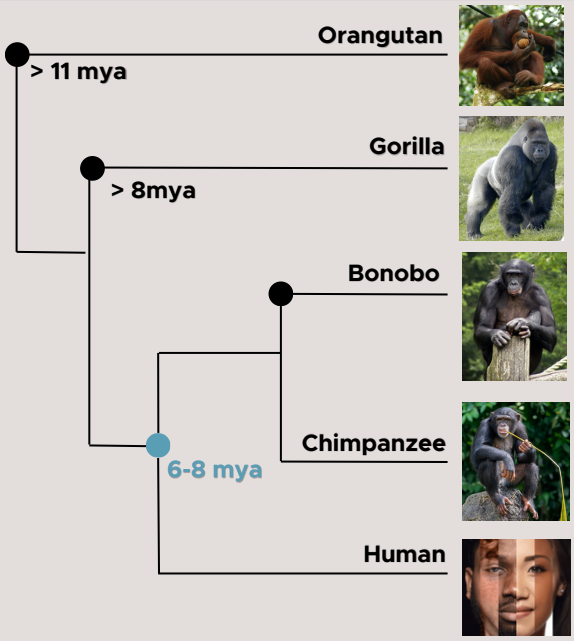
Comparing Humans & Chimpanzees

NATIONAL CHIMPANZEE BRAIN RESOURCE

INTRODUCTION

- Humans and chimpanzees belong to the **order Primates**. This also includes the other great apes - bonobos, gorillas, and orangutans.
- Chimpanzees and bonobos are our closest living relatives. Humans and chimpanzees split from our **last common ancestor** around 6-8 million years ago (mya), resulting in different **adaptations**. Adaptations are features that offer functional advantages to an individual.
- The tree on the right shows a **phylogeny** (evolutionary history) of great apes and humans.



DIFFERENCES	HUMANS	CHIMPANZEES
HOW THEY MOVE	**Bipedal** (walk on two feet)	Quadrupedal (move on four feet); Occasionally bipedal
WHERE THEY LIVE	All over the globe	West, East, Central Africa
TYPICAL LIFE SPAN	79 years old	40 to 45 years old
AVERAGE BRAIN SIZE	1,350 grams	380 grams

SIMILARITIES	HUMANS	CHIMPANZEES
DNA	Humans & chimpanzees share about 95% to 98% of DNA.	
CHILD CARE	Parents take care of infants. This is called **parental investment**.	
SOCIAL LIVING	Humans and chimpanzees are highly social. They live in communities and form complex **social bonds**.	
BODY SIZE	Chimpanzees have a similar body size to humans.	
BRAIN STRUCTURE	Human and chimpanzee brains have many folds and valleys, called **gyri** and **sulci**. The **prefrontal cortex**, in charge of planning, reasoning, and many other higher cognitive functions, is similarly structured in both species, but is larger in humans.	

Chimpanzee Brain Anatomy

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Chimpanzees have complex brains. The relationship between their brain anatomy and function is very similar to that of humans.

Parietal Lobe

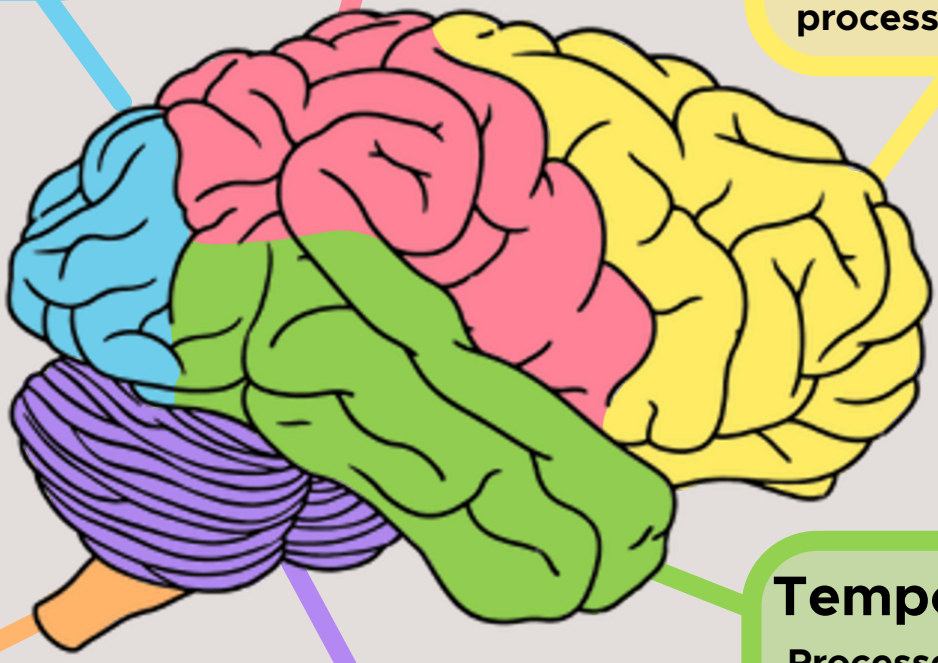
Processes touch, pain, temperature, and navigates the body in 3D space.

Occipital Lobe

Processes vision

Frontal Lobe

Executes planning, carries out muscle movements, and processes emotions.



Temporal Lobe

Processes sound and communication

Brainstem

Controls heartbeat, breathing, and sleep

Cerebellum

Keeps balance and coordination

What part of your brain do you use...

... when you touch something hot?
... when you talk to your friend?
... when you see a cute puppy?
... when you make plans with friends?
... when you sleep?
... when you balance on one leg?

What Chimpanzee Brains Do

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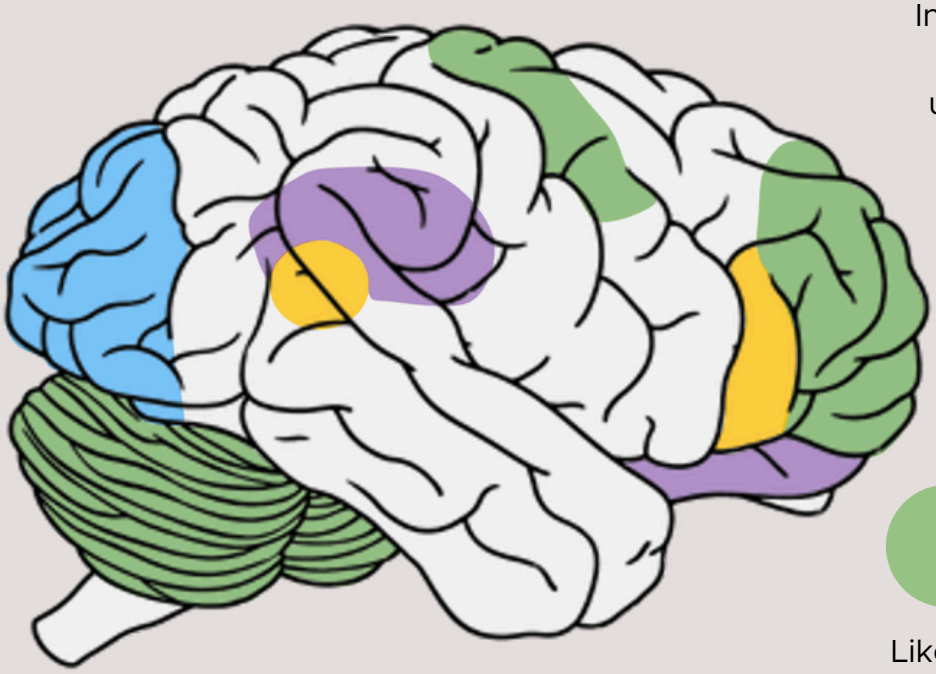
Socialization

Chimpanzees use social awareness and emotional processing skills to manage rivalries, alliances, and friendships. These skills require that areas in the **temporal lobe**, **parietal lobe**, and **frontal lobe** work together to recognize faces and control emotions.



Communication

In the **frontal lobe**, **Broca's area** is used to make gestures, facial expressions, and vocalizations to communicate with other chimpanzees.

In the **temporal lobe**, **Wernicke's area** allows chimpanzees to understand the vocalizations of others.

Tool Use

Like humans, chimpanzees use tools to find food through hunting or foraging. Some communities make tools out of sticks to fish for ants and termites. In the **frontal lobe**, the **motor cortex** allows them to handle tools, while the **prefrontal cortex** helps them plan what they will do with the tools. The **cerebellum** helps chimpanzees coordinate their movements for making and using tools.

Vision

The **occipital lobe** processes vision. Inside that area, the **primary visual cortex** decodes sight for color, contrast, and spatial information before the vision signals are moved to other brain areas.

Match The Animal To Its Brain!

Hint: Think about how animals are related.

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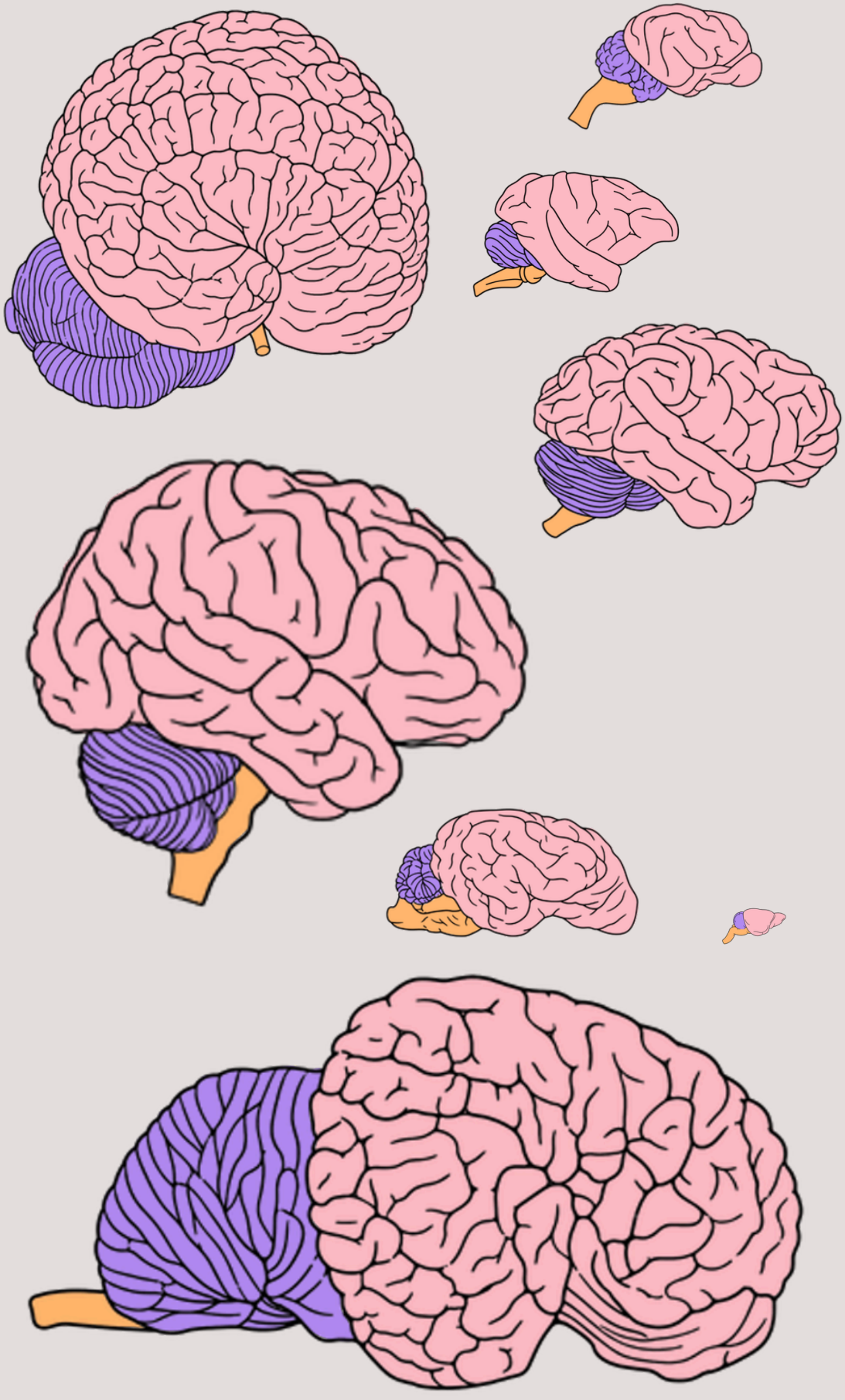
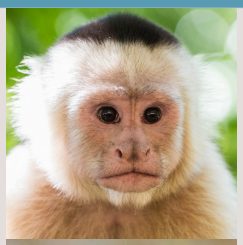
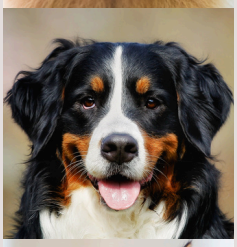
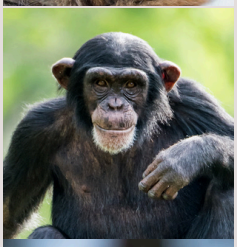
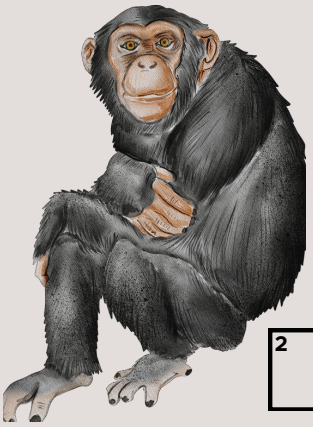


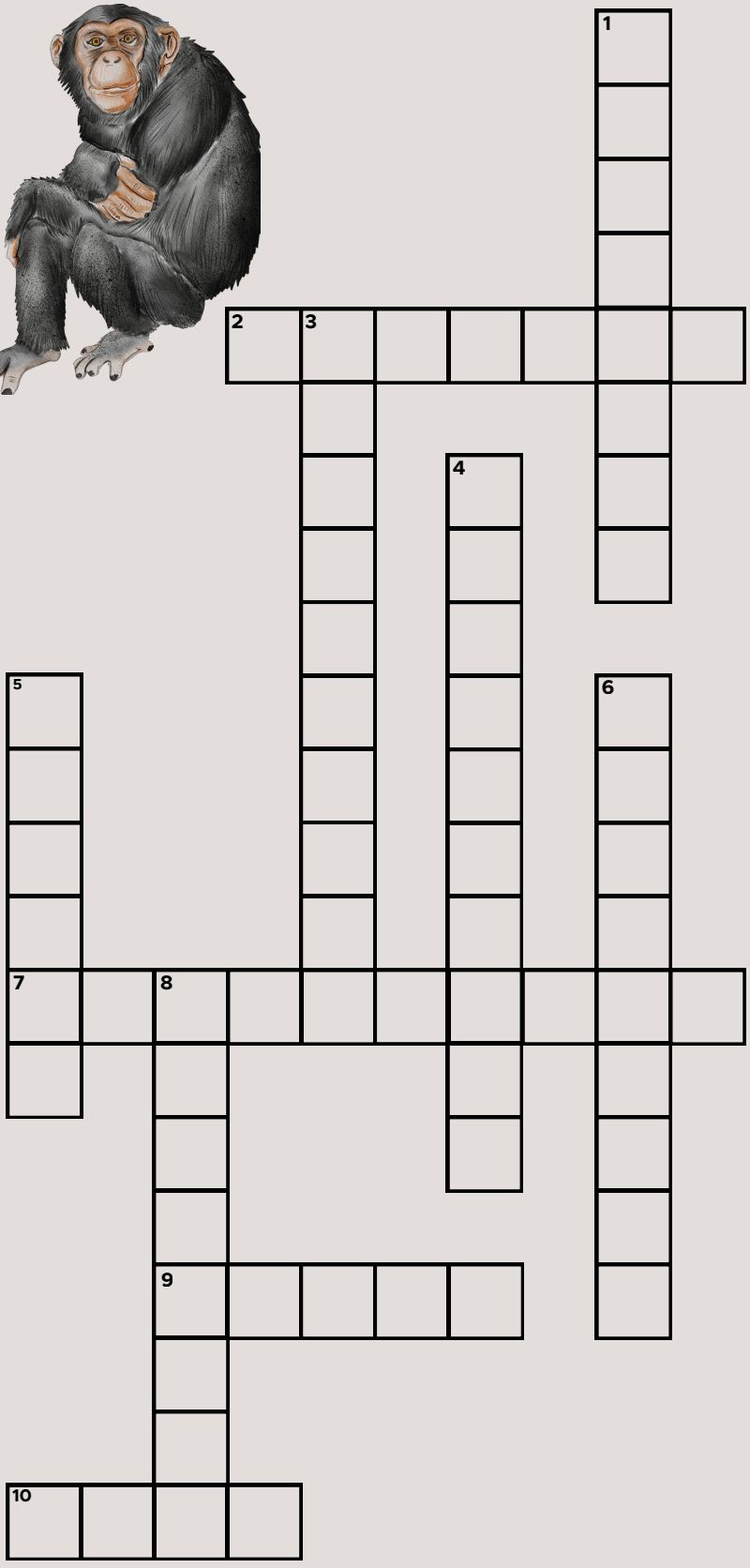






Crossword





CLUES

ACROSS

2) Humans and occasionally, chimpanzees can move on two feet. They are _____.
7) A feature that is common in a species due to a functional advantage.
9) The valleys that separate the gyri.
10) The folds on the surface of the brain.

DOWN

1) Chimpanzees, humans and other species belong to this order.
3) Parental _____ refers to the behavior where adults take care of infants.
4) This cortex is responsible for reasoning and planning.
5) Humans and chimpanzees alike are great at creating _____ bonds.
6) Refers to the evolutionary history of related species.
8) Last common _____ refers to the most recent relative that connects two diverged species.

Hint: Look at the **bolded words** on the first page of this packet!