Keeping up with the Neanderthals

Student Notes

These pages will assist you in your note taking during the presentation.

1. Summarise the evolutionary trends of living primates:

Characteristic	Trend Prosimian (Least advanced)	Monkey	Great Ape (Most advanced)
Species example	_____	_____	_____
Snout length			
Placement of eyes			
Primary sense			
Brain size			
Cerebral Cortex			

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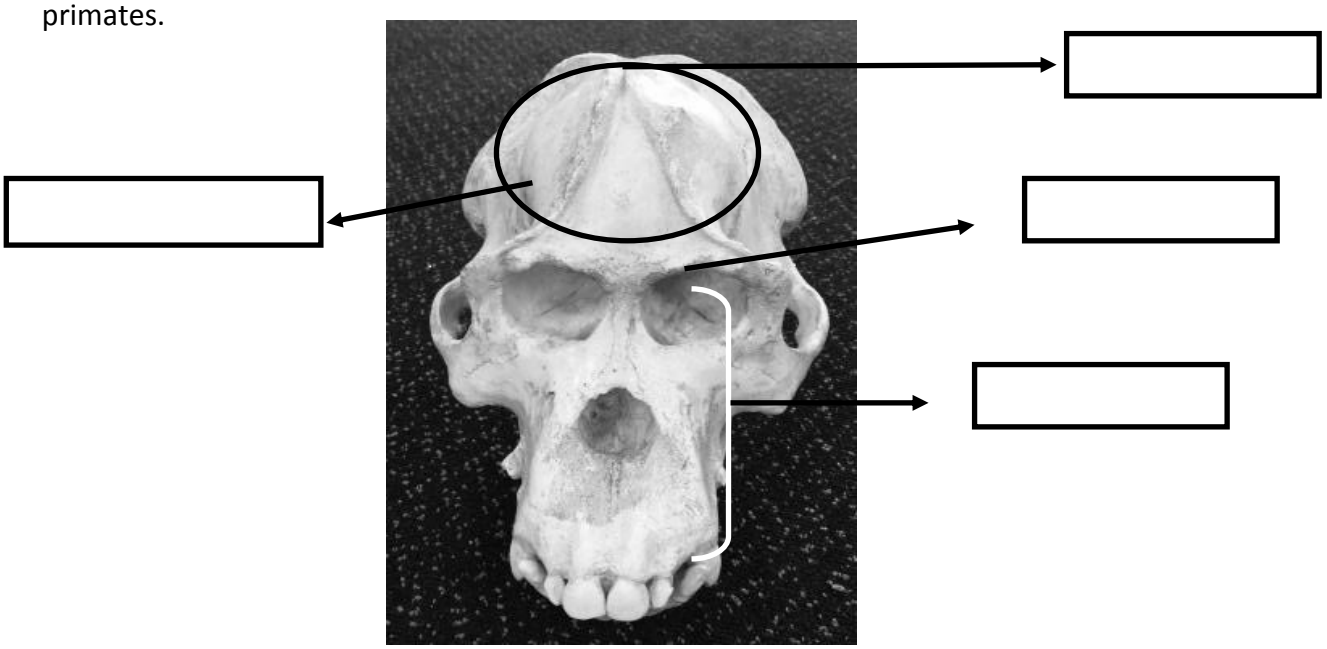
2. What are some shared characteristics of the Great Ape family?

Characteristic	Description

3. Despite many genetic similarities between members of the Great Ape Family, small differences in DNA sequences can have a great effect on form and function. Can you describe an example of this?

4. Differences in the Great Ape Family—Comparative Anatomy.

Label the features of this Orangutan skull that are used for a cranial comparison between primates.



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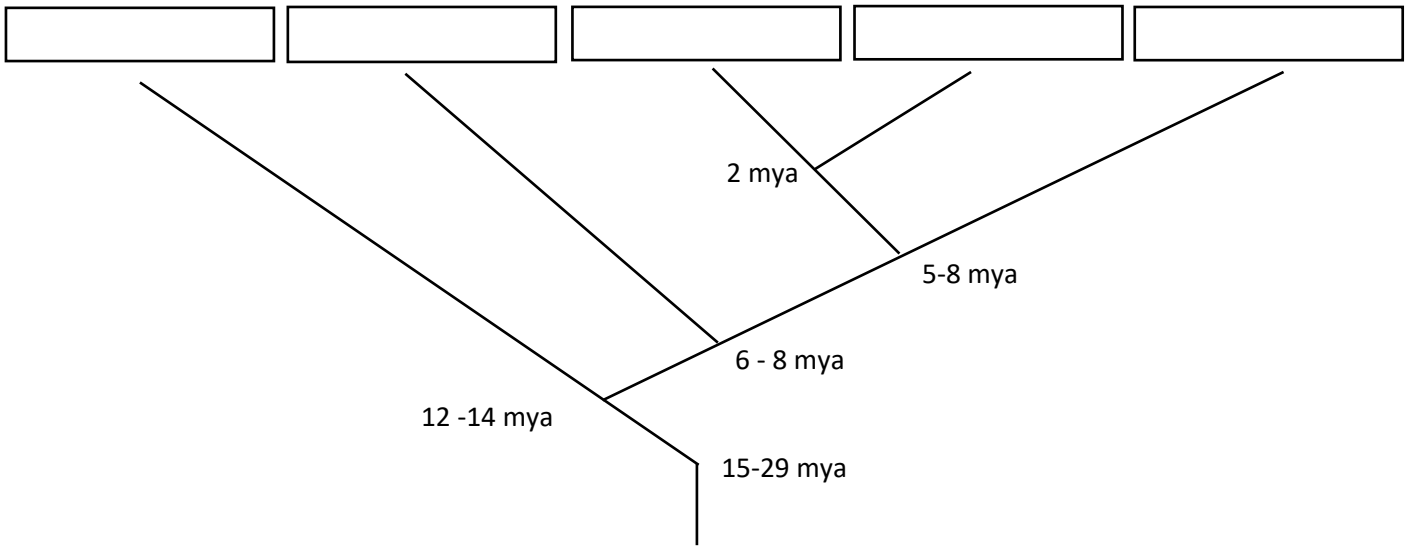
5. Phylogenetic Trees are used to show evolutionary relationships between species based upon similarities and differences in physical or genetic characteristics. They illustrate which species are related to a common ancestor and an estimated time for when this occurred and when divisions occurred. Fossils and Biotechnology including DNA sequencing can provide information to build phylogenetic trees and enhance our understanding of human evolution.



From the tree above, when is it estimated that chimpanzees and humans last shared a common ancestor?

_____

There is a well supported theory that the split between early humans from chimpanzees and bonobos was the result of significant changes in the environment. Describe these changes and how this affected early humans.

_____

_____

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6. Summarise the differences between Non Human Great Apes and Humans in the table below.

	Non Human Great Apes	Humans
The Skull		
Dentition and Prognathism		
Mobility of Digits		
Locomotion		
Stance		

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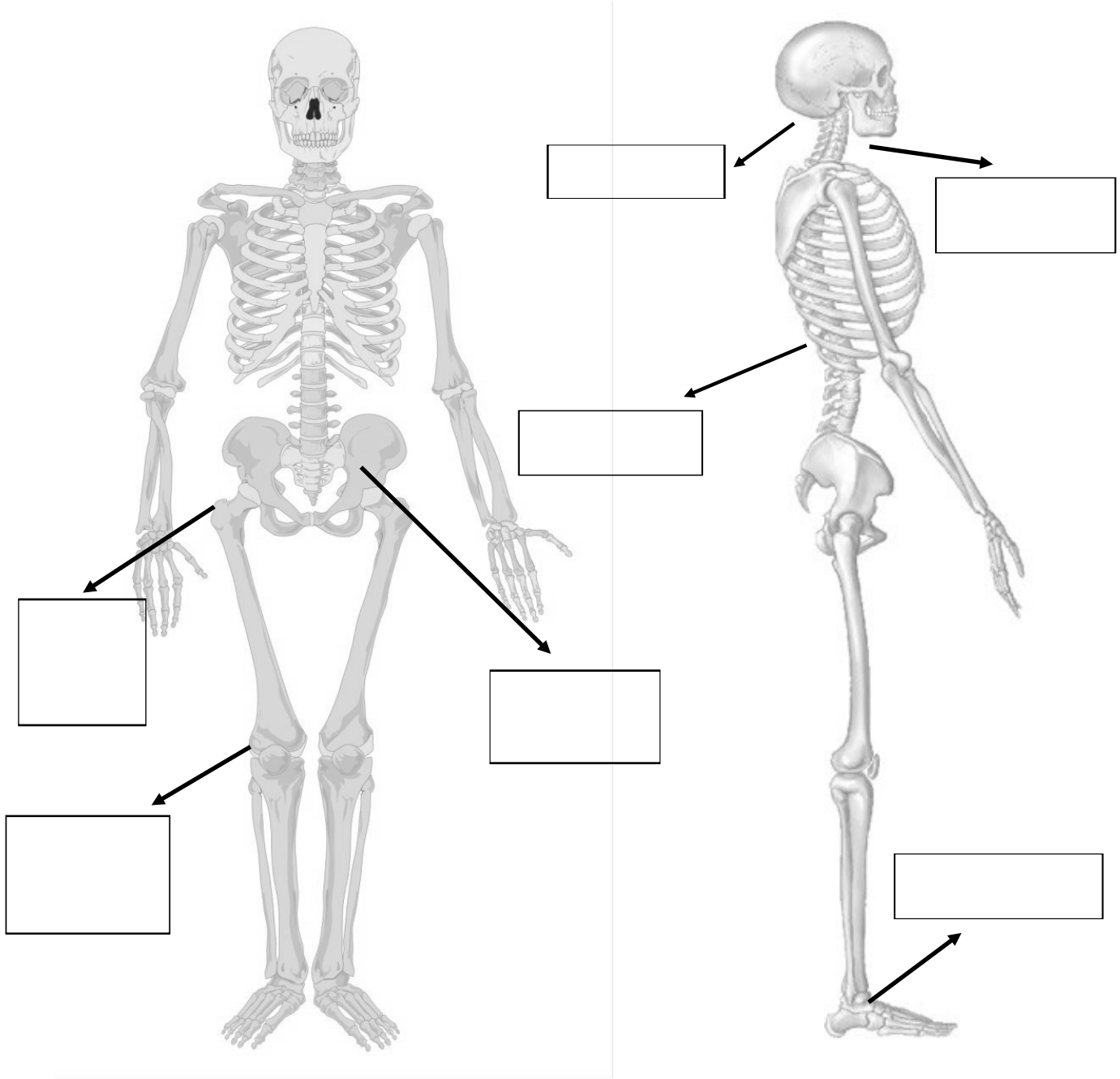
7. Significant changes have had to occur for humans to obtain an erect posture and walk on two legs (bipedal).

On the skeleton below, label the skeletal changes that have occurred in humans.



8. Describe the key trends found in the fossils of early humans that distinguish them from other great apes.

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9. List the significant features found in key species of the early hominin (human) fossil record.

	Physical Evidence	Cultural
Australopithecus afarensis Existed between 4 - 3mya	• _____ • _____ • _____	• _____ • _____ • _____
Australopithecus africanus 3.2-2mya	• _____ • _____ • _____	• _____ • _____ • _____
Paranthropus robustus 2.3— 2.7mya	• _____ • _____ • _____	• _____ • _____ • _____
Homo Habilis 2.4— 1.5mya	• _____ • _____ • _____	• _____ • _____ • _____
Homo errectus 1.6—100,000ya	• _____ • _____ • _____	• _____ • _____ • _____
Homo Neanderthalensis 300,000—28,000ya	• _____ • _____ • _____	• _____ • _____ • _____
Homo Sapien 160,000ya—today	• _____ • _____ • _____	• _____ • _____ • _____

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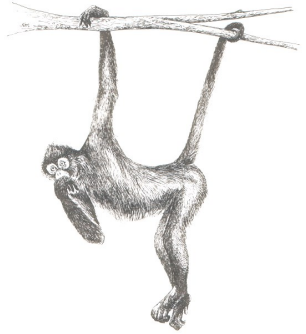
Out and About in the Zoo: Activity A - Features of Primates at Perth Zoo

	Prosimian:	Monkey:	Monkey:	Lesser Ape:	Non-Human Great Ape:	Human Great Ape:
Primate observed						
Tail present						
Tail prehensile						
Opposable thumb						
Opposable toe						
Sexual dimorphism						
Arboreal						
Terrestrial						
Locomotion						

From the information you recorded in your table construct a dichotomous key.



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Out and About—Exploration out in the Zoo

Activity Sheet B: Orangutan Social Behaviour and Sexual Dimorphism

Sexual dimorphism is quite pronounced amongst certain primate groups. These differences between the sexes are thought to have adaptive advantages in terms of survival, communication and reproduction.

Individual	Description	Explanation
Adult ♂		
Adult ♀		
Newborn ♂ or ♀		

Does sexual dimorphism exist in humans? Explain your reasoning.

_____

_____

Most great apes live in mixed social groups of males, females and young. Observe and describe the social grouping of the Orangutans at Perth Zoo. What does this suggest to you about how they live in the wild?

_____

_____

_____

_____

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Out and About—Exploration out in the Zoo

Activity Sheet C: Non-Human Great Ape Locomotion

Visit the Orangutan exhibit. Observe and record the locomotion you observe being displayed by the Orangutans.

Based on the **skeletal structure** of the Orangutan, **relate** how it **affects** their **locomotion** and **appearance**.

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Activity Sheet D - Looking at Primate Hands

Trace an outline of your hand over the picture of an Orangutan hand print (life-size). Note down differences and similarities between both primate hands and try to consider some of the reasons behind these differences. Use the Venn diagram on the next page to assist with your comparisons. Visit the Orangutan exhibit to observe how they use their hands. (Hint: Consider overall size of hand, opposability of thumb, size of digits, locomotion, etc.)

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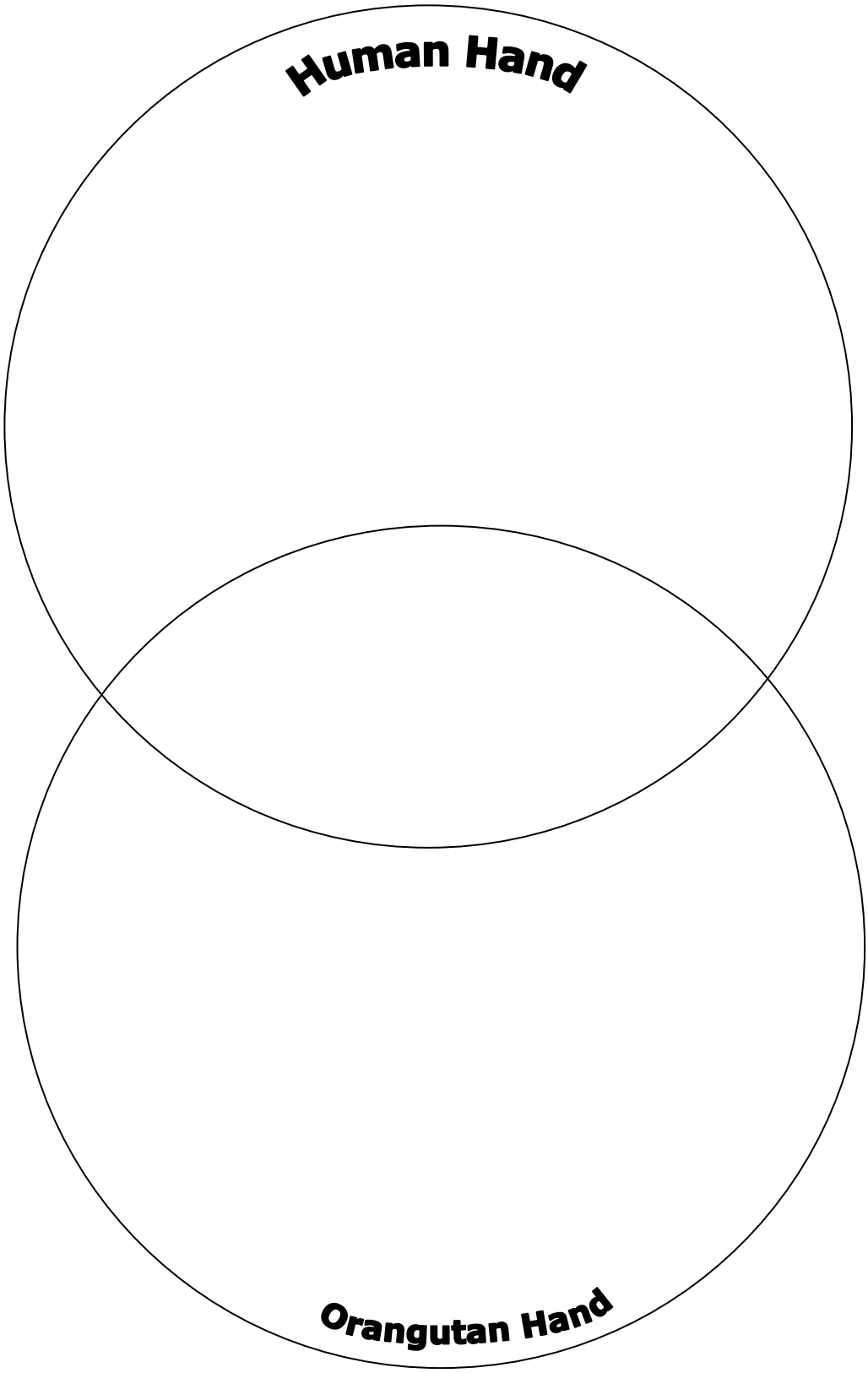
Activity Sheet D - Looking at Primate Hands cont.



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Activity Sheet E - Mimicking a Sumatran Rainforest

Perth Zoo's Sumatran Orangutan exhibit has been designed to mimic several aspects of a real rainforest. Note down how each aspect of living in a rainforest is being replicated in this exhibit.

Adjustable ropes:

_____

_____

Metal climbing frames:

_____

_____

Platforms:

_____

_____

Puzzle boxes:

_____

_____

Wooden awnings:

_____

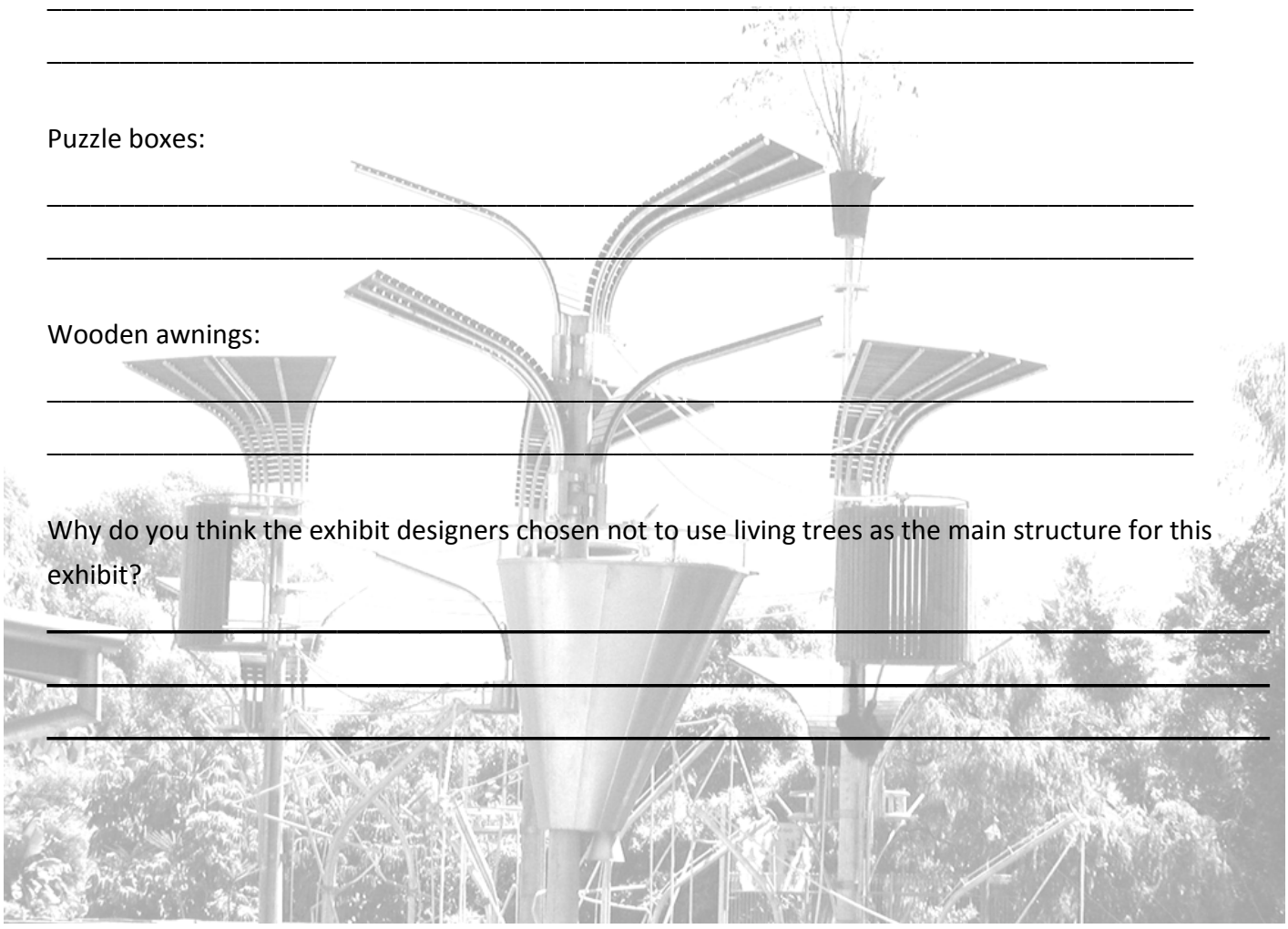
_____

Why do you think the exhibit designers chosen not to use living trees as the main structure for this exhibit?

_____

_____

_____



APPENDIX C

Learn the Lingo

Several terms and phrases are commonly used when discussing primates. Find out the meaning of the following terms and phrases to expand your biological vocabulary.

- Adaptation
- Arboreal
- Bipedal
- Brachiation
- Cerebral cortex
- Diurnal
- Home range
- Ischial callosities
- Nocturnal
- Oestrus
- Olfactory system
- Opposable digits
- Pentadactyl
- Power grip
- Precision grip
- Prehensile
- Quadrupedal
- Sexual dimorphism
- Submission
- Terrestrial
- Theory of evolution
- Hominins