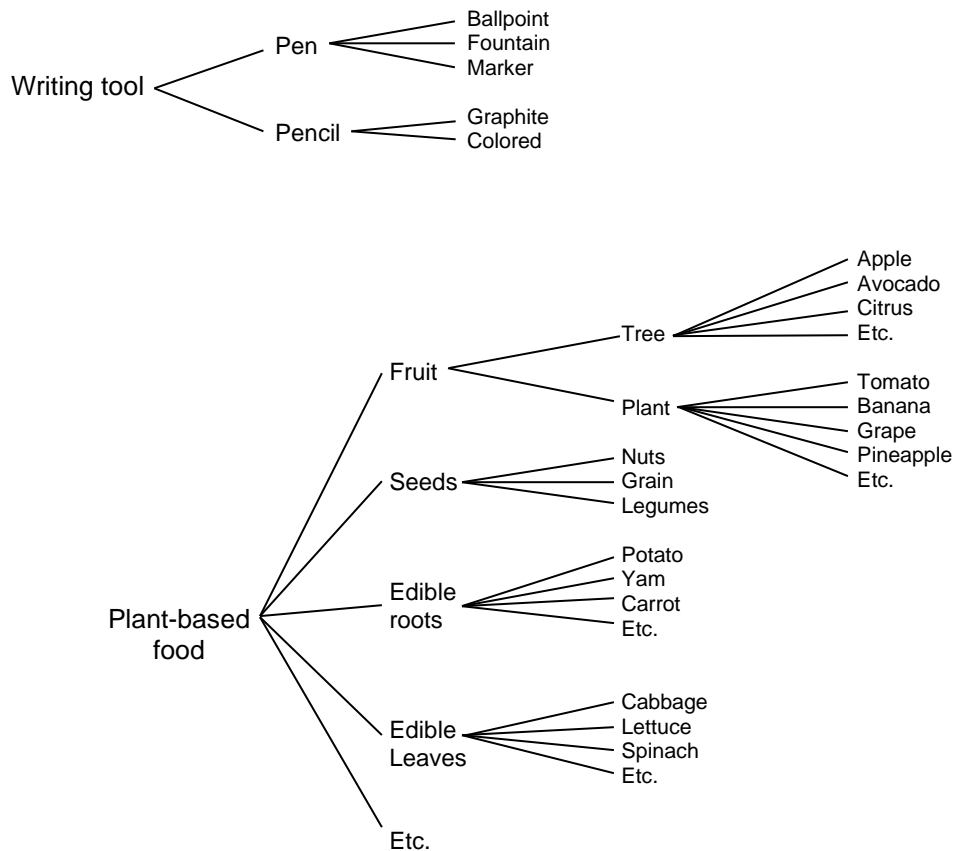


2: Agriculture and the City *Organizing Knowledge*

Knowledge Trees

When you understand a particular subject, you have a mental “tree” for organizing information about it. As your understanding grows, you add “branches, limbs and twigs” to the tree. Below are two examples of simple (but incomplete) trees. Each entry in each tree is a category that organizes information.



Knowledge-organizing trees like these help you remember and make sense of vast quantities of complicated information. In the investigations that follow, you’ll identify and organize information related to an ancient city.

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Çatalhöyük

Çatalhöyük, or Çatal Höyük (cha-tel hoo-yek) which means (in Turkish) “forked mound,” is on the Anatolian plateau in Turkey. The large mound, rising above the plain, is split in two by a dry river bed where a branch of a local river once flowed.

In 1956, British Archaeologist James Mellaart began digging in the mound and discovered evidence of one of the world’s earliest cities. Construction of the settlement began about 9500 years ago, and occupation continued for the next 1,800 years, peaking about 7000 BCE.



Excavated buildings at Çatalhöyük ►
Photo: Ahmet Poçanoğlu (Google Earth)

<https://www.sutori.com/story/mesopotamia-the-fertile-crescent>



Investigation: Human Activities in Çatalhöyük

The humans who used *El Mirón* cave (described in section 1: Paleoanthropology) were members of a “hunter-gatherer” tribe. They ate wild animals, fish and plants. Apparently they only lived part of the year in the cave, moving somewhere else to find food the rest of the year. Most hunter-gatherer groups (including those living in more recent times) have been nomadic, moving between locations to ensure a good food supply.

About the time Çatalhöyük began, there’s evidence in many places of a gradual but important change. Hunting and gathering of wild plant food continued, but people in a few places began living year-round in permanent settlements. You’ll investigate the ways that life changed for these people.

Based on the information about Çatalhöyük that follows, work with others to identify and list different kinds of work performed by people who lived there. For example, one obvious kind of work was making mud bricks used for construction.

This is an artist’s representation of Çatalhöyük, drawn based on what has been learned from excavations by archaeologists. By 7000 BCE, several thousand people lived in an estimated one thousand residences. The design of the mud brick buildings, and the way the settlement is laid out are unusual, unlike any found anywhere else that we know about.

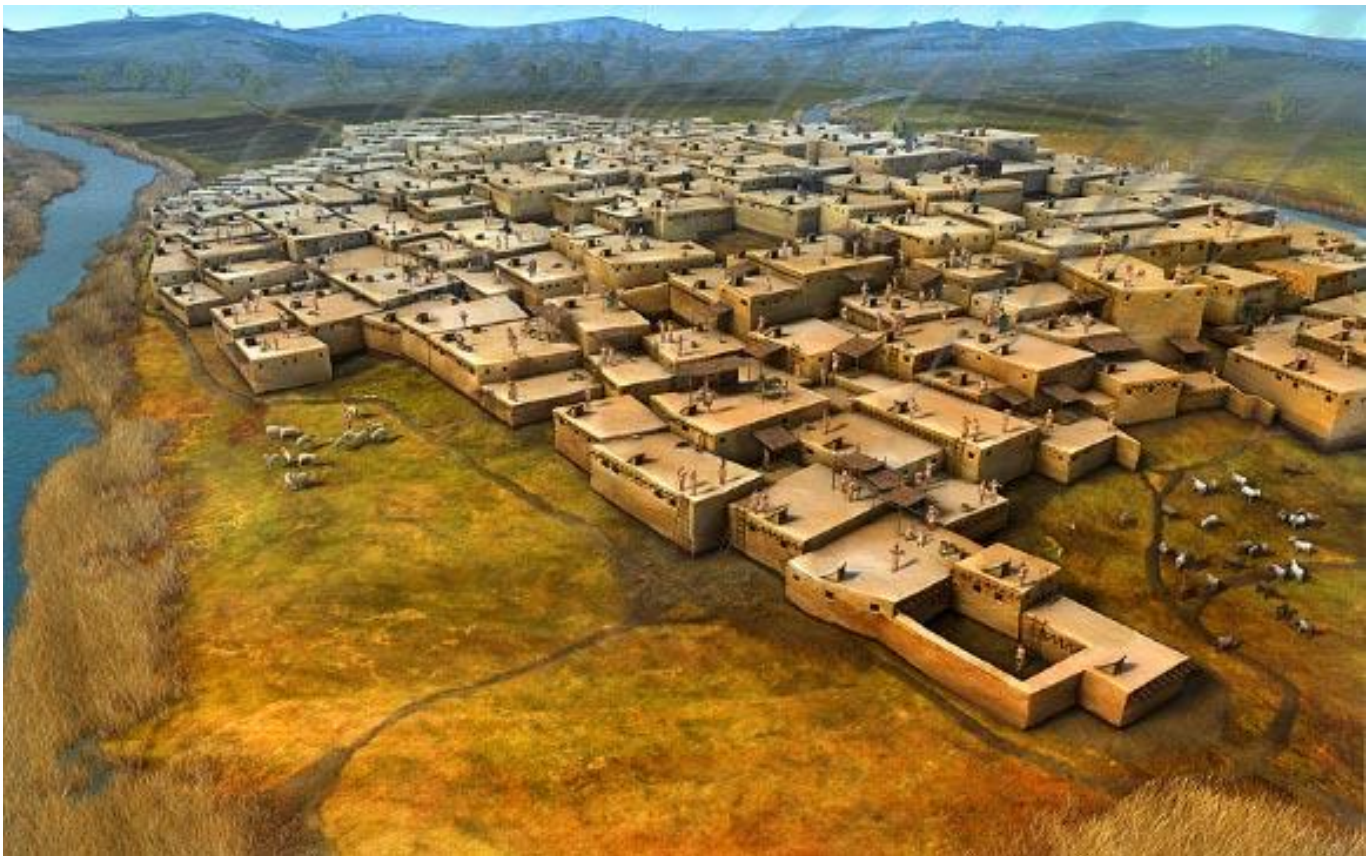


Image credit: Dan Lewandowski. <http://www.sci-news.com/archaeology/science-catalhoyuk-map-mural-volcanic-eruption-01681.html>

Another artist's drawing, a close-up of a small section of the settlement:



<http://www.fotolibra.com/gallery/32500/catal-huyuk/>

Archaeologists found that the buildings were reconstructed many times, each built on the remains and rubble of earlier buildings. Some sites have 18 distinct layers of construction, each raising the settlement's elevation, creating the two adjacent mounds. The top of the higher mound is about 15 m. (50 ft.) above the surrounding plain.

A few of the buildings' rooms are a bit different, containing platforms surrounded by horns of aurochs bulls and elaborate wall paintings, which may indicate special (perhaps religious) use of the space. For the most part, people who lived in the city all seemed to have about the same level of wealth and importance.

How is this building and community design different from other residences you know about? What might account for the differences? Record your hypotheses.

Photo of a restored room with ladder and baking oven. Timbers supporting the roof would have gone across the room from one side to the other instead of the way they are shown in this reconstruction.



http://commons.wikimedia.org/wiki/File:Catal_H%C3%BCy%C3%BCK_EL.JPG

Most residences had two main rooms, typically about 4 x 6 m. (13 x 20 ft.), and often a third room used for storage, accessed through a low wall opening. The oven, hearth (open fireplace), ladder and roof access opening (and exit for smoke) was usually on the south side of one main room. Some rooms had small openings high on the walls for light. Apparently interiors were kept clean and free of litter; refuse was dumped at the edge of the settlement.

The horned objects on the wall shown here are skulls of aurochs (wild cattle), plastered to reconstruct their living shape, with horns exposed.

Many bins for storing wheat and barley have been found, and bowls containing residues of grains. The area where refuse was dumped (“midden”) includes food residue from peas, almonds, pistachios and tree-grown fruit, along with wood ashes. Bones from fish, sheep and wild animals were also found in the midden.

Many of the plastered and whitewashed interior walls are painted with murals. This is one section of a wall. The large animal is a wild aurochs bull. Some similar murals depict use of bows and slings in hunting.



<http://www.museoorigini.it/pagina154.html>.



Excavators found many projectile points and other tools made of obsidian—natural glass formed when lava from volcanos cools quickly. When expertly fractured, obsidian creates extremely sharp edges, actually sharper than a razor. Volcanoes in the region were a source of obsidian. The chemical composition varies with the source; obsidian from Çatalhöyük was found at other settlements hundreds of miles away. Archaeologists also found mirrors of flat, polished obsidian and other objects that required great skill to make.



<http://www.catalhoyuk.com/history.html>

Pot made of fired clay, and flint dagger with carved bone handle. Flint tool edges are not as sharp as obsidian, but flint tools are harder to break.

Also found at the site:

- Fragments of cloth woven of yarn made from wool (among the oldest known woven textiles)
- In upper (later) parts of the mound, copper and lead metals, and slag from copper refining from ore
- Evidence of hybrid grain unlike the wild grain that grows in the region
- Stones shaped for grinding grain into flour
- Polished stone axes, clay, plaster and stone figurines
- Needles, chisel, pottery polisher, plaster tools, spoons, ornaments such as beads, fish hooks, other tools made of bone, woven mats, baskets, wooden boxes
- Much evidence of trade, such as seashells, flint and other materials not found nearby
- Thick layers of animal dung in some areas, and even some dung on otherwise clean floors of rooms with walls that were elaborately decorated
- Skeletons of humans buried underneath the houses. Bodies were usually flexed and bound with knees against chests, and placed in baskets or wrapped in woven mats made from reeds. Some houses show burial of many individuals (up to 60) under a single dwelling over an extended time period. There's some evidence that, immediately after death, bodies were exposed outside the city to vultures and insects to remove the flesh, and later only the bones were buried.

1. ***Make sure you've identified as many different kinds of human activity as possible. (For example, the presence of wool fabric suggests at least three or four different kinds of work.) Identify which of these activities would likely be full-time jobs.***
2. ***When your list is complete, use it to construct a "knowledge-organizing tree" of the type described on Page 1. Do this by analyzing your list to identify two or more main categories of work. Then further subdivide these categories, if necessary, to help organize the information in a way that makes useful sense.***
3. ***Based on your human-activity tree, how did life in Çatalhöyük differ from earlier life in hunter-gatherer tribes? (How is a city different from a village, besides being bigger with more people? What changes outside the city made city life possible? Identify probable advantages of living in a city rather than a village.)***
4. ***Prepare a report that includes your "kinds of work" tree and your conclusions.***

Follow-Up: Expanding Important Categories

Information-organizing trees for "human activity" are part of a more general mental organizer that you'll be using for historical investigation.

Below are other information organizing categories. Choose at least one, and build an organizing tree (sub-categories, sub-sub-categories, etc.) for it. Include both historical and present-day sub-categories.

- Means of transportation
- Means of communication
- Food production and distribution
- Kinds of shelter
- Ways of teaching and learning
- Ways of controlling behavior considered wrong

Looking Ahead

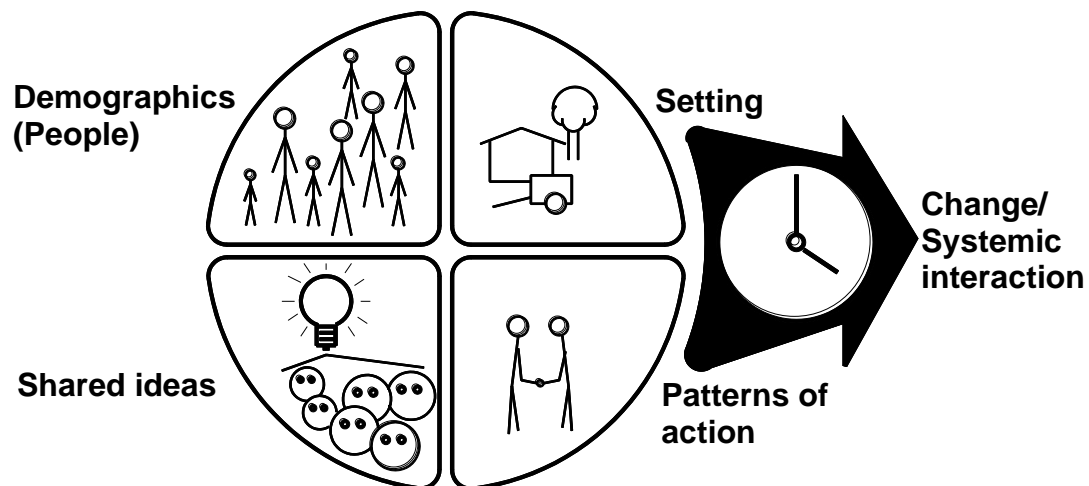
History is all about events, situations, conditions and so on. So is your everyday life. Improving your ability to make sense of history improves your ability to make sense of yourself and what's happening around and to you.

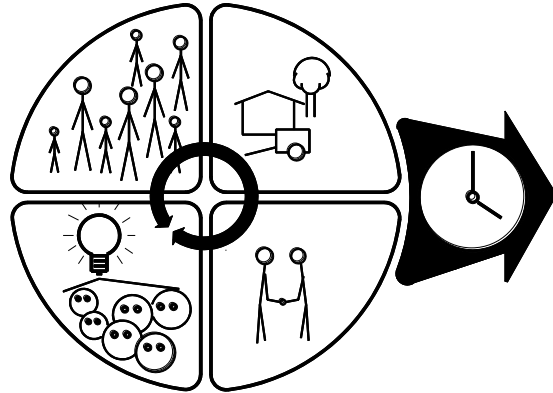
To make sense of the past, present and future (yours and the world's) you absolutely need to understand “systems”—collections of related things that interact. Trees, cars, clouds, and human bodies are systems. They're also subsystems—parts of larger systems. They surround you. You're a part of countless systems and subsystems—small and large, simple and complex, natural and human made.

The systems that affect you most are those that involve people, so those are the kinds we'll look at closely. They are complicated, but we'll organize and simplify your analysis using a “systems model.” For convenience, we'll just call it “the Model.”

The Model has four main, interacting parts. Everything you know, everything you'll ever know about anything, will fit within and can be organized by the four kinds or categories, subcategories, sub-subcategories of these four parts. Interactions between the four parts (which are always taking place) create change over time—change in history, change in your life.

Here, in graphic form, is a version of the Model. Units of *Investigating World History* that follow will help you understand how to use it.





For Teacher/Mentor—Overview:

The importance of mental organization of information as a factor in intellectual performance is vastly underrated. An organized mind, filling a 30-item grocery list, will group the needed items by department, reasoning that its owner wishes to minimize time and steps while shopping in a supermarket. Indeed that mind and its owner probably *created* the list using the store’s departments as memory-jogging categories.

Imagine a list taking in everything a person knows—*everything*—and you’ll have a good general idea of how humans need hierarchical organization to cope with the nonstop flow of information coming to them from their eyes, ears, and other senses.

Lack of a single, simple, logical system for organizing knowledge is a major reason why so little of what’s taught is remembered. The adequacy of school subjects as organizers is taken for granted, not because they work well but simply because they’re familiar.

To educators, almost of whom were trained in one or another specialization, this can be unsettling. It need not be. Systems theory doesn’t dump specializations, just makes them working parts of a master mental organizing system. **The purpose of this organizing and systems theory is not to aid memory (that may be a side benefit), but to *increase the learner’s depth of comprehension.***

Treating reality systemically occurs naturally in early life, as children learn to differentiate toys, animals, and the like. But in history textbooks, information is usually—as some historian once said—“just one damn thing after another.” Systems theory gives kids a far simpler, more efficient, and useful way to organize, store, pull from memory, and make use of what they know.

Particularly useful—even essential—is the ability to “scan” the whole of one’s knowledge free of the artificial boundaries between fields of knowledge in the search for relationships. This is the basic process (e.g. relating agricultural production and the beginnings of civilizations; relating cities to specialization of labor) by means of which individual and collective knowledge grows.

Objective of this unit: To introduce the conceptual tool of information-organizing trees that identify hierarchical relationships between categories, subcategories, sub-subcategories, etc., and to develop learners’ abilities to identify these relationships and generate information-organizing trees from unprocessed data.

As always, requiring learners to memorize facts about the past isn’t an objective of this course. We believe this traditional expectation of most history instruction should be discarded.

The final section of learner materials in this part also gives learners a first look at the five-part systems Model we use throughout the remainder of the course. This Model is, more than anything else, a question generator. It asks, “What, precisely, is going on here, and what do I need to know to make the best-possible sense of it?”

This is the question every human on earth—consciously or unconsciously—is asking every waking moment. Using General Systems Theory, the Model subsumes and integrates all academic disciplines—geography, engineering, language, ecology, anthropology, sociology, agronomy, etc., including those not yet imagined.

For a summary, look at Slideshow 2 at <http://www.marionbrady.com/SlideShows.asp>.

Notes on the Investigations:

Most world history textbooks give attention to the “agricultural revolution.” Authors and others have assumed that civilization wasn’t possible until agriculture exempted humans from having to spend most of their time and effort just feeding themselves. The usual view is that when a few people became able to feed many others, the rest had time to develop cities, civilized living, writing, and smartphones. (Actually, studies of existing and recent hunter/-gatherers, such as the !Kung in southern Africa, indicate that they typically devote a remarkably small segment of their waking hours to obtaining food.)

Urban analyst Jane Jacobs, after reading James Mellaart’s book describing his findings from the excavations at Çatalhöyük,¹ was inspired to consider origins of cities and agriculture in her 1969 book, *The Evolution of Cities*.² She raised the possibility that this city could have formed before agriculture was significant. Those that settled there, she postulated, created a trading monopoly in the essential “industrial material” obsidian. Obsidian was needed throughout the region for knives and projectile points, so the nascent city traded it with outsiders in exchange for non-perishable food—hard seeds such as grain and nuts gathered from the wild, and captured wild animals that could be kept alive until needed for food.

According to Jacob’s thesis, once the city was formed, it became a center of innovation, some of it accidental, some deliberate. For example, of the wild animals received in trade and kept penned at the city’s edge, those killed first for food would be those most difficult to deal with. The docile animals would be kept longer. Some of these docile animals would eventually be kept so long that they bred and gave birth to young, and continuing selection for docility eventually led to domestication of animals such as sheep.

Similarly, grains from many distant sources would be combined in city bins for storage. When some in the settlement noted that spilled grain would sprout and grow, they rather naturally began planting it near the city. Accidental hybrids between wild varieties of wheat or barley were likely under these conditions, and city dwellers would have become experts at judging quality of grain taken in trade. A few hybrids (or natural variants) would be better than wild grains, with larger seeds or more seeds per plant. Through accidental and deliberate selection, the improved varieties would eventually, over hundreds of years, dominate the crop.

Innovations of other sorts would also result from trading. Handicrafts such as leather work would be brought to a more skilled level by city specialists, and these products would become trade goods. The development of obsidian mirrors is an example of city-based growth of skilled work.

¹ Mellaart, James (1967), *Catal Huyuk: A Neolithic Town in Anatolia*. [McGraw-Hill](#)

² Jacobs, Jane (1969), *The Evolution of Cities*, New York, Random House

Archaeological explorations in the Anatolian region in the last 50 years indicate that agriculture—domestication of both plants and animals—was actually developing in many villages prior to the founding of Çatalhöyük, so some of Jane Jacob’s scenario is unlikely. Domestication of animals might have occurred under city conditions as Jacobs describes, but it seems more likely that hunters that followed migratory herds of wild animals would capture and tame some young animals, and this was the first, easy step to domestication and controlled herding. Many wild animals are remarkably easy to tame. In 1949, deep in the Monongahela National Forest, a forest ranger we met had tamed a half dozen deer. The does wandered the area freely, arriving early one morning to make friends with our family camped a half mile or so down the forest road from the ranger’s cabin.

But Jacobs was at least partly correct in her assumptions. Çatalhöyük was definitely a center for trade, and almost certainly a place of innovation of various sorts. People who specialized in crafts—knapping flint and obsidian into tools, for example—long predated this era, but in a city, crafters working with others would become more specialized and more skilled. *We think civilization developed not only because of the time made available by agricultural food production, but also (perhaps more significantly) because the increased cooperative interaction between individuals within cities, and with outsiders during trade, cross-fertilized advancements in both productive activity and sophisticated thinking. Cities are cradles of innovation.*

Mellaart, in an article summarizing his findings, listed the kinds of workers in Çatalhöyük:¹

“...the weavers and basketmakers; the matmakers; the carpenters and joiners; the men who made the polished stone tools (axes and adzes, polishers and grinders, chisels, mace-heads and palettes); the beadmakers who drilled in stone beads holes that no modern steel needle can penetrate and who carved pendants and used stone inlays; the makers of shell beads from dentalium, cowrie and fossil oyster; the flint and obsidian knappers who produced the pressure-flaked daggers, spearheads, lanceheads, arrowheads, knives, sickle blades, scrapers and borers; the merchants of skin, leather and fur; the workers in bone who made the awls, punches, knives, scrapers, ladles, spoons, bows, scoops, spatulas, bodkins, belt hooks, antler toggles, pins and cosmetic sticks; the carvers of wooden bowls and boxes; the mirror-makers, the bowmakers; the men who hammered native copper into trinkets; the builders; the merchants and traders who obtained all the raw materials; and finally the artists—the carvers of statuettes, the modelers and the painters.”

His list is not complete.

Another quote of significance for Çatalhöyük:²

“...the wild ancestors of many Fertile Crescent crops were already abundant and highly productive, occurring in large stands whose value must have been obvious to hunter-gatherers. Experimental studies in which botanists have collected seeds

¹ Mellaart, James, “A Neolithic City in Turkey” CCX, No. 4, April, 1964 *Scientific American*, pp. 94-104

² Diamond, Jared, *Guns, Germs and Steel, The Fates of Human Societies*, ©1999, 1997, New York, W. W. Norton & Company, p. 131

from such natural stands of wild cereals, much as hunter-gatherers must have been doing over 10,000 years ago, show that annual harvests of up to nearly a ton of seeds per hectare can be obtained, yielding 50 kilocalories of food energy for only one kilocalorie of work expended. By collecting huge quantities of wild cereals in a short time when the seeds were ripe, some hunter-gathering peoples of the Fertile Crescent had already settled down in permanent villages even before they began cultivating plants.”

A recent New York Times article sheds further light—along with raising more questions—on the agricultural revolution:

http://www.nytimes.com/2016/10/18/science/ancient-farmers-archaeology-dna.html?_r=0

Additional recent archaeological studies suggest that settled, sedentary life was a precursor to agriculture, not an outcome, at least in some parts of the ancient world. See also [Early Civilizations Had It All Figured Out | The New Yorker](#). This article (and the book it reviews) also points toward evidence at Çatalhöyük and other early cities that indicate very little social hierarchy, suggesting a functioning city with no authority doing important decision making or control of residents.

The investigation of Çatalhöyük:

As with other activities, we suggest that learners work in small groups in this investigation. To get started on the first step—listing kinds of work in the city—they may need some triggering suggestions such as “Every object shown in the picture suggests at least one kind of work, and often more than one kind.” The timbers used as roof beams implies axe makers, woodcutters, wood transporters, and builders, for example.

Once lists are complete, grouping similar activities into categories may be a bigger challenge. Possible categories include activities to produce food, tools, shelter, clothing, decoration, and the like—i.e. responses to the differing kinds of human needs. Generating categories requires the significant cognitive process “generalizing.”

As we’ve repeatedly noted, one of the biggest problems with schooling as it normally proceeds is that it bombards the learner with vast quantities of largely disorganized information. Without mental “trees” and other conceptual organizers, that information is largely useless, and will soon be forgotten. Making sense of complex reality requires organized knowledge, and learning how to do it is absolutely essential.

The data for Çatalhöyük show that the agricultural revolution indeed occurred, but there’s no actual evidence of the steps involved. As a possible expansion and enhancement of this activity, you might have learners develop their own scenarios about how domestication of plants or animals might have happened.

The assignment: ***“Make up and write (or record in some other way) a story of how a hunter/gatherer group might have begun (a) making gardens, or (b) herding goats.”***

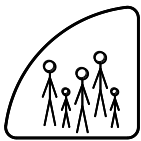
The Model¹

Every human, every waking moment, is subconsciously thinking, “What’s going on here, and what should I do next?” Lifting these questions into consciousness and approaching them systematically will provide learners with a powerful tool that will be useful for the rest of their lives. Historical study, more than any other traditionally taught subject, lends itself to this consciousness-raising process. The Model that’s elaborated in the parts that follow provides answers to those questions that have substance, depth, and vast explanatory power. Its four “super-concepts” are complex enough to have within them a complete network of interrelated sub-concepts. Identifying the relationships between them directly addresses the central purpose of historical study—tracing the dynamics of change.

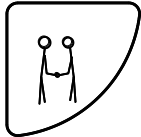
The first four components of the Model are the standard, traditional categories used to construct stories or drama, (setting, actors, action, plot). Elaborated, the four are extremely efficient information organizers and conceptual tools for analysis.



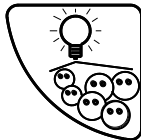
- **“Setting,”** As within any drama, the setting includes both natural and human-made elements—everything physical that relates systemically to what happens.



- **“Actors,”** focuses on the people involved, particularly their demographic characteristics. **Demographics** is a second super-concept.



- **“Action”** is not only the specific, idiosyncratic actions of each person, but (much more importantly) the **action patterns** shared by actors, learned as a part of the society in which they’ve been reared.



- **“Plot,”** encompasses the important ideas and values shared by the participants that color their perceptions and shape their way of life. **Shared ideas** is the fourth, and most important, super-concept.

These four categories of the Model, adequately elaborated and expanded, can be used to analyze any historical situation. They direct attention to important but often ignored factors shaping events, conditions, situations and historical trends. Each category contains logical, usually familiar sub-categories:

Setting: Constructions, tools, climate, resources, outside groups, transportation systems, communications networks, etc.

Demographics: Number, population density, population movement, age profile, sex ratios, subgroups, etc.

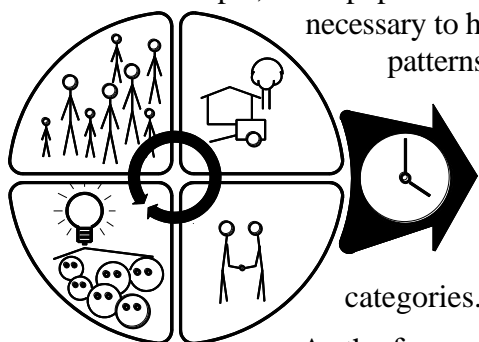
Patterns of Action: (for) work, economic transactions, decision-making, child-raising, movement of goods and people, communicating, controlling deviance, etc.

¹ Excerpted from Marion Brady and Howard Brady, *Investigating American History*, v.3.1, 2015, pp. 24-25 (www.marionbrady.com)

Shared Ideas: (about) causation, human nature, status, outsiders, the future, the supernatural, etc.

These four categories and their sub-categories provide an effective way to begin analysis of any historical situation, event or change. *However, there's more—a feature of the Model that sets it apart from linear—one thing after another—accounts in traditional history textbooks:*

Each of these four is systemically related to all others. A change within any of the four categories will tend to cause changes elsewhere. Although it plays little or no role in conventional historical study, “system” is the most powerful of all super concepts. For example, when population density increases significantly, changes in the setting will be necessary to house more people. These changes, in turn, will affect work patterns and much else. Eventually, ideas about levels of personal freedom (and many other important ideas) are likely to change.



Some important characteristics of any society or group will, of course, relate to more than one of the four main categories. For example, social stratification and class structure related to occupations, wealth, family or clan will relate to all four categories.

As the famous Irish legal philosopher (Murphy) said, “You can’t change just one thing.” One ancient change in setting—learning to plant seeds in cultivated patches—led to another change in setting: permanent settlements, plus growth in population (demographics). (Or, possibly, vice versa.) Permanent settlements led to shared ideas about land ownership and boundaries. Internal and external disputes over boundaries led to either organized conflict or organized dispute settlement (patterns of action). (The list of cascading changes is endless.)

History is, after all, a study of change. Without the key idea “system,” the causes and consequences of change can’t be understood. Learning isn’t simply a matter of absorbing facts; it’s a process of developing and enhancing the ability to discern and explore systemic relationships between aspects of reality not previously thought to be related. In the study of history, students can confront reality in all its complexity, and investigate the most important relationships of all, those which change whole societies. No other commonly-accepted course of study deals with all of reality; no other integrates all other academic disciplines, even going beyond their boundaries.

Using the five-part knowledge organizer (the Model), with its main categories—setting, demographics, patterns of action, shared ideas, and their systemic relationships—learners become far more sophisticated students not just of history, but of life.

For further information, we suggest reading the free book, *What’s Worth Learning?*, available (PDF file) at <http://www.marionbrady.com/Books.asp>.

June 2015, Minor rev. March 2016, October 2016, September 2017 (HLB)

World history unit links: <http://www.marionbrady.com/WorldHistory.asp>.