

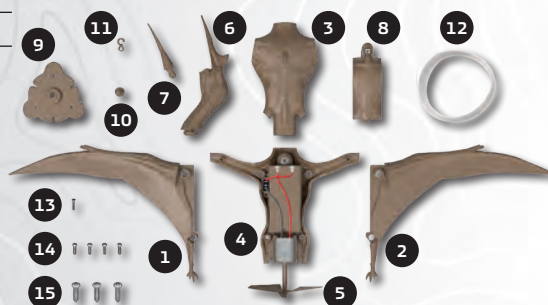


# FLYING PTEROSAUR

QUETZALCOATLUS

## KIT CONTENTS

1. Left wing
2. Right wing
3. Back body piece
4. Front body piece (with motor, switch, and battery compartment)
5. Propeller
6. Head
7. Lower beak
8. Battery compartment cover (with small, flat-head screw)
9. Ceiling bracket
10. Hanger
11. Hook
12. Cable
13. Small, thin screw for propeller
14. Small screws for model (4)
15. Large screws for ceiling (3)



## YOU WILL ALSO NEED

2 AAA batteries (1.5-volt, type LR03), small Phillips-head screwdriver, large Phillips-head screwdriver (preferably powered), scissors

Do you have any questions?  
Our tech support team will be glad to help you!

USA: support@thamesandkosmos.com  
or 1-800-587-2872  
UK: support@thamesandkosmos.co.uk  
or 01580 713000



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## DEAR PARENTS AND ADULT SUPERVISORS

Please provide your child with assistance and support when assembling the flying pterosaur model. The model must be installed by an adult and operated under adult supervision. Before starting the assembly and installation, read through the manual together and be sure to follow it. Please be careful not to let any parts of the kit get into the hands of small children, especially the small parts and long cable.

## SAFETY INFORMATION

**WARNING!** Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled. Strangulation hazard — long cable may become wrapped around the neck. This kit contains functional sharp edges or points. Do not injure yourself!  
Warning: This toy is only intended for use by children over the age of 6 years, due to accessible electronic components. Instructions for parents or caregivers are included and shall be followed. Keep packaging and instructions as they contain important information.

Store the experiment material, particularly the battery-powered motor and assembled model out of the reach of small children. Make sure the model is securely attached to the ceiling before use. Do not allow your hair, fingers, or other body parts to come near the motor-driven propeller.

### Safety for Experiments with Batteries

- To operate the models, you will need two AAA batteries (1.5-volt, type LR03), which could not be included in the kit due to their limited shelf life.
- An adult should insert and change the batteries. For instructions on how to insert and change the batteries, see step 8.
- The batteries are to be inserted with the correct polarity (+ and -). Press them gently into the battery compartment.
- The supply terminals are not to be short-circuited. A short circuit can cause the wires to overheat and the batteries to explode.
- Different types of batteries or new and used batteries are not to be mixed.
- Do not mix old and new batteries.

- Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.
- Always close battery compartments with the lid.
- Non-rechargeable batteries are not to be recharged. They could explode!
- Rechargeable batteries are only to be charged under adult supervision.
- Rechargeable batteries are to be removed from the toy before being charged.
- Exhausted batteries are to be removed from the toy.
- Dispose of used batteries in accordance with environmental provisions, not in the household trash.
- Be sure not to bring batteries into contact with coins, keys, or other metal objects.
- Avoid deforming the batteries.
- Have an adult check the model before use to make sure it is assembled properly. Always operate the motorized model under adult supervision. After you are done experimenting, remove the battery from the battery compartments.

**Notes on Disposal of Electrical and Electronic Components**  
The electronic components of this product are recyclable. For the sake of the environment, do not throw them into the household trash at the end of their lifespan. They must be delivered to a collection location for electronic waste, as indicated by the following symbol: Please contact your local authorities for the appropriate disposal location.



## YOUR OWN FLYING PTEROSAUR

With this kit, you will build and fly a model of a pterosaur, an order of prehistoric flying reptiles related to the dinosaurs. This specific pterosaur is called the Quetzalcoatlus (pronounced “ket-suhl-kow-at-luhs”). It was the largest flying animal of all time; a huge, bird-like creature with a 36-foot wingspan, a massive beak, and fierce talons. A battery-powered motor propels your Quetzalcoatlus through the air while a thin cable keeps it soaring along a circular flight path. Learn how the propeller makes the model fly, about the similarities between pterosaurs and modern-day birds, and all about this awe-inspiring giant of the prehistoric skies.

## ASSEMBLY INSTRUCTIONS

1. Attach the left wing to the back body piece by sliding the holes in the wing over the pegs on the back body piece.
2. Attach the right wing to the back body piece by sliding the holes in the wing over the pegs on the back body piece.
3. Insert the lower beak into the head by pushing the ball into the socket.
4. Insert the base of the neck into the slot on the back body piece.
5. Attach the propeller to the end of the motor shaft and screw it in place with the small, thin screw (part 13).  
**TIP!** Handle the motor circuit assembly very gently. The soldered connection points can break under too much stress. Do not push or pull on the wires. They might break off.

Note: This is the smallest screw in the kit.

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## ASSEMBLY INSTRUCTIONS CONTINUED

6. Place the front body piece (with the motor facing downward) onto the back body piece, pushing all of the pegs all the way into all of the holes. Make sure the wires fit neatly into the back body compartment.
7. Screw in the four small screws (part 14), securing the body pieces together.
8. Insert two AAA batteries (1.5-volt, type LR03) into the battery compartment. Attach the battery compartment cover by first inserting the tab into the slot in the body, then pressing the cover gently into place, and finally screwing in the screw. (The screw is already installed in the battery compartment cover.)

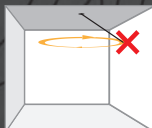


## INSTALLATION INSTRUCTIONS

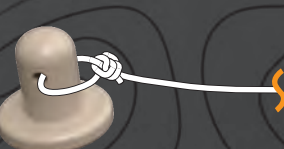
**IMPORTANT!** An adult must fasten the ceiling bracket to the ceiling to install the flying pterosaur before it can be used. Scan this QR code for an installation and flying video.



1. Determine a suitable place for installation. Make sure the ceiling bracket is positioned far enough away from any walls or other obstacles so that the pterosaur does not crash into anything when it flies around in its circular path.



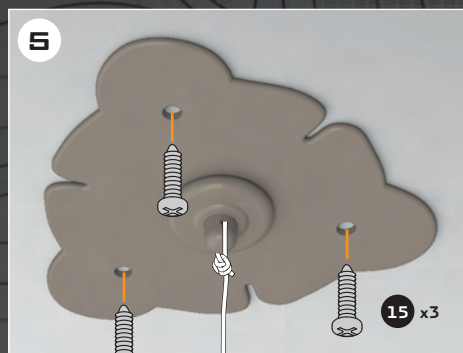
2. Tie one end of the cable to the hanger with at least three very tight knots.



3. Guide the free end of the cable through the hole in the ceiling bracket and insert the hanger into the hole in the center of the bracket.



4. Tie the other end of the cable to the hook with at least three very tight knots. Trim the loose ends with scissors.

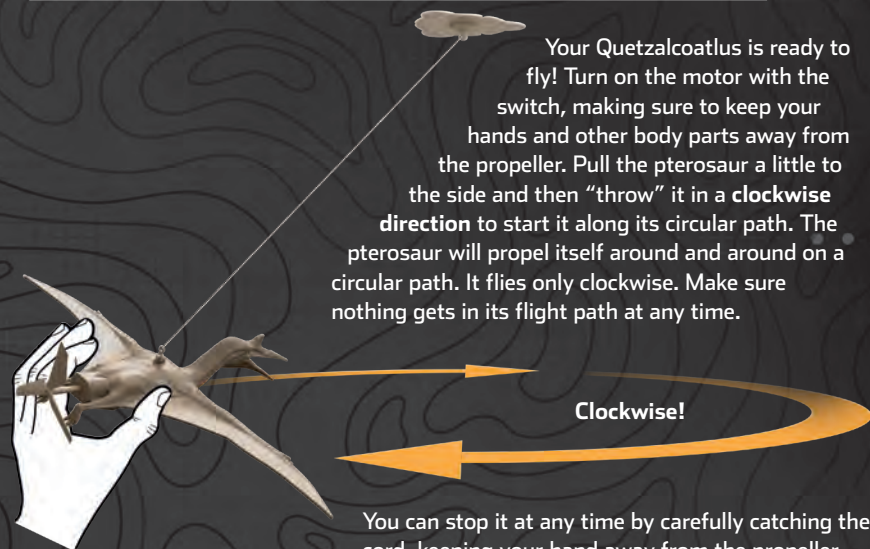


5. Place the ceiling bracket in the desired position on the ceiling and with a large screwdriver (preferably powered) screw in the three large screws (part 15) to hold the bracket in place. Make sure the bracket is securely in place by tugging on the cable.



6. Use the hook to connect the cable to the loop on the back of the pterosaur.

## TAKE TO THE SKIES!



Your Quetzalcoatlus is ready to fly! Turn on the motor with the switch, making sure to keep your hands and other body parts away from the propeller. Pull the pterosaur a little to the side and then “throw” it in a **clockwise direction** to start it along its circular path. The pterosaur will propel itself around and around on a circular path. It flies only clockwise. Make sure nothing gets in its flight path at any time.

You can stop it at any time by carefully catching the cord, keeping your hand away from the propeller, and turning off the motor with the switch.

## HOW DOES IT WORK?

The spinning propeller pushes the model forward. Since the cable keeps the model tethered to a central point, the model cannot fly off course; it stays flying in a continuous circular motion.

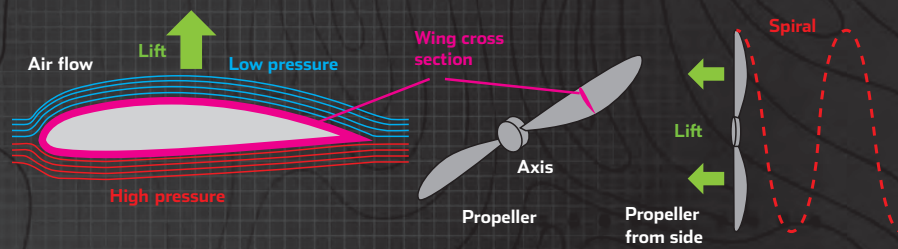
To understand how propellers work, let’s first examine another common feature of flying things: the wing. Wings generate a lifting force in air. Air is a mixture of gases. The molecules in air are always moving around and they are always being pulled toward Earth by gravity. Air pressure is the result of all these moving particles pushing on each other and all the things under and around them.

Air behaves like a fluid and obeys the physical laws of fluids. To understand how wings work, the most important principle of fluids to know is that the faster fluids move, the lower their pressure. This is called Bernoulli’s principle after the scientist who came up with it. Airplane wings are designed to take advantage of Bernoulli’s principle to lift a plane upward. The cross section of a wing has a top

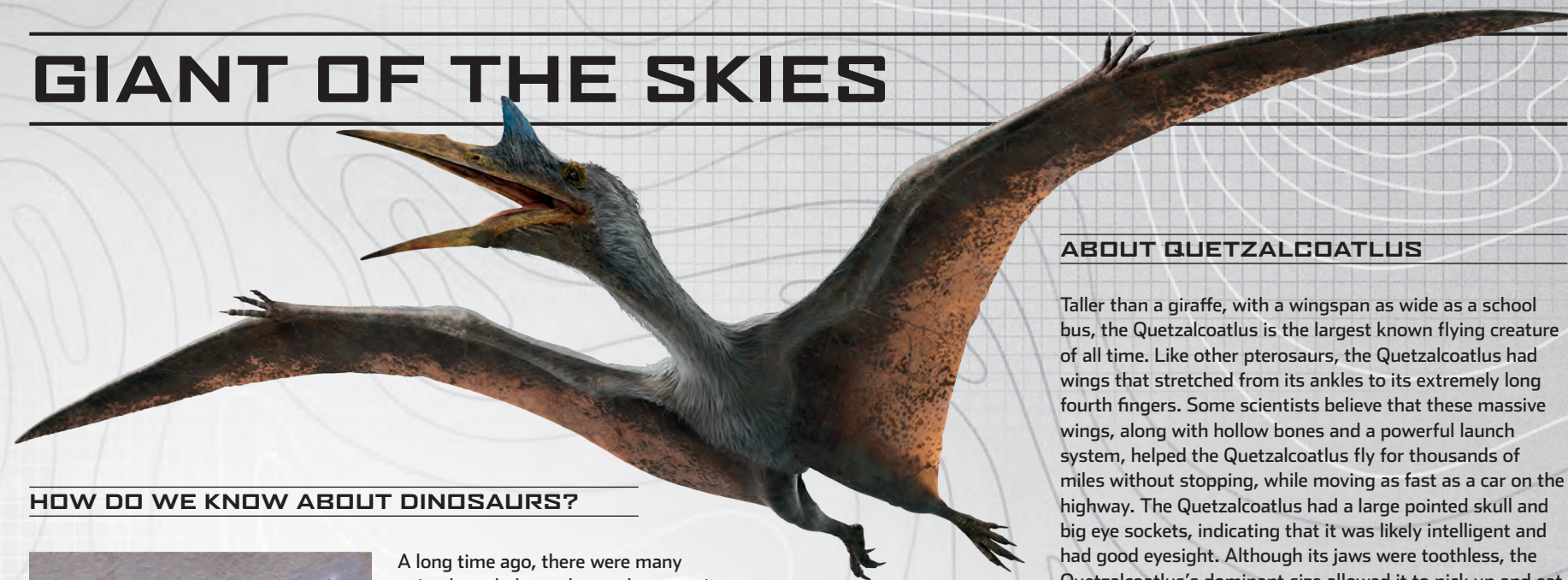
surface that is curved and therefore longer than its bottom surface. Air flowing over the top has to travel farther, so it moves faster. As Bernoulli’s principle states, faster moving air has a lower pressure and slower moving air has a higher pressure. The high air pressure under the wing pushes the wing upward and the low pressure above sucks it upward. This is called lift. Lift is always perpendicular to the direction of the airflow.

A propeller works like a spinning wing. Imagine taking two (or more) wings, sticking them on a central axis opposite one another, and spinning the axis. The wings would spiral through the air and create low pressure in front of them and high pressure behind them, and thus pull the propeller forward. The wings of a propeller, called blades, are angled so they cut into the air more.

Just like they screw through the air, propellers can also work in another fluid: water!



# GIANT OF THE SKIES



## ABOUT QUETZALCOATLUS

Taller than a giraffe, with a wingspan as wide as a school bus, the Quetzalcoatlus is the largest known flying creature of all time. Like other pterosaurs, the Quetzalcoatlus had wings that stretched from its ankles to its extremely long fourth fingers. Some scientists believe that these massive wings, along with hollow bones and a powerful launch system, helped the Quetzalcoatlus fly for thousands of miles without stopping, while moving as fast as a car on the highway. The Quetzalcoatlus had a large pointed skull and big eye sockets, indicating that it was likely intelligent and had good eyesight. Although its jaws were toothless, the Quetzalcoatlus’s dominant size allowed it to pick up and eat small animals while it was walking on land. The massive flying creature and its descendants might be dominating Earth’s skies today were it not for a single rock. The Quetzalcoatlus is believed to have died out around 65 million years ago during the great Cretaceous-Tertiary — or K-T — extinction, when much of the life on Earth was wiped out after a huge asteroid slammed into it.

## HOW DO WE KNOW ABOUT DINOSAURS?



A long time ago, there were many animals and plants that no longer exist today. The dinosaurs became extinct millions of years ago. But some traces of their bodies, such as bones, skin impressions, and footprints, have been preserved in stone. These are called **fossils**. Researchers dig up these discoveries, study them, and compare them to others. In this way, scientists figured out about 200 years ago that some of these fossil remains came from

enormous animals. Before then, people had thought they were the remains of human-like giants!

## PTEROSAURS — FLYING PREHISTORIC CREATURES

Pterosaurs were the first flying vertebrates. Some were hardly bigger than a sparrow, while others had a wingspan of up to 20 meters (66 feet). Their wings had no feathers but instead bore a delicate membrane similar to that of a modern-day bat. Some pterosaurs had a bony crest on their head, the function of which is still unknown. Some had a long tail, presumably for steering. Their bones were hollow but strengthened by bridges and sponge-like structures — thus being both light and strong.

All of the pterosaurs known today were meat eaters. The smaller, tailed types were presumably skilled flyers, able to catch lake and ocean fish in flight with their sharp beaks. Others stood in shallow water pecking on crustaceans and mollusks.

## HOW ARE PTEROSAURS LIKE BIRDS?

You may have heard: birds descended from dinosaurs. While this is true, and while birds and the Quetzalcoatlus share some similarities, the creatures you see flying around Earth today are not related to the Quetzalcoatlus. Birds actually evolved from a group of two-legged dinosaurs called theropods, which include the Tyrannosaurus rex and smaller velociraptors. Unlike most birds today, which are bipeds like theropods, the Quetzalcoatlus was a quadruped, meaning it walked on four limbs when on the ground. It is believed that the Quetzalcoatlus was covered in a downy fur, not feathers. While both types of creatures flew, the Quetzalcoatlus likely didn’t do much wing flapping, but rather relied on soaring on wind thermals. But Quetzalcoatlus did have something in common with birds: both types of animals are warm-blooded, meaning their bodies can generate heat internally, independent of the outside temperature. Another key difference: birds managed to survive the K-T extinction of 65 million years ago, while pterosaurs, including the Quetzalcoatlus, did not.

