

We hope you enjoyed reading the text we prepared for you! Now, let's put your knowledge to the test. Don't worry if you can't remember something — you can always go back and refresh your memory in the text.

Trivia

1. What did Gordon Moore predict about transistors in what's known as Moore's Law?

2. What happens to the resistance of a photoresistor when it's exposed to bright light?

3. What is biomimetics, and how does it inspire innovation?

4. What was the first commercial device to use transistors?

5. Which plant's clinging mechanism gave rise to Velcro?

Nature–Inspired Invention Matching Game

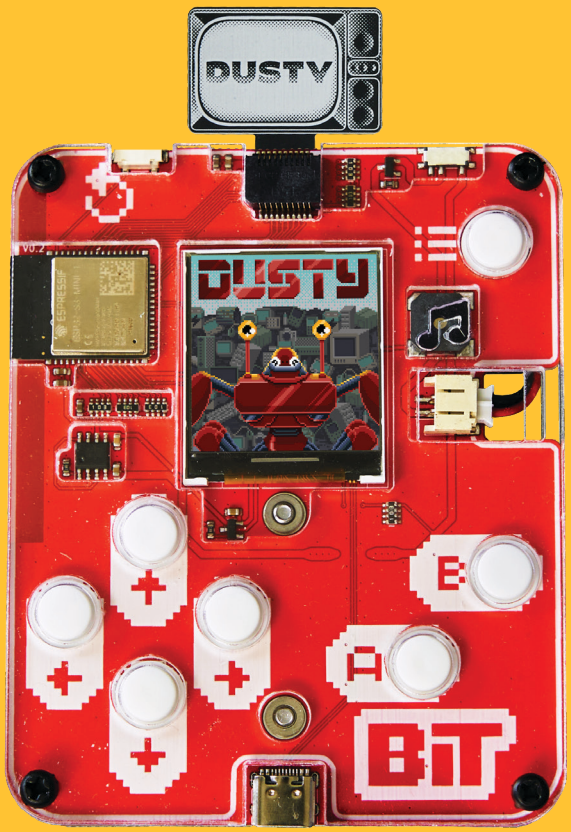
Objective: Match the nature–inspired inventions with their descriptions or real–life inspirations.

Test your knowledge and see how many matches you can make!

Mosquito	City mapping
Bacteria	Plane
Slime Mold	Backpacks
Armadillo	Self–repairing concrete
Prairie ecosystem	Less painful needles
Bird flight	Sustainable agriculture

Playing games!

Now that you know everything about your Dusty, there's one more exciting thing to mention: along with Dusty, you received a small token.



"But what's it for?" you might wonder.

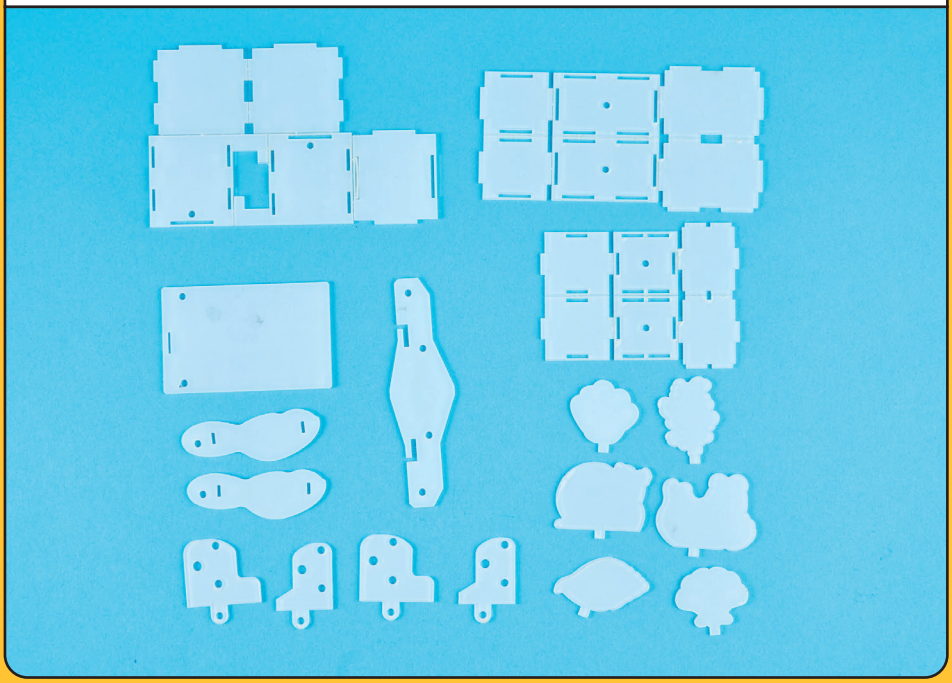
Well, here's the scoop: you can use that token to unlock a super cool new game on our gaming device called Bit.

Please note: Dusty and Bit are sold separately.

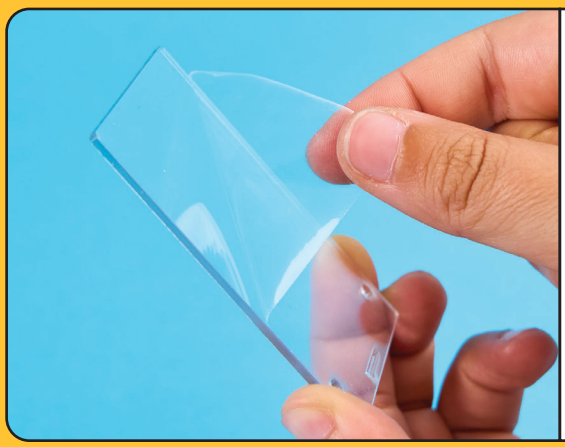
Welcome to the Dusty build guide!

Ready to build your very own Dusty robot? Follow these fun and easy steps to bring Dusty to life!

Let's start by getting your **acrylic casings** ready.



Carefully peel off the protective foil from **both sides** of each casing so they are clear and shiny.

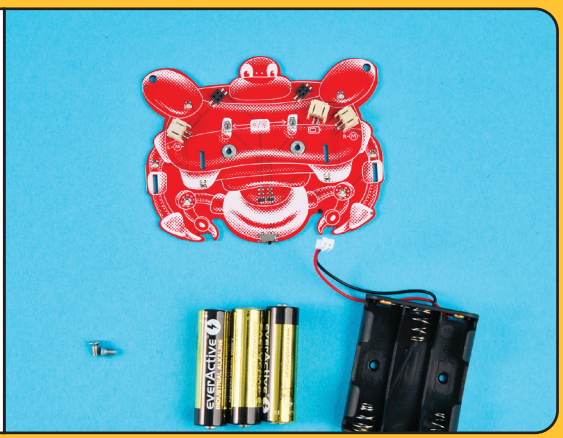


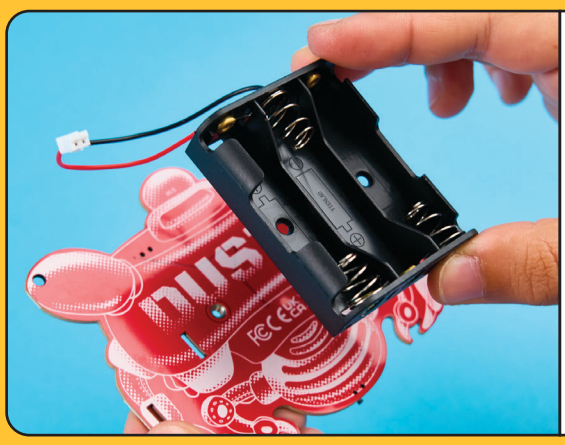
Wow, look how shiny they are now!

Let's transform into real engineers now!

The first step is to **connect the battery holder to the PCB** and **insert the batteries** into the holder.

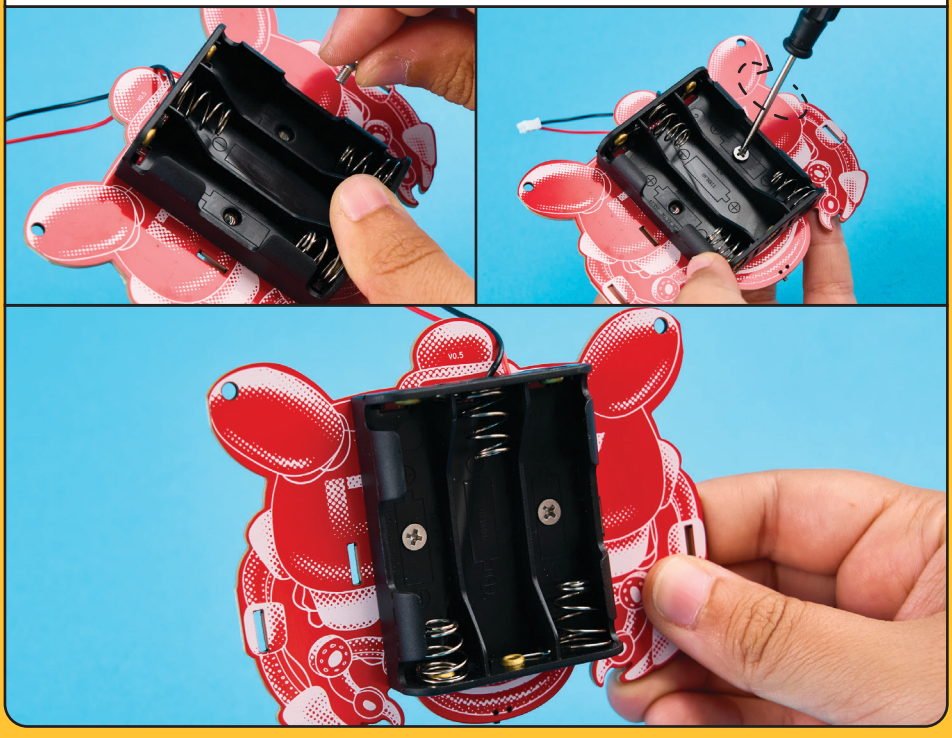
For this step, you'll need the following components:



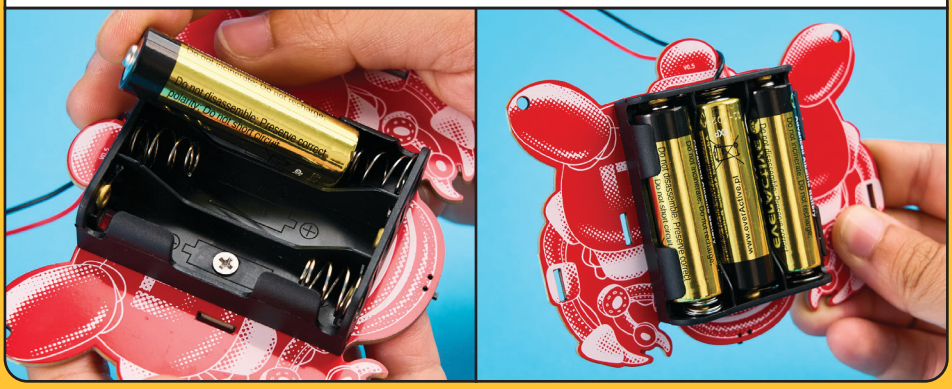


Place the battery holder onto the PCB as shown in the photo. Ensure that **the wire from the battery holder is positioned on the upper side of the PCB.**

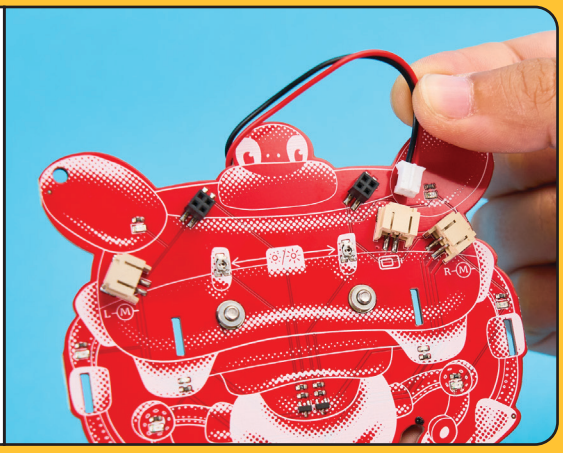
Take the metal screws and a screwdriver, and fasten the battery holder to the PCB.



Next, **add the batteries** to the holder. Be **careful** to put the batteries in the right way. Inside the battery holder, there are **+** and **– signs** indicating the correct **polarity.** The same **+** and **– signs** can be found on each battery.



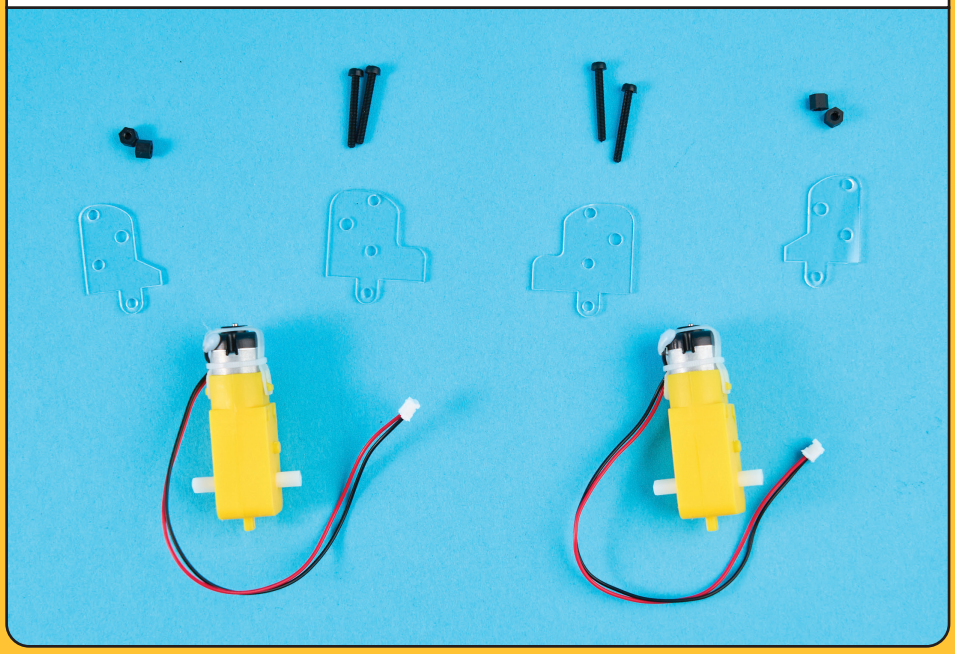
Now we can connect the wire from the battery holder to the PCB. You'll notice that each connector is labeled to help you — **look for the "M" sign for the motors and the "battery" sign for the battery holder.**



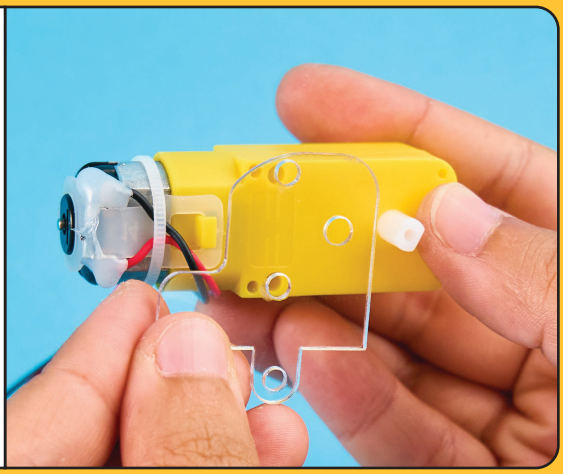
Now, let's start working on the **motors.** This is a more complex part, so **we'll need your full attention.**

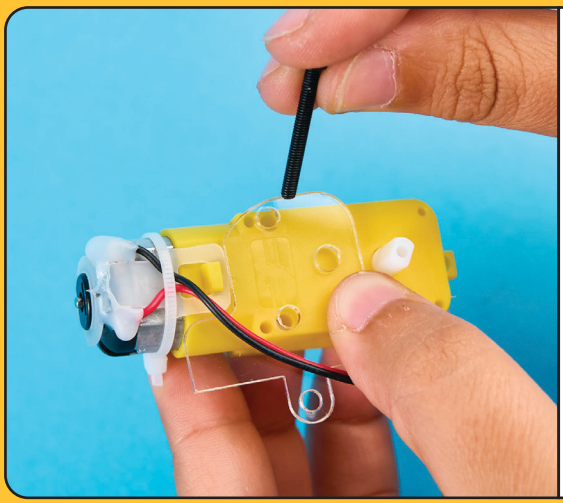
Gather both motors, the casings shown in the photo, four long bolts, and four small spacers.

To ensure everything is correctly positioned, **arrange all the components as shown in the photo below.**



Place the motor on the casing as shown. **You'll notice how every part of the motor aligns with the casing when positioned correctly.**

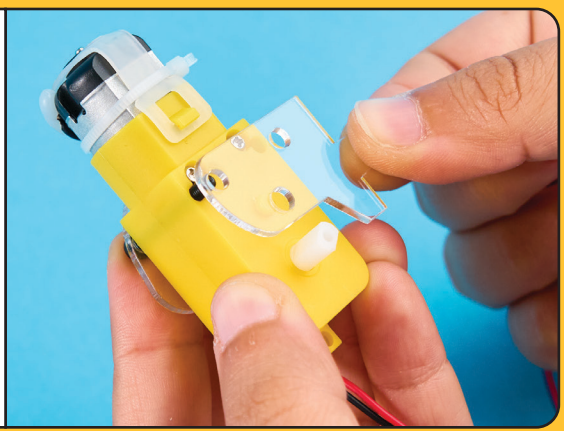




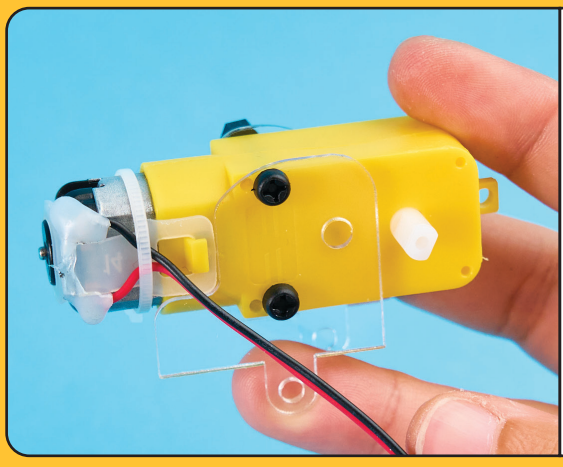
Insert the **slightly larger casings** from the **inside** of each motor.

Take one **long bolt** and thread it **through the casing and motor** so it comes out on the other side.

On the **outside of the motor,** place a **smaller casing** in the **opposite direction** from the first casing.



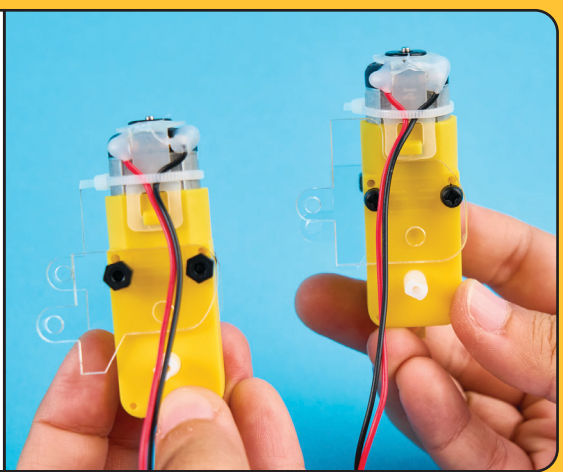
Secure the casings and the motor with the **spacer** from the **outside.**



Repeat this step for the remaining bolt and spacer.

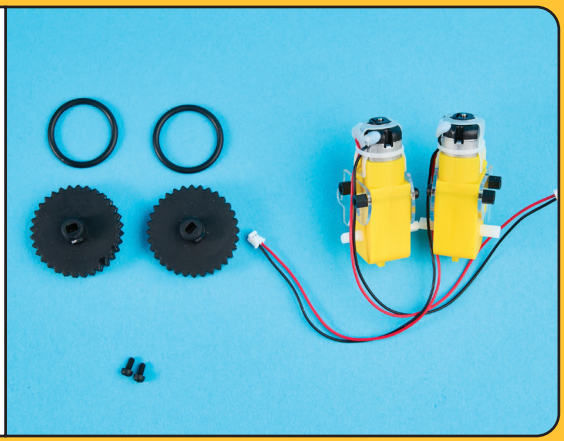
Now take the **second motor** shown in the photo on the left side, which has a wire going to the outside.

Remember, one motor should have the larger casing where its wire is, and the second motor should have the smaller one.



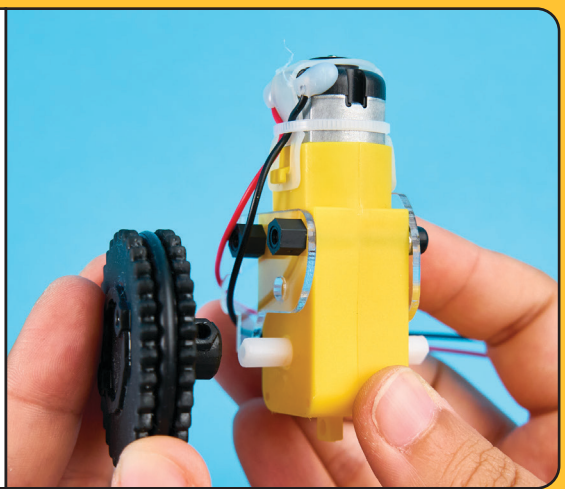
Now, let's **attach the wheels to the motors.**

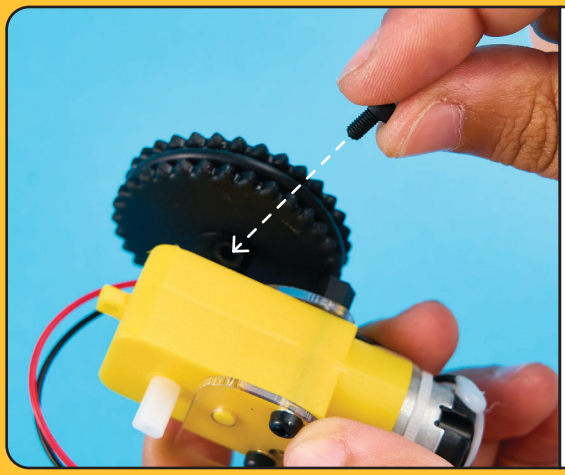
Take these parts:



The first step is to **place the rubber tires onto the wheels.**

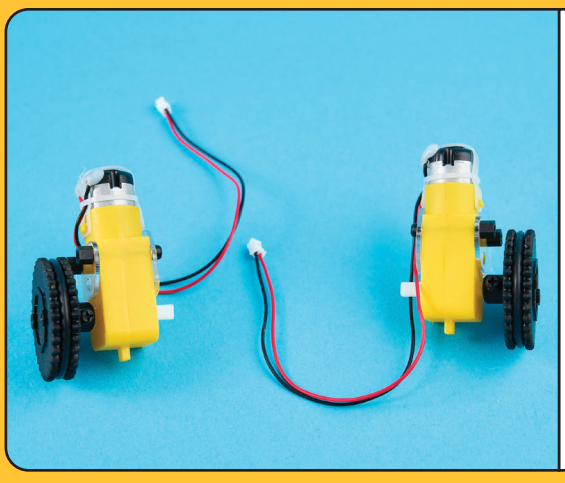
Attach the wheels to the motors from the outside (where the **smaller casing** is located) as shown in the photo.





Take a black plastic bolt and insert it into the designated place on the wheel to secure it in place and prevent it from falling off.

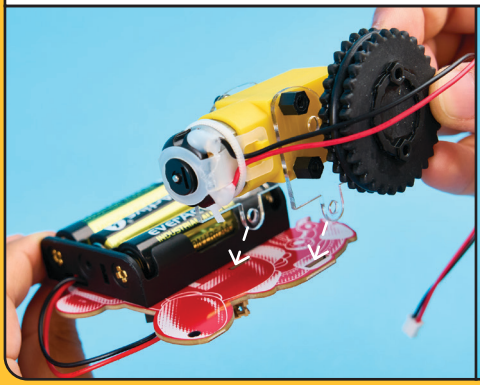
You'll need a **screwdriver** to assist you with this step.



Repeat the same step for the **second motor** as well.

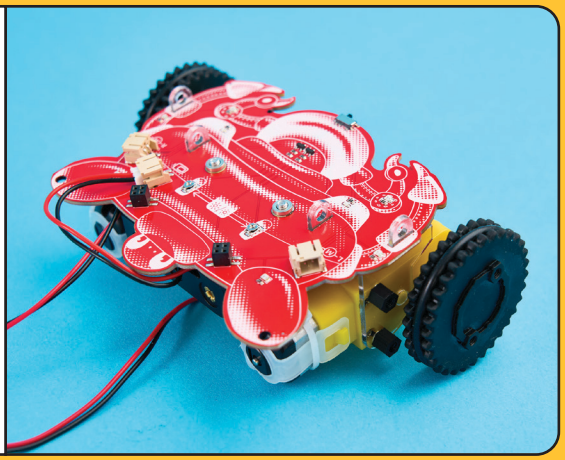
Now it's time to attach these parts to the PCB. You'll notice small **cutouts on the side of the PCB** designed for **inserting the motor casings.**

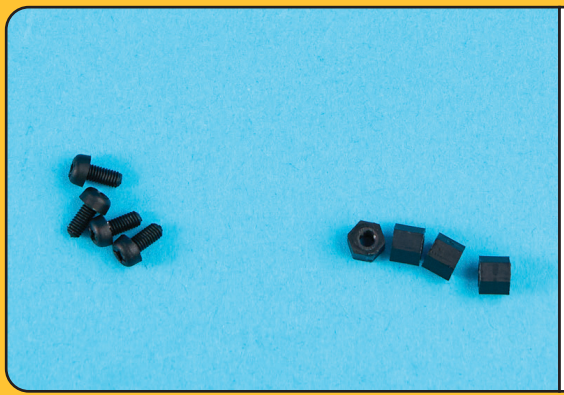
You might need a bit of strength to insert the casings into the PCB.



As you can see, the wires of the motors are on the upper side, just like the battery holder.

Repeat the step for the second motor and wheel.

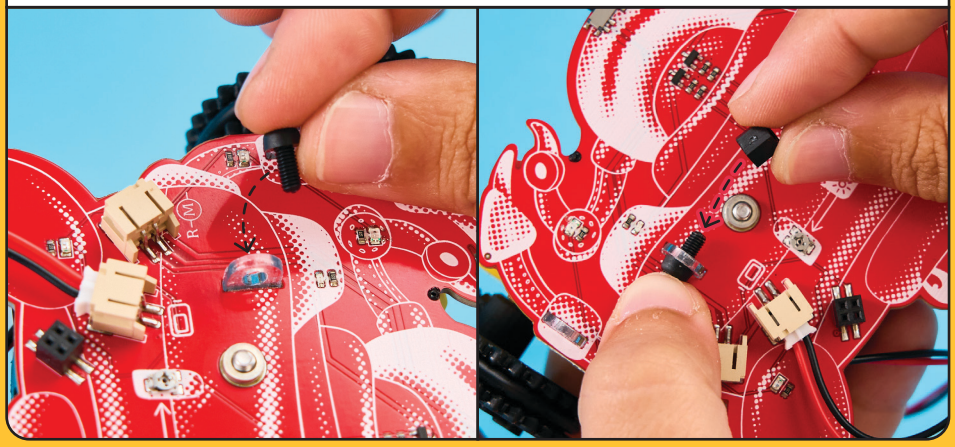




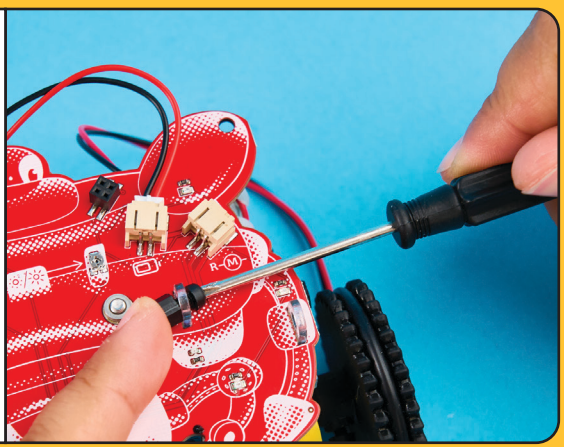
Now we need to secure everything to ensure nothing falls off.

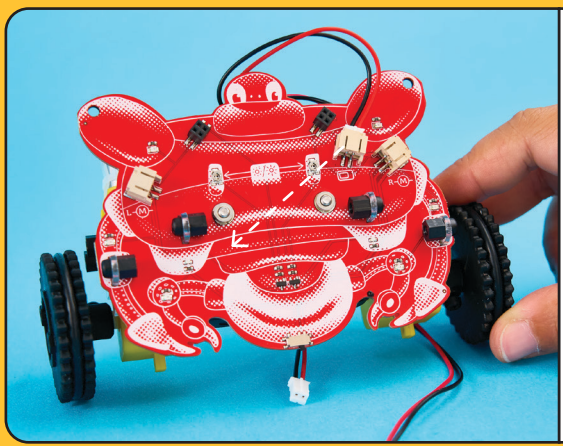
Take four small bolts and four small spacers.

We'll use them to secure the casings to the PCB like this



We **recommend using a screwdriver** to fasten this spacer because it will be difficult to do it by hand.

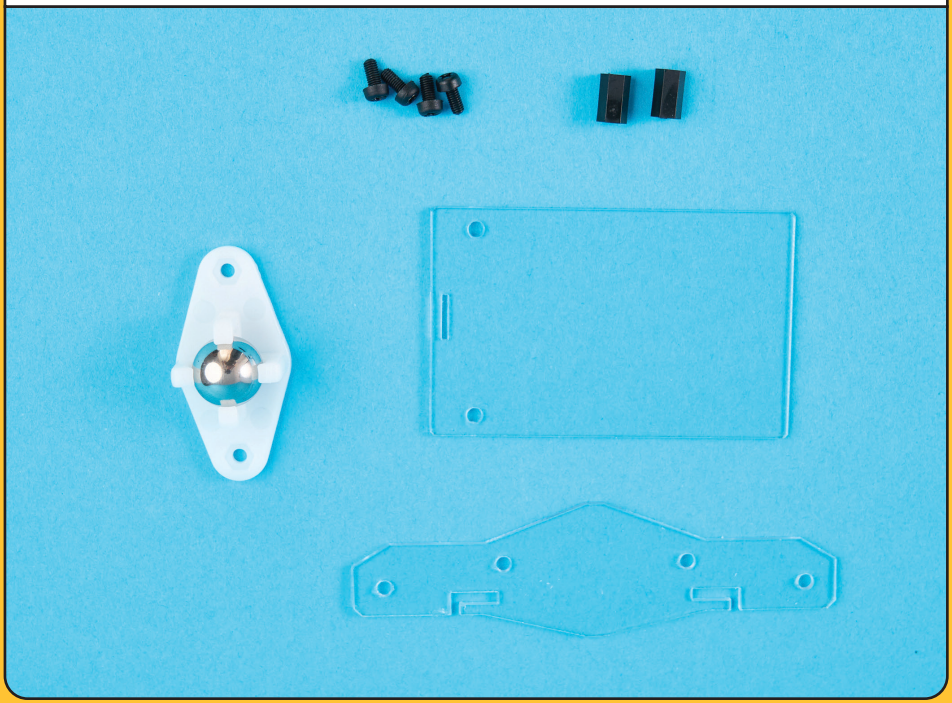




Here's how your Dusty should look now

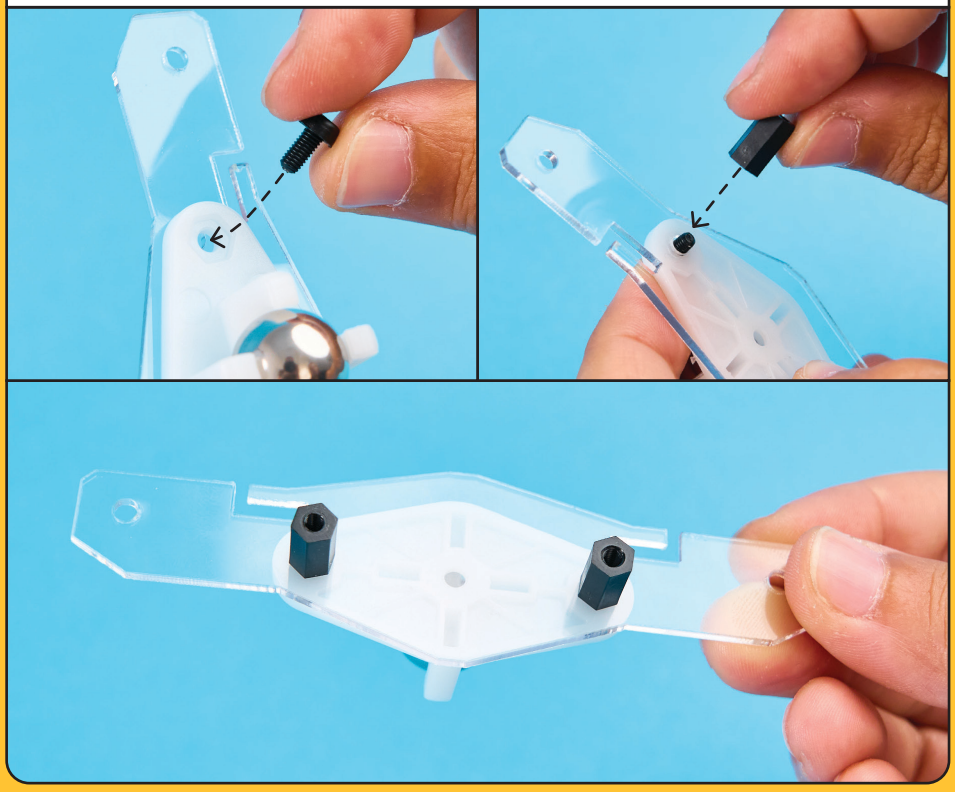
To improve stability and drivability, we've added **one more wheel** to it, and we'll assemble it now.

Take these components (we're using **two medium–sized spacers)**

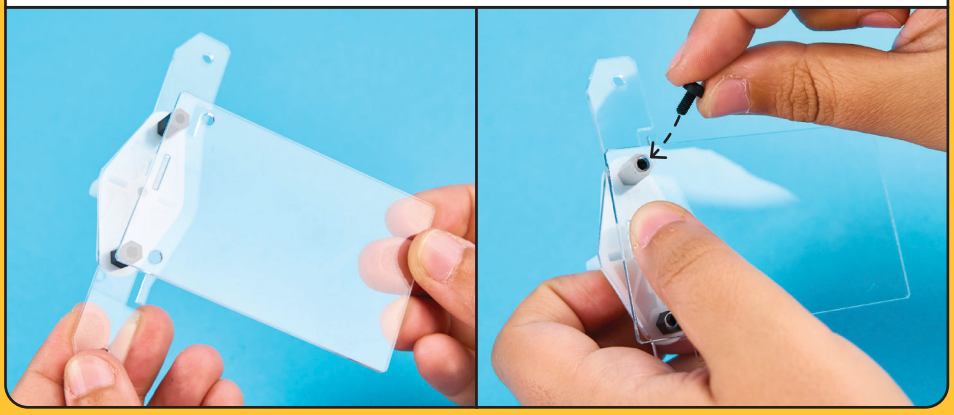


Put the wheel on the long casing like this

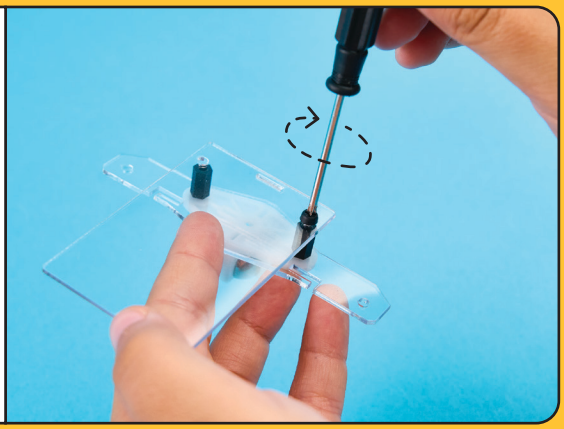
Take the bolts and spacers and fasten them together.

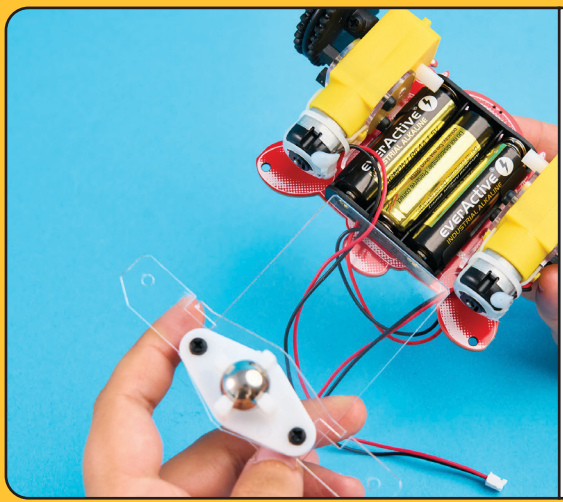


You might be wondering why we use **medium–sized bolts** here. It's because we'll be **adding another casing** to this part and need to fasten it securely together.



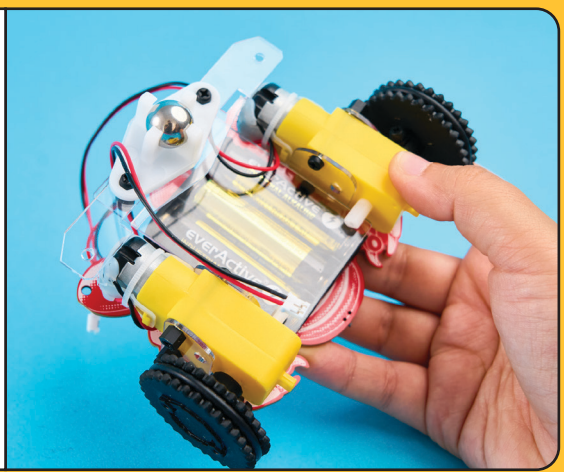
Help yourself with a **screwdriver** here





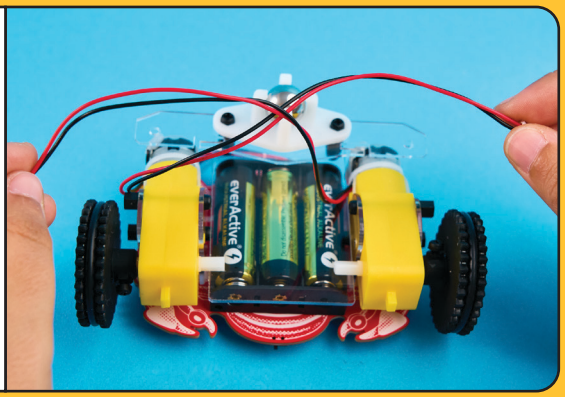
This part must **slip between the motors and the battery holder,** as shown in the photo

Ensure that the **wheel** is positioned **on the outside** and that the **two cutouts** are on the **inner side.**

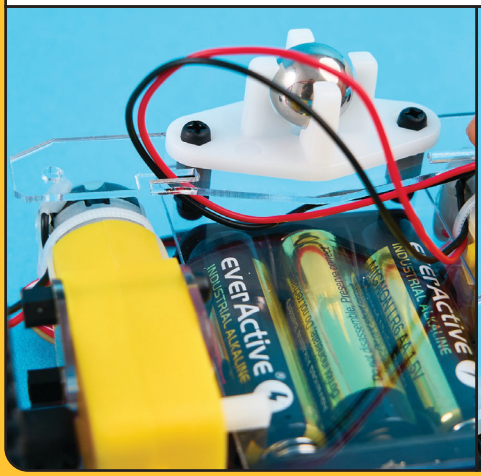


The wires are a bit long, so let's do something about it.

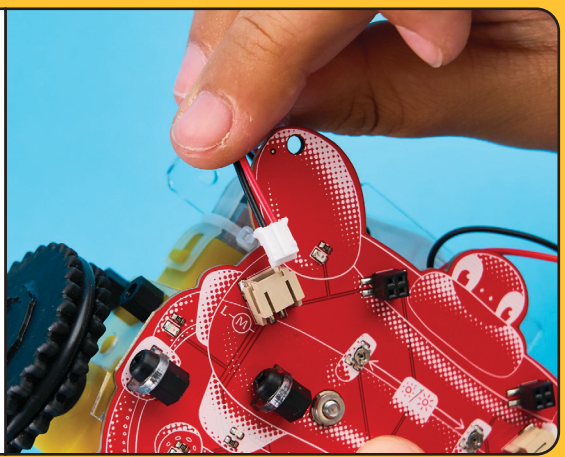
First, **cross the wires** as shown in the photo



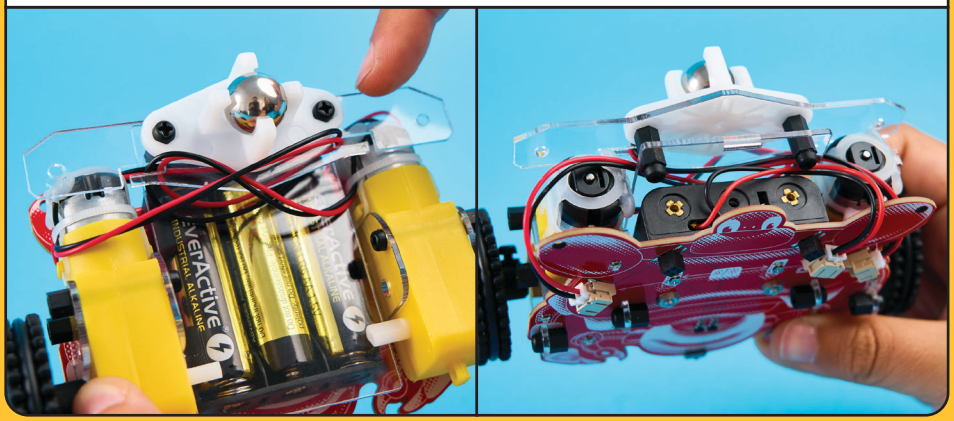
Next, **pull the wires through the small cutouts** on the casings.



Finally, connect the wire of each motor to its connector. Next to each **connector,** there's an **"L"** and **"R"** marking to indicate which motor should be connected there.



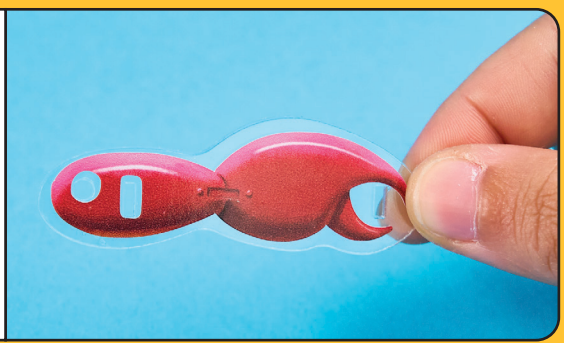
This is what Dusty looks like after connecting the wires correctly.



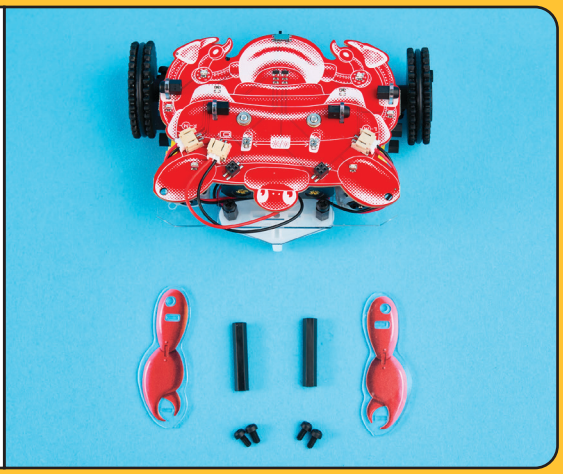
Your Dusty is a crab, but it's missing something essential — **claws!**

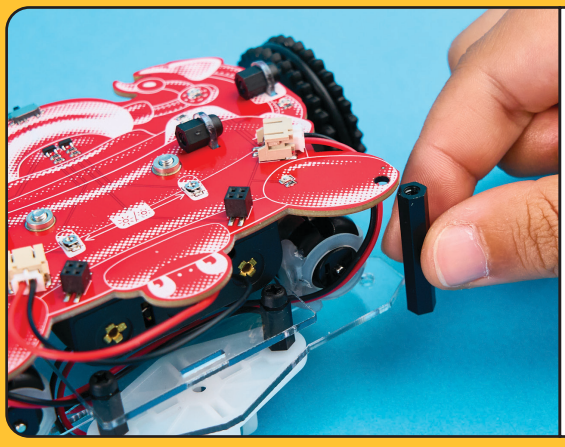
To customize the claws, we've designed some super cool options. The first step is to choose a design that suits your preference.

When attaching the stickers to the claws, ensure they are positioned correctly.



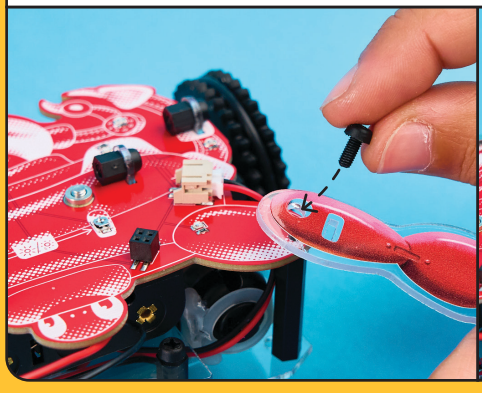
Now take these parts **(you'll need two long spacers, and two small bolts).**

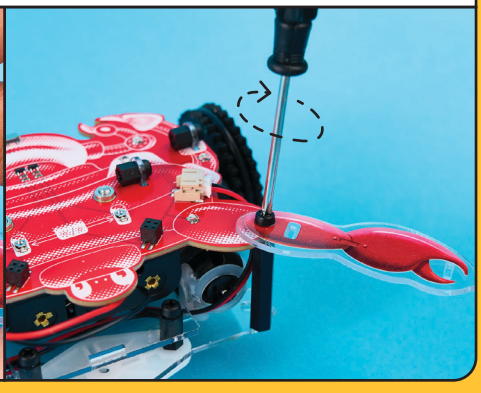




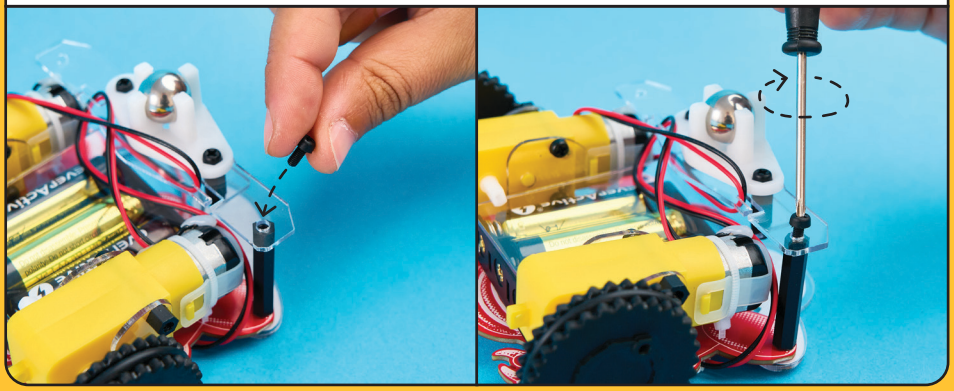
The first step is to put a spacer between the PCB and the case.

Take the claw and one of the bolts, place them on the PCB, and secure them with the bolt.



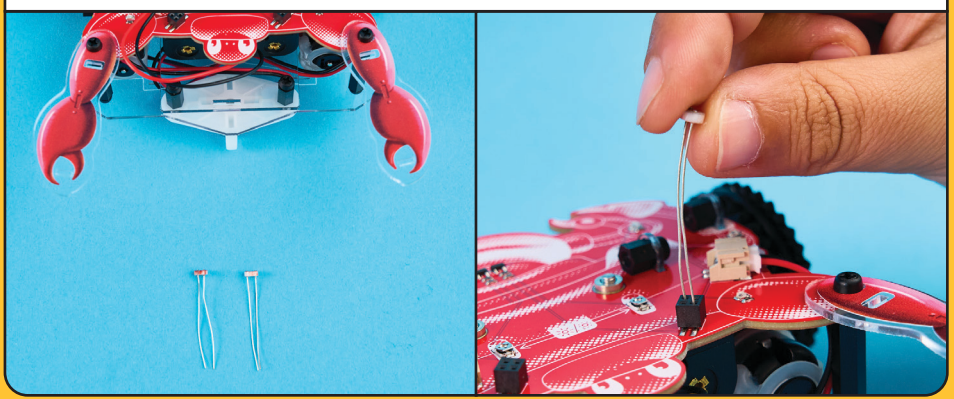


Turn Dusty around and place one bolt to the bottom side as well.

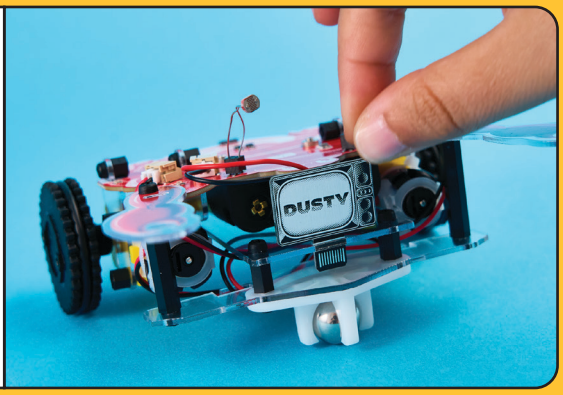


Repeat with the second claw.

Crabs often live in very dark areas and follow light to find food. To mimic this behavior, we need to add photoresistors to your Dusty. These **photoresistors** will ensure that if Dusty finds itself in the dark, it can follow the light and find its way back home.



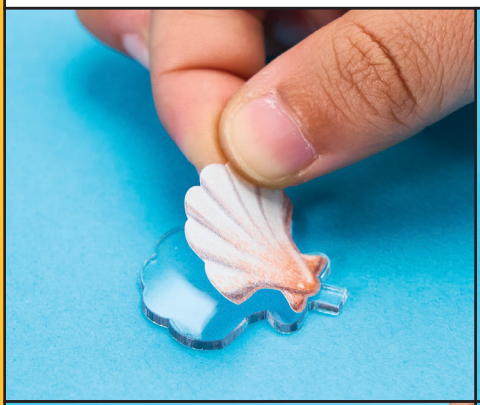
With your Dusty, you received a special **token** that can be used to **unlock a new, secret game on Bit** (sold separately). When you're not using the token, you can store it here

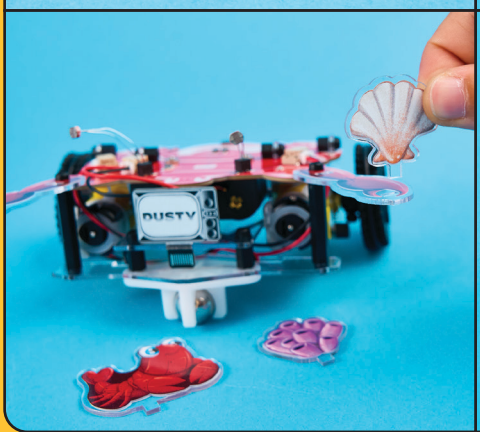


The fun doesn't end here!

We've prepared a lot of exciting **accessories** for your Dusty.

For example, Dusty can hold shells or algae.

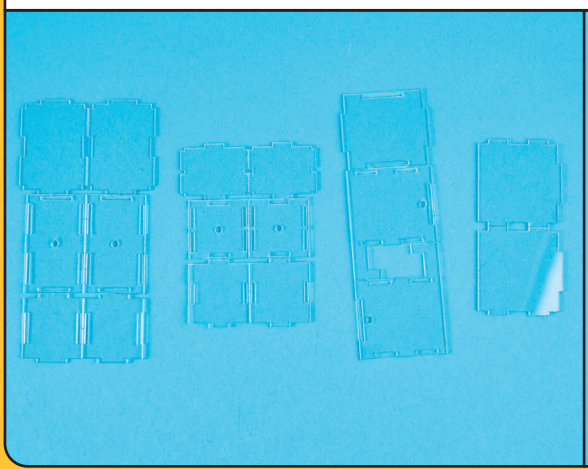




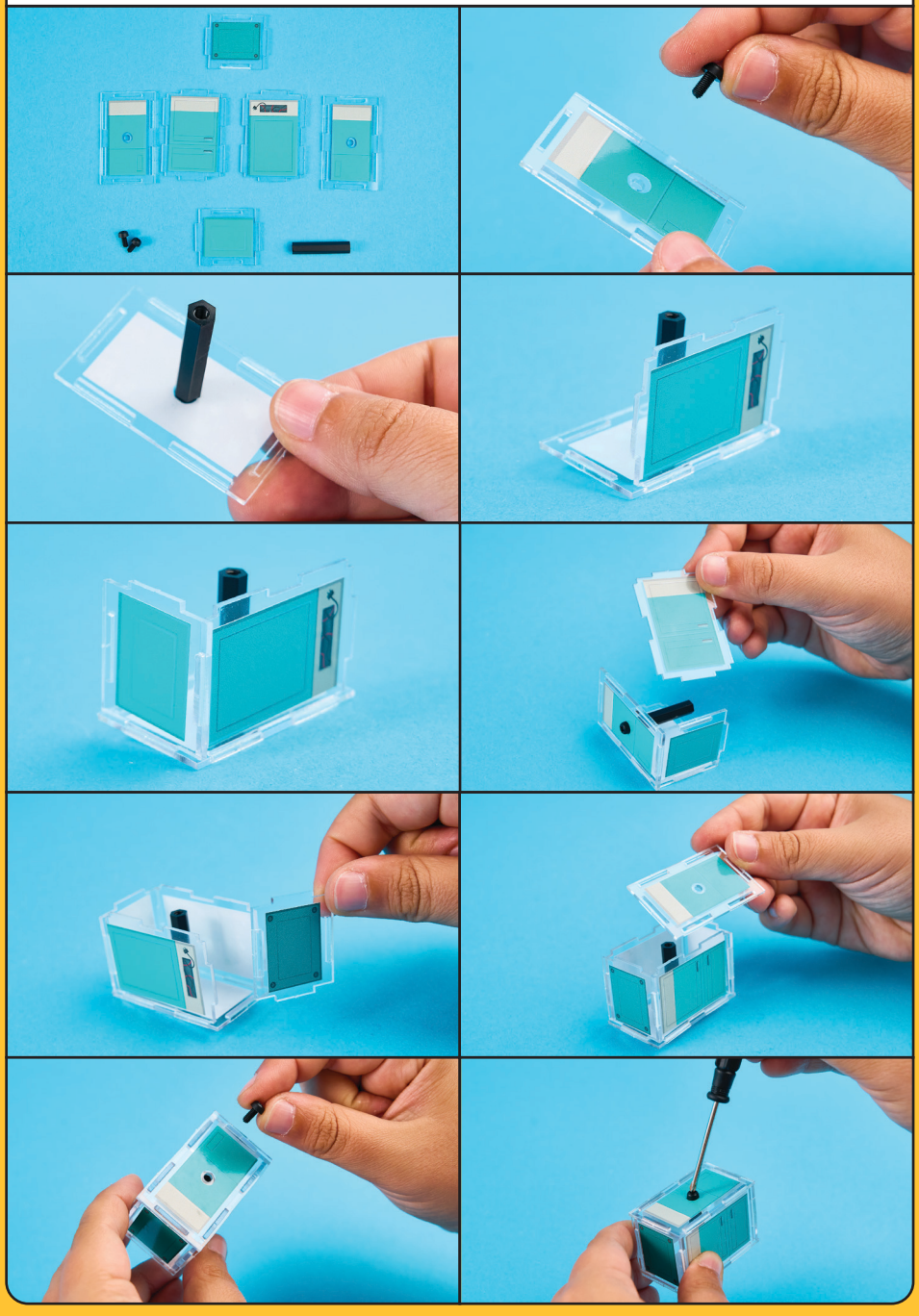
To **turn Dusty on** and **make it follow the light,** simply switch it on using the on/off switch. Then, place Dusty in a dark area and use your phone as a light source. Shine the light in front of the photoresistors and watch as Dusty follows it.

If you have leftover casings, bolts, and spacers, don't worry! We've included extra parts so you can create different accessories like cupboards or a microwave. This **step is optional** and isn't necessary for Dusty to function.

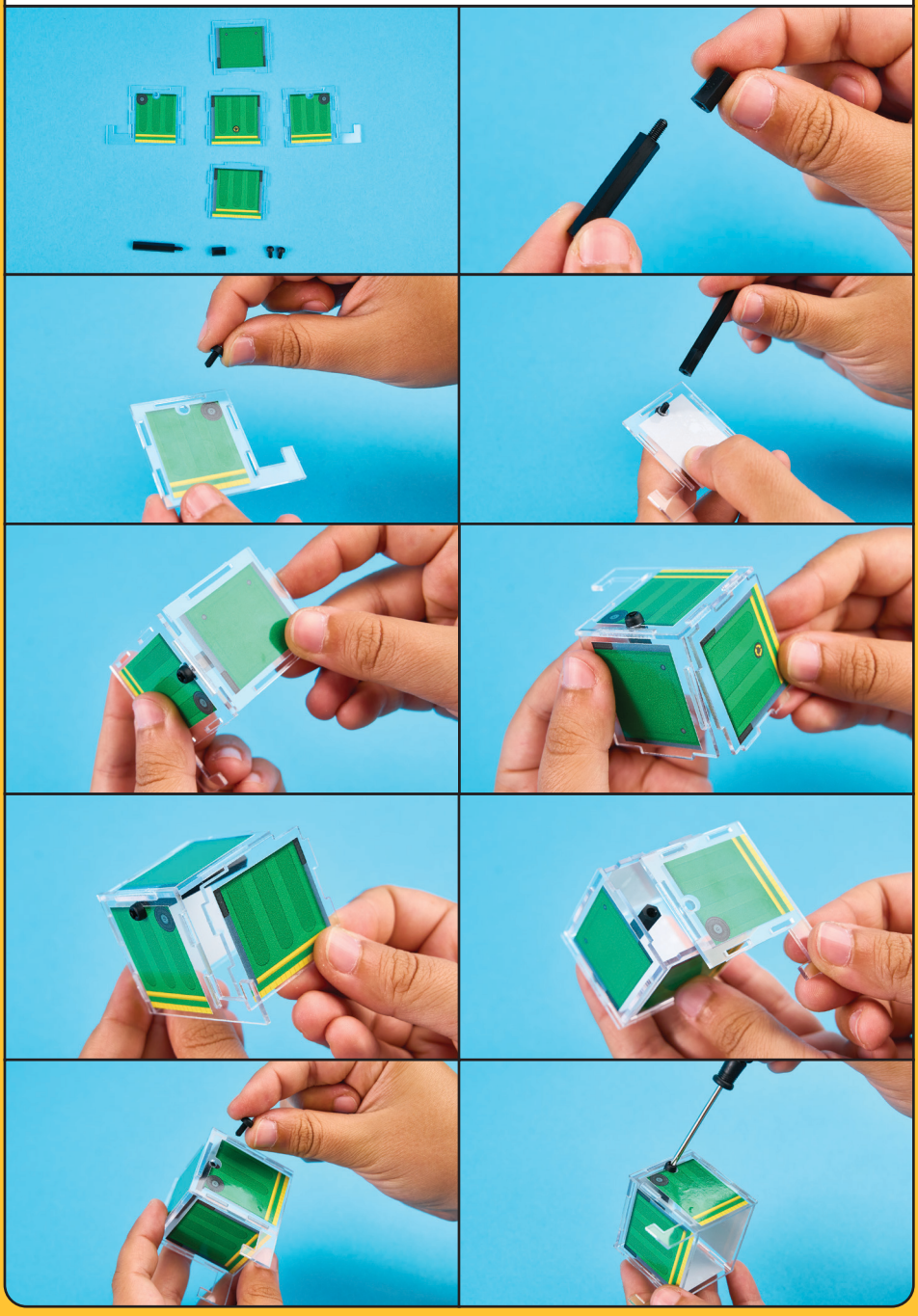
These are the casings for all the accessories. Once you put the stickers on them, it will be much easier to recognize them.



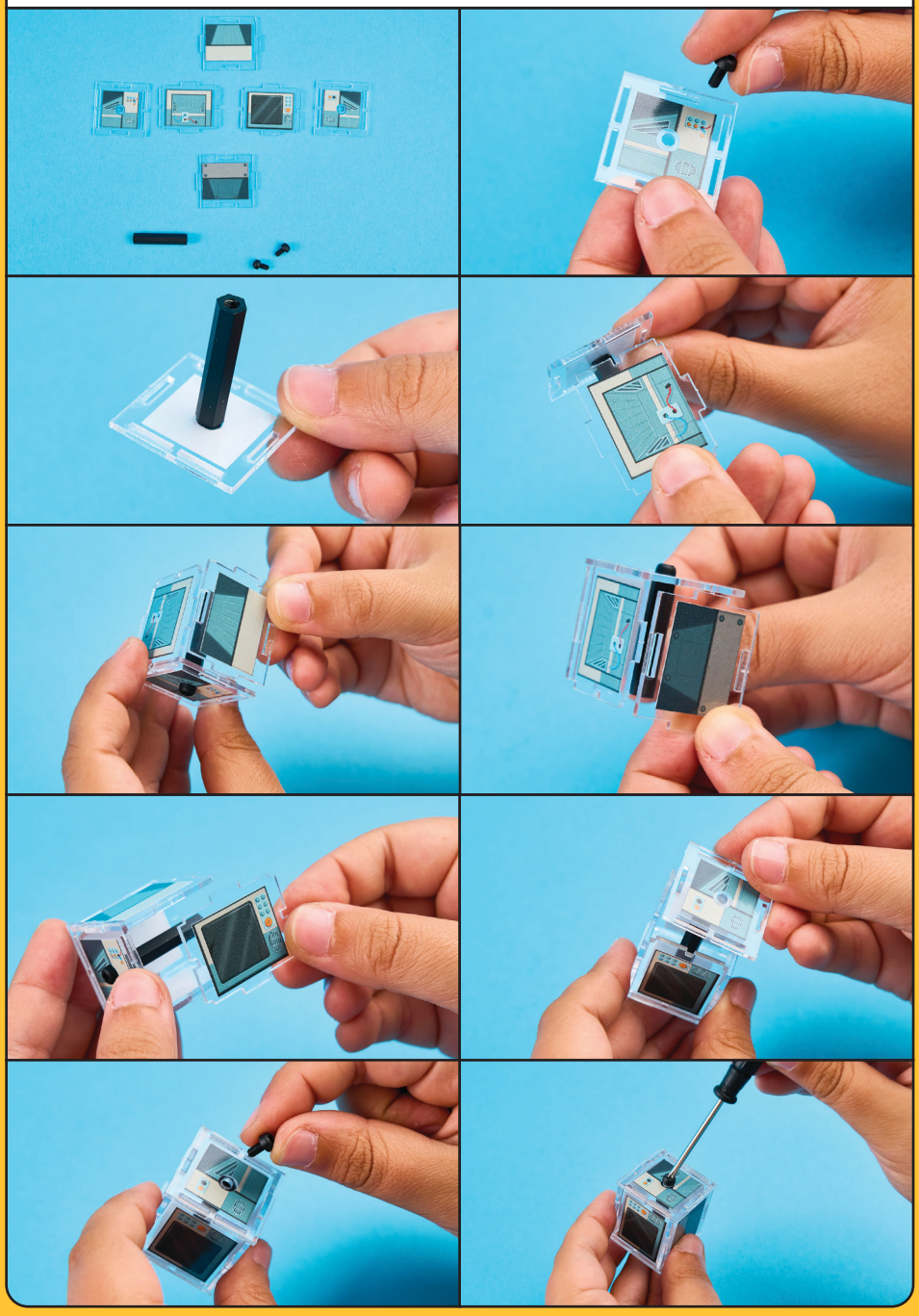
This is what we'll build first.



The **garbage disposal** is what will be built next.

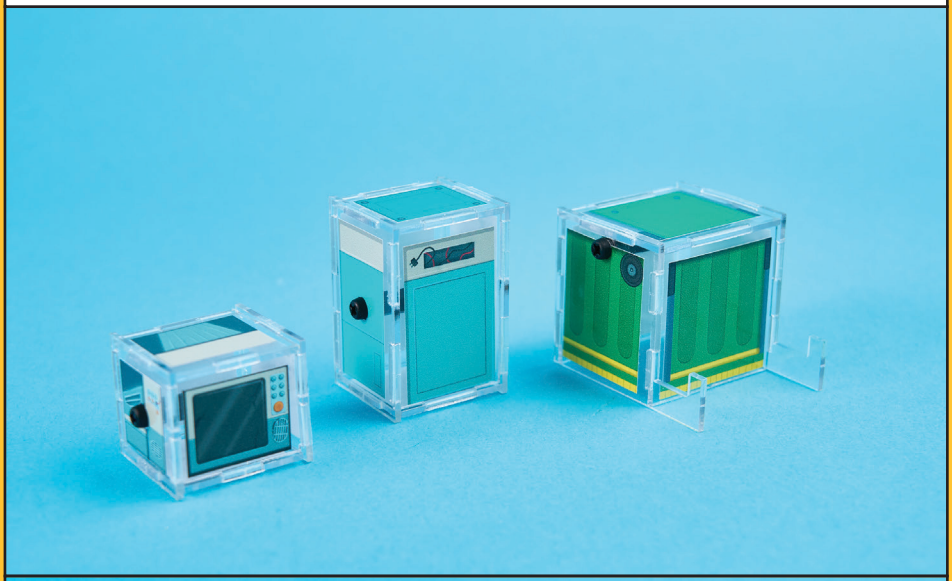


Finally, build **a microwave.**



That's it! Dusty and all its accessories are complete.

We hope you enjoyed building everything and that you've learned something new along the way!



Thank you for purchasing CircuitMess Wacky Robots Educational kits.

For more information and detailed instructions on assembling and using your device, visit our official website: circuitmess.com/resources/guides

Important safety information for CircuitMess Wacky Robots

Read all safety information before using the device.

WARNING: Failure to follow these safety instructions could result in fire, electric shock, injury, and damage to your device or other objects. Read all safety information before assembling and using this device.

This product is a do–it–yourself device, and for it to work properly, you must assemble it according to the instructions you'll find on our website.

If you are a minor, assemble it only under an adult's supervision to avoid potential risks.

CircuitMess Wacky Robots kit contains sensitive electronic components. CircuitMess Wacky Robots or its components may be damaged if dropped, burned, punctured, crushed, or in contact with liquid. If you suspect that any part of your CircuitMess Wacky Robots kit (especially the batteries) is damaged, stop using the device. Using a damaged device may cause injury.

Use only authorized accessories compatible with your device and/or the supplied tools.

The device's operating temperature ranges from 0 ° C ~ 40 ° C.

Using this device in conditions outside this temperature range may damage the device.

Please turn off CircuitMess Wacky Robots after use and store it in a safe and dry location.

The included battery must be recycled appropriately and/or disposed of separately from household waste.

Improper handling of batteries can cause a fire or explosion. Dispose of or recycle

your device, battery, and accessories according to local regulations.

The included battery is NOT rechargeable.

• Do not short–circuit the battery

• Improper use of the battery can cause overheating, burns, or other injuries.

• Do not leave the battery directly exposed to intense sunlight.

• Do not use the device or the battery in high–temperature conditions. Overheating may cause an explosion.

• Do not disassemble or damage the battery to avoid battery leakage, overheating, or explosion.

• In the case of deformation, stop using the battery immediately and dispose of it properly.

If you are not sure whether your device or the included battery is safe to use, turn off the device, put it in a safe place, and contact our customer support via email at contact@circuitmess.com.

Keep the device dry.

Do not attempt to repair the device by yourself.

If any part of the device does not work correctly, contact our customer support (contact@circuitmess.com) or take your device to a certified repair shop.

Connect other devices according to their operating instructions. Do not connect incompatible devices to this device.

Precautions

During prolonged use, Wacky Robots may rarely overheat.

Keep CircuitMess Wacky Robots in a ventilated room during the use and assembly. Pay special attention to this if you suffer from a physical condition that affects your ability to detect heat on your body.

Assembling or using CircuitMess Wacky Robots in an area with a potentially explosive atmosphere, such as areas where the air contains high levels of flammable chemicals, vapors, or particles (such as dust or metal powder), can be dangerous.

Exposure of CircuitMess Wacky Robots to environments with high concentrations of industrial chemicals, including liquefied gases that evaporate, such as helium, can damage the functionality of CircuitMess Wacky Robots.

Do not use CircuitMess Wacky Robots in hospital operating rooms or intensive care units.

Contact your doctor or our customer support (contact@circuitmess.com) to determine if the device's operation may compromise the work of medical devices.

To avoid possible interference with a pacemaker, maintain a minimum distance of 15 cm between the CircuitMess Wacky Robots and the pacemaker. To achieve this, do not carry the included device in your pockets.

Do not use CircuitMess Wacky Robots near hearing aids or similar medical aids and equipment to avoid interference with medical equipment.

Check aircraft safety regulations and turn off CircuitMess Wacky Robots on the aircraft if necessary.

Do not use CircuitMess Wacky Robots while driving.

To avoid lightning strikes, do not use CircuitMess Wacky Robots outdoors during storms.

Do not use the CircuitMess Wacky Robots in high–humidity environments such as bathrooms. Failure to do so may result in electric shock, injury, fire, and damage to the product, electronic components, power adapter, or other parts of this electronic educational kit.

Follow all the rules that limit the use of portable electronic devices in some situations and conditions.

The individual parts and components in the CircuitMess Wacky Robots can pose a choking risk to children under 36 months. Keep all components, tools, and parts of this product away from small children before and after assembling the device.

Additional Recommendations and Precautions for Parents, Guardians, and Teachers Buying CircuitMess Wacky Robots for Children

1. Carefully follow the instructions for adequately assembling CircuitMess Wacky Robots. Keep these and all other instructions that came with the products in a safe place.

2. Supervise your child while assembling and using the CircuitMess Wacky Robots. Your responsibility is to ensure that the child uses the CircuitMess Wacky Robots correctly and that the CircuitMess Wacky Robots are suitable for the child's age and abilities.

3. Check from time to time if CircuitMess Wacky Robots are damaged or worn out in any way to prevent possible

injuries and risks to the child's health and safety. If CircuitMess Wacky Robots is damaged, remove it immediately.

4. Remove any unnecessary packaging, but keep the instructions. Take care that children do not play with any plastic packaging as there are suffocation risks.

5. Teach children to always store CircuitMess Wacky Robots and other parts of the CircuitMess Wacky Robots educational kit appropriately to prevent accidents. Do not leave CircuitMess Wacky Robots on stairs or on the floor in your home or classroom where someone can step on them.

6. Always report a product security issue to our customer support (contact@circuitmess.com)

Declaration of Conformity

CircuitMess d.o.o. declares that these DIY educational kits CircuitMess Wacky Robots model complies with the essential requirements and all other relevant provisions of Directive 2014/53 / EU. The full text of the EU declaration of conformity is available at the following Internet address: circuitmess.com/certification.

Legal Information

These devices can be used in all EU Member States. Check all the national and local regulations about using the device. These devices may be restricted for use, depending on local laws.

Manufacturer:

CircuitMess d.o.o.
Ulica dr. Luje Naletilića 85,
10256 Botinec,
Zagreb,
Croatia
OIB: 50943449035

Proper disposal of this product

WEEE markings on the product indicate that this product may not be disposed of with the rest of your household waste in the EU. To prevent possible damage to the environment or human health from uncontrolled waste disposal, recycle the product responsibly. Recycling promotes the sustainable reuse of resources. For more information on the disposal of electrical and electronic equipment, don't hesitate to contact your local household waste disposal service, the store where you purchased the kit, or our customer support (contact@circuitmess.com).

IMPORTANT! Warranty conditions:

The warranty is valid only if the original invoice is attached to the product as proof of purchase during the complaint. If the customer sends the product for repair for any reason not covered by the warranty, the customer may be charged for inspection and testing and delivery costs.

WARRANTY STATEMENT

CircuitMess d.o.o., with its registered office in Zagreb, Croatia, Ulica dr. Luje Naletilića 85, guarantees the quality and proper functionality of the components that come in the CircuitMess Wacky Robots DIY educational kits for a duration of 24 months from the date of purchase.

If the assembled device does not work correctly due to defects in supplied parts or electronic components supplied in the CircuitMess Wacky Robots DIY educational kits, CircuitMess d.o.o. will repair the product or send an equivalent replacement product at their own expense.

In case you are experiencing assembly or functionality difficulties with your device, please contact us via email (contact@circuitmess.com).

Please include a detailed

description of the problem.

If you are sending the product to a repair shop, it is recommended to deliver the product in the original packaging to protect it from potential damage during transportation.

WARRANTY CONDITIONS

The warranty period begins on the day of sale indicated on the invoice.

The warranty is valid upon presentation of the original invoice.

If the defect is not remedied within a reasonable period after receiving the product for repair, CircuitMess d.o.o. will replace it with a new product.

The repair shop does not take responsibility for storing and/or losing personal data while repairing the device.

WARRANTY DOES NOT COVER

Upgrades, alterations, modifications to hardware and/or software without the written consent of CircuitMess d.o.o.

Malfunctions due to improper handling, faults due to wear of the device and/or its parts (in you need help with assembly or if you have difficulty using the device after assembling it, please contact us at contact@circuitmess.com).

Defects caused by external particles (including, but not limited to: staples, waste, dust, food) and external factors (including, but not limited to: moisture, water, thermal damage).

Mechanical damage and/or failures caused by mechanical damage.

Use of the product for a purpose for which it is not intended.

Requirements for the appearance, technical functionalities, and/or capabilities of the product outside the manufacturer's specifications and/or standards.

Damages to personal data, other tangible and/or intangible assets of the buyer and/or third parties, indirect damages, lost profits caused by the use of the product, and/or its failure.

Repairs in an unauthorized repair shop and/or installation of non–original spare parts.

Damage caused during transportation caused by improper packaging.

The rights under this warranty are the exclusive and final rights of the customer unless otherwise provided by national law.

CircuitMess d.o.o. as the warranty provider and/or its authorized partners will not be liable for any defect, damage, loss, direct or indirect cost, or connection with the delivered products outside the warranty conditions written here.

This warranty does not affect other rights of the customer belonging to him on other legal grounds.

⚠ **WARNING: CHOKING HAZARD - Small parts.** Not for children under 3 years.

WARNING:
This toy produces flashes that may trigger epilepsy in sensitised individuals.

WARRANTY SHEET

Product name	CircuitMess Wacky Robots do–it–yourself educational kit
Warranty on components and parts contained in this set is	24 months
Date of purchase:	
Seller and point of sale stamp	
Invoice number	

Information on interventions during warranty period is entered by a repair shop technician at an authorized repair shop.

Received on	Issued on	Fault description	Warranty extension

Manufacturer:

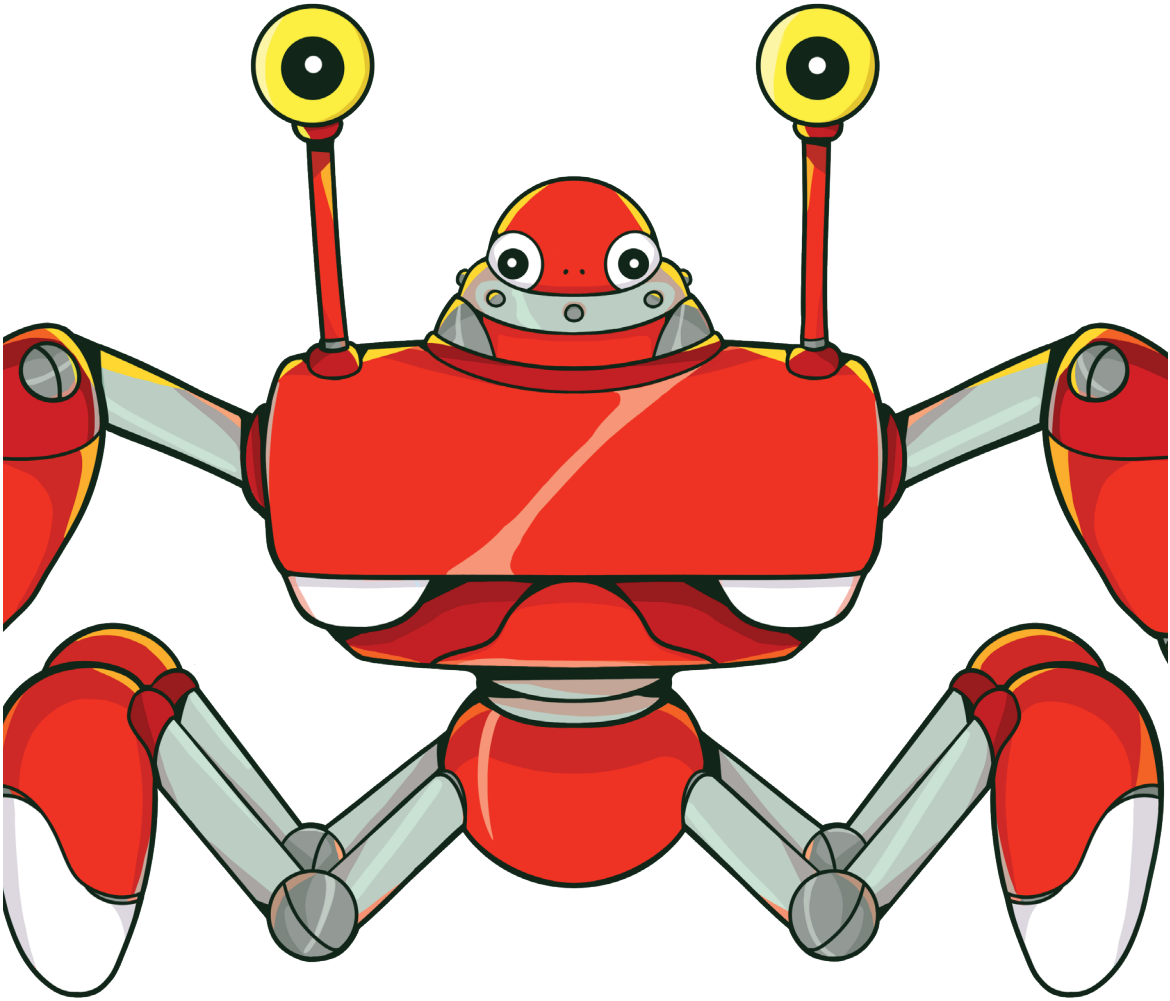
CircuitMess d.o.o.
Ulica dr. Luje Naletilića 85,
10256 Botinec,
Zagreb,
Croatia
Country of origin: Croatia
www.circuitmess.com

Authorized repair shop:

CircuitMess d.o.o.
Ulica dr. Luje Naletilića 85,
10256 Botinec,
Zagreb,
Croatia
Country of origin: Croatia
www.circuitmess.com

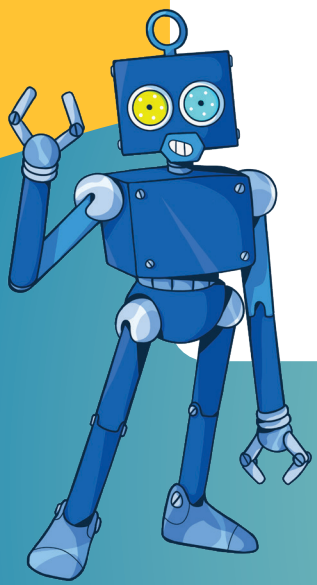
CircuitMess

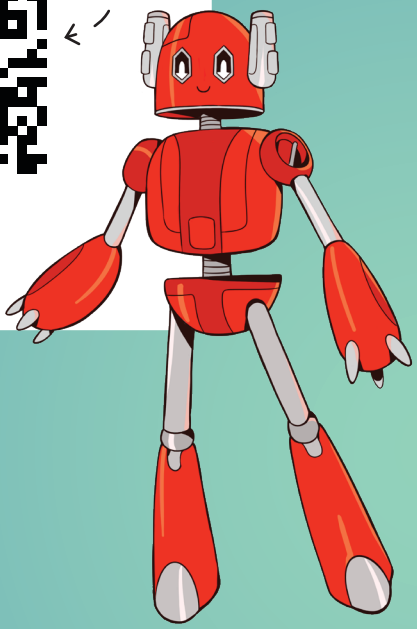
UK CA CE FC



WACKY ROBOTS

Scan for more fun





CircuitMess