Marion Brady, Howard Brady

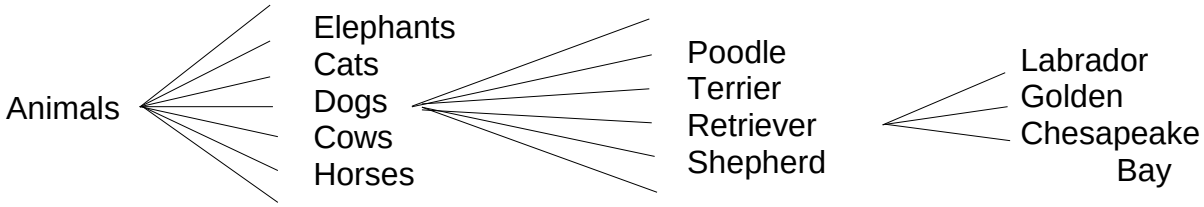
2: Systems and Societies

Knowledge Trees

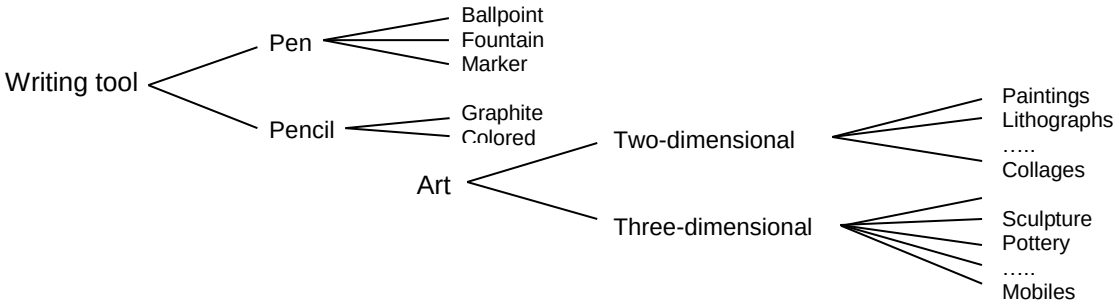
Many of the important patterns you learned while growing up were given names or labels and became "categories." The category labeled "animal" is used for many kinds of organisms that share the pattern of moving around. To build knowledge, you've been finding and refining categories since you were an infant.

For example, one of your early ways of categorizing might have put all four-legged animals together under a single heading called "doggie." However, you quickly moved on to a many-part system. Dogs, cats, cows, elephants, horses, and other familiar animals began to be seen as different kinds of things and were given different labels.

Your revised category system then became even more complicated. Instead of talking about dogs, you began to sub-categorize them, calling them poodles, shepherds, terriers, and retrievers, and so on. Now that you're older and know even more, you may have elaborated the dog category even further—poodles, for example, may have become "toy," "standard," etc. Like this:



We'll call diagrams like this "knowledge trees." They can be used to organize almost any kind of information. Each word in each tree is a category, and the tree shows important relationships between knowledge categories.



Investigation: Developing Knowledge Trees

1: ***Choose one of the following and devise a knowledge tree to analyze and classify information about it. Work with others, if possible.***

- Means of transport
- Means of communication
- Food production/distribution
- Kinds of shelter
- Ways of teaching and learning
- Ways of controlling "bad" behavior

2: ***Check your work. The category words in each column should have a similar descriptive level, and "explain" the words in the previous column. The words in your final column and the category with which you started should be directly related.***

3: ***If possible, compare your work with that of others, thinking about relative strengths and weaknesses.***

Investigation: Organizing Knowledge in Commerce

Analytical categories are important because they organize information and help us deal with complexity. If a store put its products on shelves in random order, finding something would be almost impossible. Quite naturally, similar products are grouped together.

The same principle applies to information. Random facts are hard to remember, but if they're organized into categories, remembering and using them is much easier.

1: ***Make a tree for the way products are organized in a typical supermarket.***

2: ***Nothing is perfect. Make a short shopping list and take it to your local supermarket. If you have trouble finding an item, this may indicate a category problem. Describe the problem, and suggest a change.***

3: ***Most stores place certain products in ways that make you notice and buy things you otherwise might not buy. Identify and describe parts of the supermarket's product display arrangement that cause you to slow down and notice or otherwise pay special attention.***

Bolivian Tin Miners

Some years ago, anthropologist June Nash lived and worked for a year and a half in Oruro, Bolivia, studying lives of tin miners.[1] (She later spent much more time there.) On the map below, Oruro is just above the interior lake.The city of Oruro has been a tin and silver mining center for hundreds of years.

The mining area is over 4,000 meters above sea level (about 14,000 feet), on Bolivia's *altiplano* (high plateau), where the air is thin and cold.

http://www.sustainablebolivia.org/bolivia.html

https://en.wikipedia.org/wiki/Bolivia

[1] This section excerpted from Marion Brady and Howard Brady, *Idea and Action in World Cultures*, Englewood Cliffs, N.J., Prentice-Hall, 1977, pp 25-35, supplied by contributing anthropologist June Nash.. Copyright © Marion Brady and Howard Brady.

Investigation: Problems of the Miners

Humans everywhere face problems. When those problems occur over and over, societies develop standard ways—patterns—to deal with them. For example, long ago some farming societies believed that the rains that made their crops grow came from the gods, and would continue only if the gods were kept happy with sacrifices. They adopted patterns of sacrificing animals each year at the beginning of the growing season.

Almost every pattern is a solution for some kind of problem. For example, the pattern of three meals a day (or, in some places, two or four meals) is a solution to the routine problem of an empty stomach feeling.

Tin miners in Bolivia have their own problem-solving patterns. ***As you study the follow data, make two parallel lists, one for problems miners faced (including minor ones), and one for the patterns they followed to solve them. Work with others to complete your lists.***

As part of her study, Nash visited the tin mines. She describes her experiences:

The mine company sends out a bus that takes the men from the mining camp where they lived, to the mine for the morning shift. On the morning I was scheduled to visit the mine, I got on the bus at 6:20. It was still dark and very cold. We arrived at the mine and I entered with Domingo, who had promised to let me watch his work day. I was given a hard hat to protect my head from falling rocks and from bumps where the tunnels are low. I was also given a belt holding the battery that lit my headlamp.

We descended by elevator to level 180 (180 meters below ground level). Here Domingo and his work partner changed into the patched, torn clothing that they wear when working. Most of the men sat quietly in the corridors. Some of the drillers helped each other tie the sleeves of their rain gear. They wear rain gear so the wet clay sprayed to cool their drills will not run down their arms.

We walked some distance to a vertical shaft. Beams made a floor over part of this shaft. This was where Domingo and his partner, Juan, prepared for work. Above and below them, similar platforms had been built within the shaft. Out from each of these platforms drillers worked, running tunnels into the ore-bearing rock. Domingo was making preparations for the start of a new tunnel. His task was to set a heavy wood beam against the overhead rock. Standing on the slippery, clay-covered beams with their backs to the open shaft, Domingo and Juan began to work.

Using hand drills, chisels and eight-pound hammers, they chipped out niches to receive the ends of the heavy wood support beam. They drove their drills into the rock face. They alternated between working and resting, breathing heavily through their filter masks. It was only 10° C (50° F) in the shaft where they worked, yet both men sweated heavily.

(Continued)

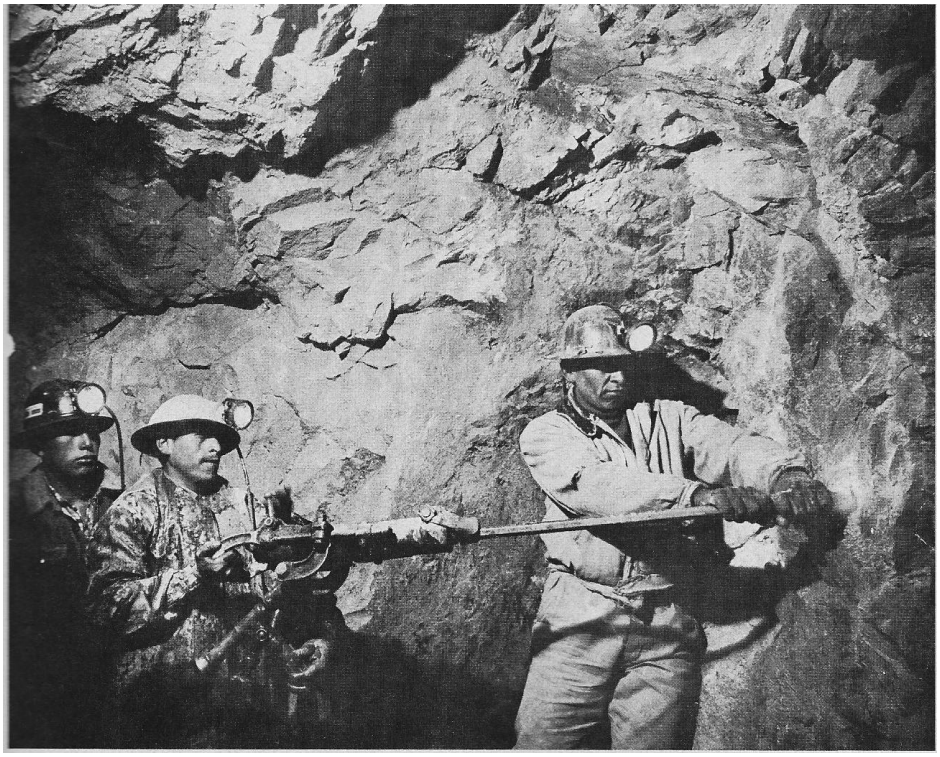
The air was filled with fine dust from a drilling operation going on in a nearby tunnel. As they worked, they continually dislodged small rocks that tumbled past the beams down the vertical shaft. They ignored these. But if a big rock were to fall, the men would call on the *Pachamama,* the earth spirit, not to be angry. A worker yelled from below, asking if he could pass through the shaft. Domingo stopped work, so that nothing would fall to that level.

The wood beam was finally fitted into place. It was pushed up tightly against the rock above it with wooden wedges driven in the niches at each end of the beam. Satisfied that the beam would hold up, even when dynamite charges were set off nearby, Domingo and Juan started down the series of seven 5-meter ladders leading down to the bottom of the shaft. I followed them down. Domingo announced that it was time for lunch. They both washed their hands in the stream of *copagira*, the yellowish-red sulfurous water that winds through all the passages.

http://www.eabolivia.com/mineria-en-bolivia.html

The lunch room was a gallery carved out in one of the passages. Rough wooden planks used as seats lined the rock wall. Three men were there when we arrived. There was some joking and laughing as the men relaxed from their strenuous work. Soon the elevator arrived with the lunches (prepared by the miners' wives), packed in metal containers and wrapped with cloths to keep them warm. The lunches were picked up at the mining camp by a company truck which brought them to the mine. The lunches were a link between home and work. If a man had had a disagreement with his wife the night before, he could guess if she was still angry if his lunch didn't show up on the elevator. Sometimes, if a man knew he was in trouble at home, he would not even come to the landing platform because he was ashamed and knew what his working companions would say if they noticed is lunch was missing.

On another day I entered the damp, cool area where Donato and Cefering were working. Drillers often work in pairs, a master with his helper. Today, as on many other days, the pneumatic hammer drill (powered by compressed air) was constantly getting stuck in the surface of the rock. The spent more time trying to dislodge it than they did drilling. This is dangerous work. Sometimes the drill point will suddenly strike something in the rock that causes the drill point to jam, and this causes the heavy drill to swing violently. This can knock men off their feet, sometimes injuring or even killing them.



Pieces of rock fell as the shattering noise of the hammer echoed against the walls of the narrow passageway. The men had no protection for their eyes. The driller said that they had tried safety glasses, but too much dust and moisture clouted their vision and they could not stop work to wipe them constantly.

At 11 the men took a break for lunch. When they went back to the worksite at 12, the driller let me hold the machine and try to drill. When I triggered air into the piston, the jolt almost threw me, although I had been warned to expect it. It was like holding a tiger, something with a will of its own. I realized fully the danger the men had spoken of in the operation of the drills. The vibrations of the machine numb the body completely. The men say that after several hours of drilling, they do not feel the pain of any wounds from a falling rock. They are sometimes surprised to see blood flowing from a wound when they come out from work. A retired miner told me that after two years away from the mines, he could still seem to hear the hissing of the piston and the blast of the drill, stuck in his mind from his 17 years of work.

Anthropologist Nash, during her stay in Oruro, interviewed many miners and their families. Below is a translation of one of these interviews with miner Juan Rocha:

When I started, I didn't know what it was like to be overcome with gas. The shaft where I was working was almost full with all the rock that had been mined. I crawled on my hands and knees on top of the rock to the rock face where I was working. In those days, we didn't have electric lights on our hats, but used carbide lamps, with open flames to give light. No one had told me that when there is gas, the light won't burn. I entered innocently, without knowing anything of what was going to happen. The lamp kept going out every few minutes. I bent over to start the drilling and I felt very weak. I couldn't do anything, not even let go of the drill. I heard all kinds of sounds in my ear. Pigs cried, birds twittered, trains whistled, autos honked. My head couldn't stand it.

I went back to a main passageway where there was a stream of water. I went there to soak my head because I thought it was the heat that had made me feel bad. I didn't know it was the gas. I wet my ears and forehead and returned again to the face. There I hung the lamp and turned to adjust the drill. I don't remember anything else.

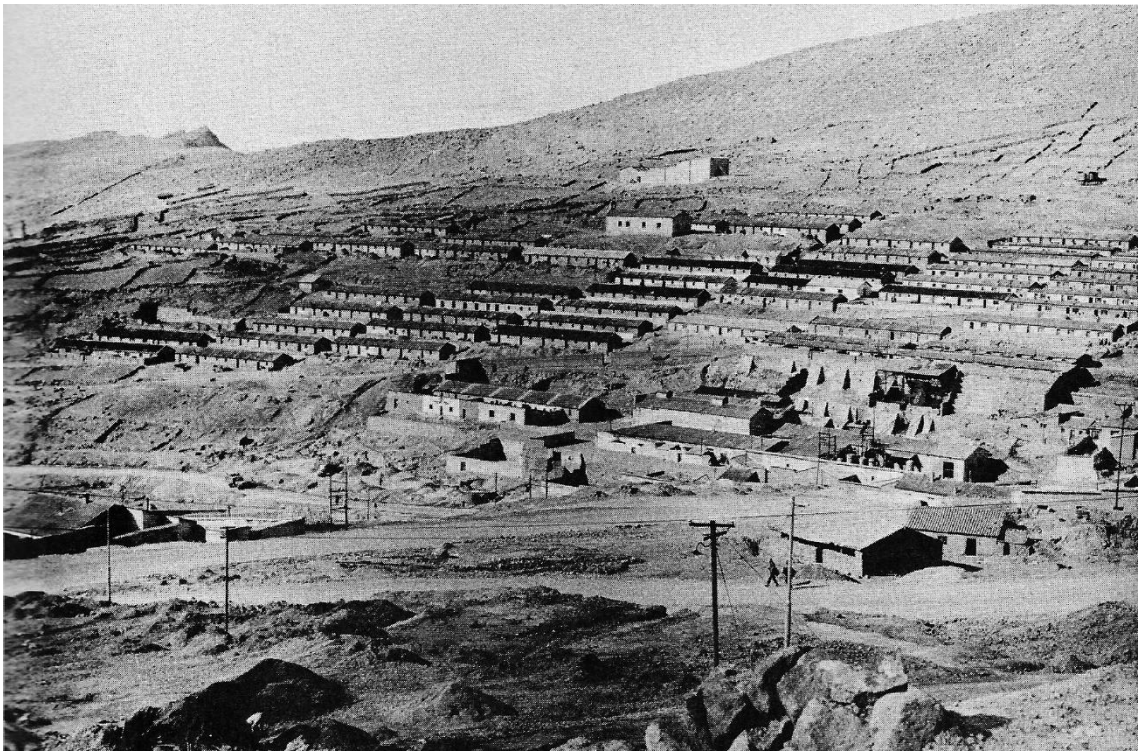
One of my comrades in the gang came to tell me it was 9:30, the time for *akulli* (the rest period). He shouted to me, "Rocha! Rocha!"

When I did not respond, he entered and found me lying on top of the rock load as though I were dead. He ran out fearfully to tell my comrades. There were about eight or ten of us in the gang. They ran in and pulled me out, dragging me to the shaft entrance while others ran to get an ore cart. The pushed me in that up to the elevator and took me outside. The ambulance was already there, and took me to the hospital.

***

In September, 1953, I became a foreman of a work group. Engineer Cesar gave the group to me, saying, "I am going to give you this mine section and you are going to work with four people to start removing ore." The mine section was very rich. I had been a driller for some time, but it was the first time I had my own work gang. The men he gave me were Severino Katari, Sebastian Cabrera who has died, Miguel Aduana who is dead, and Constantino Garcia, an old man who also has died. Of this, my first work group, there is only one living. All the rest have died as a result of their work in the mine.

Mining camps like the one shown here are built by the mining company to house workers and their families. The average life expectancy of miners who live here is about 40 years. Those who don't die in accidents are killed by lung disease from breathing toxic dust. At the time of June Nash's first investigations, the wages were about $80 per month. Wages have improved to about $360/month, but the dangerous working conditions and short life spans continue.



After an accident at the Itos mine, the miners talked to the superintendent—the *señor administrator*—to ask permission to have a three-day festival, making a sacrifice (*ch'alla*) of a llama to the mine. One worker recalls the meeting:

All of us went in a group to the office of the señor administrator. We asked for at least a day of rest so that the mine could receive the *ch'alla*. But Señor Roque almost ate us alive. He treated us as though we were lazy and bad. He doesn't have any respect for the men. He said, "You are so-and-sos and I won't give you any permit.

One of the men said, "Señor Roque, we want only to be understood. We came here to arrive at an agreement, but we are not going into the mine even if we are marked absent."

(Continued)

Roque said that if we didn't go to work we would be laid off. He was going to consider us drunkards.

The last time we were in a union meeting, one of the union leaders called Roque a brute and all the men applauded. He said he was like a donkey, like a pig, so fat. It makes me angry when a man does not feel the sacrifice of the men down in the mine, while he has easy work above it. All the time I have been working in my section of the mine, he has never come in once.

But the *ch'alla* was held and we joined together to sing the song of the miners:

The little Bolivian miner who works in the mines;
The little Bolivian miner who works in the mines.
We have made the riches that you have exploited.
The little miner has done it for his country,
So suffering and humbled,
The little Bolivian miner who works in the mine;
The little Bolivian miner who works in the mine.

Neither Barrientos nor Ovando* ever can humiliate us;
Neither bazookas nor cannons ever can humiliate us:

*Military dictators/presidents of Bolivia in the 1960s.

Miners believe that *El Tio* is the sprit that lives underground and watches them at their work. Many miners believe *Tio* can make the vein of metal appear to those who make *ch'alla* to him. Statues or images of *Tio*, depicted with horns, are often placed in the mines. An old woman who had worked in the mines told this to anthropologist Nash:

I used to pray the Lord's Prayer as I entered the mine. I asked the spirits [*of men and women who died in the mine*] to let me pass. When the miners go below ground level, they don't pray. They don't even say "Jesus," because the metal would escape. When they enter the mouth of the mine, miners pray the Lord's Prayer. But inside, a miner never prays. Where would they get metal? Impossible! They wouldn't get any metal!

Below ground level I ask, "*Tio*, help me to see the metal." Then at that moment I see the metal. I did not get frightened in the mine. It was as though I was in my house. I brought my cigarettes and smoked well for *El Tio*. I asked *El Tio* questions. "Where will the metal be now, *Tio*?" And, at that moment, the metal would appear.

A miner describes *ch'alla* to Nash:

Since this was Friday, my wife gave me some pure alcohol to sprinkle in the mine, but I couldn't do it until I finished work.

At lunch we always eat where *Tio* is. We have a small *Tio* made of clay at the corner of the rock. *El Tio* has many miniature bottles for alcohol and wine. Today my helper, who has just begun work here, was very curious. He was a Beniano, from the east part of the state of Beni, in the tropical lowlands. As I was decorating *El Tio*, he came and looked at me and said, "What are you doing, *maestro*?"

"I am decorating *El Tio*," I told him. "We are going to *ch'alla* him."

I put the liquor and wine in *El Tio*'s little bottles, then sat down and asked the Beniano if he wanted a bit of liquor.

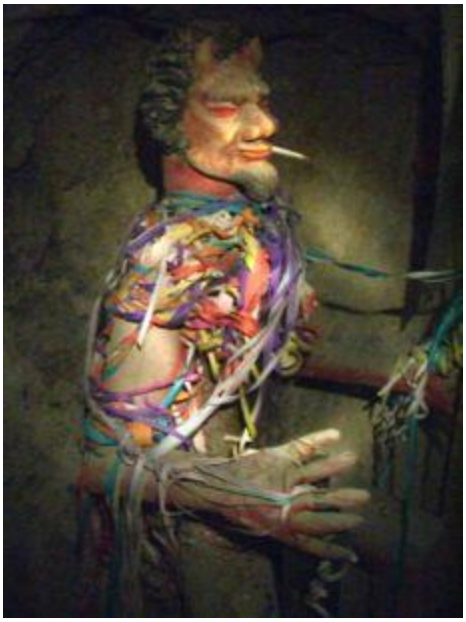
"No, *maestro*."

So I asked him if he wanted a cigarette. He said he did, then sat back surprised when I first lit a cigarette and gave it to *El Tio*. He kept looking from *El Tio* to me. "*El Tio* likes cigarettes," I told him.

http://bolivia.for91days.com/tag/refinery/

The Beniano looked at me as though he was thinking, "This man is going crazy!" We continued smoking, and finally the other men came. The Beniano seemed to think that I had gone mad. I said to him, "This is the custom here, my friend; it is our custom. You have to excuse me. Don't be surprised."

Note that until recently, many miners were paid based on the amount of metal in the ore they found and extracted. Miners lucky enough to find and mine a rich vein of ore would make more money than other miners.



Another *Tio* figure in a mine: ►

https://www.devp.org/en/blog/bolivia-impact-mine-communitys-women

http://en.citizendium.org/wiki/El_T%C3%Ado

Work with others, and combine your lists of problems and patterns of the tin miners. Then organize them into "knowledge trees."

Investigation: Organizing Knowledge in the Target Area

RHRN Project

The Target Area investigation you began earlier should have given you a great deal of "raw material" to consider.

Focus on one aspect of the Target Area and identify parts, sub-parts, sub-sub-parts, etc. Show your results in a tree diagram.

Investigating Relationships

As you've seen, making sense of the real world (knowledge) grows as you expand your pattern awareness and knowledge categories. There's another major source of insight into the world around you—the **discovery of relationships**. [Note: When you hear or read the word "relationships," you may think immediately of "**human** relationships." That isn't what we're talking about. We're concerned here with **logical** and **cause-effect** relationships. For example:

- Sunlight and plant growth are related.
- Lung cancer and smoking are related.
- Wet pavement and skidding are related.
- Economic hard times and political uncertainty are related.

- Tides relate to the moon.

- Weather relates to ocean currents.
- Suburban patterns for neighboring relate to street width.
- Rate of plant growth relates to soil characteristics.
- The welfare of a nation relates to its decisions about what to do with surplus wealth.

For individual humans, for whole societies and civilizations, in every field of study, a search for insight is, more than anything else, a search for possible and probable relationships.

This isn't new for you—you've been finding relationships since you were an infant. You discovered a relationship between crying when you were hungry or uncomfortable, and receiving attention from a parent**. In your investigation of the Bolivian tin miners, you searched for and found relationships between problems and patterns.**

Investigation: A Closer Look at Relationships

1: ***Below are parts of relationship statements. Discuss these with others, then, in your journal, fill in the blanks with what seem to you to be useful hypotheses:***

Teen-age suicide is related to _____.

Claustrophobia can be caused by _____.

_____is related to free time.

Neighborhoods are peaceful when _____.

_____ is affected by color.

Violent behavior is related to _____.

_____ is related to birth order.

If job stress is high, then _____.

2: ***Do you feel safer in some places than others? Explain how personal feelings of security and comfort (or insecurity and discomfort) might relate to each of these:***

(a) Neighborhood design

(b) Infant care procedures

(c) How classrooms are organized

(d) How schools are organized

Investigation: Geographic Relationships

1: ***Identify and list what you believe are the ten or twelve most important cities on earth.***

2: ***Check the geography where each of the cities is located, and identify similarities (patterns) in their locations. List the geographic characteristics probably related to city formation and growth.***

3: ***Find other locations with similar geographic conditions to those where important cities are located. Almost always, a city will be located there, but many of these cities are smaller and less important. Identify possible reasons why.***

Investigation: Relationships in Public Issues

Below is a list of the states in the United States and their 2014 crime rates,[1] expressed as total crimes per 100,000 people. The list is arranged in series, with Vermont having the lowest rate.

On a map of the United States, identify the locations of the 10 lowest crime states, and the locations of the 10 highest-crime states. Why do you think the crime rates differ?

Vermont	1738.8	Utah	3341.9
New Jersey	2267.3	Oregon	3370.0
Maine	2269.2	Ohio	3404.2
Idaho	2307.9	Indiana	3404.4
Virginia	2339.9	Maryland	3418.8
Wyoming	2377.3	Kansas	3469.4
New Hampshire	2389.5	Mississippi	3503.7
Connecticut	2410.1	North Carolina	3549.5
New York	2501.6	Hawaii	3590.5
South Dakota	2565.3	Missouri	3820.3
Pennsylvania	2581.6	Oklahoma	3835.5
Rhode island	2636.0	Texas	3861.9
West Virginia	2654.1	Nevada	3931.6
Massachusetts	2664.0	Delaware	3986.8
Iowa	2667.3	Arizona	4033.8
North Dakota	2677.8	Georgia	4057.2
Wisconsin	2689.3	Alabama	4061.9
Kentucky	2690.1	Alaska	4107.0
Minnesota	2782.4	Tennessee	4305.8
Michigan	2839.4	Washington	4307.3
Illinois	2839.9	Arkansas	4338.0
Nebraska	3117.2	South Carolina	4486.3
Montana	3162.3	Louisiana	4509.6
Colorado	3187.8	Florida	4526.8
California	3255.0	New Mexico	4788.4

Note: The causes of crime are complex, and some crimes are never reported, so don't show up in statistics. Crimes totaled in the table are murder, forcible rape, robbery, aggravated assault, burglary, larceny/theft, and motor vehicle theft.

[1]FBI, Uniform Crime Reports, 2014

Investigation: Relationships in the Target Area

RHRN Project

The information you've gathered about your Target Area is the beginning point for this investigation. Using that information, think about some possible relationships between parts of the Target Area you've identified (or will identify).

For example, is there a relationship between the orientation of different parts of a building and use of electricity? Between sound levels and locations? Is the level of dust in the air different in different parts of the Target Area? If so, why? Where and why do people congregate? Where is the most maintenance necessary? Why? Is any part of the Target area creating problems or deteriorating excessively? Identify reasons.

1: List at least five possible relationships between parts of your Target Area.

2: If you identify problems, suggest possible solutions. If possible, identify those responsible, and do what you can to improve the situation.

Analyzing Systems

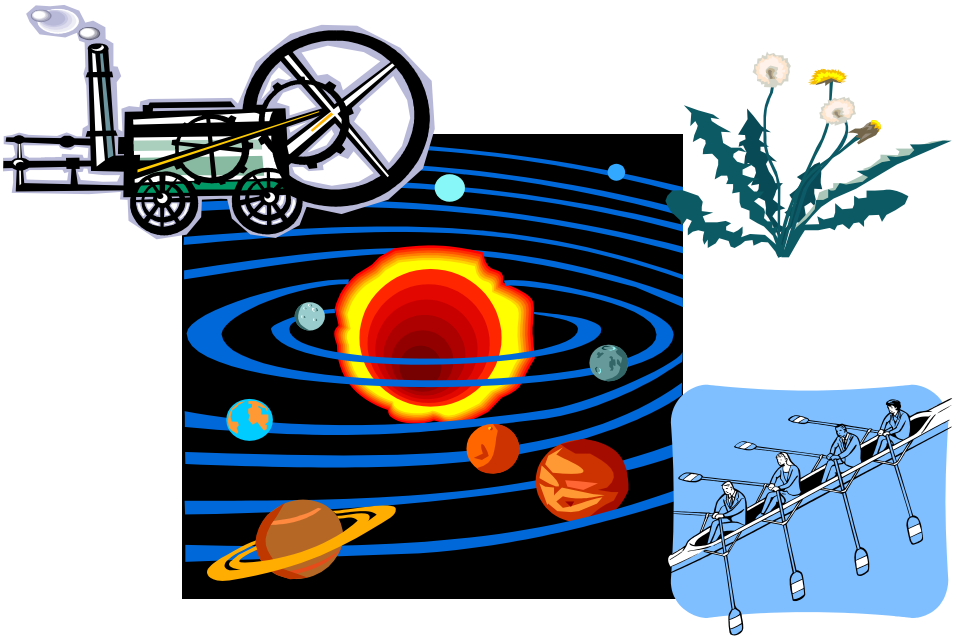
A system is an assembly of related parts that interact in patterned ways. If one part of a system changes, other parts will change.

You're surrounded by countless systems:

- Big systems (the solar system, the economic system of the United States, a hurricane)
- Middle-sized systems (your local water system, your school library)
- Small systems (cell phone, a kid on a bicycle, a burning candle)
- Biological systems (an oak tree, your digestive system)
- Social systems (A school club, the Navajo nation)
- Systems of molecules (your life depends on them).

The whole universe is a system. So are atoms. *Every science is a study of systems*. Understanding how to make sense of them is essential to survival. You've already begun the process by improving your ability to find *patterns* and *relationships*.

Four systems:



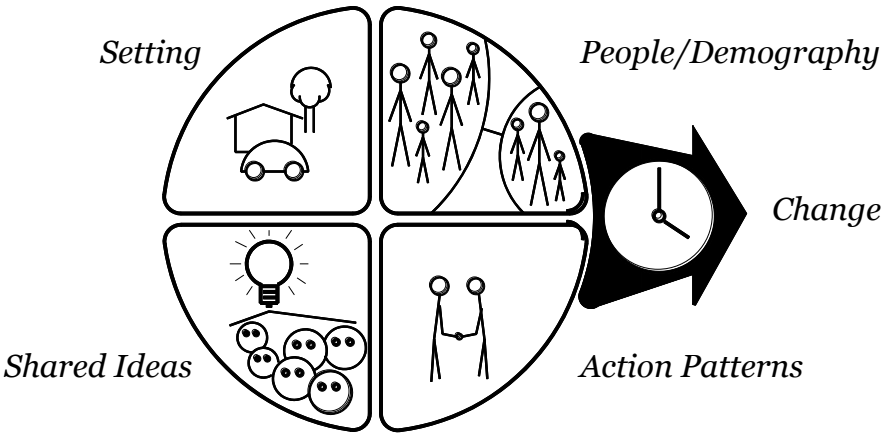
To make sense of the past, present and future (yours and the world's) you have to understand "systems"—collections of related things that interact. Trees, cars, clouds, and human bodies are systems. They're also subsystems—parts of larger systems surrounding you. You're a part of countless systems and 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're complicated, but we'll organize and simplify your analyses using a "systems model." For convenience, we'll just call it "the Model."

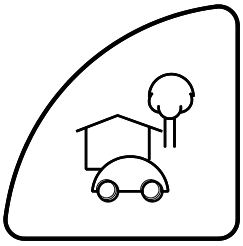
The Model has four main, interacting parts. Everything you know, everything you'll ever know about anything, will fit within and can be organized by the four kinds or categories, subcategories, sub-subcategories of the four parts. Interactions between the four (which are always taking place) create change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

You investigated one part of the Model—Action Patterns—in Unit 1 and in your study of Bolivian tin miners. And, even though you haven't recognized it, you've been using the Model, informally and intuitively, for years.

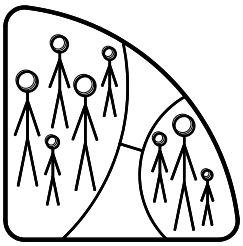
Here, in graphic form, is a version of the Model. Investigations that follow will help you improve your use of it as an analytical tool.



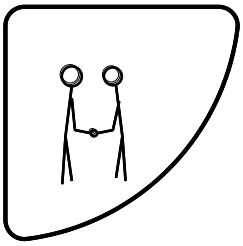
Societies and Cultures: The Model describes Culture—the systemic characteristics of a human group, such as their ways of thinking and acting. Each human group that shares a particular culture is called a "society."



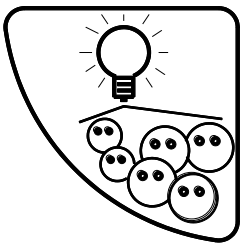
Setting: To make sense of ourselves and others, it helps to know the Setting. This includes not only the natural but also the human-made environment: the tools people use, the clothes they wear, the food they eat, the roads and buildings they create—everything tangible. Note that the Setting sub-categories "natural" and "human-made" overlap—human-made facilities and tools require natural materials and resources, and many parts of Setting are combinations of the two.



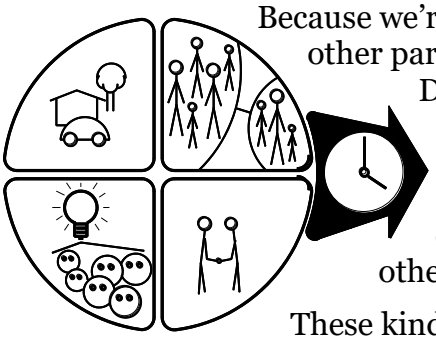
Demographics: Understanding events requires some knowledge of the people involved—how many, how they're distributed, the number of young and old, how these numbers are changing, and the size and relationships of sub-groups. Study of this kind of information is called "Demographics."



Action Patterns: Much of what you and those around you do every day follows "standard" patterns, simplifying life by helping you know how to act, and how others are likely to act. These important ways of acting are learned from parents and other members of society. They differ from society to society, and tend to change very slowly. You're probably not conscious of many of the patterns you follow—they're so natural you don't think about them.



Shared ideas: Members of groups share important ideas, values, beliefs, and assumptions. Ideas are invisible, of course, so must be inferred from what group members say and do. Important action patterns are generally motivated by Shared Ideas. As with action patterns, these differ from society to society, and generally change slowly. You may not be directly conscious of some of the ideas you share with those around you, or may think they're shared by everyone everywhere. Shared Ideas are the most important thing that can be known about societies and other human groups.



Because we're dealing with systems, every part is related to every other part, and a change in any part will cause changes elsewhere. Demographic change, such as an increase in population, will likely cause changes in people's Action Patterns—ways of teaching the young or distributing food, for example. These, in turn, will cause changes in the environment (such as new buildings) and in ideas about others.

These kinds of changes take time, so investigating change almost always requires a look into the past.

Investigation: Bolivian Tin Miners and the Model

You've already identified significant Action Patterns shared by the Bolivian tin miners (pages 3-11).

Working with others, review the information about the tin miners and list (in your journal) important parts of their Setting, Demographics (e.g. kinds/jobs of people) and Shared Ideas. Organize this information based on the Model, using the information on Page 18 to help you define what should be in each list.

Investigation: How Universal Is Our Human Systems Model?

News reporters are reminded, over and over, that to tell any story, they must answer the five "W" questions:

Who? What? When? Where? Why?

Note that these questions "fit" logically with the main categories of the Model.

Fire severely damages local dentist office

TITUSVILLE — A dentist office sustained extensive damage after a Thursday night fire in Titusville, Fire Departments officials said.

Fire crews got a call at 6:11 p.m. for the fire at Christie Dental of Titusville in the 600 block of Country Club Drive, Battallion Chief Greg Sutton said. Crews saw smoke coming from the windows of the business when they arrived on the scene.

Crews extinguished the fire in 30 minutes and no injuries are reported. But the dentist office sustained extensive smoke damage throughout the building and is uninhabitable.

The cause of the fire is under investigation and the State Fire Marshal's office

1: Match each of the five "W" questions with its corresponding Model category.

2: Test the Model by reviewing the "who, where, what, when and why" of human affairs in several sources, such as news stories similar to the one shown here, an historical account, an elderly person's recollection, an incident in your school, etc. In your journal, paste in news clippings or copies of other printed accounts, and write in other information from verbal accounts, then draw circles around the information that answers each of the "W" questions, and indicate which question is answered.

Note: The question "Why?" sometimes isn't answered in news stories, either because the answer is obvious, or because the reporter doesn't know the answer.

3: For each story, identify possible systemic relationships between the components. For example, did the Setting of the story (environment) have an effect on what happened?

4: Another set of categories are often used to analyze a drama or play: Cast/actors, stage/setting, action, plot. Fit these categories to the Model. How well do they match?

Investigation: Criminal Investigation and the Model

Even if experts don't realize they are using the Model, they use it, intuitively, in every in-depth investigation of events or situations involving humans.

1: ***Match each of the following terms used in criminal law enforcement with its general Model category. (Some terms may fit in more than one category.)***

2: ***Choose a term from the list, and describe its relationship with one other term. Repeat this relationship linking for several other terms.***

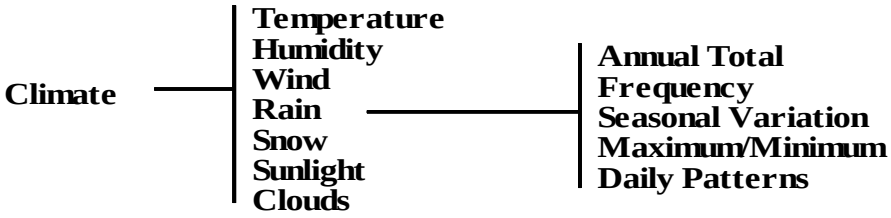
Clue	Perpetrator
Motive	Police detective
Investigation	Suspects
Sequence of events/timeline	Arrest
Victim	Witnesses
Prison	Questioning of suspect
Prosecuting attorney	Sentencing
M. O. (*modus operandi*)	Defense attorney
Crime scene	Fingerprints
Weapon	DNA analysis
Prosecution	Lineup
Evidence	Surveillance
Lie detector	Ballistics
Criminal laws/statutes	Criminal court
Jury	Constitutional rights

http://oureverydaylife.com/crime-investigation-schools-25466.html

Investigation: Extending the Model

"Knowledge trees" may be used to extend each element of the Model, adding sub-categories, sub-sub-categories, etc. For example, we've said that "Setting" has two main parts—the natural environment, and human-made tools and constructions.

The natural environment includes, of course, "climate" as a sub-category. It can be extended further:



This, of course, only shows expansion of the sub-sub-category "rain," but each of the items on the list (temperature, humidity…) could also be extended to give more detail. There's no one "right" tree expansion of the Model. The sub-categories and other levels may have terms selected to fit whatever situation or society is being analyzed.

Working with others, use knowledge trees to add and extend three or four other sub-categories in the Model, in a way similar to the above. Add at least two more levels of more-specific categories.

As with other investigations, record your results in your journal. Your work in "Developing Knowledge Trees" (page 2) should fit here, as an expansion of either "Setting/human-made/tools" or "Action Patterns."

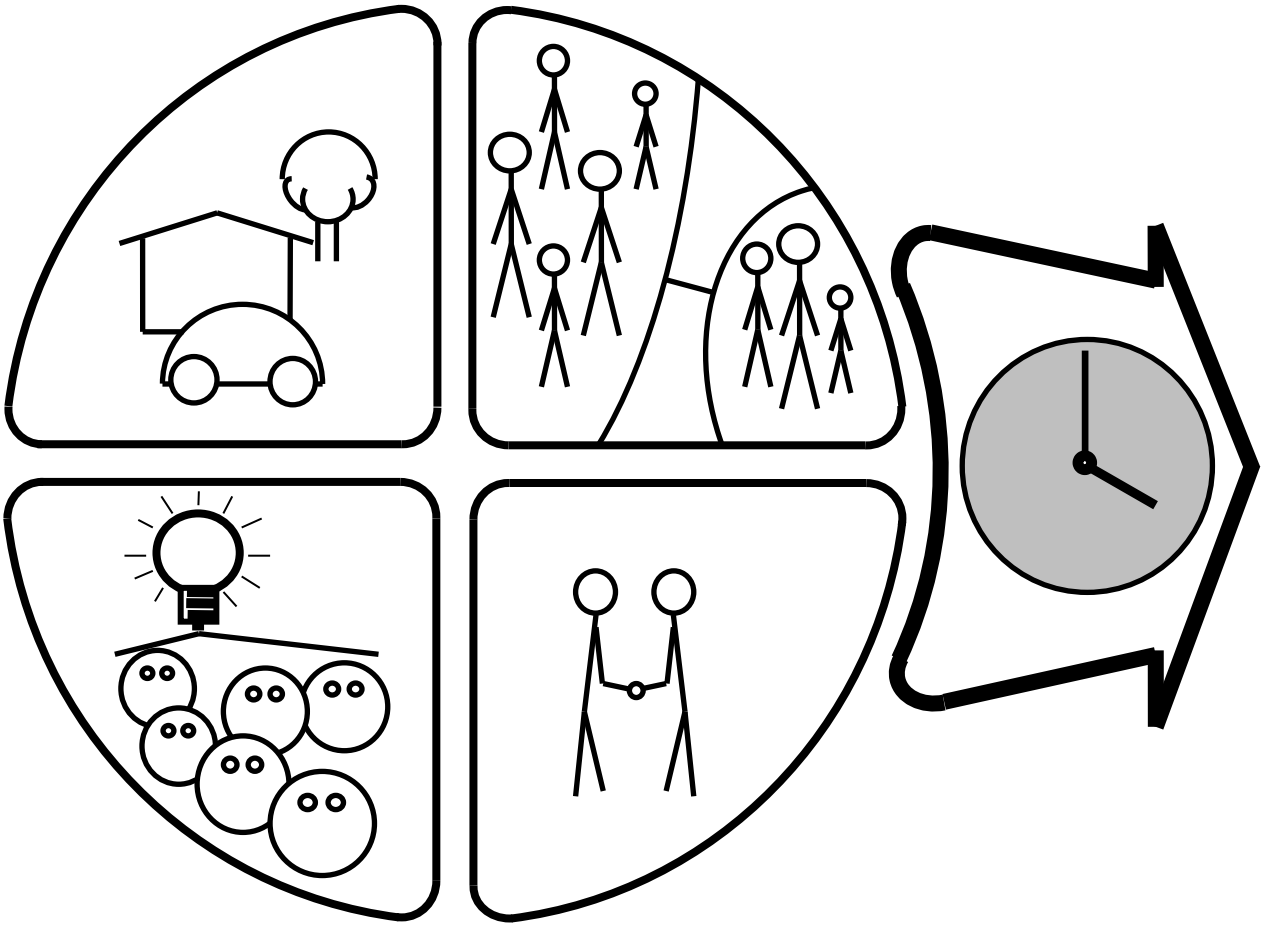
Suggestion: Look for "Action Patterns for_____," "Shared Ideas about_____, and/or Demographic data about_____."

Investigation: The Main Target Area System

1: Your Target Area is a system (or contains at least one major system), with many different parts. You've already begun collecting data about this system. Working with others, use the Model to organize the information you've collected so far.

2: Based on the Model, identify information you need to collect to make your Target Area analysis more complete.

3: Plan your approach to collecting more Target Area information, and begin collecting information and filling in the "gaps." This will be a continuing project.



For Teacher/Mentor—Overview:

Unit 2 reinforces the concept "action pattern," and introduces hierarchical expansion of concepts ("knowledge trees"), the importance of understanding relationships, and the major system concepts of the Model that will guide investigations from this point forward.

This is vital. To solve major human problems—even the problem of continued human existence—sense must be made of complex realities. This requires an understanding of the *systemic relationships between parts of reality*. There's no alternative.

A great deal of what happens in schools these days overwhelms learners with so much information that coping is like trying to drink from a fire hose. Learners haven't been given tools for coping—for sorting essential from trivial knowledge, for finding significant relationships between various pieces of knowledge, or for linking what they're learning to the world around them.

Investigating World Cultures helps learners create and use information-organizing tools—both process—actively tying what is learned to the real world—and content—organizing concepts that can be applied over and over to sort out and make sense of complexity.

One of those tools is hierarchical classification of information, typically arranged from general categories to more specific ones.

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. 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 all of whom were trained in one or another specialization, this can be unsettling. It needn't be. Systems theory doesn't dump specializations, just makes them working parts of a master mental organizing system. **The purpose of using systems theory to organize information isn't aid memory (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 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 use 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 dangerous working conditions to ritualized ways of gaining supernatural assistance, relating schoolroom furniture arrangement to ways of learning) by means of which individual and collective knowledge grows.

Objective of this unit: To formally introduce learners to systems-based tools for analyzing human societies and groups and their problems, and practice applying the tools in a variety of contexts.

As always, requiring learners to remember facts about particular societies isn't an objective. This traditional expectation should be discarded.

Investigation: Developing Knowledge Trees

A possible problem in this and many other *Investigating World Cultures* investigations may be the conventional assumption by learners that there's only one right answer. That's rarely the case in this course (and in real life). Even if they start with the same category, the trees that learners will generate will differ significantly. Evaluating conceptual trees should be based on whether categories at each level of the hierarchy are reasonably parallel, and whether they follow the criteria listed in Step 2 of the investigation.

If the knowledge trees are generated by teams, some way of presenting their work to the whole class for discussion will be helpful. Questions such as, "What are the strong points of this tree?" "Are bigger trees better than smaller ones?" "Is anything important left out?" "How are these two categories in this group different?" "Which tree is most useful?" may be helpful. Check the trees in advance, and ensure that criticism (by you or learners) won't result in hurt feelings. Treat displayed trees as "works in progress, subject to change."

Note that the starting categories for these trees are important parts of the general systems Model that will be introduced later in the Unit.

Investigation: Organizing Knowledge in Commerce

This investigation will help drive home the necessity of rational organization in many areas of life. Of course, the focus may be changed to another kind of store if needed for simple access—a "big box" store, and even the urban corner *bodega* or the local convenience store needs to have its wares grouped into similar categories to be successful.

Bolivian Tin Miners

For more background information on distinguished anthropologist Dr. June Nash, see https://en.wikipedia.org/wiki/June_Nash. She was one of 14 contributing scholars for our 1977 secondary textbook, *Idea and Action in World Cultures*, and the material she supplied is republished here.

The region of tin mines extends in a narrow band of ore-bearing mountains from about 80 k. (50 mi.) north of Oruro to about 400 km. (250 mi.) south.

The lives of the tin miners has been affected over the years by fluctuations in the demand for and price of tin on world markets. Presently the demand and price for tin is high, and present-day miners make excellent wages (by local standards). This has created competition among Bolivian women for miners as mates, with adverse consequences for social stability.

Although wages are up, the dangerous working conditions haven't improved, and average lifespans of miners is still in the vicinity of 40 years. Silicosis or other lung diseases usually kill those who aren't felled by accidents. The Cerro Rico mines (the "mountain that eats men," where there have already been many miner deaths), have riddled a Bolivian mountain with so many mining passages that the whole mountain is in danger of collapsing, yet the mining continues, placing hundreds of miners in jeopardy.

Investigation: Problems of the Miners

Learners analyze Nash's description to identify the problems and the related action patterns of miners. The lists of problems and patterns are used to generate "knowledge trees." Separate trees for problems and patterns are likely, but ingenious work groups may combine them in some way. Later in the unit, the whole Model is used by learners to further analyze miner society.

Some problems and patterns are minor; the patterns associated with the meals of the miners, for example. The big patterns—those associated with *ch'alla* and *El Tio,* for example—are anything but trivial. Those who lack sufficient control of their own fate, and feel threatened by danger rather naturally look for help from supernatural sources. The *Tio* cult is derived from old Christian-derived folk ideas about the Devil, who is assumed to be master of an underground realm, combined with traditional indigenous ideas about earth spirits or gods.

The earlier practice of paying miners according to the amount of metal in the ore they found and extracted contributed, of course, to the significance of *Tio* in the miner's culture, as is evident in the woman's mining account.

One point that may not be clear from Nash's account is the reason for drilling into the rock. The holes made by drilling are packed with dynamite, set off to break loose the ore so it can be transported (usually using ore carts on rails) through the mine. Winches are usually needed to raise ore containers to the surface.

Processing and smelting the ore, done near the mines, has caused enormous water and air pollution problems in the region, jeopardizing the lives of all who live there.

Investigation: Organizing Knowledge in the Target Area

This should be a fairly simple and quick activity for learners who successfully made the knowledge trees required earlier. This is an intermediate step to the next Target Area investigation, which will apply the entire Model to the area.

Investigating Relationships

Knowledge and understanding generally grow not by amassing facts but by linking together aspects of reality not previously thought to be related. Finding relationships, then, is central to learning.

Investigation: A Closer Look at Relationships

As we said earlier, there's usually no single right answer to the puzzles that make up *Investigating World Cultures*. That's true with this activity, as well. After work groups have come up with answers, whole-class discussion could compare them to select those answers with the greatest merit (rated by "usefulness").

Investigation: Geographic Relationships

Major cities are generally deep-water seaports in places with reasonable climate, conducive to development and industry and creation of a commercial hub. The amount of commerce accessible from the major city is probably the greatest determinant of its size.

This somewhat-optional activity is a chance to introduce some conventional world geography. If course expectations require some emphasis on such topics, learners could prepare detailed reports on various major world cities and their overall characteristics, with appropriate graphics for illustration.

Investigation: Relationships in Public Issues

Let the work groups struggle with this for a while. Plotting the locations of the low-crime and high-crime states, the obvious first correlation is with location, which suggests a possible relationship to climate. Perhaps people are less likely to commit crimes in cold weather. Alaska, however, is a high-crime state, confusing the issue.

Poverty rates (https://en.wikipedia.org/wiki/List_of_U.S._states_by_poverty_rate) match crime rates fairly well, but again Alaska, with low poverty, is an outlier that doesn't fit the pattern. We've not found an explanation, but believe the high Alaska crime rate may be at least partially due to a kind of leftover "wild west" culture in the state. Also, in some locations, the sparse population may make some people feel they're not being observed by those around them, thus are more likely to commit crimes.

Probably the best lesson here is that not all questions have easy-to-find answers.

Investigation: Relationships in the Target Area

One key to maintaining learner interest in a project is making sure all feel they have some reasonable control over the learning process. Autonomy is closely associated with effective learning, and this investigation provides opportunities for kids to choose the direction of their investigation, and potentially take action that could make a significant difference in their environment.

Analyzing Systems: The Model[1]

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 they'll use for the rest of their lives.

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 one central purpose of the study of culture—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 comprehensive and efficient information organizers and conceptual tools for describing and analyzing.

The four categories of the Model, adequately elaborated and expanded, can be used to analyze any human 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.

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

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 analyzing any human situation, event or change.

The four are systemically related. A change within any of the four categories will tend to cause changes elsewhere. Although it plays little or no role in

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

conventional social studies courses, "system" is the most powerful of all super concepts.

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.

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 societies and cultures, students confront reality in all its complexity, and investigate the most important relationships of all—those that change whole societies.

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

Investigation: Bolivian Tin Miners and the Model

Conventional exposition, by itself, is of little value in teaching and learning. We've introduced the Model with three pages of conventional exposition. It really won't register in the minds of learners until they're required to apply it. Applying Model elements to the tin miner's society will begin this process. (Note: Demographics information is minimal in Nash's account.)

Investigation: How Universal is Our Human Systems Model?

Investigation: Criminal Investigation and the Model

These two investigations provide additional evidence to learners that the Model is an effective tool for analyzing reality. The second is perhaps optional, but some learners may be more interested in this one than in the first.

Investigation: Extending the Model

This investigation brings the various themes in this unit full circle—elaborating the Model using the hierarchical organizing principles used at the beginning of the unit. At this point, don't expect too much sophistication in the ways learners extend the categories—a great deal of elaboration will happen in later units.

Investigation: The Main Target Area System

The school (if that's the learning environment) is a microcosm of society, with all the elements of a reality identified by the Model. Here, learners begin their more-detailed analysis of the Target Area that will continue into the rest of the course.

(HLB) January 2017