# Thinking About Conditions at Places

A sense of place is not just a list of features.

(Drafted 2008, revision 2012, Mild update 2014)

This chapter is about making a mental representation of the world by noting the environmental, economic, and cultural conditions at specific locations. In this book, the term "geographic condition" refers to any feature that one can observe at a location. The concept includes intangible features such as average land value, voting behavior, or time since the previous earthquake, as well as tangible features such as current temperature, tree species, street width, or architectural style.

As noted in the introductory essay, the process of listing the conditions in a place could be described as a very concrete form of spatial thinking. Unfortunately, this kind of "thinking" makes a lot of demands on both short-term and long-term memory, and therefore it is not something that the human brain does very efficiently. (Court records are full of examples of errors by "eyewitnesses" asked to remember the conditions around a crime scene!)

For this reason, it might be more valid to view the modes of spatial thinking as strategies that brains use to reduce the amount of memorization needed to ensure acceptable recall of the conditions in places. If we accept this view, it makes sense to conceive of conditions (and connections, the topic of the next essay) as being basic "facts" of geography, and the other modes of spatial thinking are the ways that people perceive, organize, and represent those facts.

Here is another way to say it: conditions at places and connections between places are like the "words" in a spatial language, and the other forms of spatial thinking are the grammatical rules that we use to combine words into meaningful sentences.

If that second option doesn't work for you, try this third way: the brain is like a computer and you are its programmer. Conditions and connections are like the data items to be stored in the computer memory, and the other forms of spatial thinking are the algorithms you can use for manipulating those data (either before, during, or after storage).

If we start with this concept of spatial thinking, you might reasonably expect that an essay about "spatial" conditions would be relatively short, and you would be right – at least for the research part of the essay. This essay, however, will also include a brief discussion of the kinds of "condition-knowledge" that students should be taught. We will include this discussion for an important reason: getting the balance right is like learning how to ride a bicycle, and it is far too easy for novice teachers (and well-intentioned but less-than-knowledgeable administrators, parents, newspaper editors, standards-writers, etc.) to "fall off the bicycle" in two different ways:

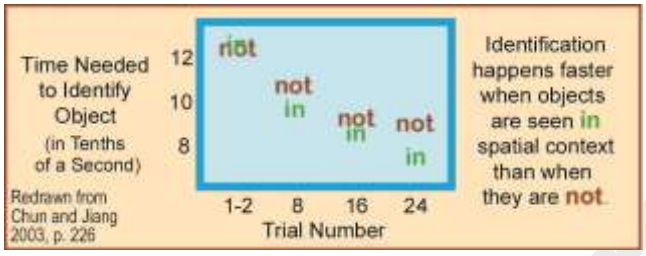
1) by teaching as if factual knowledge about places is the primary goal of geographic education. One obvious consequence of this trap is the enormous number of geography test questions that deal only with factual knowledge. Another related effect is illustrated by some quiz shows and party games that present geography as a category of facts rather than as a way of thinking about the world.

2) by teaching as if geographical principles are the main point of the class, and facts don't really matter much, because the principles can be applied to any facts. One possible consequence of this trap is a generation of students who are well equipped to think about places, to do various kinds of geographical analysis, but their stock of factual knowledge about places is scanty and derived largely from motion pictures, TV commercials, and random forays onto the Internet (for a related, cross-cultural comparison about the state of scientific knowledge, see Bao et al. 2009).

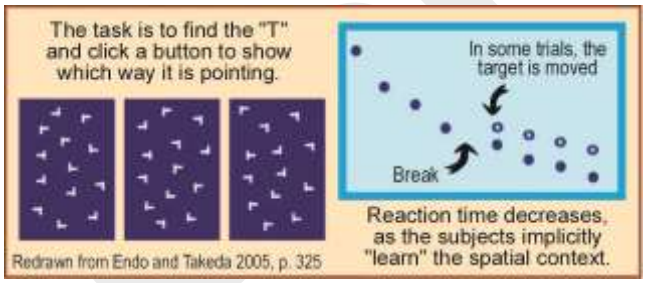
In short, our goal in this chapter is to define geography in a way that puts the emphasis on spatial thinking rather than factual memorization, and at the same time to provide some guidance for teachers in choosing facts to include in their classes (and their tests).

**Quick Review of Research on Thinking about Conditions at Places**

Most of the relevant research for this chapter deals with aspects of what many researchers call the "dissociation of 'what' and 'where'" in the way the human brain processes information – in other words, the brain's tendency to record facts about an object and the location of that object in different areas of working and long-term memory, even while maintaining a link between them (Levine et al. 1985; Courtney et al. 1996; Kumaran and Maguire 2005; Konen and Kastner 2008). Proof of mental dissociation is only part of the research story, however. The other part of the story is the research that demonstrates faster reaction times and greater durability of "what" memories when they are cross-linked in a neural network that includes a rich "where" and "when" context (for reviews at various times, see Bransford 1979; Hazen and Volk-Hudson 1984; Allport 1989; Shin and Ivry 2002; Chun and Jiang 2003; Endo and Takeda 2005; Tse et al. 2007; Brunyé et al. 2007; Luck and Vogel 2013; for a review and general discussion of specific brain activity that accompanies the memory encoding of spatial context, see Burgess et al. 2001; Good 2002; Suzuki et al. 2005; or Polyn and Kahana 2008; for an exploration of reasons why children may be less able than adults to encode such memories efficiently, see Vaidya et al. 2007).

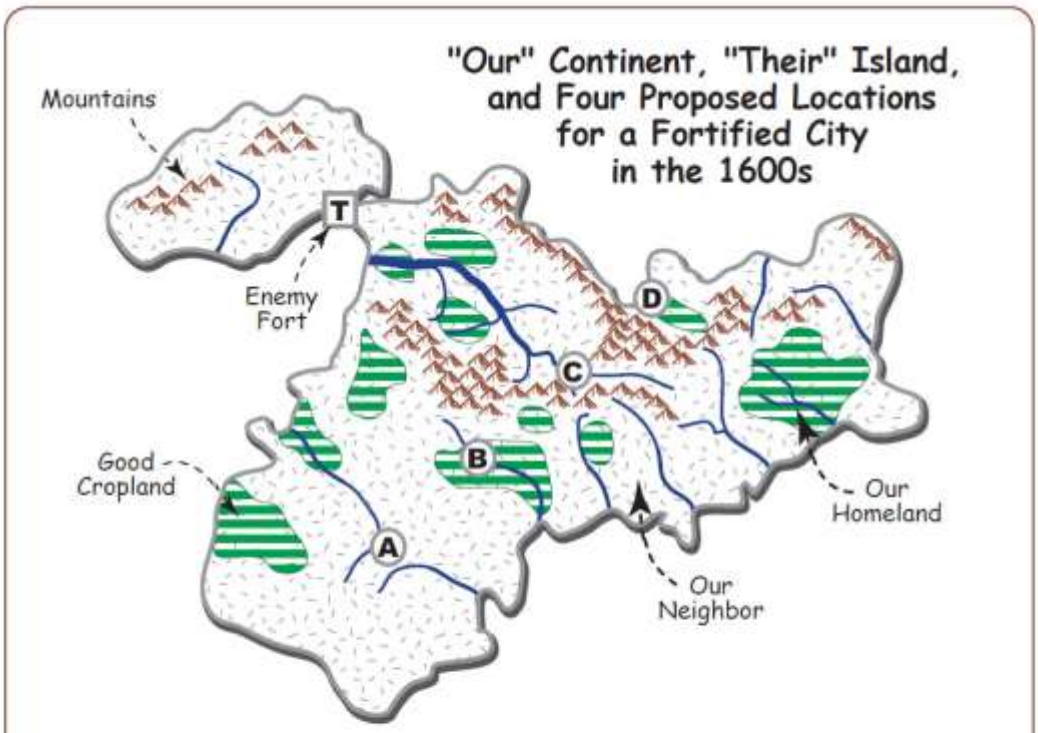



Taken together, this research strongly suggests that trying to memorize facts about places is like trying to learn words by reading a dictionary. That approach may work, for some people at some times, but it is seldom as effective as a well-crafted strategy of embedding new words into a body of prior knowledge and an ongoing narrative, especially if the narraitive is inherently interesting and therefore helps make the words seem worth learning. The geographic equivalent of this teaching strategy is the idea that a geographic fact is likely to be easier to remember if it is organized into some kind of spatial framework.




In this early essay, we will simply assert that the goal of this entire project is to demonstrate the value of spatial frameworks (or schemas, the term used by Meredith Gattis in the title of her edited book, *Spatial Schemas and Abstract Thought*). We therefore ask readers to be patient if our explanation in this early essay seems a little incomplete – to paraphrase a well-worn comment about education, "it takes a village to tell this story." The truth is that the human brain has an incredibly complex suite of tools for perceiving, analyzing, and representing spatial information. And, as daily users of these tools, as well as the even more complex set of tools for processing language, we often find ourselves agreeing with the sentiment in a quote attributed to Lyall Watson or Emerson Pugh, "If the brain were so simple we could understand it, we would be so simple we couldn't!" (heartquotes.net; whatquote.com; see also Sigman 2004)

With that as background, therefore, let us go on to look at one student activity that deals with organizing and analyzing information about geographic conditions and connections. Then, we will briefly consider the kinds of facts that teachers should include in their geography classes, as parts of lessons that have their primary focus on developing greater competence in the use of various modes of spatial thinking to organize that factual knowledge.




1) Which locations had the best and worst local **conditions** for a fort/city in the 1600s? Circle their letters below and briefly note some good or bad things about the sites.

Best: A B C D _____

_____

Worst: A B C D _____

_____

2) Which locations had the best and worst **connections** with other places in the 1600s ?

Circle their letters below and describe some good or bad things about the situations.

Best: A B C D _____

_____

Worst: A B C D _____

_____

3) Now put the ideas of conditions and connections together. Write a speech or design a poster to recommend a location for a fort/city in the 1600s, and explain why you chose that place.

**Other activities that teach about geographic conditions**

Our sample activity (together with its explanatory powerpoint presentation) was basically a way to structure a geographic comparison (Chapter 5). We will not offer any suggestions about activities that try to teach about geographic conditions without also having a focus on one or more specific modes of spatial thinking. Specifically, we will not describe any classroom activities that involve students designing "interesting" products such as posters, mystery novels, diplomat briefs, news reports, country profiles, travel brochures, trip reports, Survivor settings, Globe-Trekker outlines, panoramas, haiku, collages, gallery walks, papier-mache models, or other "frameworking" devices. There is no shortage of "lesson plans" like that on teacher-prep websites. We only suggest that their likelihood of success for a geography lesson depends primarily on whether those devices are used simply to "force" students to compile lists of geographic conditions, or whether the lessons also model other modes of spatial thinking, provide guided practice with them, and encourage students to use them on their own. For that reason, we especially will not offer any crossword puzzles, wordfinders, or other games that send a subliminal message that "geography is nothing but a bunch of facts about conditions, and you just have to memorize those facts, so let's try to make memorization at least a little bit fun."

In short, we put this heading in this chapter mainly to give us a chance to repeat the basic assumption of this whole project, namely that the "goal" of spatial thinking is to simplify the world and thus make it easier for us to remember the conditions and connections that we think may be important for other reasons.

That leads us to the final question of this essay, which is about the kinds of factual knowledge that should be included in geography lessons.

**Geographic Conditions Worth Knowing**

Q: what kinds of condition knowledge should we include in our geography standards, lessons, and assessments?

A: Less than you think, but choose it carefully.

When we say "choose carefully," we are not thinking about a very sophisticated strategy; in fact, we can reduce it to two broad principles – one based on an observation about interest, and one based on an observation about mental connections.

Here is the first general rule of thumb: choose facts that matter from both curricular and citizenship perspectives; then find a way to make them interesting. If we start with interest as a primary criterion, we soon run across a kind of "law" about expressions of interest: in a completely free market that is ruled only by initial consumer preference, all roads lead to Las Vegas (Times Square, Branson, Orlando, Mammoth Cave, pick your chaotic tourist strip), full of gaudy billboards, flashing lights, and garish architecture.

What do we mean by that statement? Just this: when you try to attract the attention of consumers with a billboard, the biggest and flashiest one usually does best – as long as it is alone. But, in time, companies start to compete to make ever bigger and flashier billboards. Eventually, even the biggest and flashiest one gets lost in the general clutter.

That principle also applies in the classroom. When you use student reaction as the primary measure of the usefulness of a fact, the students tend to prefer the more exciting, exotic, extreme fact, in its most exuberant guise (and we're just looking at the words that start with "ex" in our dictionary!). This, of course, is just an educational formulation of the old journalistic maxim, "if it bleeds, it leads."

The problem with choosing facts for their shock value is what happens in the long run – as a kind of mental numbness sets in, even the most extreme facts lose their shock value, and their gain in memorability disappears. The take-home message is embodied in an old piece of advice for film composers: "save the trombones for when you need them." If you use the loud instruments for every event in the movie, you will not have any extra orchestral volume left to help make the arrival of the rescuing hero really stand out.

A major goal of this project is to help teachers expand their range of strategies for "packaging" geographic facts (think of it as having a larger number of instruments in a band or orchestra, or more buttons on your synthesizer, or more paints on your palette, or more moves in your basketball drive 0 whatever analogy works for you!) Careful packaging of geographic facts is especially important because it seems to require more brain cells to store facts if they are accurately embedded in a spatial context than if they are not; the resulting memory, however, seems to be more durable (Broadbent et al. 2004).

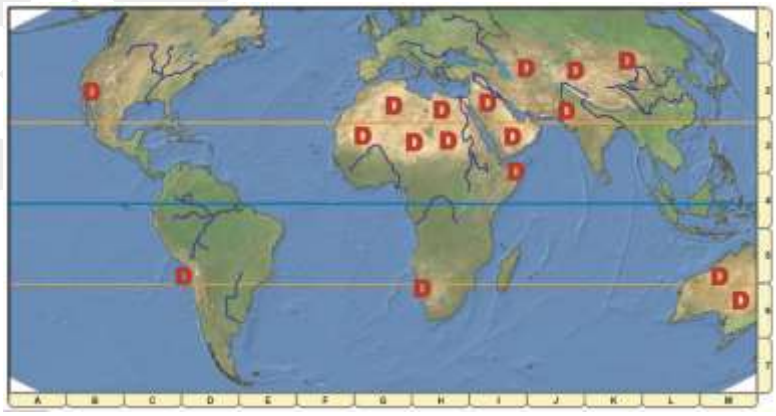
That observation leads us to our second general rule of thumb: choose facts that allow students to infer additional facts by applying various modes of spatial, temporal, or causal thinking. Consider these alternative ways to express a really simple idea:

- the average temperature in this place in the second week of April is 45 degrees Fahrenheit

- temperatures here range from 95 degrees on a hot July day to minus 10 in January.

The first way allows the learner to describe the temperature in that place on a specific day of the year. The second allows a thoughtful learner to infer a reasonably likely temperature in any season of the year. That seems like a more efficient use of the storage space needed for a 16-word idea!

A somewhat more sophisticated version of the same principle can be illustrated by a simple activity about climate. Give students a satellite image of world environments and have them put large D's directly on the major deserts of the world.



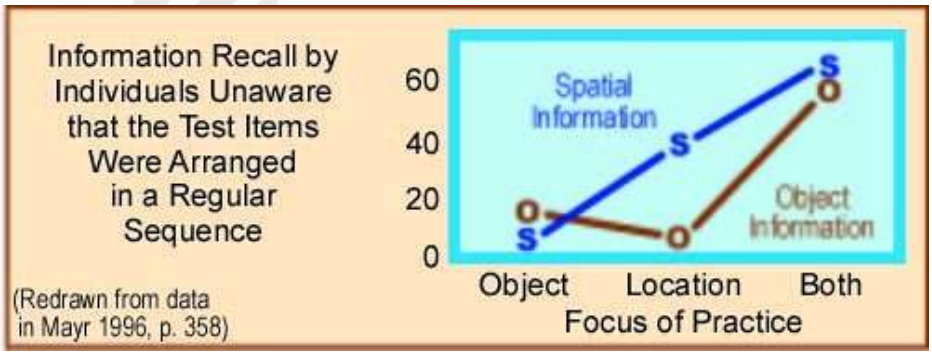
Then, put students in groups and have them describe the relative positions of those deserts, using several different locational vocabularies.

For example, the Taklamakan is a relatively small desert with an unusually important role in history. It also has a name that is somewhat exceptional (another of our "ex" words!) – translated, it basically means "whoever goes in does not come out." Since this fact is important, it might be a good place to use a "shock fact" like this, but make sure that students also learn that this forbidding desert is:

- just a bit south of the geographic center of Asia (let them find it on a globe and a map)
- a big area in way-western China (they now know how far China extends inland)
- located between the high Tien Shan mountains and the even higher Tibetan Plateau (they now know the spatial relationships of three important topographic features of Asia)
- southwest of Mongolia and east of "the little stans" (they now can read about Genghis Khan and Tamerlane and put them in geographic perspective, especially if explicitly encouraged to do so; they also learn they don't necessarily have to memorize every little country to "do geography")
- a key part of the ancient Silk Roads trading network that stretched from China to Rome (they can now put this trading connection into perspective)

The Taklamakan is somewhat unusual in that its boundaries are fixed by terrain rather than global air circulation. The Sahara is a more typical desert – it is one of a half dozen deserts that are formed where global air movements force air to descend, about 25 degrees of latitude north and south of the equator. A map shows that the Sahara extends all the way across the northern part of Africa. That does not tell the whole story, however. The desert (the area subject to descending air and resulting dryness) also "moves" a little bit north in summer and south in winter. When it moves north, it brings a dry summer to north Africa and southern Europe. When it moves south, it makes a dry winter in a strip of land that also stretches all the way across the continent, from the ancient city of Timbuktu to the southern Sudan and Ethiopia.

In short, many students may find it much easier to understand the climate pattern of northern Africa if they picture a big desert that moves a little, rather than trying to memorize the locations of a bunch of separate environmental regions – rainforest, savanna, grassland, desert, and Mediterranean chaparral. Essays 7 and 8, about geographic regions and transitions, will provide more detailed discussions of two modes of spatial thinking that may help different students remember the global pattern of deserts better.




Those memories, in turn, can help students gain perspective on a variety of topics, including ancient civilizations, modern land uses, the spread of religions, the areas vulnerable to wildfires, the geographic extent of diseases such as malaria, and some aspects of global climate change.

As noted above, a major goal of this project is to help teachers find a wider range of strategies for presenting and organizing geographic facts. One purpose for doing this is to help provide variety in the

classroom. An even more compelling reason is that different students have brains that seem to structure space in different ways, by preferentially using different modes of spatial thinking. The purpose of this project is to explore the neurological reasons why this is so.

So, let's end this essay and get on with the project.

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