



DESERT WORLD ACTIVITY
LIVING IN
THE DESERT



Jane Goodall's
Roots & Shoots



LIVING IN THE DESERT

In this activity your students will be looking at what makes a desert a desert. They will look at hot deserts (like the Arabian Desert) and cold deserts (like the Patagonian desert) and compare and contrast some of the animals that live there. Based on what they have learned they can then design their own fantasy desert animal!

IN THIS ACTIVITY YOU AND YOUR STUDENTS WILL:

- ▶ Learn about the definition of a desert.
- ▶ Learn about hot and cold deserts.
- ▶ Learn about the evolutionary adaptations that the animals have made to live in these different desert environments.
- ▶ Design their own fantasy desert animal.

OBJECTIVES

Carrying out this activity will help students learn about deserts and some of the animals that call them home. They will also learn about how animals cope with the heat and the cold and how this affects the way they look and behave.

You can also ask your class to design their own fantasy desert animal showcasing the special adaptations that they have learned about. These can be displayed in the classroom and uploaded to the Roots & Shoots UAE website to share with the world.

WHAT DO I NEED TO MAKE IT WORK?

You do not need anything special for the first part of this activity (which can be done in the classroom), just an internet connection to carry out some background reading, view pictures and watch some video segments.

To design their own fantasy desert animal your students can use paper and coloured pens/pencils, or why not incorporate craft materials to make the designs more exciting, or even make a 3-dimensional creature!

WHAT THINGS WILL MY STUDENTS CREATE?

- ▶ Drawings and/or models of a fantasy desert animal.

WHAT IS A DESERT?

Living in the UAE the word desert automatically conjures up a mental image of the vast expanses of the hot, sandy Arabian desert which covers the majority of the country. But not every desert is the same...

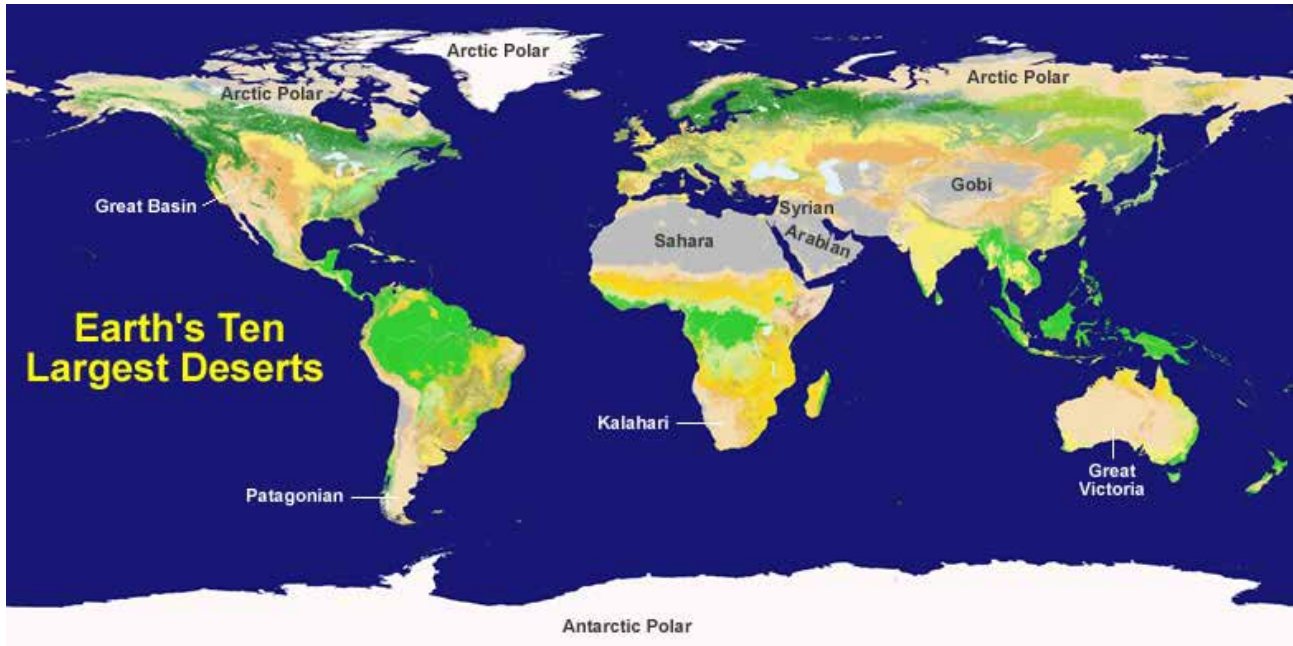
- ▶ First, ask your students what they know about the desert in the UAE. Ask them to describe it, and ask if anyone has visited the desert. What was it like? What could they see? What did they feel? Record their observations on a whiteboard or big piece of paper in the form of keywords like 'hot', 'sandy', 'camels', etc. Keep prompting the students until you have a number of different keywords that includes 'dry' (you may have to add 'dry' yourself if the students are not forthcoming).
- ▶ Ask the students which **one** keyword from the list is the thing which makes the desert a desert. You can run a 'hands up' vote to do this and record the results alongside the keywords.
- ▶ Reveal to the students that the correct keyword is 'dry'.

A desert can be defined as follows (taken from Wikipedia – goo.gl/BX92BQ):

“A desert is a region of land that is very dry because it receives low amounts of precipitation (usually in the form of rain but may be snow, mist or fog), often has little coverage by plants, and in which streams dry up unless they are supplied by water from outside the area. Deserts can also be described as areas where more water is lost by evapotranspiration than falls as precipitation. Deserts generally receive less than 250mm of precipitation each year.”

Depending on their age, this full definition may be a little confusing for your students, but the key point is that the lack of water is the only thing which defines a desert; not heat, sand or anything else.

HOT AND COLD DESERTS



Location of the world's largest deserts, from geology.com goo.gl/IMv7Ou

The desert in the UAE is part of the large, hot Arabian desert. As a contrast we are also going to look at the cold Patagonian desert in South America.

- ▶ Show the students some pictures of the Patagonian desert. Google image search is good for this – here is a direct link: goo.gl/JblOKN
- ▶ Compare them to images of the Arabian desert (Google image search link: goo.gl/FgSem5)
- ▶ Ask them what things look the same (sand, dust, rocks, not much vegetation) and what looks different (colours, mountains, snow).
- ▶ Tell the students that the temperatures are very different – the average temperature in the UAE desert is 27°C in the winter and often exceeds 40°C in the summer. The average temperature of the Patagonian desert is just 3°C and it rarely gets hotter than 12°C. Ask the students if they can imagine what 3°C feels like. This is about the temperature of a normal food refrigerator!

You can find more information on Wikipedia about the Arabian desert here: goo.gl/56ck14 and about the Patagonian desert here: goo.gl/gTtJyD

ANIMALS OF THE DESERT

So far in this activity we looked at the similarities and differences between the environment of the Arabian and Patagonian deserts.

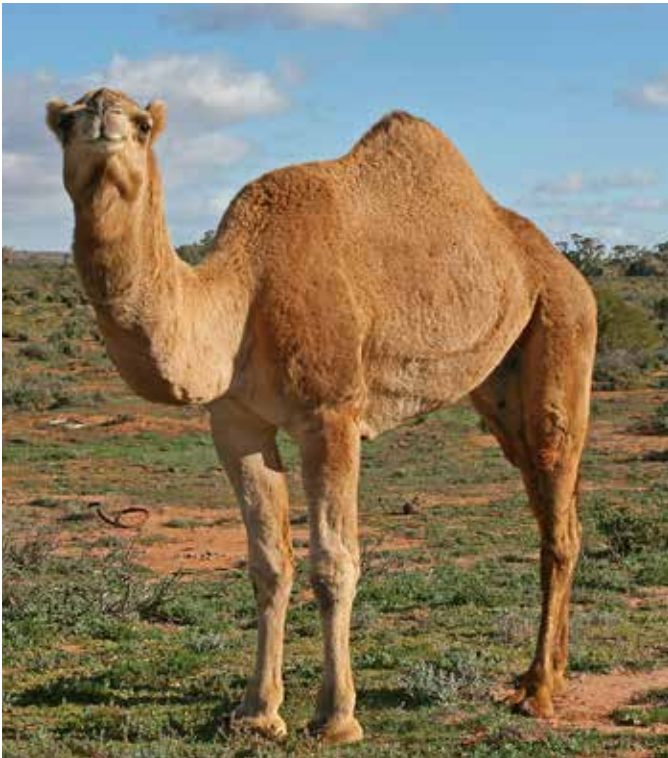
Here is a summary:

Main Similarities	Biggest Differences
Dry	Hot (Arabian) vs cold (Patagonian)
Little vegetation	Altitude (Patagonia is generally much higher than the Arabian desert)
A mixture of sandy, dusty, and rocky substrates	

In this section we will look at some animals from the Arabian and Patagonian deserts. As animals evolve to suit their environment we might expect to see animals in both places that have similar adaptations to living in dry, dusty/rocky environments with little vegetation. We should also be able to see different adaptations to cope with the different temperatures. We've hand-picked some paired examples below, one from the Arabian desert and one from the Patagonian desert in each pair. You can show these to your class and discuss the similarities and differences in the animals. You can also find lots more animals from both deserts online – here are some links to get you started:

- ▶ Animals of the sand dunes of the Arabian desert on arkive.org: goo.gl/qRdtJZ
- ▶ Animals of the wadis and mountains of the Arabian desert on arkive.org: goo.gl/bwa3X5
- ▶ Animals and plants of Patagonia: goo.gl/DTkQ4h and goo.gl/GMgi0o

ARABIAN (AMEL (DROMEDARY) VS. GUANACO



Dromedary camel in outback Australia, near Silverton, NSW. By Jjron (Own work) [GFDL (<http://www.gnu.org/copyleft/fdl.html>) or CC-BY-SA-3.0 (<http://creativecommons.org/licenses/by-sa/3.0/>)], via Wikimedia Commons



Guanaco de San Carlos. By xxxx [CC BY-SA 2.0 (<http://creativecommons.org/licenses/by-sa/2.0/>)], via Wikimedia Commons

The Arabian camel or dromedary (goo.gl/WrAktG) with its distinctive single hump is probably already well known to your students. The guanaco (goo.gl/mnL0oo) is a distant relative of the dromedary (they are both camelids) that can be found in Patagonia. They look similar, have similar vegetarian diets and both are great at extracting water from sparse vegetation and storing it in fat for later use. Their hooves are well adapted to travelling on uneven, stony ground. So what are the differences?

- ▶ The dromedary stores its fat in a very visible hump, whereas with the guanaco it is spread throughout the body. The all over fat layer is like a jacket and is great at keeping the guanaco warm whereas putting most of the fat in a hump helps keep the dromedary from overheating.
- ▶ The guanaco has a 'double-coat' with a layer of very fine hair underlying the more obvious 'guard hairs'. This helps keep them warm. You can see some of this on the underside of the guanaco in the picture.
- ▶ Not visible in the picture, the guanaco has far more red blood cells than most other mammals (a teaspoon of guanaco blood contains about 68 billion red blood cells – four times that of a human). This makes it easier for them to survive at high altitudes where there is less oxygen.

CAPE HARE VS PATAGONIAN MARA



Cape Hare (Lepus capensis arabicus). By Shah Jahan (Own work) [CC BY 3.0 (<http://creativecommons.org/licenses/by/3.0/>)], via Wikimedia Commons



Patagonian Mara at Temaiken Zoo, Argentina. By Luis Argerich derivative work: Snowmanradio [CC BY 2.0 (<http://creativecommons.org/licenses/by/2.0/>)], via Wikimedia Commons

The Cape hare (goo.gl/leVmqC) is a widespread and abundant hare in the Arabian desert that is well adapted to living in arid and desert environments, with a low metabolic rate, concentrated urine (to minimise water loss), and the ability to drink more saline water than other hares. Unlike other hares they are also known to occasionally dig burrows. The Patagonian mara (goo.gl/reeQ5H) is not very closely related to the hare but it occupies a similar ‘ecological niche’ – i.e. it lives in a similar environment, acts in a similar way and eats similar food. Because of this they have ended up looking quite similar. Like the hare the mara can use its strong back legs to run very quickly for short distances and digs burrows with front legs adapted for burrowing. They both have long thin faces (this positions the eyes on the sides to give better all-round vision so they can spot predators) and whiskers that help them to judge the size of small gaps in vegetation, rocks and burrows. Some differences are:

- ▶ The cape hare has much bigger eyes than the mara (compared to the size of its body). The cape hare is mainly active at night when it is cooler, so therefore needs to make the most of the available light. The mara is mainly active during the day.
- ▶ The cape hare has enormous, thin ears. These ears are packed full of veins, bringing their blood close to the surface which helps them cool down. The cold-living mara has much smaller ears.

SAND CAT VS GEOFFROY'S CAT



Sand cat (*Felis margarita*). By TimVickers (Own work) [Public domain], via Wikimedia Commons



Geoffroy's Cat. By Charles Barilleaux from Cincinnati, Ohio, United States of America [CC BY 2.0 (<http://creativecommons.org/licenses/by/2.0>)], via Wikimedia Commons

Both the sand cat from Arabia (goo.gl/k3Z3hO) and the Patagonian living Geoffroy's cat (goo.gl/75jGRU) are predators that feed on small creatures such as rodents, birds and reptiles. They are both solitary hunters, hunt primarily at night and are both around the same size as a domestic cat (the sand cat is slightly the smaller of the two). Like many predators, both cats have forward facing eyes and mobile, triangular ears that help them to locate their prey. So what is the difference between the two?

- Unlike most cats, the sand cat has thick hair on the pads of its feet. Thick hair may at first sound like a strange adaptation for an animal that lives in the hot desert, however, it's the position of the hair that is important here. The thick hair acts like a pair of sandals when you are on the beach, protecting the cat's paws from being burnt by the hot sand.

ARABIAN SAND GECKO VS DARWIN'S MARKED GECKO



Arabian sand gecko (*Stenodactylus arabicus*). By Todd Pierson [CC BY-NC-SA (<http://creativecommons.org/licenses/by/2.0>)], via iNaturalist.org



Darwin's Marked Gecko (*Homonota darwinii*). By Leandro Alvarez [CC BY-NC-SA (<http://creativecommons.org/licenses/by/2.0>)], via iNaturalist.org

The Arabian sand gecko (goo.gl/wiVteq) and Darwin's marked gecko (goo.gl/PPsCiD) are both small lizards with large heads and large eyes which feed mainly on insects. Lizards are a type of reptile and are ectothermic (goo.gl/pRq0wI) meaning that they generate very little body heat and are reliant on the environment to keep them warm. So, what are the differences?

- ▶ Because of being ectothermic, reptiles (including geckos) are far less common in the cold Patagonian desert than in the hot Arabian desert, and tend to only be found in the warmer fringes.
- ▶ The Arabian sand gecko is unusual because of its webbed front feet. As well as making it easier to walk on soft sand, the webbed feet also make it easier for the gecko to burrow quickly into the sand to escape the heat!

A different lizard, the shovel snouted lizard of Namibia also burrows to avoid the heat and is famed for its 'heat dance'. This short (3:22) video on YouTube shows both these behaviours: goo.gl/z3uuq8

DESIGN A FANTASY DESERT ANIMAL

Now we've learned about the adaptations that the real animals have made to thrive in their different environments it's time to design our own fantasy animal!

- ▶ First, decide if the students are going to work individually or in groups
- ▶ Each student/group should decide if they are going to design a cold desert or warm desert fantasy animal
- ▶ Each student/group should decide what sort of fantasy animal they will design. Is it big or small? Mammal, reptile, amphibian or insect? What does it eat? Is it predator or prey (or both, like the geckos)?
- ▶ Now they should make a list of all the adaptations that might apply to the fantasy animal. Forward-facing eyes to chase its prey or sideways to spot the predators? Big ears and nocturnal to escape the heat or diurnal and wooly to keep warm? Remember that there are other ways to keep cool that we haven't looked at here so far (humans sweat, dogs pant, etc.) so encourage them to be creative. As it's a fantasy animal you don't have to be too restrictive here, it could be something we don't normally see in nature.
- ▶ Make a picture or collage of the fantasy animal and write a profile that explains why it has the features that it has. For example, 'it has a thick layer of fat to keep it warm' or 'it can burrow really quickly to escape the heat'.
- ▶ Don't forget to give each fantasy animal a name.
- ▶ Display the finished pictures and profiles on the classroom wall!

TELL US HOW YOU GOT ON!

When your fantasy animal pictures and profiles are finished, we'd love to see photos of them! If you already have an account you can upload a story with images to Roots & Shoots UAE (www.rootsnshoots.ae) and create an online gallery on the website. If you don't already have an account then just send us an email to MrH@rootsnshoots.ae and we can set you up.

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As well as the website at www.rootsnshoots.ae you can also find us on Facebook at <https://www.facebook.com/RootsnShoots.ae> or on Twitter as [@JaneGoodallUAE](https://twitter.com/JaneGoodallUAE)

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