

Civic Systems

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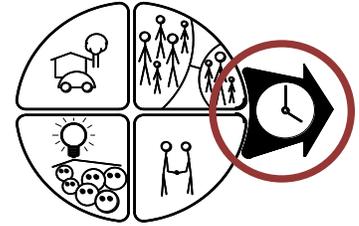
5: System Change & Dysfunction

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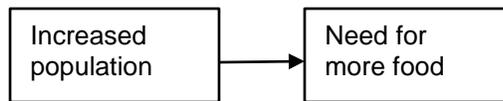
Analyzing change

Investigation: Flowcharting change



Societies are systems, and in systems, **everything** relates to **everything**. Turn on a water faucet, and the pressure in an entire municipal water system will be affected—not much, but affected nevertheless. Change the orbit of a body in the solar system and the orbits of all other bodies will shift. Change interest rates in an economic system and all other parts of that economy will be impacted.

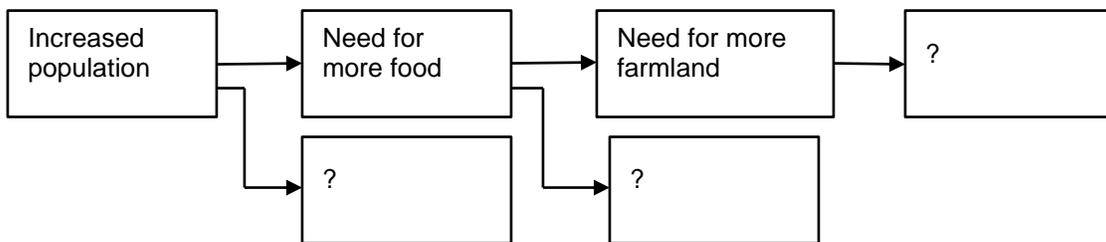
Looking at changes in a system can be complicated, so it's important to keep your investigations organized. One rather simple approach is through the use of flowcharts—diagrams showing possible cause-effect relationships. A flowchart begins by identifying a change in one part of a system, and then asks, “What would logically follow as a consequence of this change?”



Each new change usually becomes a cause of more changes:



And so on. Each change can have more than one effect.



- 1:** *In your journal, copy the diagram above, and fill in additional changes that would fit logically in the “question mark” boxes.*

2: Work with others on this: Choose three of the following situations (a through h below) and create flow charts that suggest possible consequences for the society of which you're a member. Extend the chart until a change is identified that would probably change your society in important ways.

- (a) A five gallon per day per individual limit on fresh water consumption.
- (b) A ten-dollar very reliable VSA (Voice Stress Analyzer), portable, about the size of a cellphone. (Voice stress analyzers indicate by a light or signal when a speaker is lying.) Assume it works face-to-face and over telephone, radio or television.
- (c) An anti-pollution law prohibiting the use of gas-powered automobiles for trips of less than two miles.
- (d) A mandatory year of public service for all at age 18 or after completing high school.
- (e) A heavy tax on automobiles, based on the number of square feet of road surface occupied.
- (f) A law requiring all shopping malls to sell or lease the airspace over their parking lots for apartments or condominiums.
- (g) Good meals, housing, healthcare and public transportation available free to any citizen, paid for with higher individual and business taxes.
- (h) Zoning regulations allowing a return to the colonial era arrangement when people lived and worked in the same building.



<https://www.pinterest.com/pin/440930619748990952/>

The data below describe changes that have affected several societies in important ways. A flowchart at the end shows some of the changes. ***Read the account, then complete the investigation by working on the summarizing flowchart.***

Fifty to seventy years ago, in Detroit and a few other cities, a young high school graduate could go to work at a local auto plant. He (almost always this was a male) would be taught how to do one particular job on an assembly line, then do that job for months or years. It would be boring, but wages and benefits were good. He would be making enough, in three or four years, to support a wife and family.

The job might change a little when a new model came out, and he might eventually move to a higher-skilled position as he gained experience, but he'd likely continue, working alongside thousands of other workers doing similar jobs.

<https://media.ford.com/content/fordmedia/fna/us/en/features/celebrating-the-moving-assembly-line-in-pictures.html>



Auto assembly at Ford factory, Windsor, Ontario, Canada, 1956.

In relatively few years, production procedures changed in major ways. Writer and columnist Thomas L. Friedman, writing about an experience in 1992:¹

“I was in Tokyo on a reporting assignment and had arranged to visit the Lexus luxury car factory outside Toyota City, south of Tokyo. It was one of the most memorable tours I’ve ever taken. At that time, the factory was producing 300 Lexus sedans every day, made by 66 human beings and 310 robots. From what I could tell, the human beings were there mostly for quality control. Only a few of them were actually screwing in bolts or soldering parts together. The robots were doing all the work. There were even robotic trucks that hauled materials around and could sense when a human being was in their path and would “beep, beep, beep” at them to move.”

[Creative Problem Solvers: Dice Factory! - Robotic Assembly Line Challenge \(Intro to "Agile Development"\)](#)



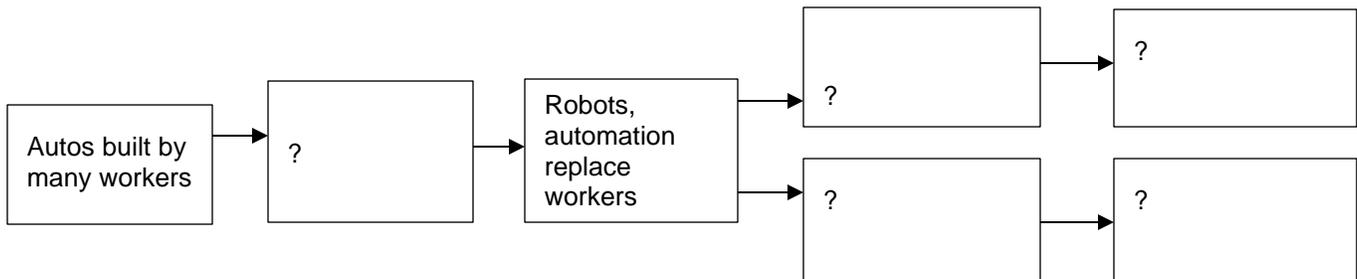
All vehicle assembly plants operate like this now.

¹ Thomas L. Friedman, *The Lexus and the Olive Tree*, New York, 2000, Anchor Books Div. of Random House; p. 30.

High unemployment in factory communities eventually led to deterioration in housing, city services, and schools, along with other problems.

The system for assembling cars changed, causing other changes.

Copy the flowchart below, and fill in the blanks, showing causes and effects. You may wish to change the diagram, with fewer or more blocks, or arrange them differently. Make sure every arrow shows a true relationship.

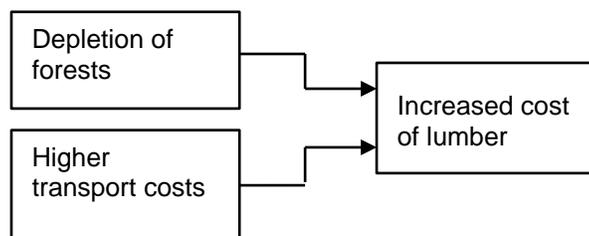


What’s happened in auto production has happened in most manufacturing industries. Robots assemble TVs and toasters. Machines mix, process and bag fertilizer or cake mix. Computers replace law books and the expert legal knowledge needed to use them.

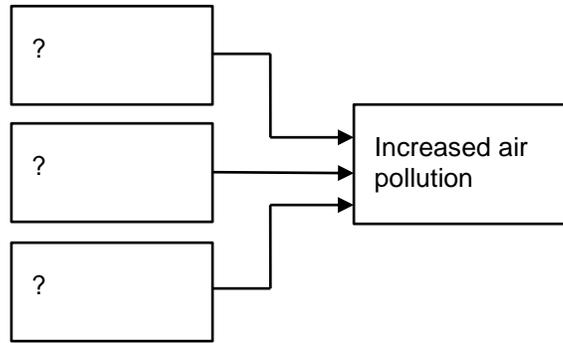
Investigation: Complex causation

You’ve surely enjoyed some success in identifying and diagramming apparent cause-effect relationships. There’s nothing particularly difficult in guessing that, say, the price of a resource is going to go up as it becomes scarce, or that increases in the number of elderly people will place a greater load on medical facilities.

There are, however, a couple of ideas that you may or may not have noted and illustrated on one of your flow charts. For example, effects often have more than one cause. In flow chart form:



You may have discovered, for example, that several different changes in societies may raise taxes. When an effect is due to two or more causes, this process is called “multiple causation.”



- 1:** *Copy the diagram above, and enter three possible causes of increased air pollution. (Air pollution has decreased in some places. Does your diagram suggest why?)*
- 2:** *Diagram multiple causation for the following changes:*
 - People moving from rural areas to cities
 - Development of self-driving cars
 - Decline in number of newspapers and newspaper subscriptions
- 3:** *Check your flow charts from the previous investigation to see if you've overlooked examples of multiple causation, and add blocks and/or arrows as required.*

Investigation: Local System Change

Prepare a report about System Change in your own community, city or county:

- 1:** *Gather demographic data for the past 30 years or so. You may already have some of this information from earlier investigations. (Choose a time interval over which major change has occurred, but not more than 50 years.)*
- 2:** *Interview adults who've lived in your area and remember what the area was like as far back as they can recall. Ask what they see as important changes.*
- 3:** *If possible, find copies of old newspapers (in library archives, for example) for your area, and identify local change from what is described or shown there.*

Use the Model to analyze this data, and identify system changes. For example, how has demographic change affected the human-made setting? Identify changes in patterns of action having to do with transportation, communications, business, or government, and cite reasons for the changes.

Show changes you've identified in a flowchart.

Investigation: Climate change and the Model

Authorities agree that huge changes in Setting are occurring worldwide. Mainly due to burning of fossil fuels—coal, petroleum and natural gas—the amount of carbon dioxide and methane in the atmosphere has increased over the past century, and is still increasing. These “greenhouse gases” create a blanketing effect, allowing the sun’s heat to penetrate to the earth’s surface, but preventing re-radiation of heat into space. The temperature of the atmosphere is increasing. Results:

- A significant and increasing number of extreme weather events. Hurricanes now sometimes stay in one location for hours or days, causing catastrophic damage in places like Houston, Texas (2017) and the Bahamas (2019). Rainfall changes helped trigger forest fires that have destroyed towns like Paradise, California (2018). Rainfall changes caused flooding in the Central U.S. (2019). Other extreme weather events are occurring elsewhere worldwide.
- Many people around the world rely on agriculture for survival, but drought triggered by global warming is making it difficult or impossible for them to raise crops. This is a major cause of emigration northward from Central America. (Drought has almost certainly been the biggest cause of civilization collapse worldwide over thousands of years.) Drought in many regions will likely increase if warming continues.
- Melting of vast amounts of land-based ice in Greenland and Antarctica is raising ocean levels. An increase in ocean temperatures also causes ocean water to expand, adding to the rise. Increase in sea levels is already causing problems in low-lying coastal cities. If warming continues, the oceans may rise several feet.

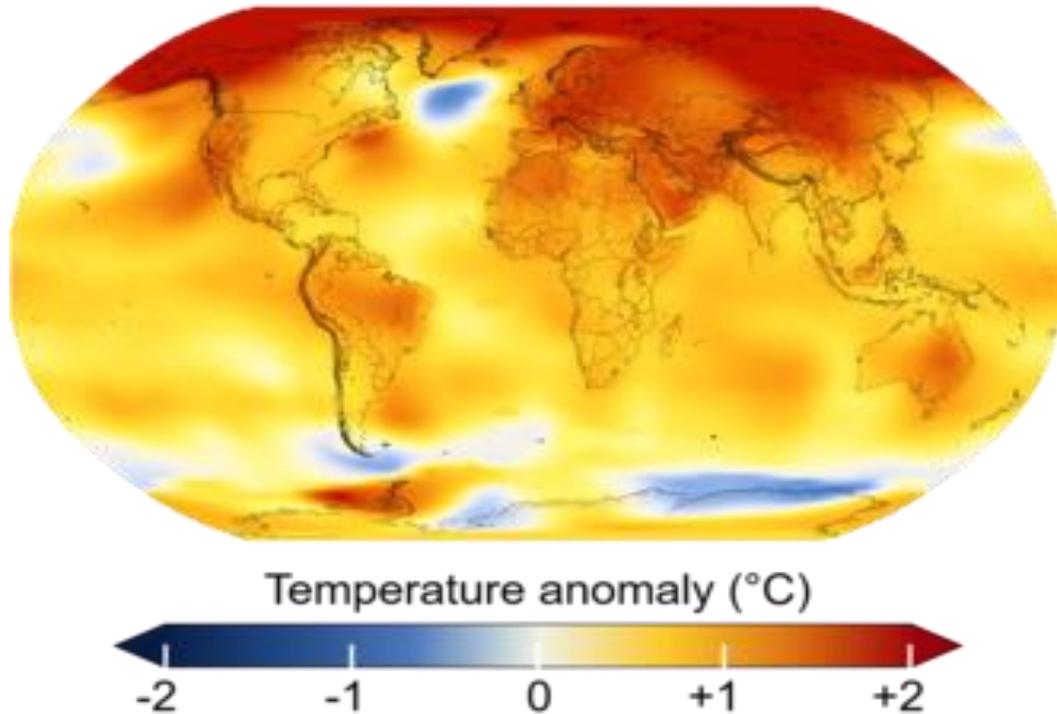
Those aren’t the only effects. The changes are complex, and sometimes difficult to understand. The effects vary a great deal from place to place—some places may even have colder winter weather, at least for a time. But overall, global warming is almost certainly the biggest problem facing humans now and for the immediate future.



Part of what was Paradise, California (Photo by *Los Angeles Times*)

<https://www.latimes.com/opinion/editorials/la-ed-wildfire-rebuild-20181124-story.html>

Temperature Change in the Last 50 Years
(2014-2018 Average vs 1951-1980 Baseline)

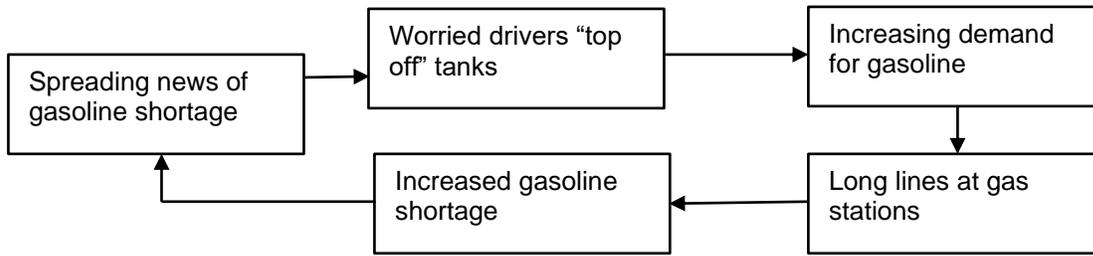


[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)

- 1: Working with others, identify and describe the probable long-term changes in Demographics and Action Patterns that have contributed to climate change. Use system change diagrams to aid your description.**
- 2: Shared Ideas having to do with relationships between the natural world and humans also are important in understanding climate change. Identify these ideas.**
- 3: Predict future changes in Setting, Demographics, Action Patterns, and Shared Ideas that may be forced by climate change. Use system change diagrams (and other kinds of illustrations, if possible) to show your conclusions.**

System Change: Feedback

Because of the systemic nature of societies, effects often “double back” and reinforce themselves (or their causes). Sometimes this is called “feedback.” (You’re no doubt familiar with feedback in public address systems. When the sound from an amplified speaker is picked up by the microphone and amplified again, and then again and again, an ear-splitting noise may result.) In flow charts, “feedback” can take many forms:



Very nearly the same thing has happened with food shortages in some countries around the world. Worried people with access to food hoard it, turning food shortages into famines, and other people die of starvation.

The idea of feedback is extremely helpful in understanding human affairs. In everything from personal relationships to international politics, it’s a powerful force for making things better or worse. In fact, it’s certain that feedback (or lack of it) is a major contributor to both the rise and fall of civilizations.

Investigation: Flowcharting feedback

1: Convert the following into a flow chart. Show feedback.

A society that lacks trust in another society may increase its defenses. The second society, seeing the first increase its defenses, may in turn increase **its** defenses, making the first society even more suspicious. The two groups may go to war with each other. Even if they don’t, a not-so-rare consequence of this version of feedback is that one or both of the societies end up investing so much in defense that neglect of other societal needs (such as education, health, or failure to maintain infrastructure) causes decline or even destruction of the society.

2: From current world events, identify at least one example of the process you’ve just diagrammed.

3: Check other flow charts you’ve created to see if you’ve overlooked examples of feedback. Add blocks and/or arrows as needed.

Another illustration:

When the ancient Egyptians invested their surplus wealth in irrigation canals, the increased food production created new wealth than could then be used to build more canals—creating more wealth. The same thing appears to have happened to the Athenians, in what is now Greece. When Athenians used their trade surpluses to build more ships to expand trade, they became steadily more rich and powerful.

4: *In your journal, describe the feedback taking place in these two societies.*

Decision-makers in Egypt and Athens eventually began using wealth to build pyramids, temples, and other monuments. What effects would you expect from this change? (Check the Model for help.)

Which local, state, or federal government expenditures seem to you to fall into the “pyramids and temples” category, and which into “canals and trading fleets” category? Why?

Investigation: Analyzing multiple and cumulative causation

Multiple and cumulative causation are important in each of the following situations. *Choose one change, and identify and chart related changes:*

- Reduction in tobacco use
- Rising prices for food
- Conflict between workers and business owners
- Development of new, expensive medical technology
- Redevelopment and improvement of old downtown areas
- Increase in use of computers



http://www.tabletsmanual.com/wiki/read/magnetic_resonance

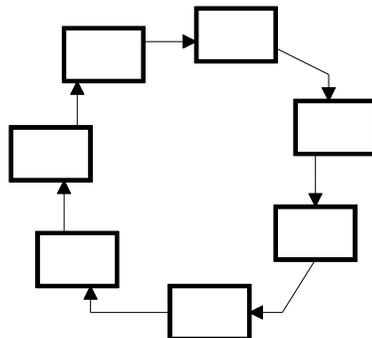
Investigation: Identifying cumulative causal sequences

Cumulative causation affects the lives of almost everyone. After World War II, a series of changes over the next 40 years or so affected major cities all over North America.

1: The list of city conditions below is in random order. Copy each condition on a separate slip of paper or Post-It Note®, then arrange them in a circle, with “causes” preceding “effects.”

- Poorer downtown municipal services
- Decline in downtown business profits
- Movement of population to suburbs
- Less downtown shopping
- Lower municipal property tax receipts
- Lower downtown property values
- Decline in downtown security and attractiveness

2: In your journal, copy your “cumulative causal circle” in diagram form:



3: Many cities have been successful in stopping downtown decline. Use your diagram and the Model to help you identify changes that cities could have made (or did make) to help fix the downtown decline problem.



<http://www.istockphoto.com>

Investigation: Negative feedback

Feedback doesn't always increase change. "Negative" feedback reduces the effects of change, creating more stability. One common example affects the prices that stores charge for what they sell:

Most merchants want to charge as much as they can for what they're selling, but the more they charge for an item, the greater the number of people who'll refuse to buy it, reducing sales and profits. And, if there's a competitor nearby, the competitor will see an opportunity to sell more by pricing his identical or similar item lower than the first merchant. These two effects act together to help stabilize prices.

Diagram the process described in this paragraph, showing how negative feedback stabilizes the price system.

Look over the systems you've analyzed so far, and identify possible negative feedback loops.

Voting in elections is feedback. Is it negative, positive, or both? Explain your answer in your journal.

Investigation: Change and the Model

Look over each of the change diagrams you've made so far. For each box in each diagram, identify the main Model category (Setting, Demographics, Action Patterns, or Shared Ideas) that best fits the change described in that box. Write the category name (or an abbreviation of it) next to each box.

Based on this evidence, which of the four categories are most often involved in change?

Investigation: Target Area System Change

- 1: Identify a significant change that has happened in your target area, such as new construction, gain or loss of people, addition of new equipment, or something similar. Check the Model—it will suggest the kind of changes to look for.***
- 2: Diagram the causes that led to the change, and any other changes that occurred as an outgrowth of the change you selected.***



Investigation: Dysfunction—corruption and news reporting

Newspapers have a traditional responsibility to keep people informed. For example, reporters Jeff Gottlieb and Ruben Vives wrote the story in the data box for *The Los Angeles Times*. Bell is a suburb of Los Angeles, with a population of about 38,000 people. It was one of the poorest cities in Southern California; 90% of the residents are Hispanic or Latinx.

This newspaper article, and articles that followed, led to an official investigation of city officials. Eventually, 12 officials were convicted of crimes, and given sentences ranging from probation to 12 years in prison. The officials had used fraud to control a special election, and attempted to cover up how much they were being paid, so the city residents wouldn't know their tax dollars were being ripped off, until the newspaper investigative report.

- 1: ***Find out if your local news sources (newspapers, TV, etc.) are monitoring local government. Would they be likely to discover corruption?***
- 2: ***Newspapers are dying out in many places in the U.S. Find out if other news sources are filling the need for reporting on local government.***

Bell city manager might be highest paid in nation: \$787,637 a year

July 14, 2010

Top city officials in the small, relatively poor city of Bell might be the highest paid in the nation, according to documents reviewed by The Times.

In addition to the \$787,637 salary of Chief Administrative Officer Robert Rizzo, Bell pays Police Chief Randy Adams \$457,000 a year, about 50% more than Los Angeles Police Chief Charlie Beck or Los Angeles County Sheriff Lee Baca and more than double New York City's police commissioner. Assistant City Manager Angela Spaccia makes \$376,288 annually, more than most city managers.

Experts in city government said they were amazed at the salaries the city pays, particularly Rizzo's. "I have not heard anything close to that number in terms of compensation or salary," said Dave Mora, West Coast regional director of the International City/County Management Assn., and a retired city manager.

By comparison, Manhattan Beach, a far wealthier city with about 7,000 fewer people, paid its most recent city manager \$257,484 a year. The city manager of Long Beach, with a population of close to 500,000, earns \$235,000 annually. Los Angeles County Chief Executive William T Fujioka makes \$338,458.

Top officials have routinely received hefty annual raises in recent years. Rizzo's contract calls for 12% raises each July, the same as his top deputy, according to documents obtained under the California Public Records Act.

<https://latimesblogs.latimes.com/lanow/2010/07/bell-city-manager-might-highest-paid-in-nation-787637-a-year.html>

(For more information on the Bell scandal:

https://en.wikipedia.org/wiki/City_of_Bell_scandal)

More on city corruption:

<https://www.cheatsheet.com/culture/here-are-obvious-signs-you-live-in-a-corrupt-city.html/>

Change and Stress

Chances are you're sitting where you've often sat before. You probably put the same shoe on first this morning that you put on first yesterday morning, started brushing your teeth in the same part of your mouth, put the same arm first into the sleeve of a shirt or blouse.

Why? There's a powerful human tendency to do things the way we've done them before. Patterns are, after all, patterns.

In many respects, this is a good thing. If we stopped and thought about such matters, we'd probably never get to work or school.

Here's a generalization:

Action Patterns tend to be static—to stay the same.

The static tendency of patterns comes from internal pressures (habits and customs) and external pressures (the expectations of others). Countless laws regulate action. Much of what parents do and say is designed to teach and reinforce "right" action. Prisons, mental institutions and even death threaten those whose actions (of some kinds) fall outside accepted Action Patterns. Societies will go to war to resist attempts by other societies to impose new patterns on them.

Investigation: Action Pattern stability

Sometime in the next day or so, break a minor pattern in your home—one that won't cause real problems. Sit in a different chair at dinner, or grab a broom and start sweeping when everyone usually watches TV, or wear a hat that belongs to someone else. Remember what happens, and record it in your journal.

Here's our original investigation for action pattern stability:

Interview the oldest people you can find, and ask them to describe their earliest memories about the Action Patterns of men and women in the home (for example, patterns for eating or sleeping).

Based on this evidence, identify the in-home patterns that haven't changed significantly between then and now...

Is this likely to work? Why or why not? If possible, try it. Record your results and conclusions.

Investigation: Shared Idea stability

What's true for Action Patterns is also true for Shared Ideas. A society's shared beliefs and values are its most treasured possessions. Intergroup conflicts are consequences of differences in these ideas.

"The upper classes are wiser and should rule."

"No, the upper classes exploit other classes."

"Your ancestors did my ancestors wrong."

"No, your ancestors did my ancestors wrong."

"A fetus is a human baby."

"No, a fetus is a fetus."

"The poor are poor because they're unmotivated."

"No, the poor are poor because the system gives them no opportunities."

At an individual level, feelings of discomfort, irritation, anger and fear usually accompany contact with those whose ideas about important aspects of life differ from our own. Within societies, the pressure to think "correctly" is even greater than the pressure to follow standard Action Patterns. In America, for example, despite the widely-shared idea that people should think for themselves, there's little tolerance for "socialists" or "polygamists."

A generalization:

Shared Ideas tend to be static—tend to stay the same.

About a century ago, the Boy Scouts of America organization was formed. It adopted an oath and law reflecting deep-seated American values and beliefs. Here is the Scout Law in brief (right):

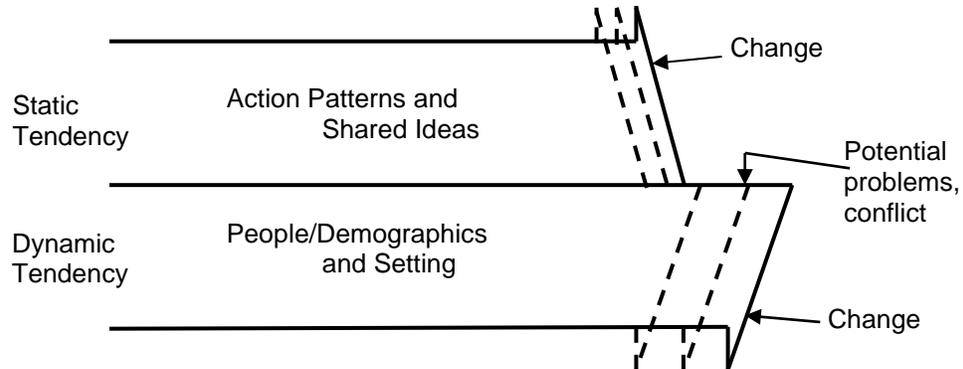
- 1: *Discuss each of the 12 points. Which do you think are still accepted by most Americans? Are any of them less accepted than others? Which ones? Record conclusions in your journal.***
- 2: *How do people tend to react to those (not just Scouts) who violate one of these laws? Record conclusions.***

A Scout is:

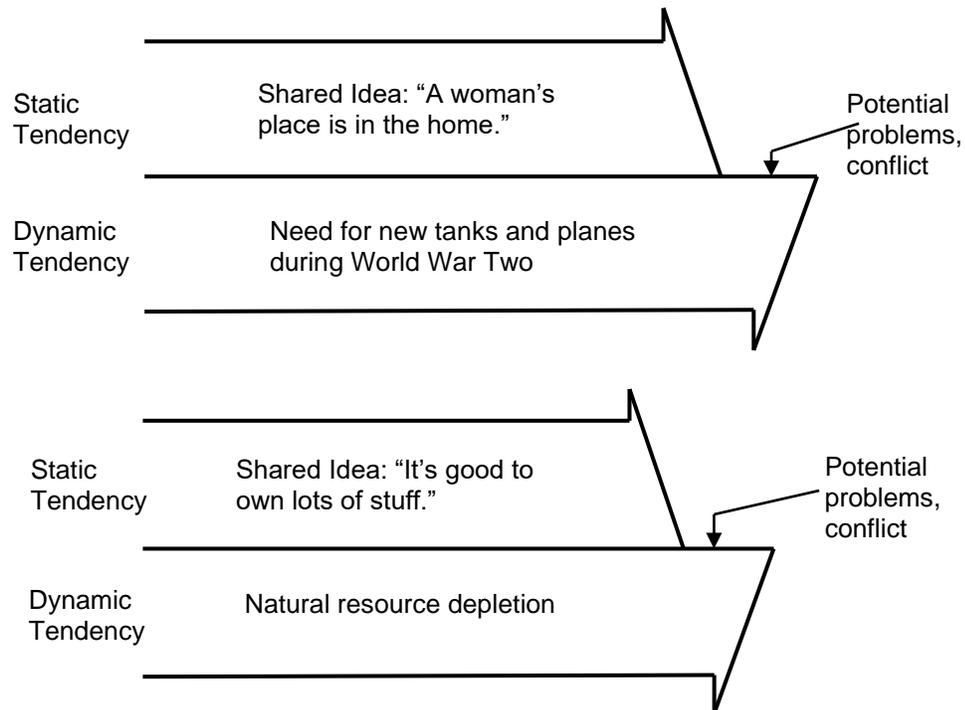
- Trustworthy
- Loyal
- Helpful
- Friendly
- Courteous
- Kind
- Obedient
- Cheerful
- Thrifty
- Brave
- Clean
- Reverent

Conflict triggered by change

The graphic below identifies a frequent cause of societal friction and conflict. The arrows represent time:



Examples:



These kinds of problems are difficult to solve. If a new way of acting or thinking is proposed in order to adapt to change, people often feel insecure, angry or frustrated. On the other hand, it's almost impossible to stop changes in Demographics and Setting, and failure to adapt to them—simply doing nothing—can contribute to societal destruction.

Humans differ in their willingness to change. Classic terms for them are "conservatives" for those who resist change and "liberals" or "progressives," for those who advocate it. Both have advantages; either can create problems, depending on the situation.

Investigation: Change-triggered conflicts

- 1:** *Americans use personal autos for travel. Make an arrow diagram or flow chart like those on the previous page, showing this pattern as a “static tendency.” Then identify a change in Setting or Demography that would probably result in problems or conflict with the existing pattern.*
- 2:** *A deep-seated American belief is that every generation should live better than the previous generation. Make another arrow diagram showing this as a “static tendency,” and identify a change in Setting or demography that may threaten the belief.*

Investigation: Target Area conflicts

In the earlier Target Area investigation (Page 11), you identified changes. ***Go back to your results of that investigation, and identify possible conflict or stress related to the changes.***



Investigation: Incremental change

To survive and prosper, a society must adapt to change. However, demographic and environmental changes often occur so slowly they aren't noticed. Or, if people *do* notice, the changes seem to be so gradual they can safely be ignored.

Here are examples of incremental changes in Setting. Which, if any, apply to your society? What are possible long-term consequences of the changes? Choose one and make a flow chart.

- Gradual loss of topsoil
- Long-term lowering of underground water tables
- Gradual increases in the length of the growing season and maximum temperatures.

Add other possible changes to this list, and make flow charts.

Investigation: Monitoring change

To adapt to change, it's important to know what's changing. Societies need systems for monitoring long-term changes in Setting and Demographics. ***In your journal, answer these questions:***

- (a) What are your society's major sources of information (feedback) about its Demographics and Setting?***
- (b) Do you think they're adequate? If they're adequate, are people paying attention? Why or why not?***
- (c) If you don't consider the information sources adequate, or if people aren't paying enough attention, what could be done?***

Future Change

What's ahead for America—and for you? There's no way to know, of course. Only one thing can be said for certain. Life in the America of the future won't be like life in America today.

Just because we can't predict the future doesn't mean that the future has to be full of unexpected surprises that find us unprepared. Whatever it's like, the future will probably be a result of conditions and trends that are already part of your lives. For example, we know for certain that the amount of crude oil under the surface of the earth is limited. Very soon present methods of generating electricity, propelling automobiles, and heating many houses will either have to be changed or we'll have to live without them. Getting ready for the future, then, requires thinking about probable, possible, and preferable futures.

Investigation: Possible Futures

As you read the following accounts, discuss and record answers:^{1,2}

- 1: What present trends might lead to each of these futures?**
- 2: What trends might keep these futures from occurring?**
- 3: What are some advantages of these possible futures? Disadvantages?**
- 4: How do you feel about each of them?**

Identify and diagram other possible or probable systemic consequences of each future, e.g. changes in where people live (including towns and cities), population levels, ways of acting and thinking, and changes in government.

¹ First sketch excerpted from George Orwell, *Nineteen Eighty-Four*, copyright 1949 by Harcourt Brace

² Second and third sketches written by Marion Brady, in Marion Brady and Howard Brady, *Idea and Action in American History*, copyright 1977, Englewood Cliffs, NJ, Prentice Hall, Inc. Copyright transferred to Marion Brady and Howard Brady.

Zero Privacy

It was a bright cold day in April, and the clocks were striking 13. Winston Smith, his chin muzzled into his breast in an effort to escape the vile wind, slipped quickly through the glass doors of Victory Mansions, though not quickly enough to prevent a swirl of gritty dust from entering along with him.

The hallway smelt of boiled cabbage and old rag mats. At one end of it a colored poster, too large for indoor display, had been tacked to the wall. It depicted simply an enormous face more than a meter wide; the face of a man of about 45, with a heavy black mustache and ruggedly handsome features. Winston made for the stairs...

The flat was seven flights up, and Winston, who was 39, and had a varicose ulcer above his right ankle, went slowly, resting several times on the way. On each landing, opposite the lift shaft, the poster with the enormous face gazed from the wall. It was one of those pictures which are so contrived that the eyes follow you about when you move. BIG BROTHER IS WATCHING YOU, the caption beneath it ran.

Inside the flat a voice was reading out a list of figures which had something to do with the production of pig iron. The voice came from an oblong metal plaque like a dulled mirror which formed part of the surface of the right-hand wall. Winston turned a switch and the voice sank somewhat, though the words were still distinguishable. The instrument (the telescreen, it was called) could be dimmed, but there was no way of shutting it off completely....

Outside, even through the shut window pane, the world looked cold. Down in the street little eddies of wind were whirling dust and torn paper into spirals, and though the sun was shining and the sky a harsh blue, there seemed to be no color in anything except the posters that were plastered everywhere. The black-mustachio'd face gazed down from every commanding corner. There was one on the house front immediately opposite. BIG BROTHER IS WATCHING YOU, the caption said, while the dark eyes looked deep into Winston's own.

...In the far distance a helicopter skimmed down between the roofs, hovered for an instant like a bluebottle, and darted away again with a curving flight. It was the Police Patrol, snooping into people's windows....

Behind Winston's back the voice from the telescreen was still babbling away about pig iron and the overfulfillment of the Ninth Three-Year Plan. The telescreen received and transmitted simultaneously. Any sound that Winston made, above the level of a very low whisper, would be picked up by it; moreover, as long as he remained within the field of vision which the metal plaque commanded, he could be seen as well as heard. There was of course no way of knowing whether you were being watched at any given moment. How often, or on what system, the Thought Police plugged in on any individual wire was guesswork. It was even conceivable that they watched everybody all the time. But at any rate they could plug in your wire whenever they wanted to. You had to live—did live, from habit that became instinct—in the assumption that every sound you made was overheard, and, except in darkness, every movement scrutinized.

Second Independence Day

The February daylight was still hours away when Greer blinked awake. It was 4:30 in the morning. The bedroom was dark, and no clock had alarmed, but Greer knew what time it was. He had awakened at 4:30 every morning for almost 14 years.

Greer also knew it was useless to try to go back to sleep. He had tried that for the first time four years before on the 4th of July, and he had gone on trying for months after Second Independence Day.

For the first ten of the last fourteen years there was a reason to wake at 4:30. He had depended on a clock then, had rolled out of bed at the alarm's first click, and gone into the kitchen of his small apartment to be certain the automatic coffeemaker was at work on his two cups of coffee. Reassured by the small red light, Greer would complete the morning ritual with a shower, shave, clean clothes, and an instantly-prepared but leisurely-eaten breakfast of the best synthetic meat and eggs. By 5:40 he would have the breakfast dishes in the washer, his door locked, and be seven levels below his apartment in the mini-subway control center.

Until four years ago, Greer had been a transit controller. His four-hour workday was spent in a soft swivel chair facing a console glowing with hundreds of green lights moving in ordered patterns. Occasionally, but only occasionally, one of the green lights would change to a rapidly blinking yellow. When that happened, he would note its identification number and push a series of buttons on the panel before him. The light would change to green again, indicating that the pneumatically propelled four-passenger transporter whose performance it monitored was operating normally in its tube 30 feet below the grassy streets of the city.

But Second Independence Day (or SID, as everyone called it) had put an end to his ten-year routine. Precisely at noon on the 4th of July nearly four years before, the President of the United States had signed the bill which made it unnecessary for Greer to spend four hours a day at a transit controller's desk—or any other desk. Greer had absolutely *nothing* to do. Since SID, the Volunteer Work Corps did the few, occasional tasks not done by robots.

Euphoria

It was only a minor news item. Near the end of the CNN evening news, the announcer briefly summarized several Supreme Court decisions which had been handed down during the week. In one of the cases, he said, the government had that day lost its effort to delay the marketing of a new tranquilizer drug developed by Philathea Pharmaceutical Laboratories.

The newscast ended at 7:28. At 7:28, television screens all over the United States went silent and dark. For 15 long seconds that unfamiliar silence continued, as millions of viewers turned their attention more closely to their television screens.

At the end of 15 seconds, in the far distance, music. Circus music—softer, slower, and somehow richer than most circus music—but circus music nevertheless, echoing inside the Big Top, spilling out to the animal cages and the sideshows, smelling like buttered popcorn and hot candied apples in October.

The music drew closer but no louder. The screen glowed blue, yellow, green, red, then all colors at once. Balloons floating, possibly, but the picture was too softly focused to tell for certain. Other sights, the camera floating at child's eye height through bright childhood memories.

An announcer's warm voice grew out of the music. "You can bring it back," he said. "The happiness. Twelve hours of the pure happiness of childhood can now be yours. Anytime, anywhere, under any circumstances. (A pause.) Cozasil. (Pause, as the word appeared on the screen.) From Philathea Pharmaceutical Laboratories. (Pause) Non-habit-forming. Absolutely no side effects. No prescription necessary. At your drugstore on Monday."



Investigation: Predicting change

Technology (which we consider a part of Setting) is one of the important engines of change. Those introducing new technologies rarely consider their long-term consequences. Below is a description of a possible technological change:

One way of thinking about Earth is to see it as a self-contained life support system. Air and water and other essentials of life are recycled and stored, ready to be used again. It's a good system. If we take care of it, it seems capable of working for a very long time.

One of the research objectives of the National Aeronautics and Space Administration is the building of life-support systems. For travel away from Earth, what's needed are portable versions of Earth—systems which supply food and water, and manage waste, indefinitely. To be practical in space, a self-contained life support system has to be light in weight, very compact, and very energy efficient. However, in the much friendlier environment of Earth these factors are far less critical. The design problems for building a self-contained system to provide a continuous supply of food, water, energy and waste management are challenging but not insurmountable. (If this seems far-fetched, remember that it's been done before. Not long ago, a great many Americans owned and operated their own self-contained life support systems. They were bulky and needed constant care, but they worked. They were called "family farms.")

Done well, the following assignment will take a long time:

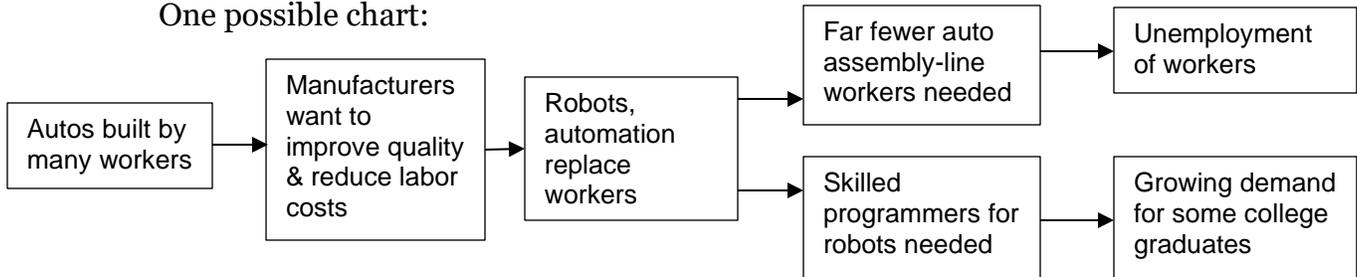
- 1: Design a self-contained life support system sufficient to meet the needs of four people, operable in the local climate. (No outside connections to utilities.) Try to make it compact enough to maintain average suburban population densities.**
- 2: Compute the approximate unit cost of the system.**
- 3: Decide who would be the most likely buyers of such equipment and devise a multi-media marketing program, complete with roughed-in ads, etc.**
- 4: Predict both the probable and possible impact of the system on local Demographics, Setting, Action Patterns and Shared Ideas. (Check subcategories of the Model.)**
- 5: Take and defend a value position on the desirability of making the equipment available and affordable.**

For Teacher/Mentor:

This part has 19 investigations that deal with many aspects of system change. Learners who've worked their way through the previous four Parts of *IS* should have no problem jumping into these with a minimal guidance. A few comments:

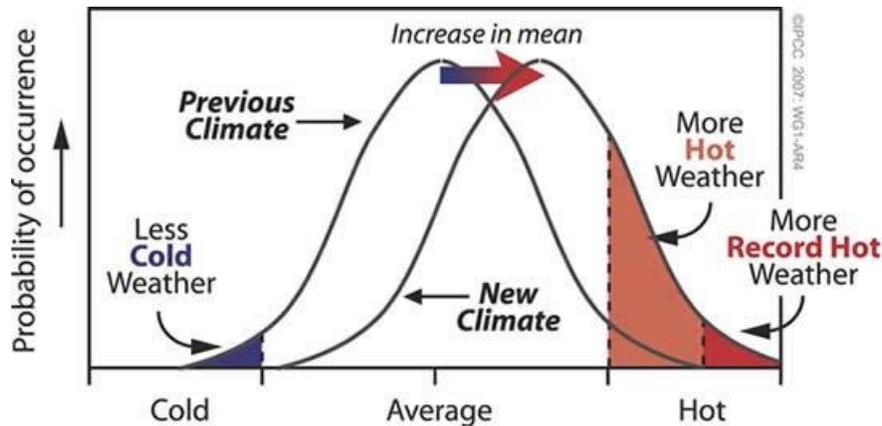
Investigation: Flowcharting Change

One possible chart:



Investigation: Climate change and the Model

Extreme weather events increase disproportionately with relatively small changes in mean temperature. This is apparent from probability curves:



Note that the cool spots on the ocean temperature map are also the result of warming. Runoff from melting ice in Greenland and Antarctica cool down adjacent ocean temperatures. Also see [Most bleak federal report yet on high-tide/sunny-day tide floods » Yale Climate Connections](#)

Investigation: Identifying Cumulative Causation Sequences (Page 12)

If time permits, use a far more complete version of this investigation, downloadable from:

<http://www.marionbrady.com/americanhistory/SystemChange-Cities.pdf>.

Investigation: Negative Feedback (Page 13)

This description, of course, is of Adam Smith's "invisible hand," which he described in *The Wealth of Nations* (1776).

Market forces sometimes don't function quite as efficiently as theory might suggest. One merchant or supplier with sufficiently deep pockets can price products so low, even below cost, that the competition is driven out of business. Or two merchants can collude to fix prices higher than would exist with true competition. In some cases, luxury goods from an "exclusive" brand are deliberately given extremely high prices, fixed by the source, to appeal to the wealthy and allow high profits from limited production. Many other circumstances can distort market forces. The extreme faith placed in market competition by some in Western society is often misguided.

Investigation: Action Pattern Stability (Page 15)

The point here is that we normally aren't conscious of Action Patterns, unless and until they're violated. Kids that interview elders are certain to hear about Action Patterns that are different between "then" and "now," (probably including criticism of "now" patterns), but will likely get little or no information about what *hasn't* changed.

Conflict Triggered by Change (Page 16)

The "split arrow" diagram for depicting societal stress and dissonance was originated by Marion Brady in "A New Social Studies," *Phi Delta Kappan*, October 1966, pp. 68-71. See: <http://www.marionbrady.com/articles/1966-NewSocStudies-KappanOct.pdf>.

Remaining investigations

Learners who have completed the previous activities should be able to move on to the remaining investigations with a minimum of guidance.

Advanced learners who may wish to move on to further projects may choose to investigate some of these possibilities:

- Comparing two nearby towns or cities (taxes, services, rates of population change, dysfunction, etc.)
- Preparing photo-essays on city changes
- Studying the effects of local big-box stores (Walmart, Target, etc.) or Internet-based commerce (e.g. Amazon)
- Analyzing local employment
- Identifying local problems in services (streets, water, sewer, police protection, etc.)
- Predicting future local change and its consequences.
- Identifying the distribution of rights between city or town vs. residents, related to such things as zoning/land use, standards for property appearance, etc.

(HLB) September 2019, minor changes 11/13/2019, 10/15/2021, 8/22/2022