



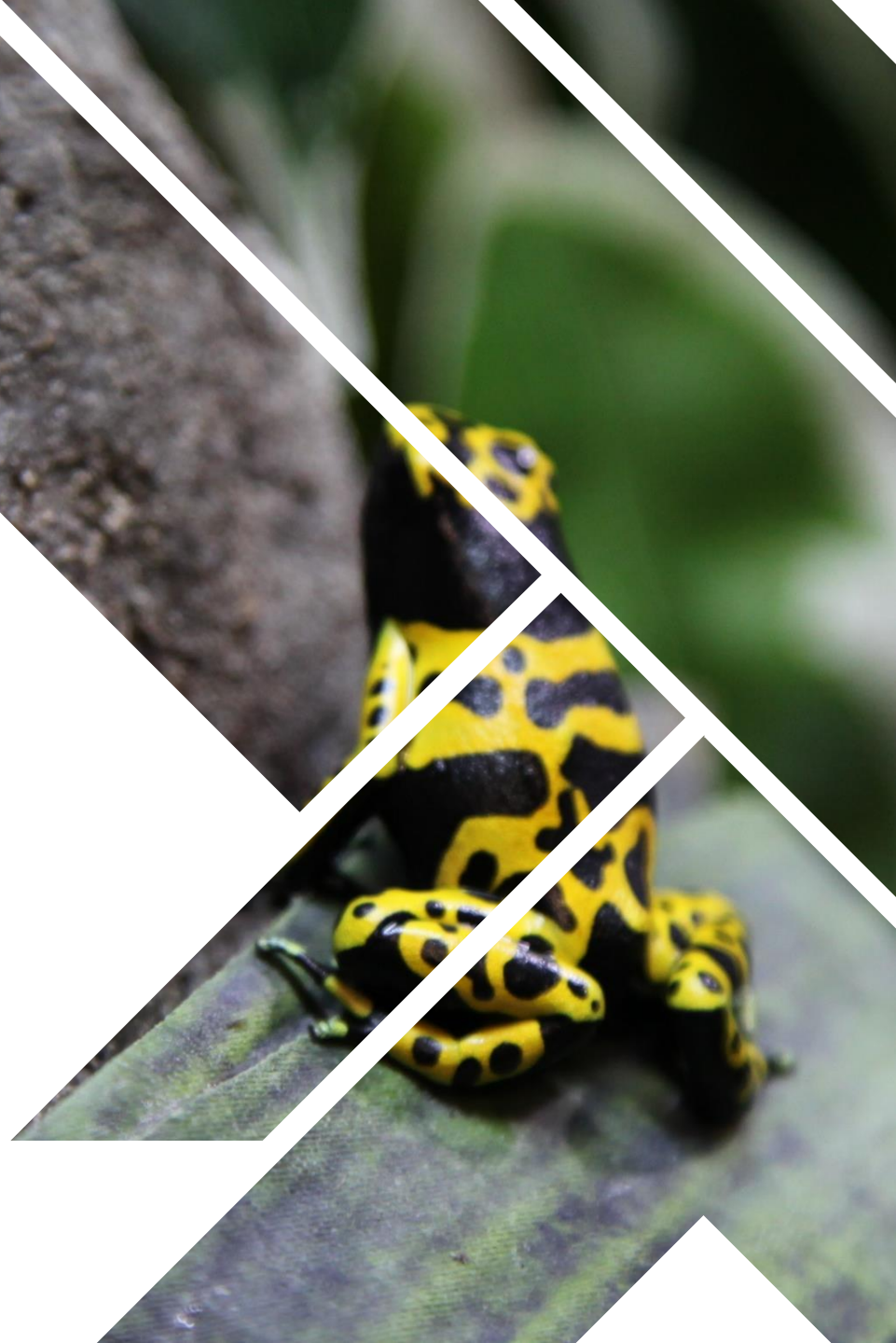
IMAGINE

PARK LIFE 2.0

Secondary Smart
Conservation Lessons 1 & 2

> an RS Components **ImagineX** resource

LESSON 1



What does it
mean to be...

ENDANGERED?

??



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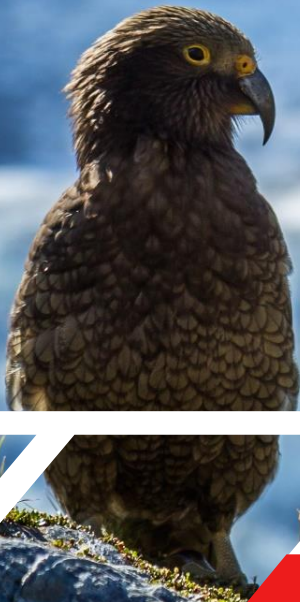




Endangered animals are...

“A species at serious risk of extinction”

(this means **dying out completely**)



> We recently lost...

- **Spinx Macaw** (Blue Parrot native to Brazil – star of the film 'Rio') in 2018
- **The Fishing Cat** (native to the Island of Java, South East Asia) in 2017
- **The Blue-tailed Skink** (native to Christmas Island, Northwest Australia) in 2017
- **Nullarbor Dwarf Bettong & Desert Bettong** (native to Australia) in 2016

The current '**rate of extinction**' is **1000** times higher than it should be naturally.



Why is this?





Why do animals become endangered?



Habitats are being destroyed (e.g. deforestation)

Hunting and poaching

Over-harvesting

Illegal pet trade

Being displaced/forced to live in the wrong habitat

Pollution

Climate change

Q: What do these all have in **common**?

A: They are all caused by **'human activity'**



Lets talk about...

ZOOS

> With a little bit of help from...



WEST MIDLAND
**SAFARI
& LEISURE
PARK**

DISCOVER IT ALL



Why do some people not like zoos?

- Animals are kept in **cages**
- Animals are not in their **natural** environment
- Animals are being used for **entertainment**
- Not all animals **breed well** in zoos
- They believe it's better to help animals in the **wild**





Research

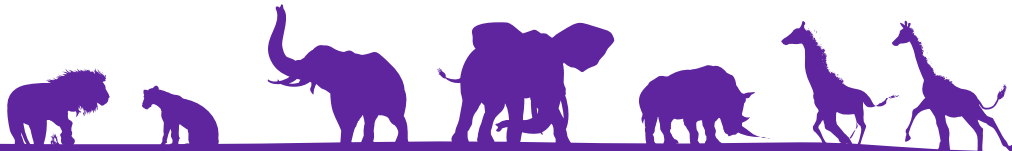
Education

Conservation

??

Why do we need zoos?

??



Zoos are for: Research

- **Studying** breeding patterns and behaviours
- Being wise to '**red flags**' and signs of endangerment
- **Developing:**
 - Better methods of care
 - Better medicines
 - Better ways of helping animals in the wild



Zoos are for: Education

- Teaches people all about animal **appreciation** and **respect**
- Spreads awareness of **how** and **why** animals become endangered
- **Encourage** the preservation of wild habitats
- Change individuals' behaviour by **encouraging**
 - Recycling
 - Reduction of waste
 - Animal care



Did you know?

Most zoos put the money they make from selling tickets back into research and conservation



Zoos are for: Conservation

- **Preservation** through captive breeding programmes (such as the lemurs and the bats)
- Animals are donated to other zoos so they can start their **own** breeding programmes
- If their natural habitats are suitable, release back into the **wild**



Did you know?

Zoos are the main reason many animals have been saved from extinction





Conservation can mean: Captive breeding



Successful techniques include:

- Natural breeding programmes
- Artificial incubation
- Cross fostering
- Surrogate incubation/embryo transfer
- Artificial insemination



Captive breeding

There have been some major captive breeding successes, saving hundreds of species from extinction. These include:

- Przewalski's horse
- Golden lion tamarin
- Oryx
- Ne-Ne
- European bison
- Mauritius kestrel
- Black-footed ferret
- Bali starling
- Rockhopper penguins

Did you know?

The extremely successful captive breeding of Rockhopper Penguins took place at **Drusillas Park!**

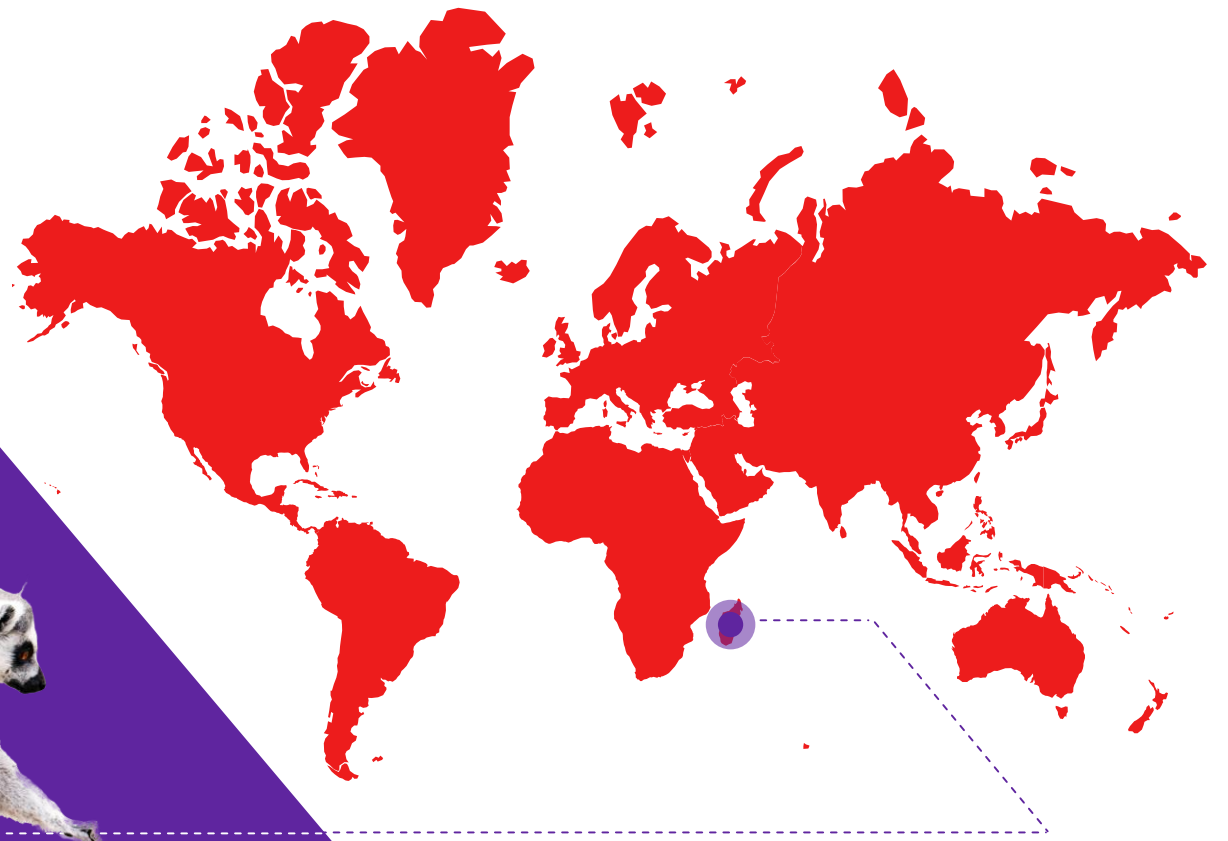
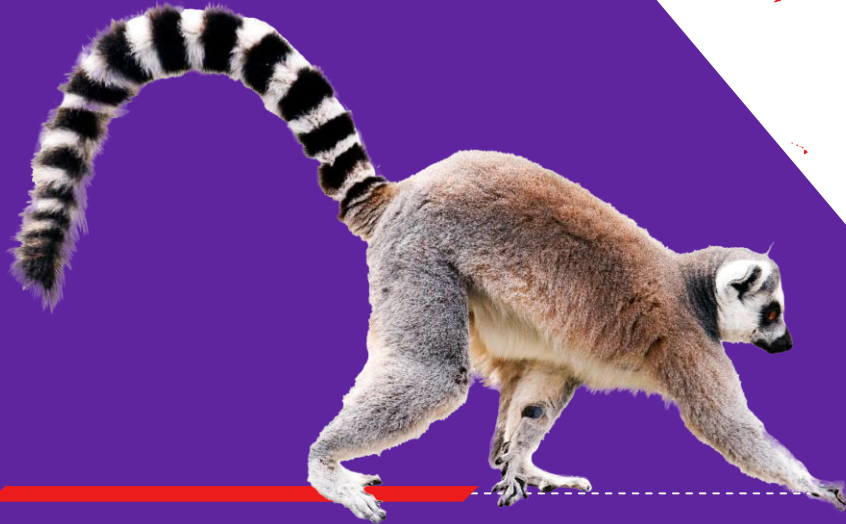
Not only that, but the **West Midlands Safari Park** is currently taking part in **25** captive breeding programmes.



IMAGINE

**[PLAY INTRO VIDEO
FOR DRUSILLAS PARK
– COLIN - RS HEROES]**

Ring-tailed Lemur!



Location: South Madagascar

Habitat: Hot, scrubby, tropical forests (18 to 29°C)

Diet: Flowers, leaves, insects (omnivorous)

FACT: Lemurs have become endangered due to habitat destruction. Thankfully, they breed well and live happily in captivity, as long as their enclosure is just right



What do you need to be a healthy, happy lemur?

- Lots of sunlight
- Lots of exercise outdoors
- Lots of other lemurs to socialise with
- Warm indoor enclosures
- Forest-like settings





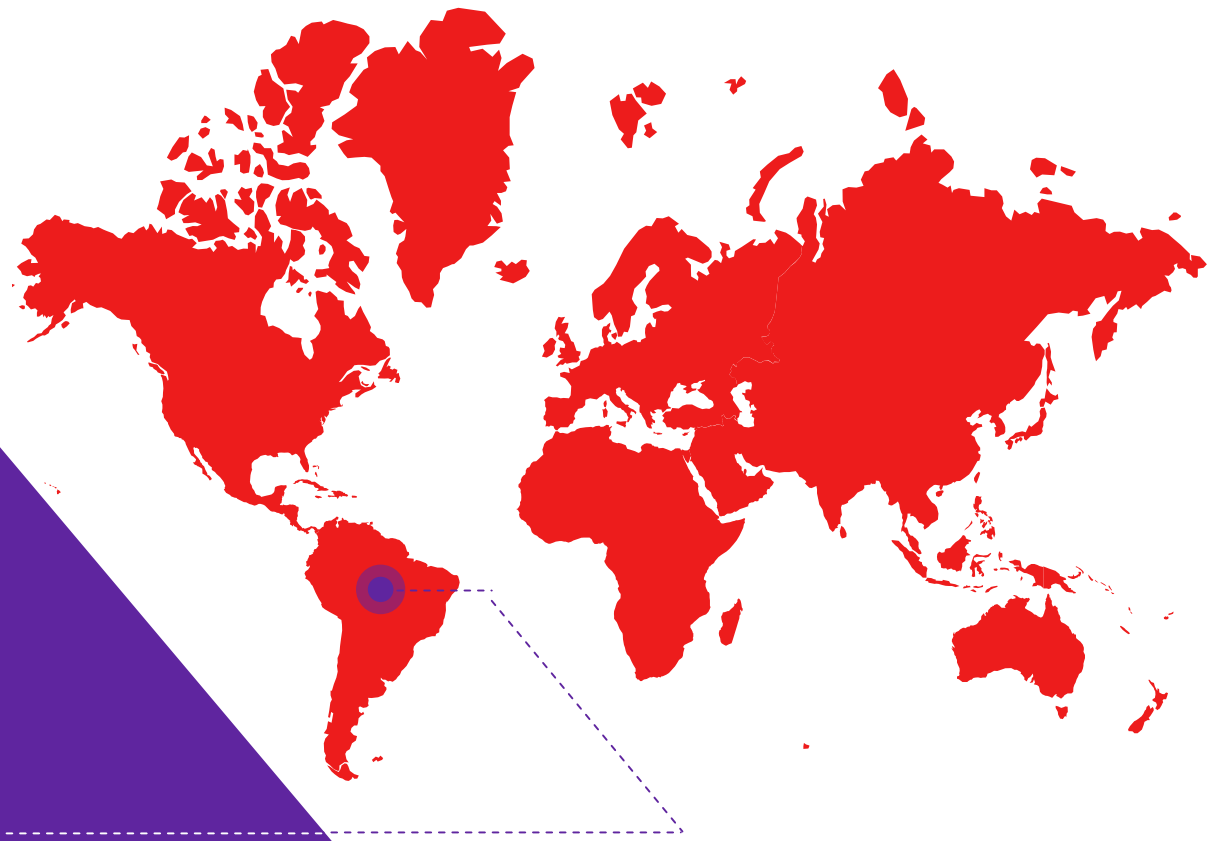
Two-toed Sloth!

Location: Amazon Rainforest (South America)

Habitat: Humid rainforest canopies (24 to 33°C)

Diet: Buds, shoots, leaves, fruit (herbivorous)

FACT: Sloths are the slowest-moving mammals out there. They live in the canopies of trees (and are almost always hanging upside down) and are threatened by deforestation. They have very low body temperatures too, so need to conserve energy and stay warm



What do you need to be a healthy, happy lemur?

- Lots of sunlight
- A very warm, humid enclosure
- Lots of trees and branches to hang from
- Indoor and outdoor areas
- Places to hide and sleep



Humboldt Penguin!



Location: the coasts of Chile and Peru (South America)

Habitat: Rocky islands and coasts (0 to 20°C)

Diet: Small fish (carnivorous)

FACT: These super social penguins nest in 'guano', or old bird droppings – which is a popular fertiliser. This means their habitat is threatened, and they find it difficult to breed. They are now classed as 'vulnerable' with only 12,000 left in the wild, but thrive in captivity

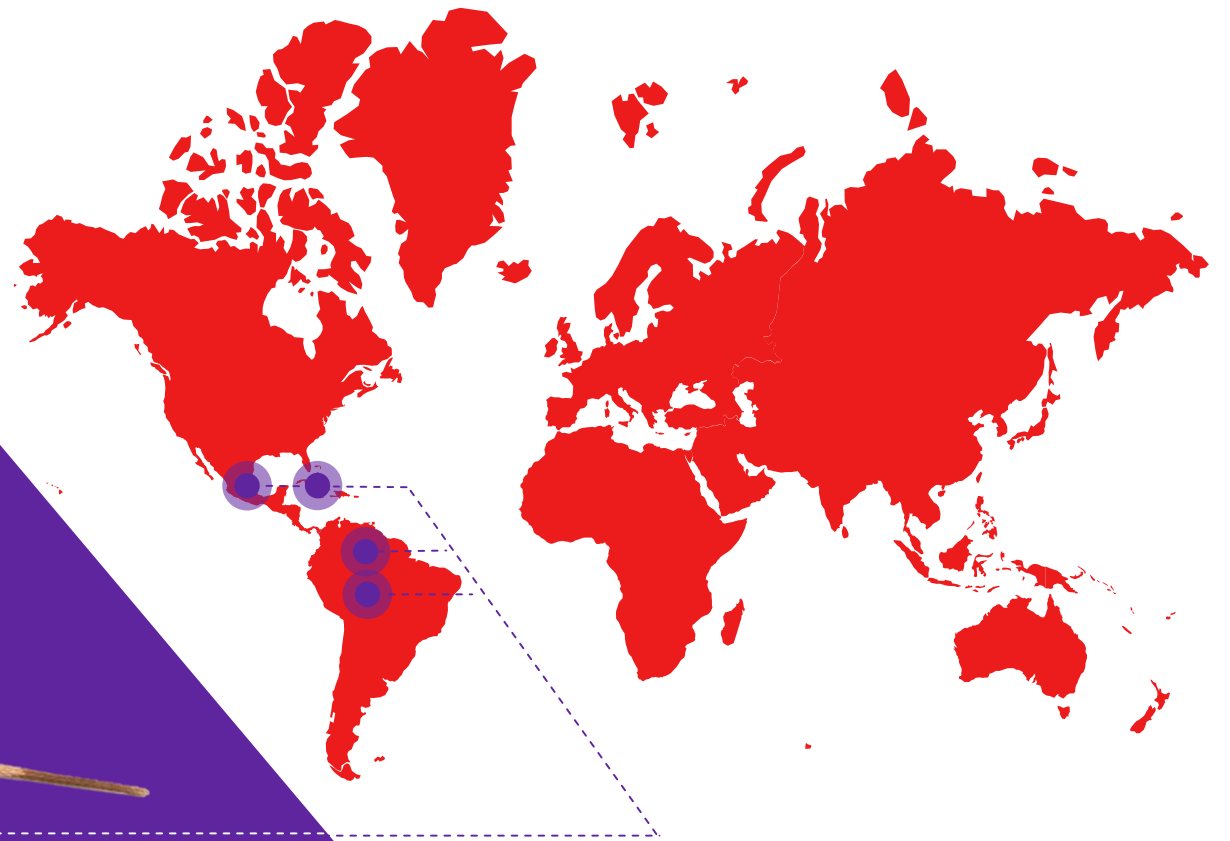


What do you need to be a healthy, happy penguin?

- Cold, deep water to swim in
- Hot rocky ground to nest in
- Tunnels to hide in
- Lots of other penguins to socialise with



Green Iguana!



Location: Rainforests across Central and South America and the Caribbean Islands

Habitat: Humid rainforest canopies (23 to 37°C)

Diet: Flowers, fruit, leaves, shoots (herbivorous)

FACT: The solitary Iguana can grow up to 1.8m in length, with a tail that can break off and regrow if grabbed. Iguanas are popular as pets, but sadly often don't live very long due to needing very special care. They are getting rare in the world, but thrive in captivity

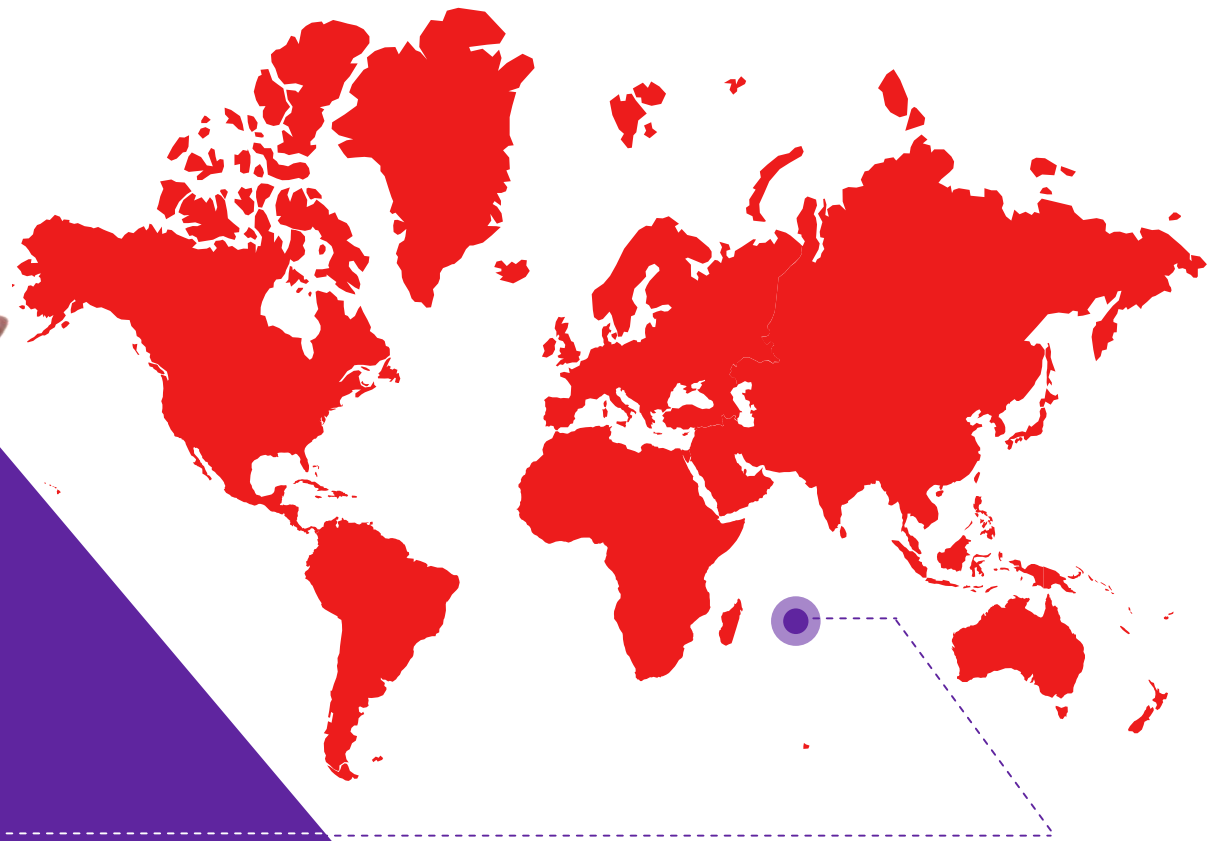


What do you need to be a healthy, happy iguana?

- Lots of branches for climbing and shedding
- A hot, humid environment
- Hot rocks to warm up on
- Cool spots to cool down on
- Damp places to hide



Rodrigues Fruit Bat!



Location: Rodrigues Island (in the Indian ocean)

Habitat: Dark, damp caves (21 to 32°C)

Diet: Flowers and fruit (herbivorous)

FACT: Also known as 'flying foxes', these sociable nocturnal fruit bats are a big conservation success story. They were saved from extinction, going from just 100 in the wild to 4,000 thanks to a captive breeding and release programme

What do you need to be a healthy, fruit bat?

- A dark enclosure (even during the day)
- A damp and warm place to sleep
- Places to hang upside down
- Space to fly around
- Lots of other fruit bats to socialise with



OPTION 1...

(using the internet)

Chose a new endangered animal, and find out...

- Why that animal has become extinct
- How many are left
- What their natural environment is
- What their needs are
- Ways that environment can be recreated artificially



OPTION 2...

(without using the internet)

With your assigned animal, start thinking about ways you could help recreate their natural environment, in order to start a captive breeding programme.

Think about:

- Natural habitat
- Diet
- Sociability
- Reasons for being endangered



Ring Tailed Lemur Tech

Wild location: South Madagascar

Habitat: Hot, scrubby, tropical forests (18 to 29°C)

Social status: Very sociable

At West Midlands Safari Park:

ENCLOSURE

- Big open space with an electric fence and double doors to prevent escapes, with real trees to climb in
- Both Indoor and outdoor areas with flaps in between, so they can come in and out at their leisure
- Lots of other lemurs (both the same and different species with the same need)

LIGHT

- Natural light outdoors
- Dimmed electric light indoors

AIR

- Natural

HEAT

- Outdoor mini shelters with heatlamps
- Electric heaters indoors - thermostat at 23-25C and sensors to monitor the ambience



**Keeper
Lucy says:**

“Lemurs love to hang out together, and will snuggle up, wrapping their tails around each other to keep warm.”

Two Toed Sloth Tech

Wild location: Amazon Rainforest (South America)

Habitat: Humid rainforest canopies (24 to 33°C)

Social status: Somewhat sociable

At Drusillas Park:

ENCLOSURE

- Both indoors and outdoor areas (mostly indoor) large spaces so each sloth can spend time alone
- Natural trees to climb in outdoors and indoors – high branches
- Double door system to prevent escapes

LIGHT

- Natural light outdoors
- Slightly dimmed electric light indoors

AIR

- Humid indoors – spray system set to a timer
- Natural outdoors

HEAT

- Outdoor mini shelters with heatlamps
- Electric heaters indoors - thermostat at 29 ° C and sensors to monitor the ambience



Humboldt Penguin tech

Wild location: The coasts of Chile and Peru (South America)

Habitat: Rocky islands and coasts (0 to 20°C)

Social status: Very sociable

At West Midlands Safari Park:

ENCLOSURE

- Indoor and outdoor enclosures (mostly outdoor) with a big salt water pool (3m deep)
- Use three different filters on the water:
 - Chlorine
 - Ozone
 - UV
- Water density measured with a hydrometer

LIGHT

- All natural – indoors and outdoors

AIR

- Outdoor air temperature

HEAT

- Indoor heat lamps, up to 15-16°C degrees max
- Water unheated



Keeper Vicky says:

“We use three tonnes of salt in the water and filter it three different ways to make sure it’s free from ‘heavy metals’. The rocks we use are very close to the ones they have in the wild, and will keep them from getting problems with their feet.”

Green Iguana Tech

Wild location: Rainforests across Central and South America and the Caribbean Islands

Habitat: Humid rainforest canopies (23 to 37°C)

Social status: Very solitary

At West Midlands Safari Park:

ENCLOSURE

- Fully enclosed – tall glass vivariums with large pools
- Live plants

LIGHT

- Basking spots at safe distances, with both UVA and UVB lamps and heat lamp in different places (emulating 'full sun', 'evening sun' and cool spots for 'night time')
- Bigger wattage bulbs for bigger reptiles, smaller wattage for smaller ones
- UV metres next to each spot to measure the light levels

AIR

- A spray system on a timer for high humidity
- Humidity measured by a hygrometer

HEAT

- White heat lamps at appropriate 'basking distances' controlled with a thermostat
- Temperature gauge next to each spot to measure ambience



Keeper Steve says:

“Different reptiles need different conditions to survive and there is a big difference between jungle and desert habitats. Both are hot – but one is very dry, and the other very humid.”

Fruit Bat Tech

Wild location: Rodrigues Island (in the Indian ocean)

Habitat: Dark, damp caves (21 to 32°C)

Social status: Sociable

At West Midlands Safari Park:

ENCLOSURE

- Fully enclosed cave-like room with solid walls
 - free roaming
- Double doors to prevent escapes

LIGHT

- Dimmed lights during 'night time' bright lights for 'day time' (usually in reverse)
- Green lights for stimulation (differences in spectrum)

AIR

- Reverse air system
- Big pool for humidity (regularly filtered – complete with catfish and rays)

HEAT

- Kept at a consistent 25 °C using electric heaters
- Monitored using temperature gauges
- Pool is heated for the fish, and the humidity



Keeper Amy says:

“We and control the light so it’s the opposite of the way it is outside, at a 12 hour difference. That way, the visitors can see the bats when they think it’s night time, and they can get some sleep when they think it’s the day.”

Homework

Research your own endangered animal.

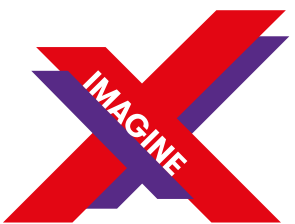
Find out:

- Why that animal is endangered
- How many are left in the wild/in captivity
- What their natural environment is and where
- What their needs are (in both the wild and in captivity)





SEE YOU IN LESSON 2!



LESSON 2





Endangered animals are...

“A species at serious risk of extinction”

(this means **dying out** completely)

The current '**rate of extinction**' is **1000** times higher than it should be naturally.





Why do animals become endangered?



Habitats are being destroyed (e.g. deforestation)

Hunting and poaching

Over-harvesting

Illegal pet trade

Being displaced/forced to live in the wrong habitat

Pollution

Climate change

Q: What do these all have in **common**?

A: They are all caused by **'human activity'**



??

Why do we need zoos?



Research

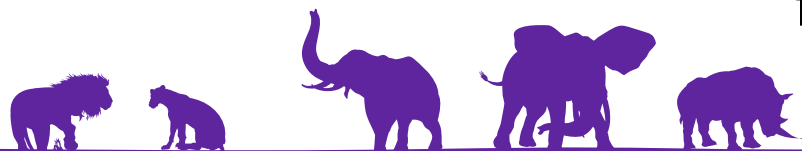
Education



Conservation

In order for the animals in the care of zoos to be happy and healthy, their natural environments need to be replicated as closely as possible.

There are lots of ways to do this, including making use of the technology available for **'smart enclosures'**.



Your own research

What did you find out about:

Why that animal is endangered

How many are left in the wild/in captivity

What their natural environment is and where

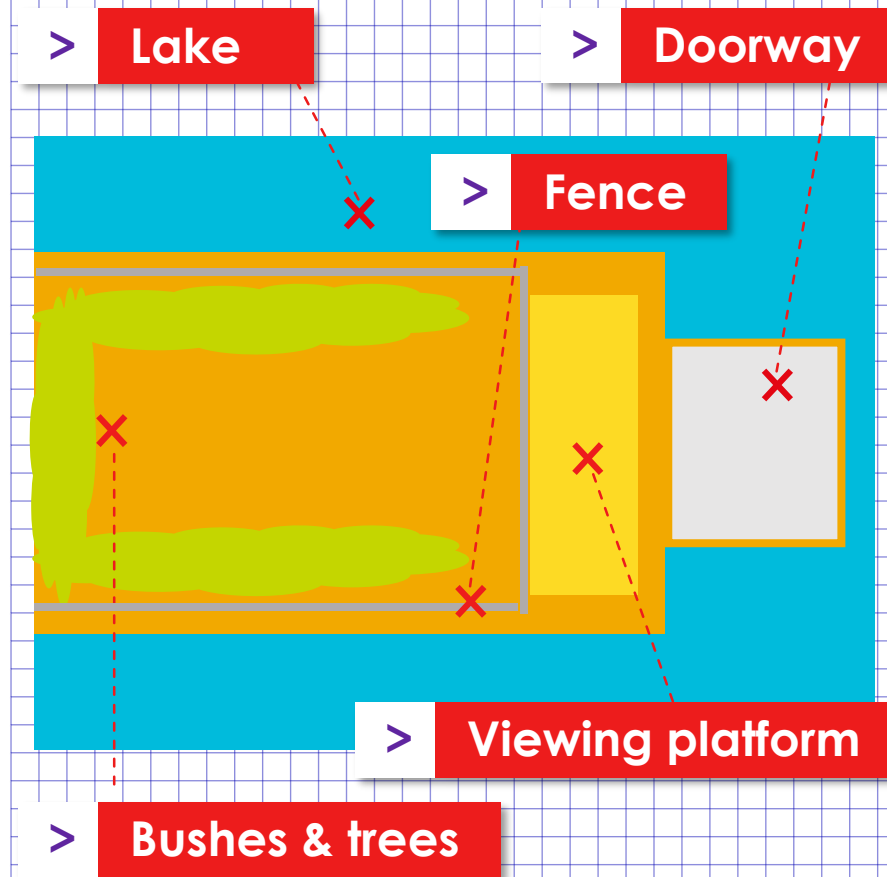
What their needs are (in both the wild and in captivity)



When designing an enclosure for an exotic animal...

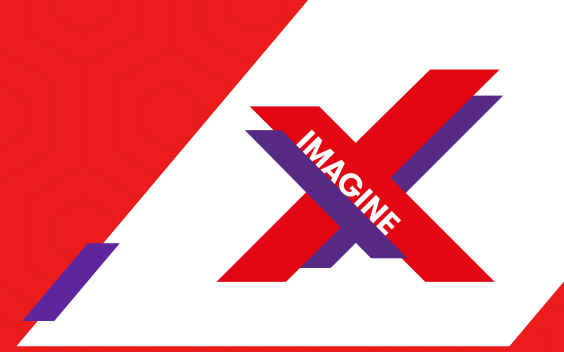
- Outdoors or indoors (or both)?
- Light or dark?
- Dry or wet?
- Humid or fresh?
- Hot or cold?
- Big or small?
- Enclosure features (trees, rocks, pools etc.)

> Sample zoo enclosure





Smart Enclosures:



Which animals need which tech?

Hygrometers
 Water filters
 UV monitors
Water heaters
 Indoor electric heaters
 White heat lamps
Indoor heat lamps

UVA
Lamps
 Temperature gauges
 Double doors

Electric fences
 Spray system
 Thermostat
 Hydrometers
 UVB Lamps
Outdoor
electric
 Water filters

Think about... technology

- ENCLOSURE

> Air

- LIGHT

> Light

- AIR

> Heat

- HEAT

> Light

> Air

> Sample zoo enclosure

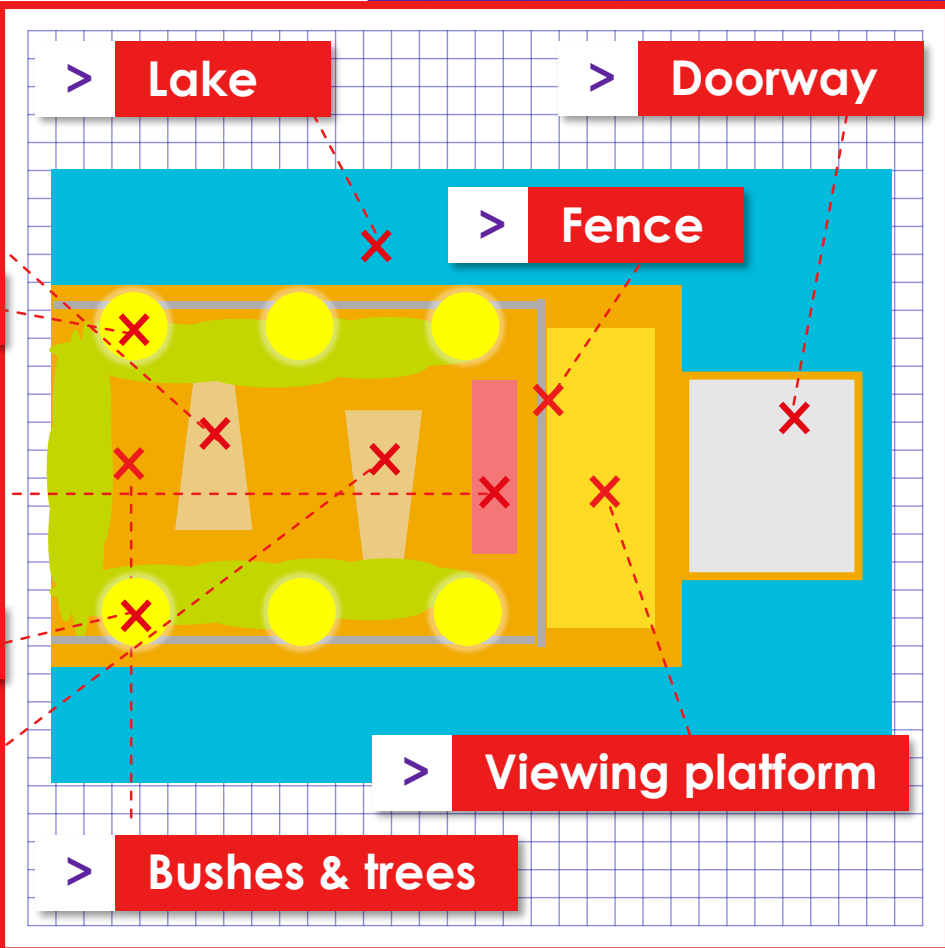
> Lake

> Doorway

> Fence

> Viewing platform

> Bushes & trees



ADAPT & AMEND

What would need to
× change if your enclosure
was needed for a captive
breeding programme?



Think about...

> The size of the enclosure

> The needs of the baby animals – are they different?

> The needs of 'mating pairs'

> Allowances for different captive breeding techniques



'Smart conservation' is...



... using innovative technology and techniques to improve the chances of a species' survival, both in captivity and in the wild.



STEM in zoos

There will be jobs for:

- Electricians
- Plumbers
- Mechanical engineers
- Software developers
- Design engineers
- Who else?



Making a wild difference

The best habitat for an animal is its natural one. You could help preserve them through:

- Recycling
- Reducing waste
- Ethical consumption
- Pressure on government bodies



Think about



How **you** could help preserve the natural environment of...



- Ring-tailed Lemurs
- Two-toed Sloths
- Green Iguanas
- Humboldt Penguins
- Rodrigues Fruit Bat
- Rodrigues Fruit Bat
- Other endangered animals?





IMAGINE

x



an RS Components **ImagineX** resource