



**Fumaroles release steam that smells like rotten eggs**

**What has three hearts, 10 arms and eyes the size of frisbees?**  
Find out in this week's *UTV Alive for Kids* broadcast, featuring Professor Gretta Pecl, on Wednesday August 11, from 9:15am-10am.  
Register: <https://bitly.co/88hg>  
A recording will be made available on the Peter Underwood Centre website: <https://www.utas.edu.au/underwood-centre/projects-and-initiatives/uctv>

HAVE you ever visited a hot spring?  
There is something magical about them, particularly if they are the right temperature for people to swim in.  
Hot springs form where warm to very hot groundwater has made its way to the surface.  
This water might be heated by areas of volcanic activity, where magma (molten rock) is close to the Earth's crust, or by the Earth's molten core in deep underground reservoirs.  
We know the Earth's core is very hot - hot enough to melt rock.  
Hot, less dense water rises through cracks in the ground.  
Much like molten rock makes its way to the surface and escapes via a volcanic eruption (lava).  
When the water reaches the surface it forms hot springs, and other geothermal features - geysers, fumaroles and mud pits.  
Some of these geothermal features have become major tourist attractions.  
Old Faithful, a geyser in



**ATTRACTIONS:** Old Faithful, main picture, and Grand Prismatic Spring, inset, in the United States, and Waimangu Cauldron (Frying Pan Lake), New Zealand, above. Pictures: iStock/ BigshotD3/ Tom Mendola/ Fyletto

Yellowstone National Park in the US state of Wyoming, shoots up to 32,000 litres of boiling water in the air, and its eruptions can last for five minutes.  
Hot springs often contain large amounts of minerals, which feed

microorganisms, organisms that can only be seen through a microscope (some scientists believe hot springs are where life began on Earth).  
Grand Prismatic Spring, also in Yellowstone National Park, is

remarkable for its vivid colours. Ranging from green to red, the colours are caused by layers of microorganisms (mainly bacteria and archaea) around the edges of the pool.  
The amount of colour depends

on the levels of chlorophyll (green pigments) and carotenoids (yellow, orange and red pigments).  
The centre of the pool is sterile (free from bacteria) due to extreme heat.  
The largest hot spring in the world is Waimangu Cauldron (Frying Pan Lake) in Rotorua, New Zealand.  
Located in a volcanic crater, the lake covers 38,000 square metres and its acidic water maintains a temperature of 50-60 degrees Celsius.  
It was formed by the eruption of Mount Tarawera in 1886.  
While there is no active volcanism in Australia (with the exception of Heard Island and the McDonald Islands group), we still have our share of hot, or at least warm springs.  
The Hastings Caves State Reserve in southern Tasmania, features the largest cave in Australia that is open to visitors, and natural warm springs.

**Continued Page 2**





In hot, dry weather the water table falls below the surface.

Many years ago desert areas were covered in water

Desert areas can still have underground reservoirs

When rock wears the water rises to become as oasis

# Bath time for monkey

Picture: iStock/ AlexandorLaws

THERE are few things as pleasant as a warm bath - just ask the Japanese macaques at the Jigokudani Monkey Park in Nagano, Japan.

The macaques, commonly known as snow monkeys, are wild animals and come and go as they please.

But in winter, when the surrounding hills are covered with snow, they enjoy nothing more than a long soak in the

natural spring, known as an onsen.

As you can see from the photo above, they really do relax and enjoy the experience.

The macaques enter the water mainly in winter, and the really interesting thing is they observed humans bathing in the soothing waters for quite some time before curiosity got the better of them and they tested it out themselves.

Not that this should come as a great surprise, because the Japanese macaque is known to be a very intelligent species.

Researchers studying Japanese macaques at Koshima Island, in Japan, observed a female, known as Imo, washing her food in the river, rather than brushing off the dirt.

After a while others started to copy her

behaviour. Then Imo started dipping her food in salty seawater to season it, and once again others copied her behaviour.

Capybaras, a giant semi-aquatic rodent native to South America, also like to submerge themselves in the warm waters of an onsen and relax at the Izu Shaboten Zoo in Japan.

Macaques also roll snowballs for fun.

## Earth's pool of hot water energy

### From Page 1

The thermal springs feed a popular swimming pool, which was built in the early 1900s.

The temperature of the water is about 28 degrees Celsius.

At the Kimberley Warm Springs in North-West Tasmania, the water rises from about 350 metres below the surface into a natural pool with a constant temperature of about 25 degrees.

It is believed convicts from the nearby Mersey Probation Station once frequented the springs for a warm dip.

There are also a number of springs near Smithton.

'Geo' means earth, and 'thermal' means heat, so geothermal energy means heat found inside the Earth.

Many countries around the world use geothermal energy by digging wells deep into underground reservoirs to access the steam and hot water there, which can then be used to drive turbines connected to electricity generators.

In Iceland geothermal water is piped under roads and footpaths to melt ice and snow.

## Table of ideas in the groundwater challenge

HAVE you ever heard of the water table?

There are areas underground where soil and rock are permanently saturated with ground water.

This is called the 'saturated zone'.

The area directly below the surface of the Earth is called the 'unsaturated zone'.

This is where both water and air fill open spaces.

The depth of the unsaturated zone can vary from zero (where groundwater

reaches the surface) to more than 100 metres in deserts.

The water table is a boundary between the soil surface (unsaturated zone) and the saturated zone.

Below that is impermeable rock.

You can demonstrate groundwater yourself with a clear container, filled with several layers of sand and gravel.

Ask for an adult family member's permission and help if you are using a glass container, such as a vase.

Fill the container three-quarters full,

with alternating layers of sand and gravel.

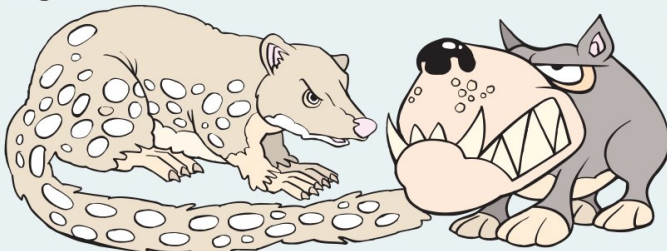
Then pour in water a small amount at a time, over several days if you like, and watch what happens.

Observe the water as it makes its way through small openings to it eventually reaches the bottom of the container, which represents the impermeable rock.

Children's University Tasmania members can earn stamps in their passports for this challenge, at the discretion of their school coordinator.

## Word CHANGER

Change one letter and arrange them on the next line to make a new word. Use the clues to help you change a spotted-tailed quoll into a Tasmanian devil. The answer is at the right.



Long, stiff feather	Q	U	O	L	L
Small game bird	_____				
Of the same size	_____				
What something is worth	_____				
Captive worker	_____				
Brides wear these	_____				

D E V I L

SOLUTION: QUOLL, quill, quail, equal, value, slave, veils, DEVIL.