Cleveland Museum of NATURAL HISTORY

TEACHER GUIDE

Human Evolution:
Following *Lucy's* Footsteps

60-Minute Life Science Lesson
Interactive Video Conferencing
Grades: 6-12

Human Evolution: Following *Lucy's* Footsteps

Description

Trace the development of modern humans using information from fossil hominids as well as clues from living primates. Closely examining casts of primate and fossil bones from our Museum research collections, students will "meet" their primate cousins and ancestors. The differences between primate groups will be explored, as well as the characteristics that distinguish primates from other mammals. The human family tree, including "Lucy", will help students understand their place in human prehistory.

Objectives

- Demonstrate that the diversity of species is developed through gradual processes
- Distinguish between the different primate groups: lemurs and Old World monkeys; New World monkeys; apes and hominids
- Describe 2 traits from fossil hominins that illustrate how humans have evolved since our last common ancestor with chimpanzees
- Compare and contrast the pelves and femurs of quadrupedal and bipedal animals

Ohio's Learning Standards

Grade 4: Life Science – Earth's Living History

- Changes in an organism's environment are sometimes beneficial to its survival and sometimes harmful.
- Fossils can be compared to one another and to present-day organisms according to their similarities and differences.

Grade 8: Life Science - Species and Reproduction

- Diversity of species, a result of variation of traits, occurs through the process of evolution and extinction over many generations. The fossil records provide evidence that changes have occurred in number and types of species.
- Every organism alive today comes from a long line of ancestors who reproduced successfully every generation.
- The characteristics of an organism are a result of inherited traits received from parent(s).

High School: Biology - Evolution

- Mechanisms
- Speciation

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How You Can Help Make This Virtual Program A Success

- Print the last 3 pages of this guide for your students. Have them cut out the 'bones', keeping each pelvis with its matching leg bones. Our instructors will demonstrate use of these cutouts during your program.
- If your students are joining us from your classroom computer, please arrange your room and projection screen so everyone can see us clearly.
- If you and your students are joining us from your homes, we will have an educator monitoring the Chat feature for questions. We request that you or another staff person serve as a Co-Host to help monitor students for any inappropriate Chat or camera behavior.
- If you will have a hybrid class (some at school, some joining from home), our educator will monitor the Chat and camera behavior, and we reserve the right to temporarily move any disruptive students to our Waiting Room so we or school staff can correct the undesired behavior.
- If you prefer, we can turn off all cameras and interact solely via the Chat feature.

Vocabulary

adaptation - an anatomical structure, physiological process or behavioral trait that facilitates an individual's survival in a given environment

bipedal - walking on two feet

DNA - Deoxyribonucleic Acid, a molecule that dictates the placement of protein building blocks in all living cells

evolution - any cumulative change in the characteristics of populations of living things from generation to generation; change over time

femur - the thighbone

foramen magnum (fo-ra'men mag'nem) - the large opening at the base of the skull through which the spinal cord passes

frugivore (froo'ji-vor) - an animal that primarily eats fruit

hominid - a member of the family Hominidae (hom-in'i-da), the group consisting of all modern and extinct great apes (that is, modern humans, chimpanzees, gorillas and orangutans plus all their immediate ancestors)

hominin - the group consisting of modern humans, extinct human ancestors and all our ancestors (including members of the genera *Homo*, *Australopithecus*, *Paranthropus* and *Ardipithecus*) after the split from the chimpanzees, 7 to 6 million years ago

olfactory lobe - the part of the brain that processes information about smell

pelvis - the hip bones (plural is either *pelves* or *pelvises*)

primates - the order of mammals which includes lemurs, monkeys, apes and humans.

sagittal crest - a thin ridge of bone on top the skull which anchors the temporal or jaw muscles.

scavenger - feeds on carrion (dead animal flesh) or organic refuse (e.g. rotting vegetation).

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stereoscopic vision - the ability to use both eyes to view the same visual field, resulting in depth perception.

traits - distinguishing characteristics or qualities

Extension Activities

1) To highlight the importance of stereoscopic vision and the relationship it has to depth perception, ask students to sit at their desks, and draw a dot on a piece of paper. Then ask them to sit still with their eyes closed for 2-3 minutes (this is really hard!). At the end of the time interval, ask students to open one eye and try to touch the dot. Chances are they will miss because they are viewing the field with only one eye, and they cannot judge distances correctly. Discuss with students the importance of depth perception to our early ancestors who lived in trees (traveling, catching insects for food).
2) Hominids are bipedal. Students can run races by knuckle-walking, the way chimps and gorillas do. Next, try the races again, but hold a lunch box or basket in one hand. What are the advantages of bipedalism for carrying objects? What kinds of skeletal changes were necessary to modify the quadrupedal body to a bipedal one?
3) Ask students to look at a world map, and mark in the locations of fossil human ancestors, including early *Homo sapiens*. Put the age of the fossil next to the dot. What does this say about the geographic origins of humans? What climate zones did these early ancestors evolve in? Are any patterns evident for the later migrations of humans across the continents?
4) Read about our scientists at work! Visit this page to see what we're currently doing: https://www.cmnh.org/phys-anthro/research-and-projects

Online Resources for Teachers and Students

Click the link below to find additional online resources for teachers and students. These websites are recommended by our Museum Educators and provide additional content information and some fun, interactive activities to share with your class.

CMNH Educators regularly review these links for quality. Web addresses often change so please notify us if any links have issues.

Cleveland Museum of Natural History https://cmnh.org/edlinks

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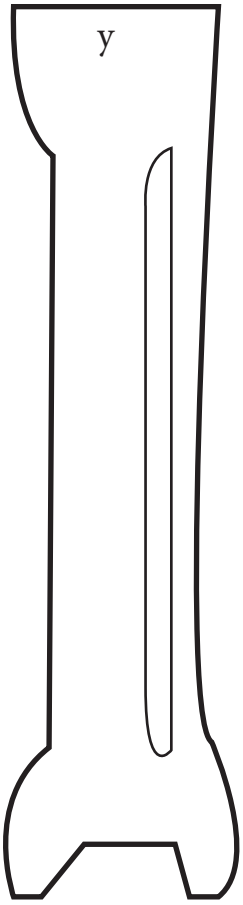

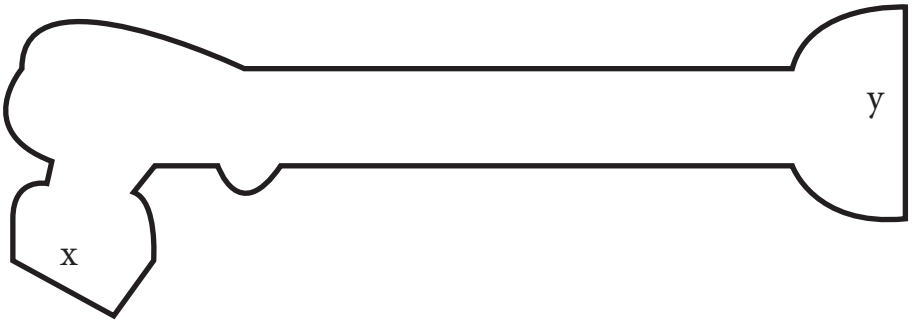

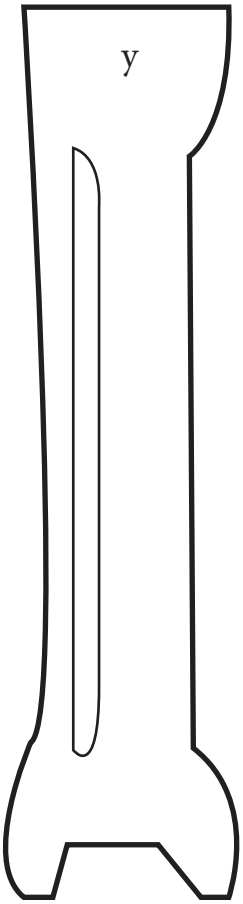

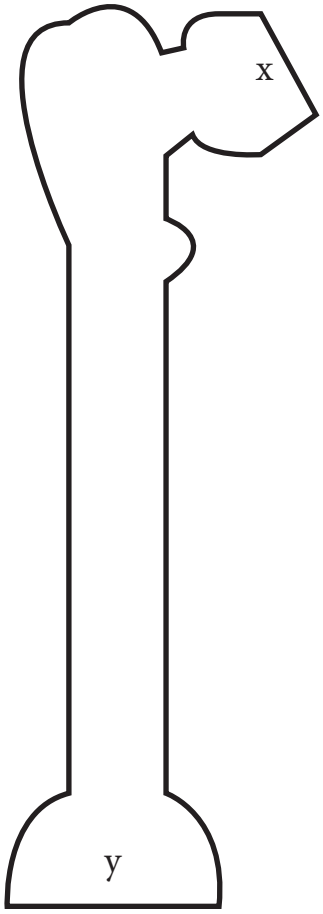

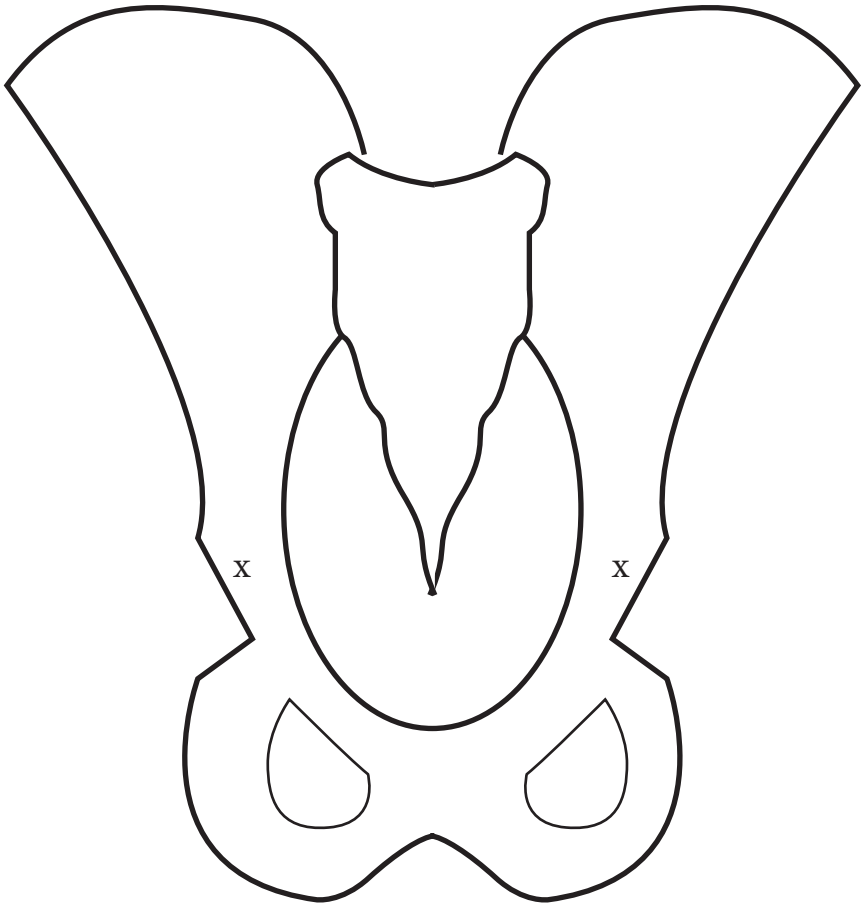

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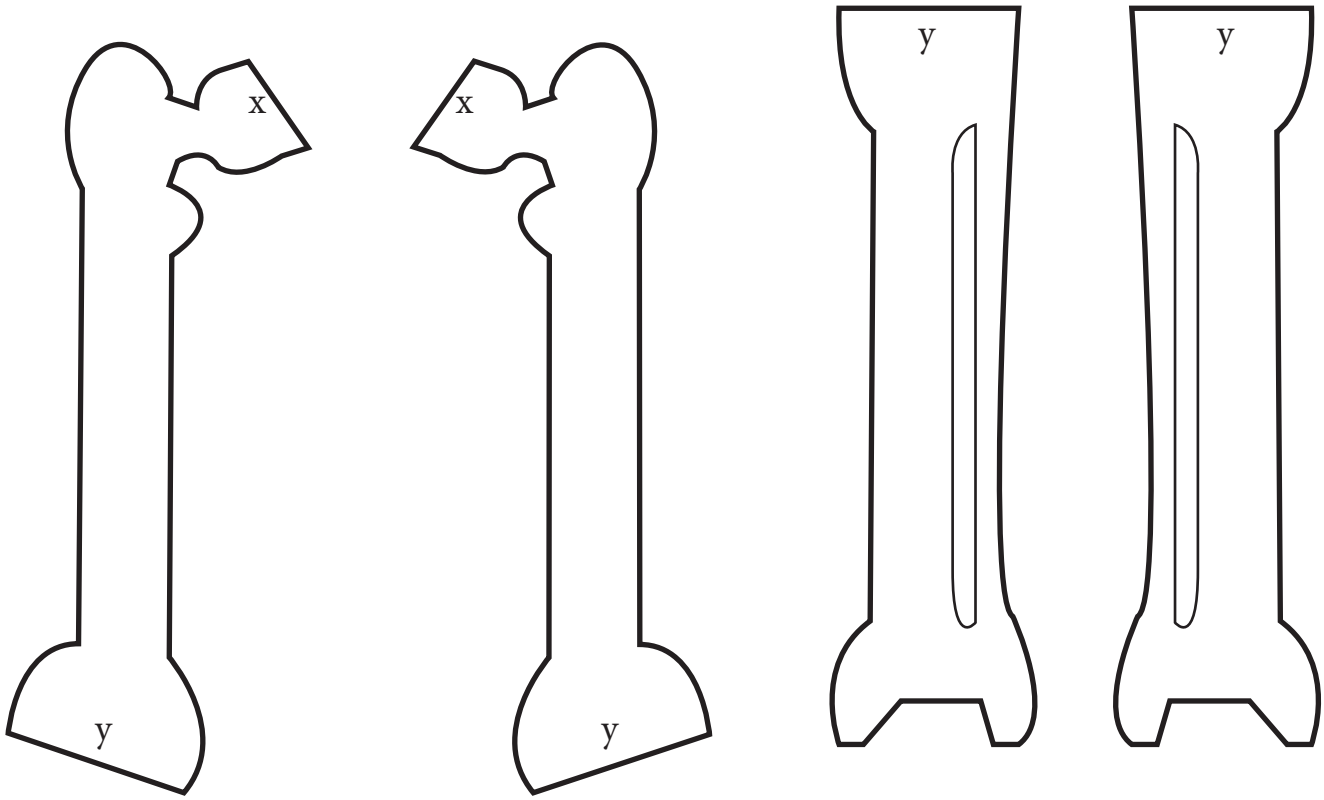

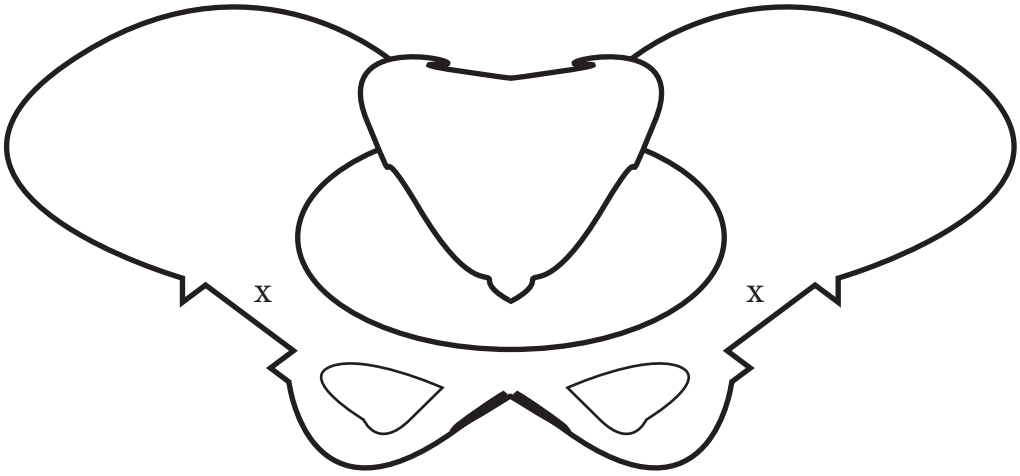

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