

How Tuatara Use Energy from the Sun



☉ Cold-blooded and warm-blooded animals

Scientists put animals into two groups. One group is **cold-blooded** animals, like fish, frogs, snakes and tuatara. The other group is **warm-blooded** animals, like birds, whales, cats and dogs. These two groups have different ways of staying warm, and cooling down.

☉ How these groups of animals are different

How animals keep cool

On a hot day, many **warm-blooded** animals will sweat and pant to cool down. Some will lose their winter fur or feathers in the summer. **Cold-blooded** animals don't have fur or feathers, so they go to a cool, shady place when they want to cool down. Sometimes tuatara will hide in their holes to keep cool, or splash in rain water if they are feeling too hot and dry.



A tuatara hides in its hole when the sun is too hot.

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How animals keep warm

Warm-blooded animals have fur or feathers and extra fat to help them keep warm. They get energy from food too, that keeps them warm **inside** their body. **Cold-blooded** animals like snakes and frogs have slimy skin.

Tuatara have scales on their skin, a bit like fish, but the scales do not keep body heat in. Tuatara have no feathers, fur, or extra fat to keep them warm.

So **cold-blooded** animals like tuatara find a **sunny** place and use the heat from the sun to warm up.



Tuatara need the sun to keep warm because their scales let body heat out.

☉ Growing in summer and winter

Tuatara grow more slowly in winter because they do not eat as much as they do in summer. Light from the sun also helps the tuatara grow and in winter there is less sunlight. The tuatara will not move around as much in winter because its body cools down when the air is cold.

Needing food for energy

Warm-blooded animals need to eat a lot of food to stay at the same warm temperature. They use the energy in the food to make heat. Because they need so much food they spend a lot of time hunting and eating.

Cold-blooded animals like tuatara don't need as much food as warm-blooded animals because they use the sun's energy to warm up. In fact, a tuatara can go without food for months.

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How a Tuatara hunts and eats its food

When a tuatara hunts for food it stays in or near its hole. The hungry tuatara waits and waits. It is very still. At last a weta comes close. The tuatara leaps out and snaps up its meal. Sometimes it will eat a big meal and may not need to eat again for awhile. Tuatara can eat chicks, giant weta and small reptiles, and like to lie in the sun after they have eaten a big meal. The sun's energy warms the tuatara up and helps its stomach break up the food.



A tuatara
eats a tasty
giant weta.

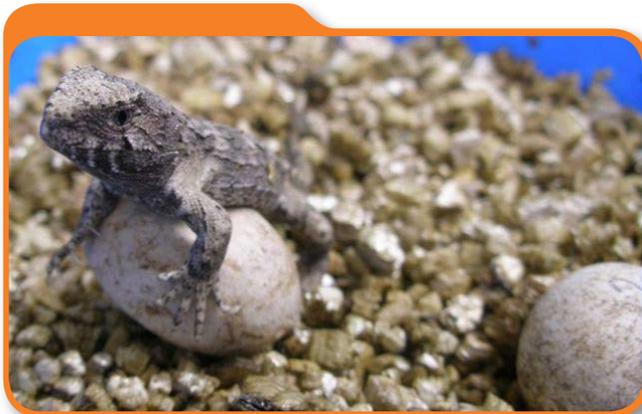
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☉ The sun helps eggs hatch and babies grow

Warm-blooded animals use their **body heat** to keep their babies warm, but most **cold-blooded** animals use the **sun's energy** to keep their eggs warm.

It can take more than a year for tuatara eggs to hatch.

When mother tuatara lays her eggs, she digs a nest out in the open where the sun's energy will warm them up. The eggs that get the most sun are the first to hatch because the sun's energy helps the young tuatara to grow faster inside their eggs. But if they get too hot and dry from the sun, the baby tuatara will die. Tuatara grow faster in warmer areas because there is more energy from the sun to keep them warm. So they can use more of the energy from their food to grow.



Eggs that get the most sun are the first to hatch.

Interesting Fact

Scientists have found that if tuatara eggs are kept in cool temperatures, more of the baby tuatara will hatch as females. If the temperature is warmer, more of the tuatara babies will hatch as males.

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◎ How Tuatara are different to other cold-blooded animals

Living in cool temperatures

The tuatara is different from other cold-blooded animals like snakes because it can live in cold temperatures. When a tuatara gets very cold it stays in its hole and **hibernates**. It will not go looking for food and its body can move so slowly it only needs to take one breath every few minutes. The tuatara will also slow its heart down to beat only once a minute. (When a tuatara is hot, its heart will beat once every two seconds!) The tuatara saves energy when it hibernates. This helps it stay alive when it is very cold.

Night-time hunters

Most **cold-blooded** animals like to be busy during the day because the sun's heat helps them move faster. But not tuatara. They are **nocturnal**, which means they come out of their holes at **night** to hunt for food. Tuatara like cool temperatures between 17 and 22 degrees. Some cold-blooded animals like snakes live in deserts with temperatures of 40 degrees or more. This is far too hot for a tuatara.

Interesting Fact

The tuatara has a third eye on top of its head. It has scales over it, so the tuatara can't see out of it, but the extra eye can *feel sunlight*. Some scientists think this third eye lets the tuatara know if it has had enough sunlight.

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The tuatara's third eye can actually feel the sunlight.

☉ Staying too long in the sun can be deadly

Animals that are **cold-blooded** like to lie in the sun. The energy from the sun helps them stay healthy and grow strong. The sun's energy keeps them warm while the energy they get from food helps them grow.

Tuatara cannot lie in the sun for too long however, as they will die if they get too hot and dry.

Using the sun's energy to move fast

A tuatara can move faster if it has been in the sun for awhile. On warm days tuatara get more energy from the food they eat and can use their muscles better. This helps them hunt at night, too.



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◎ Glossary

| | |
|-----------------------------|---|
| burrow | A hole or tunnel that an animal uses to live in. |
| cold-blooded animals | A group of animals that stay as warm or as cool as the air around them. They use the sun to keep them warm. Fish, frogs, reptiles and insects are cold-blooded animals. Scientists call these animals 'ectotherms'. Note: some fish and reptiles are very nearly warm-blooded (e.g. tuna keep warmer than the surrounding water). |
| hibernate | When an animal slows its body down into a kind of sleep, so that it is very still for a very long time. |
| nocturnal | To be busy at night and to rest during the day. |
| pant | When an animal breathes in short fast breaths to help it cool down. |
| reptile | An animal that is cold-blooded and has scales on its body. Most of these animals lay their eggs on land. Snakes, crocodiles, lizards, turtles, tortoises and tuatara are all reptiles. |
| scales | Bony plates that protect the skin on fish and reptiles. |
| sweat | Water that an animal's skin lets out to help cool the body down. |
| temperature | The amount of heat. |
| tuatara | A reptile that lives in New Zealand. It looks like a lizard but it comes from a different reptile group called Rhynchocephalia, or 'beak head'. Tuatara have soft spikes on their backs and a third eye. They come from a reptile group that lived on Earth before the dinosaurs. |
| warm-blooded animals | These animals keep their bodies warm all of the time. They do this by making heat inside their bodies. These animals also have hair or feathers. The proper science name for these animals is 'endotherms'. |