

# Big Era Two Human Beings Almost Everywhere 200,000 – 10,000 Years Ago



# Landscape Teaching Unit 2.1 Human Beings Around the World 100,000-10,000 Years Ago

### **Table of Contents**

Why this unit?	2
Time and materials	2
Unit objectives	2
Authors	3
The historical context	3
This unit in the Big Era time line	4
Lesson 1: Collective learning: Pass it on	5
Lesson 2: Meeting new challenges: Early humans on the move	8
This unit and the Three Essential Questions	18
This unit and the seven Key Themes	18
This unit and the Standards in Historical Thinking	18
Resources	19
Correlations to National and State Standards and to Textbooks	20
Conceptual links to other units	21

World History for Us All A project of San Diego State University In collaboration with the National Center for History in the Schools (UCLA) http://worldhistoryforusall.sdsu.edu/

## Why this unit?

Between 100,000 and 10,000 years ago, humans migrated to new environments within Africa. Even more importantly, some humans also moved out of Africa into Eurasia, Australia, and eventually the Americas. These migrations took humans into new environments. This required new survival skills and lifeways. This globe-encircling movement of humans has no parallel in the histories of other species. It demonstrated that there was something unique about our species, an adaptability and a level of technological genius that no other species could match. This exceptional creativity is what makes human history so different from that of other species.

Of course, some other animals have managed to move to radically new environments. But they have done so only after undergoing significant biological changes. An example is the hairy mammoth. It is closely related to the African elephant, an animal adapted to tropical environments. But the mammoth could survive in the tundra lands of ice-age Siberia because it had changed genetically. Specifically, it acquired a hairy covering that kept it warm. In contrast, humans remained the same biologically but developed new technologies and ways of doing things. For example, humans adapted to the cold of ice-age Siberia by learning to hunt animals such as mammoths, to warm themselves with fire, and to clothe themselves in tailored animal skins. While animals adapt by changing genetically, our distant human ancestors adapted much more quickly by changing their behaviors.

What enabled humans to alter their behaviors so radically? What makes our species so different? In this unit, students will hypothesize about the factors that have made our species so creative? They will consider a theory called collective learning, which has been developed by Professor David Christian. This theory might help explain humans' adaptability. Students will also investigate the particular skills and technologies early humans used to adapt to new environments. They will do this using the concept of biomes.

# Unit objectives

Upon completing this unit, students will be able to:

- 1. Define collective learning.
- 2. Explain the theory presented in this unit of why humans were able to move out of their original habitat while chimpanzees were not.
- 3. Explain the distinction between the terms "biome" and "ecosystem."
- 4. Describe features of the biomes presented here, and locate them on a map.
- 5. Explain what factors may have led early humans to migrate to new biomes.

### Time and materials

This unit includes two lessons. The first explores the idea of "collective learning," the feature that has made our species so unique and that lies at the foundation of our history. The second

explores the skills humans used to adapt to different environments. Each lesson takes approximately 45 minutes to complete.

Materials: Student Essay ("Collective Learning—Pass it on"), Migrations Map and Student Handouts, paper, and pencils. Atlases and other maps with climate and topographical information are helpful.

## Authors

Felicia Eppley taught history at Lamar High School in Houston, Texas. She received a Fulbright-Hays Fellowship for summer study in India, and she has traveled widely in Europe, Africa, and Asia. She contributed to *Teaching World History: A Resource Book* edited by Heidi Roupp (M.E. Sharpe, 1997).

Ellen Leader Pike teaches history at Lancaster Country Day School in Lancaster, Pennsylvania. She was a Klingenstein Fellow at Teachers College, Columbia University, and she authored "Bringing the World History Standards into the classroom," *Social Studies Record* 35 (1998).

## The historical context

Between 100,000 and 10,000 years ago, humans migrated to all the habitable regions of Africa, and some even left Africa. They and their descendants eventually migrated to most other parts of the world.

Archaeological evidence demonstrates that by about 100,000 years ago some humans had migrated out of Africa to Southwest Asia. From then, people moved farther and farther from their African homeland. Somewhere between 60,000 and 40,000 years ago they crossed from Southeast Asia to Sahul, the ice-age continent made up of present day New Guinea and Australia. About 40,000 years ago they migrated to ice age Russia and the Ukraine. In addition, evidence suggests that beginning 13,000 years ago and probably earlier people migrated from Asia to the Americas, either by crossing the frozen Bering land bridge from Siberia to Alaska or by paddling boats around the northern rim of the Pacific Ocean. Within just a couple of thousand years, these travelers managed to populate all of North and South America from northern Canada to Tierra del Fuego at the tip of South America.

Though these migrations occurred long before there were any written records, they show for the first time the unique ability of our species to adapt to new environments. Humans were learning how to live in extreme types of climate. Their capacity for collective learning allowed humans to acquire and accumulate the new skills that were needed to adapt to environments throughout the world. Among the most significant developments in history is the story of how humans have interacted over time with the community of plants and animals in different environments. We will explore this aspect of early human history by exploring how humans adapted to different "biomes".

# This unit in the Big Era time line

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## Lesson 1 Collective Learning: Pass It On

### Procedure

- 1. Have students look at Map 1 (The Spread of Modern Humans}, and Map 3 (Current Chimpanzee Habitat). Both of these maps are located in Lesson 2. Then ask students to read Student Handout 1.1 titled "Collective Learning: Pass it On." When students have finished reading, ask them to put away the essay and try to write definitions of "symbolic language" and "collective learning". Have students compare their answers and discuss the results.
- 2. Organize students into groups. **No one may write or talk** once the exercise begins. Choose one person from each group and see how long it takes this person to explain to his/her group that:
  - a. Tomorrow is a free day and they don't have to come to school.
  - b. The teacher is going to drop everyone's lowest test grade for the next report card period.

Discuss how the chosen student communicated these two ideas using gestures but not words. Why is it difficult to explain these ideas without symbolic language involving words? Are gestures and facial expressions part of symbolic language?

- 3. As a class or in groups, consider one or all of the following:
  - a. Pretend that there has been some disaster which killed every human on earth except you and your family (or other group) and disintegrated all books and computers. Fortunately, it didn't kill any animals or leave any harmful aftereffects like radiation or giant roaches. Using pencil and paper, make an inventory of the knowledge and skills possessed by the members of your family (or group). How could you best use them? How many of the things that you use every day would you be able to maintain (water, lights, machinery)? How would your life change?
  - b. Pretend that the disaster left the members of your town, say 1000 people, still alive. Would that change the picture?
  - c. Pretend that the disaster left your town and its library. How does that change things?
- 4. As a class or in groups, consider a world if humans could not speak or write with words. What difference would it make in their lives? What kinds of things could they do and what kinds of things would they be unable to do? Could they have built cars? TVs? Would they be likely to gather with others in a place of worship? What kinds of things would they be able to teach their children?

# Lesson 1 Student Handout 1.1—Collective Learning: Pass It On

The chimpanzee is our nearest relative and capable of doing many things that we view as proper to humans. They learn, they use tools, and they communicate. Yet, when comparing Map 1 (The Spread of Modern Humans) to Map 3 (Current Chimpanzee Habitat), it is clear that humans have been able to leave their African homeland while chimps have not. Humans have been able to acquire entirely new skills so that they can adapt to environments very different from those in which they first evolved. Why is it that humans have been able to do this—to make the world their habitat and even move into outer space, while chimps are stuck at home?

In his book *Maps of Time: An Introduction to Big History*, world historian David Christian theorizes that the key to human adaptability is the ability to pass on knowledge through the use of symbolic language—language that uses words to symbolize abstract ideas. It is true that chimps are able to pass on knowledge to their offspring; but, because they don't have symbolic language, they can only do so by demonstration. A chimp, for example, may poke a stick in a termite mound to show its offspring how to get to the termites. Chimps can teach only what can be shown. They cannot describe things that are not present. They are also stuck in the present. They can't discuss the past or imagine the future. Humans, on the other hand, because of symbolic language, can pass on knowledge about what happened yesterday ("A lion ate your father.") They can imagine the future ("Tomorrow it will be your turn to clean the latrine."). And they can describe things that are out of sight ("There is quicksand in the river at the edge of the yellow cliffs.").

Symbolic language allows humans to describe things precisely and in great detail. As a result, humans can pass on huge amounts of information from generation to generation. That means that the human species' store of information about hunting, making tools and weapons, gathering food, using plants for healing, organizing themselves, and a thousand other topics, grew and increased in complexity as humans passed it from one generation to another. The human species was developing the equivalent of a giant, communal brain. Christian refers to this ability to learn and transfer the knowledge learned-- the ability to build this giant brain, as "collective learning."

Because they share knowledge, humans have access to the ideas of other humans, both living and dead. This gives them a huge advantage over chimps and other animals. Christian theorizes that it is collective learning that allowed humans to leave their native biome and to populate, eventually, even inhospitable corners of the earth. If he is right, it is collective learning that explains why the history of humans is so different from that of all other animals.

Collective learning enabled humans to adapt to new environments by allowing them to share ideas about how to cope with their surroundings. Over time, this enabled them to adapt to more and more varied environments. Animals can adapt to new biomes only by changing genetically. Elephants moved into Siberia, but they had to evolve into a new breed, the wooly mammoth. Humans, on the other hand, did not need genetic alteration to move to frigid climates. Humans made the move relatively quickly by adopting warm clothing of skins and furs, building houses of skins or sod, and eating musk ox steak!

Humans' exhibited their capacity for collective learning before they left Africa. They began by moving out of their original habitat and into new environments within Africa. They developed new tools and used new materials. For example, some living near sea shores learned how to fish and to consume shellfish. Individual groups developed their own distinctive lifeways, passed on from generation to generation, and displayed distinctive styles in the making of their tools. Exchange systems were created, sometimes between groups a hundred miles apart. Each of these innovations (new ideas) was built on an accumulating backlog of knowledge, a store of collective learning.

So, how did we humans do it? How did we learn collectively? We did it through symbolic language. Unlike grunts or chirps, symbolic language (mainly the use of words) is capable of transferring information of every kind. Not only can words refer to things but to ideas and even other words. New words can be invented as needed. The system is efficient and flexible. It is the system that we humans still use today as we continue to enlarge our collective brain and adapt to increasingly complex environments, even including the environment of the moon!

### Lesson 2

# Meeting New Challenges: Early Humans on the Move

### **Teacher Background Notes**

Increasingly sophisticated systems of dating, going beyond Carbon 14 to such techniques as thermoluminescence, potassium argon, and electron spin dating, are giving archaeologists increasingly accurate ways to examine fossil sites. In spite of this increase in technological proficiency, professionals in fields like paleo-ethnobotany, paleo-climatology, paleo-anthropology, and other fields debate the significance and dates of their finds and frequently disagree. For example, the date of human arrival in the Americas is hotly contested and ranges from 30,000-12,000 BCE. Therefore, dates are often presented as ranges in order to take into consideration various researchers' explanations.

A key term for this lesson is biome. A **biome** is a major ecological community that corresponds to a climate zone and is characterized by plant and animal species that have adapted to that particular environment. Biomes are composed of many **ecosystems**. Whereas biomes are limited to a particular climate, ecosystems tend to be limited by geographical features, such as mountains, rivers, or surrounding seas. A biome may be composed of many ecosystems. Within biomes, plants have similar growth forms and animals tend to have similar feeding habits. Biologically, all living things are closely adapted to their biomes. A change in any part of the environment, such as an increase or decrease in the population of a particular plant or animal, has a ripple effect of change on other parts of the environment.

World biomes are determined by climate. In general we can group them according to their latitudes. For example, low latitude biomes include tropical rainforest, savanna, and desert. Mid-latitude biomes include steppe, chaparral, grasslands, and deciduous forest. High latitude biomes include taiga, tundra, and alpine forest. In addition, biomes include several types of aquatic environment.

Humans are exceptional. Like all living things they adapt biologically to their biomes. In addition, collective learning allows humans to adapt culturally. Unlike other large animals, humans have moved into many different environments. This process is the focus of this lesson.

#### Procedures

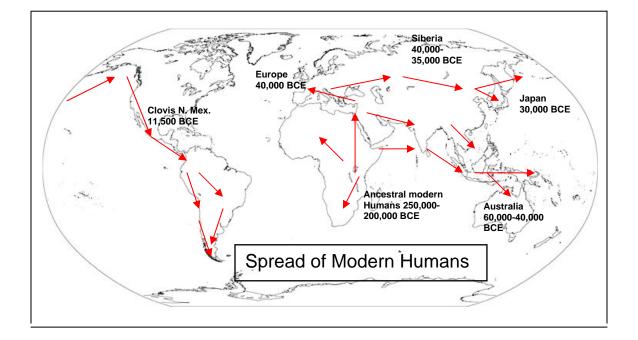
- 1) Put "Map 1: Spread of Modern Humans" (see below) on the overhead.
  - a) Ask students to examine the map and to note the movement and dates of humans out of Africa and across the globe.
  - b) Ask students to hypothesize about the challenges of geography and climate that early humans confronted as they moved out of Africa.

- 2) Arrange students into groups.
  - a) Assign each group a biome and give them the appropriate handout (see handouts below).
  - b) Tell students that they must imagine that they have been dropped into their assigned biome with nothing but the tool kit described in their handout. They will not have food, clothing, or shelter. Their job is to:
    - i) Figure out how they will provide themselves with food, clothing, shelter, and if necessary, a type of transportation.
    - ii) Keep track of the skills they have to develop to deal with this new environment.

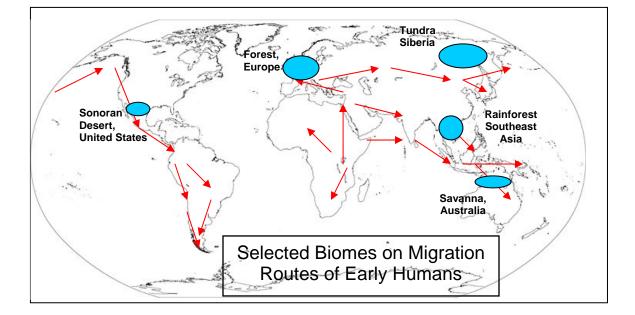
**Note:** Teachers should remind students that in some regions either built up or excavated dirt was the only option for housing, while in mountainous regions caves were useful. As for food, eggs of birds and larvae of insects were plentiful in some regions. While some biomes of this period were populated with many species of megafauna, only eight kinds of land mammals weighing more than a ton are left on earth—the giraffe, two species of elephants, four species of rhinos, and the hippo. Students should consider how hard it would be to kill one of these animals with only a spear.

- Reorganize students into groups with one student from each biome. Ask each student to present the details and challenges of her/his biome and the adaptations humans likely made. All students in each group should have some idea about the ways in which humans survived within each biome.
- 4) Show Map 2, which shows five different biomes. Ask students to reconsider their original hypothesis on the problems faced by migrating humans. What adjustments have they made in their initial hypotheses?
- 5) Show Map 3: Current Chimpanzee Habitat Ask students to hypothesize why humans have expanded their habitat to include the entire world and why chimpanzees are limited to an ever-shrinking habitat in West Africa.
- 6) Ask students to consider ways in which humans continue to adapt to their environments. Students should ponder not only new ways of dealing with their environments (e.g., air travel, thinsulate insulation) but also take into account new types of environments they may encounter (e.g., high altitudes, outer space, ocean depths).
- 7) Assessment: Have students think of themselves as paleo-climatologists who are about to present papers at an International Paleo-Climatology Conference in Stockholm, Sweden. Students should write abstracts (summaries of a longer text, usually of an academic article) of the papers they will present for the Conference Bulletin. Each student should select one of the biomes that has been studied in this lesson. Then they should describe it, and explain how humans likely adapted to it and what technological skills they might have had to perfect in order to survive in it.

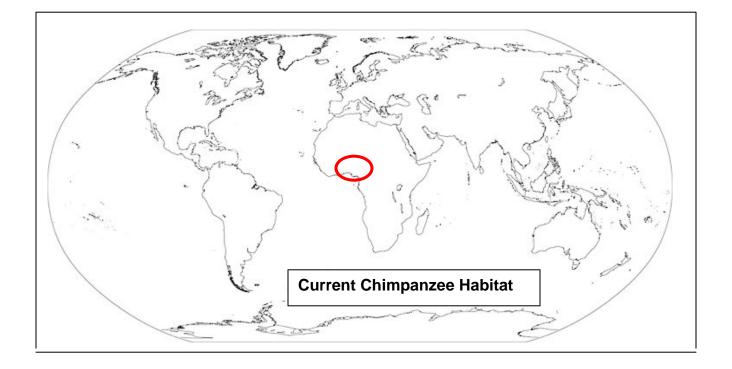
Map 1



Map 2



Map 3



# Student Handout 1.1—Characteristics of Specific Biomes Tropical Rainforest: Southeast Asia



Sweet Briar College, <u>http://ripley.wo.sbc.edu/departmental/emy-studies/geo/rainforest.jpg</u>]

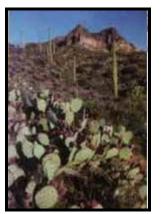
#### Features

Densely forested, broad canopy with little light penetration to floor of forest Broadleaf evergreen trees, generally shallow-rooted Orchids, ferns, palms, mosses Hot and humid, little seasonal change Daily period of heavy rainfall Great variety of birds Reptiles – crocodiles, snakes, lizards Rats, bats, wild pigs, dogs Fish and shellfish in nearby waters Tree kangaroos Insects

#### **Tool Kit**

Flint [knives, scrapers, weapons] Stone [grinders and pounders] Bone [awls, needles, shovels, fuel, shelters, ornaments] Wood [digging sticks, supports for shelters, fuel] Composite tools [stone-tipped spears, spear throwers, harpoons Fire

### **Student Handout 1.2—Characteristics of Specific Biomes** *Desert: Southwest United States (Sonoran Desert in Arizona)*



Susan L. Woodward, Dept. of Geography, Radford University, http://www.runet.edu/~geog-web/Faculty/Susan.html

#### **Features:**

Arizona Upland straddles the frost line where the upper slopes of mountains are forested with oak, juniper, and pinion pine.

At lower altitudes: ironwood, mesquite, blue palo verde, acacia, and willow along streams

Shrubs (bursage and creosote bush) give way to yuccas, agaves, saguaro (up to 12 feet high), prickly pear, cholla and other cacti

Rainfall: 15-23 inches per year

Springs and seasonal streams

Bighorn sheep, javelina, ring-tailed cats, snakes, lizards, salamanders, frogs, desert tortoise, rabbits, kangaroo rats and other rodents

Mexican eagles, owls, roadrunners and other birds

Insects

11,000 BCE: Camels, saber toothed tigers, mammoths, long-horned bisons, short-faced bears (taller than a Kodiak bear and able to kill almost anything with exception to a healthy mammoth), and panthers are all extinct.

#### **Tool Kit**

Flint [knives, scrapers, and weapons]

Stone [grinders and pounders]

Bone [awls, needles, shovels, fuels, shelters, and ornaments]

Wood [digging sticks, supports for shelters, and fuel]

Composite tools-stone-tipped spears, and spear throwers

Fire

### Student Handout 1.3—Characteristics of Specific Biomes *Tundra: Asia (Siberia)*



Susan L. Woodward, Dept. of Geography, Radford University, http://www.runet.edu/~geog-web/Faculty/Susan.html

#### **Features:**

Bare, rocky ground supports low-growing shrubs, mosses, heaths, and lichen No true soil Lower latitudes: birches Ground permanently frozen 10 inches to 3 feet deep Little precipitation: 6-10 inches a year Winter: cold and dark with high winds Summer: top layer of permafrost melts. Land gets soggy and covered with marshes, lakes, bogs and streams that attract migrating birds and insects [mosquitos] Big animals: caribou, reindeer, musk oxen, wolves, and Arctic foxes Small animals: snow shoe rabbit, Arctic hare, and lemmings

#### **Tool Kit:**

Flint [knives, scrapers, and weapons]

Stone [grinders and pounders]

Bone [awls, needles, shovels, fuel, shelters, ornaments]

Wood [digging sticks, supports for shelters, fuel]

Composite tools-stone-tipped spears and spear throwers

### Student Handout 1.4 Characteristics of Specific Biomes: Savanna: Australia (Northern Territory)



Suzanne McAlister, Dept. of Botany, Oklahoma State University http://www.okstate.edu/artsci/botany/bisc3034/lnotes/images/AUSTRALIAN%20SAVANNA01.JPG

#### Features:

Terrain tropical perennial grassland, grasses 3 – 6 feet tall

Widely spaced, drought resistant trees, mostly eucalypts

Rainfall 40" – 60" per year

Distinct dry season - frequent fires (burnt shrubs return nutrients to the soil and force animals into the open to feed which encourages regrowth)

Kangaroos, wallabies, possums, and echidna

35,000 BCE: megamarsupials

Varieties of lizards, snakes, and mice

Insects-termites, beetles-and their larvae

Cockatoos, cranes, emu, and grass owls

Cycads: large palm-like plants whose kernels are very nutritious but highly toxic

#### Tool Kit:

Flint [knives, scrapers, and weapons]

Stone [grinders and pounders]

Bone [awls, needles, shovels, fuel, shelters, and ornaments]

Wood [digging sticks, supports for shelters, and fuel]

Composite tools --stone-tipped spears, spear-throwers, and harpoons

Fire

# **Student Handout 1.5—Characteristics of Specific Biomes**

Forest: Europe



Susan L. Woodward, Dept. of Geography, Radford University, http://www.runet.edu/~geog-web/Faculty/Susan.html

#### **Features:**

Deciduous trees like ash, beech, and birch Patches of evergreens in northern regions Temperate climate: four seasons, warm summer, and cold winter Ample rainfall fairly evenly distributed throughout the year Animals: bears, reindeer, deer, squirrels, and foxes Variety of birds: woodpeckers, warblers, tufted titmouse, and wood thrushes Snakes, lizards, and frogs Insects

#### **Tool Kit:**

Flint [knives, scrapers, and weapons] Stone [grinders and pounders] Bone [awls, needles, shovels, fuel, shelters, ornaments] Wood [digging sticks, supports for shelters, fuel] Composite tools—stone-tipped spears, spear-throwers, and harpoons Fire

### This unit and the Three Essential Questions

HUMANS &	Why were human beings able to adapt to many different biomes, when most animal species could not?
other HUMANS	How important was social cooperation in human adaptation to a wide range of biomes?
NUMANS &	Homo erectus, an early hominid species, adapted to fairly cool climates in Asia even though we have no evidence that this species had language. Could humans have adapted successfully to any biome if they had not had language?

### This unit and the seven Key Themes

This unit emphasizes:

Key Theme 1. Patterns of Population

Key Theme 6. Science, Technology, and the Environment.

### This unit and the Standards in Historical Thinking

Historical Thinking Standard 1: Chronological Thinking

The student is able to (F) reconstruct patterns of historical succession and duration in which historical developments have unfolded, and apply them to explain historical continuity and change.

Historical Thinking Standard 2: Historical Comprehension

The student is able to (G) draw upon data in historical maps in order to obtain or clarify information on the geographic setting in which the historical event occurred, its relative and absolute location, the distances and directions involved, the natural and man-made features of the place, and critical relationships in the spatial distributions of those features and historical event occurring there.

Historical Thinking Standard 3: Historical Analysis and Interpretation

The student is able to (D) draw comparisons across eras and regions in order to define enduring issues as well as large-scale or long-term developments that transcend regional and temporal boundaries.

Historical Thinking Standard 4: Historical Research Capabilities

The student is able to (A) formulate historical questions from encounters with historical documents, eyewitness accounts, letters, diaries, artifacts, photos, historical sites, art, architecture, and other records from the past.

### Resources

#### Instructional resources for teachers

- Cavalli-Sforza, Luigi Luca, and Francesco Cavalli-Sforza. *The Great Human Diasporas: The History of Diversity and Evolution*. Reading, MA: Addison-Wesley, 1995. Fascinating discussion of the relationship between the genetic and the linguistic trees of human dispersion around the world.
- Christian, David. *Maps of Time: An Introduction to Big History*. Berkeley: University of California Press, 2004. A breathtaking journey through history from the Big Bang to the present.
- Fagan, Brian M. *The Journey from Eden: The Peopling of Our World*. London: Thames and Hudson, 1990. Somewhat out of date now but written with a broad audience in mind.
- Flannery, Tim F. The Eternal Frontier: An Ecological History of North America and Its Peoples. Berkeley: Grove Press, 2002. A popular Australian writer tells the story of North America from 65 million years ago to today, including much on human colonization of the continent.
- Flannery, Tim F.. *The Future Eaters: An Ecological History of the Australian Lands and Peoples*. Berkeley: Grove Press, 2002. The ecological impact of humans on the "southern continent."
- Gamble, Clive. *Timewalkers: The Prehistory of Global Colonization*. Cambridge: Harvard UP, 1993. The author poses the big question, "Why are human beings everywhere, and how did they get there?"
- Mithen, Steven, *After the Ice: A Global Human History, 20,000-5000 BC.* Cambridge: Harvard UP, 2003.

Wenke, Robert J. Patterns in Prehistory: Humankind's First Three Million Years. 4<sup>th</sup> ed. NY: Oxford UP, 1999. A comprehensive textbook written with vitality and humor.

#### Instructional Sources for Students

Jones, Stephen, Robert D. Martin, and David R. Pilbeam, eds. *The Cambridge Encyclopedia of Human Evolution*. Cambridge: Cambridge UP, 1994.

http://agronomy.ucdavis.edu/gepts/pb143/lec10/pb143l10.htm. This University of California at Davis site contains excellent descriptions of biomes along with photos and links to other sites.

http://www.ucmp.berkeley.edu/glossary/gloss5/biome. The University of California Museum of Paleontology maintains this site, which presents world biomes in text and pictures.

http://agronomy.ucdavis.edu/gepts/pb143/lec10/pb143l10.htm. Description of biomes along with photos. Plus links. Resources on domestication.

http://www.ups.edu/biology/museum/worldbiomes.html. Established by the University of Puget Sound, this site offers considerable information on biomes.

### **Correlations to National and State Standards and to Textbooks**

#### National Standards for World History

Era One: The Beginnings of Human Society, 1B: The student understands how human communities populated the major regions of the world and adapted to a variety of environments.

### California: History-Social Science Content Standards

Grade Six, 6.1.2: Identify the locations of human communities that populated the major regions of the world and describe how humans adapted to a variety of environments.

### New York: Social Studies Resource Guide with Core Curriculum

Unit One: Ancient World – Civilizations and Religions (4000 BC – 500 AD), A. Early people, 3. Relationship to the environment, 4. Migration of early human populations.

### Virginia Standards of Learning

World History and Geography to 1500 AD. Era 1: Human Origins and Early Civilizations, Prehistory to 1000 BC. WHI.2: The student will demonstrate knowledge of early development of humankind from the Paleolithic Era to the agricultural revolution.

### **Textbooks**

A Message of Ancient Day (Houghton Mifflin). Chapter 4: The Depths of Time. Lesson 1: Uncovering Clues to Our Past.

*World: Adventures in Time and Place* (Macmillan/McGraw-Hill). Chapter 3: Early Cultures. Lesson 1: Early People.

*World History: Patterns of Interaction* (McDougal Littell). Chapter 1: The Peopling of the World, Prehistory to 2500 B.C.

*World History: The Human Experience* (Glencoe McGraw-Hill). Chapter 1 Human Beginnings. Lesson 2: The Appearance of Homo Sapiens.

*World History: Continuity and Change* (Holt Rinehart and Winston). Chapter 1: The Rise of Civilization. Lesson 1: Before Civilization.

*World History: Connections to Today* (Prentice Hall). Chapter 1: Toward Civilization (prehistory-3000 B.C.). Lesson 2: The Dawn of History.

# **Conceptual links to other teaching units**

When modern Homo sapiens was peopling the earth and adapting to many different biomes, it already had the gift of language. The next Landscape Teaching Unit (2.3) in Big Era Two is titled "Language: What Difference Did It Make?" It explores in depth the question of what made human language different from animal communication and how language became such a fundamental tool in human history.