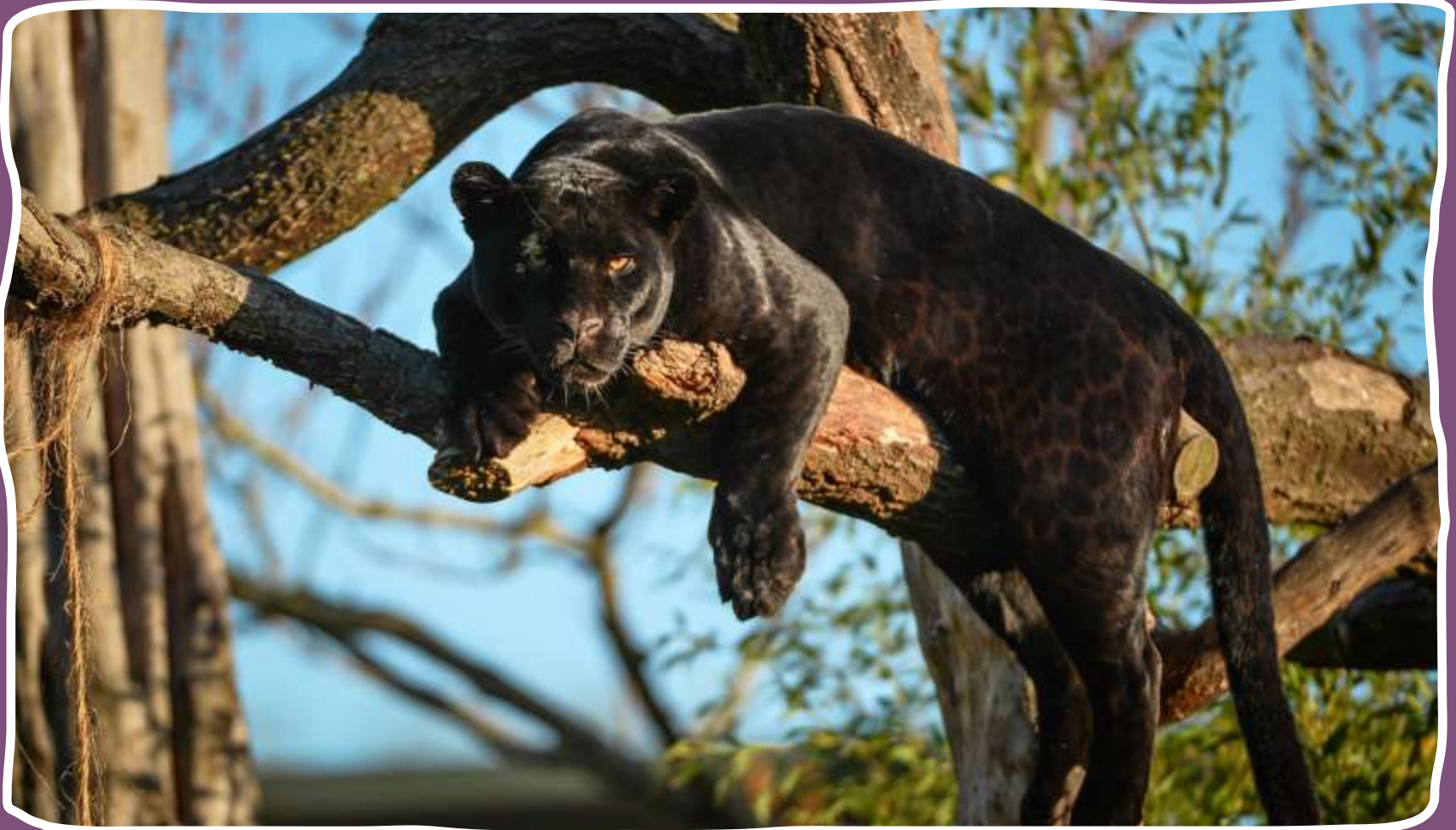


CASE STUDY: MELANISM IN JAGUARS



@LearnatCZ

CHESTER ZOO

Jaguars

- Only member of ***Panthera*** found in the New World
- **Apex predator**
- Adapted to **rainforest** habitat
- Coat patterns help to **camouflage**
- Population is **declining**
- **Threatened** by:
 - Deforestation
 - Habitat fragmentation
 - Poaching
 - Human-wildlife conflict



Genetics Recap



DNA

- Base pairs coiled into tight strands called chromosomes

Chromosomes

- Inherited from parents

Base Pairs

- Paired nucleotides. Adenine and thymine, guanine and cytosine

Mutations

- Changes to the base pairs

Genes

- Short sections of protein coding DNA

Alleles

- Different forms of the same gene



Dominant allele

- Displays phenotype in heterozygous individuals

Recessive allele

- Only expresses phenotype in homozygous recessive individuals

Homozygous

- Two identical forms of a gene; one inherited from each parent

Heterozygous

- Two different forms of a gene; one inherited from each parent

Genotype

- The genetic makeup of an individual

Phenotype

- The physical expression of the gene (e.g. coat colour)

Inheritance in Jaguars

- There are **two colour forms** in Jaguars – yellow with black rosette spots, and black with black rosette spots (**melanism**)
- Black coat colouration is caused by a **deletion mutation** on the *MC1R* gene
- It causes **more colour** pigment to be expressed
- Dark coat is **dominant** – only one copy of the mutated gene is needed for it to be expressed



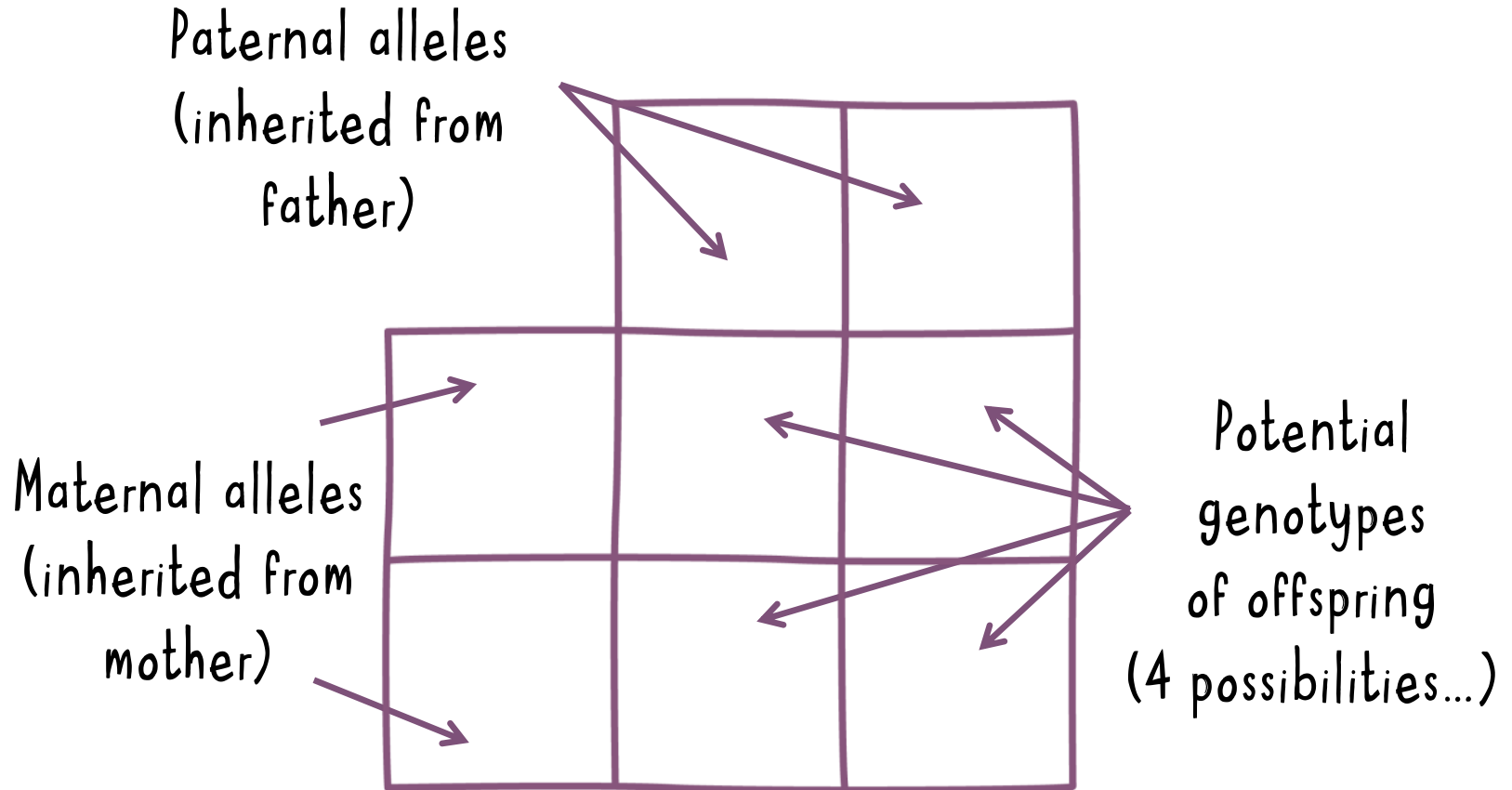


Spotted phenotype =
Homozygous recessive (bb)







Black phenotype =
Homozygous dominant (BB) OR
Heterozygous (Bb)

Punnett Squares



Example Punnett Square

	Black (B)	Spotted (b)
Black (B)	BB 	Bb 
Spotted (b)	Bb 	bb 

How many different genotype combinations could there be...?

Predicting Phenotype



+



= ?

Napo



= Homozygous recessive (bb)

Goshi



= Homozygous dominant (BB)
OR
= Heterozygous (Bb)

If Goshi is...

	Spotted (b)	Spotted (b)

Heterozygous





	Spotted (b)	Spotted (b)

Homozygous

If Goshi is...

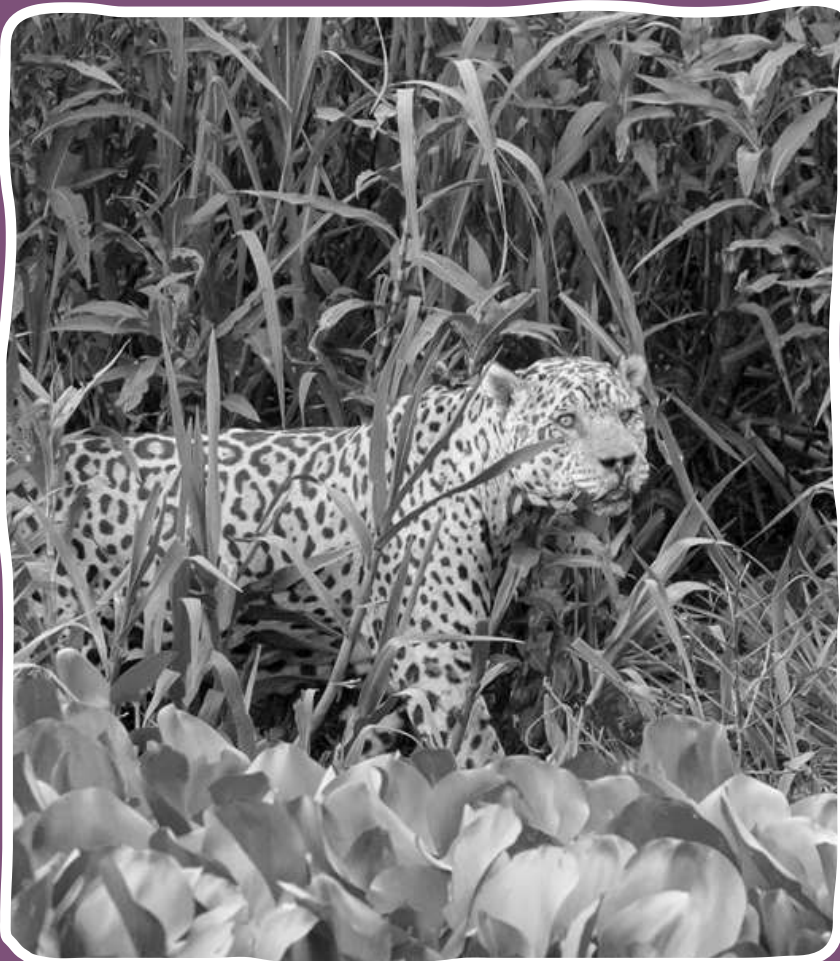
	Spotted (b)	Spotted (b)
Black (B)	Bb 	Bb 
Spotted (b)	bb 	bb 

Heterozygous

	Spotted (b)	Spotted (b)
Black (B)	Bb 	Bb 
Black (B)	Bb 	Bb 

Homozygous

Natural Selection







>90%

Why...?



<10%

	Spotted (b)	Spotted (b)
Spotted (b)	bb 	bb 
Spotted (b)	bb 	bb 

Summary

CHESTERZOO

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- Jaguar ecology
- Inheritance
- Gene expression
- Melanism
- Predicted phenotypes – Punnett squares
- How natural selection influences phenotype

