Slide 1

Text: Standard 3: Analyzing the spatial organization of people, places, and environments

- Knowing and applying geography
- Questioning approach to the world around them and ask what, where, when, why and how
- Formulate answers to critical questions about past, present and future
- Powerful tools for explaining the world at all scales
- Ability to describe and analyze the spatial organization of people, places, and environments

[Photo of group of people looking at a map]

Audio: The Standard Three is analyzing the spatial organization of people, places and environments. Spatial organization is very important in today's world, particularly in the planning sphere. Geographers and planners apply geography. They ask questions about the world; where, when, why and how. And they look for answers to critical questions about the past, about the present and certainly about the future. Spatial analysis is a powerful tool for examining the world at all scales: on the micro level, in municipal governments, in state governments, federal governments and even international governments. The ability to describe and analyze a spatial organization of people, places and environments is highly important in the world today. The picture on the right shows a number of people looking at a city map or a regional map. They could be asking questions, like, how do we rerun a stream that tends to flood in particular neighborhoods? How do we change its channel without damaging the environment? They might be asking questions about where they might build a new school, a new elementary school. They might be looking at other questions involving traffic and transportation routes or other kinds of linkages that make a community more cohesive and run more efficiently. There are many, many questions that people will examine around spatial organization.

Slide 2

[Map of ancient trade routes in North America]

Audio: The picture you're looking at on this slide is showing us ancient trade routes in North America, Canada, the United States and Mexico. What you're seeing are American Indian trade centers, copper mining centers, obsidian mining centers and other minerals as well. More importantly, what you're looking at are the trade routes and the linkages and the connections and the interactions among people in this hemisphere. This is a very early beginning of what we can talk about as spatial organization or spatial analysis.
Slide 3

Text: Trade Routes and the Spread of Infectious Diseases

[Map of Prehistoric, Protohistoric and historic trade routes in the Plateau and neighboring areas]

- Knowing and applying geography
- Questioning approach to the world around them and ask what, where, when, why and how
- Formulate answers to critical questions about past, present and future
- Powerful tools for explaining the world at all scales
- Ability to describe and analyze the spatial organization of people, places, and environments

Audio: The previous slide we looked at showed us ancient Americans trade routes and obsidian copper and other minerals. This particular slide that we're looking at now gives us a whole new perspective on the trade routes of the American Indians. This one is showing us trade routes and the spread of infectious diseases. More than likely it crossed the same paths that we saw in the previous slide. So analysis of prehistoric and historic trade and exchange networks provides insights into the possibility of old world infectious disease, transference and diffusion prior to European contact. Transference and diffusion to geographers are important keywords. How have things been transferred from one place to another, from their center of origin to other centers? How have they diffused? Meaning, how have they grown and moved from one part to another? Sometimes across continents. Both of these terms are geographic concepts that arise again and again in geography. By showing the existence of established trade routes and exchange networks dating back into the prehistoric times, the possibility is greatly increased that these trade networks acted as access corridors in the pre-contact diffusion and transference of many old world infectious diseases, like smallpox, typhus, measles and others. So here, again, we can see how we can apply geography. We can look at ancient trade routes, look at major infectious diseases today in this continent and we can make some connections, how they might have transferred and diffused from places of origin along these trade routes.

Slide 4

Text: Analyzing the spatial organization of people, places, and environments

Geographic/Spatial Literacy

Identifying features, structures & human activity on Earth’s surface

- Physical environment (topography, streams and rivers, climates, vegetation types, soils)
• *Human features* (towns & cities, population, highways, trade flows, the spread of disease, national parks)
• *Physical and Human taken together* (beach resorts in relation to climate, topography, or major population centers)
• *Location and Arrangement* of both physical and human phenomena form *regular* and *recurring* patterns

**Audio:** To engage in spatial analysis one has to become geographically and spatially literate. To do that geographers identify features and structures and human activity on Earth's surface. We can look at four different realms. The physical environment; we look at topography, the hills, the valleys, the mountains of a region or a place. We look at streams, rivers, and lakes, and other water sources in an area. Climates are important as are vegetation types, soil types, and other questions that have to do with the physical world. Human features might include the towns and cities that people have built; ancient cities, modern cities, and future cities. We look at population rise, decline, and migration to and from a particular place. We look at highways and other trade flows and networks. We might look at the spread of diseases like you saw in the previous slides. We might look at the development and growth of national parks throughout the country as population has demanded that. Perhaps more importantly we take the physical and the human together. We look at, for example, a beach resort in relation to the climate of the region, a physical feature; the topography of the region, another physical feature; and major population centers or cultural innovations in the area. And then we look at location and arrangement of both the physical features and the human phenomenon, and we look at what kind of patterns they form. What regularities are there on the landscape, maybe what irregularities? We look at patterns and recurring patterns in analyzing our space.

**Slide 5**

**Text:** Analyzing the spatial organization of people, places, and environments

• The description of a pattern of spatial organization begins by breaking it into its simplest components: *points, lines, areas, and volumes*
• There 4 elements describe the spatial properties of objects:
  o A shipyard can be thought of as a *point*…
  o …connected by shipping and rail routes (*lines*)…
  o …leading to nearby (and far away) markets (*areas*) as well as leading from nearby iron ore mining sites (*areas*)…
  o …and the lake or river the ships travel in can be thought of as a *volume*.

[Map of Duluth, Minnesota and Superior, Wisconsin]
Audio: In this picture we're looking at a map of Duluth, Minnesota and Superior, Wisconsin at the very western most edge of Lake Superior. Duluth and Superior have long been very important hubs or nodes for transportation, shipping transportation, as well as railway transportation in the United States. So what we're going to look at in this slide is the description of a pattern of spatial organization by breaking it into very simple components. We'll look at points, lines, areas, and volumes. These four elements describe the spatial properties of objects, for example, a shipyard that we can see in both Superior and Duluth can be thought of as a point, an actual place. The shipyards are connected by shipping lines and rail routes. These are the lines. Then these shipping lines lead to nearby markets as well as far away markets, and they also lead from nearby iron ore mining sites. Those are considered areas and then the lake, the Great Lake Superior can be thought of as a volume.

Slide 6

Text: Analyzing the spatial organization of people, places, and environments

- Next, concepts such as: location, distance, direction, density, and arrangement (linear, grid-like, random) are considered.
- Thus the U.S. interstate highway system can be described as lines connecting points over an area--the arrangement is partly grid-like (with north - south and east - west routes as in the central United State) and partly radial or star-shaped (as in the highway centered on Atlanta) -- and the pattern of the interstates is denser in the East than it is in the West.

Audio: In this slide we're going to look at the concepts of location, distance, direction, density, and arrangement. In terms of arrangement we can look at linear arrangement, grid-like arrangement, random, circular or others. We can look at the two maps on this page. The U.S. interstate highway system can be described as a series of lines. These lines are connecting points over an area, the United States. The arrangement is partly grid-like with north and south and east and west routes, and its partly radial or star shaped, or even-spoked as in the highway centered on Atlanta. And the pattern of the interstates is denser in the East than it is in the West. That's what you see in the top map in the picture. Just a slight switch on the theme, in the bottom map we also see the interstate systems, but the focus of this map is the bottlenecks that occur on the U.S. interstate system. You can see that it's probably partly connected to the denseness of the population in the eastern portion of the United States, and you can see that most likely in major cities, even in the West, we have more bottlenecks.

Slide 7

[Map of spatial organization for tourism]
Audio: This is a great map to show us the concept of human as well as physical elements taken into consideration when planning or organizing or analyzing a tourism city. This is a fairly complex map, brightly colored map that you might not pick up if you are a tourist in a particular place. It's not going to be that useful to you. However, if you're an urban planner or city planner, you're going to be looking at several things on this map. What are the best zones and regions for tourism in this particular place? What are the amenities that people are going to be drawn to? What are the transit road routes? How do people get from one place to another? What are the transit water routes? How do these connect our various amenities and various recreational centers, or how may they cut off a route, a road route, that may need a bridge built around it? Where are the airports? Where are the other tourist centers? Where are other amenities like spas and other places where tourists might like to frequent? All of these are taken into consideration as city planners try to develop a city and make it more accessible and more amenable to tourists.

Slide 8

Text: Applying Spatial Analysis & Putting it into Practice: Developing a Safe Routes to School Walking Route Map

[Walking map for Orangewood Elementary School]

Audio: This slide is showing us how spatial analysis can actually be put into practice, in this case, developing safe routes to school for children. The walking route plan helps to identify where improvements are needed and where to place crosswalks, stop signs, and adult school crossing guards. The ultimate purpose of the walking route map is to encourage more children to walk to school and discourage parents from driving their children to school. What's great about these maps and this project, these projects, is that it involves students, it involves parents, it involves school officials, and it involves city officials. The school provides the boundary map and parent volunteers to work on reviewing and developing the walking routes. The city provides aerial photographs, quarter section maps, and guidelines for parents and school officials on how to conduct the reviews. The whole process requires parent volunteers or school officials to review the entire walking route and to identify the most desirable walking routes to serve each household. Once the walking route maps are completed, traffic officials review the area of concern and work with school officials to assure that the right number and placement of adult school crossing guards exists. The city provides final versions of maps and maintains the computer files for the walking routes for easy updating. It is the responsibility of the school officials to distribute the walking route plans the parents at the start of the school year and when new students are enrolled at the school. School walking route maps are reviewed annually to identify if there are any changes to or within the school walking attendance boundary.

Slide 9
The analysis of patterns and spatial organization examines concepts such as:

- Movement & Flow
- Diffusion
- Cost of distance
- Hierarchy
- Linkage & Accessibility

...to explain the reasons for patterns & functioning of the world.

Audio: This slide is showing us the trucking network in the state of Vermont. Here we can look at questions of spatial organization such as movement and flow. In this case the movement and flow of goods from one part of Vermont to another and, of course, beyond the state of Vermont. We look at the concept of diffusion, the site of origin, and its spread. Where does something begin, and where does it move? How does it diffuse? We look at the concept of the cost of distance. Most firms, as they are profit based, are going to want to move something for the lowest possible cost; the most efficiency, the fastest way to get it there, the least amount of gas. We can also look at questions of hierarchy; large urban centers down to small towns. Where do you suppose trucks will stop more often? Probably in large cities where they can drop off more goods or pick up more goods. We look at the concept of linkages. How do trucks move from one city to the next city most efficiently? And accessibility. What's the easiest route to arrive at one place or another? When you're looking at this map, what you can see are a variety of roads. We have the blue lines, which are national networks, yet that have limited access for trucks. The red roads are showing truck networks that don't need any permits. The green roads require a permit. There are yellow areas around certain roads that show trucks where they should avoid travel. These are generally urban areas. Trucks want to go around urban areas rather than through them for efficiency. So looking at these maps can help us explain the patterns and the functioning of transportation in Vermont.

Slide 10

Text: Analyzing the spatial organization of people, places, and environments

Audio: Geographers and planners today place a great deal of emphasis on spatial organization that includes the concept of functional regions. Functional regions are areas that are defined by...
business and economic activities. Functional regions are organized around a node or a focal point with the surrounding areas linked through that node through systems, associations and activities. In this case on this slide we see a map with an airline headquarters and all of its flights that originate at that hub or at that node at that focal point. The concept of functional regions provides a way for geographers and planners to examine the linkages and flows that create interdependence among people.

Slide 11

[Map of an area with several identifiable physical features as well as human features]

Audio: This slide is showing us a map of an area with several identifiable physical features as well as human features. From the left hand upper corner, we can see some natural boundaries, the mountains, which also are open space since they're not developed. Moving to the upper right hand corner, we can see along the edge of the area some manmade or human made boundaries. Moving around the map, we see a regional service area, we see a core at the center of the map, we see some neighborhoods, and circled, we see a community service area. This model of planning suggests that cores be created at neighborhood, community, and village levels. Some reason for creating cores in neighborhoods is to encourage a more densely settled pattern of living. That is, the more people living in close proximity to one another leaves more hinterland space that can be left as open space and preserved. Another reason for creating cores is for community cohesion. Sometimes in the United States over the past couple of decades, we've heard that people don't know each other. So the purpose of having a community core is to create perhaps a more walkable, more accessible part of a city so community members are able to participate and engage more in civic affairs.

Slide 12

[Map of the Great Lakes]

Audio: In this map we're looking at the Great Lakes. We're looking at relief, drainage, and urban areas. In the case of a physical pattern such as a river or a lake system, there is a complex hierarchical arrangement linking small streams and lakes with drainage basins and large rivers and lakes with drainage basins. Like other regions, here we can see the spatial and human relationships, linkages, and networks that operate in the Great Lakes region of the United States and Canada

Slide 13

[Map of the Mississippi River Drainage Basin]
Audio: In this slide we see the Mississippi River drainage basin. Without question, America's greatest river, the Mississippi, like the Great Lakes region in the previous slide, has made many great contributions to the physical and economic growth of this country. It is what we call a navigation artery of great importance to our transportation system. Some of our earliest transportation was conducted by river ways before cars, before trains. Rivers carry an enormous amount of commerce. Cities are also supplied with water through this gigantic river drainage basin. Industries and towns have long been located along the banks of rivers.

Slide 14

Text: Some Keywords / Concepts

- Transportation
- Linkages, Nodes, Hubs
- Communications
- Density Patterns

Audio: This slide is showing us the North American Rail Network. Some keywords and concepts that we should think about as we look at this map are transportation and communications. As with the U.S. interstate map, we can see how transportation and communications are very, very linked. If there is transportation routes, that means there's access for people, for trucks, for ships, for railways to move about from one place to another. And where there's movement of people, there's also communications. We can also look at this map and we can see that the linkages, the interdependence, the nodes and the humps. We can see where there's a concentration of railway lines emanating out from larger cities for areas of shipping and transport. Especially take notice of the Great Lakes and how dark and dense the railway lines become in those regions. Here again we see density patterns. The eastern portion and the central portion of the United States has a great number of railway lines while the western portion and into Mexico and Canada we see fewer and fewer lines. So central to geography is to believe that there is a pattern, regularity and reason to the locations of physical and human phenomenon. Spatial relationships, spatial structures and spatial processes are simple to understand although they may look unfamiliar and complex. For example, the spatial organization of human settlements on Earth's surface is generally a pattern of a few large cities which are widely spaced and many smaller towns which are much closer together. A comparative analysis of those cities and towns shows that cities offer a wide range of goods and services, whereas small towns offer fewer goods and services. Taken together, the description and the analysis explain why customers shop where they do, why they often buy different products at different locations and also why changes occur in this spatial pattern.
Slide 15

**Text:** The core functions of public transportation are:

To connect people to jobs

To connect people to major regional activity centers, such as downtown Pittsburgh, Oakland and the Airport

To connect people to local activity centers within each county

[Map of “Focused Growth Regional Form”]

**Audio:** In the maps on this slide we see transportation planners' vision for their particular region. The core functions of public transportation are to connect people to jobs. Do people drive in cars? Do they get to their jobs in buses? Is there a light rail? Are there other forms of transportation people can rely on? Another core function of public transportation is to connect people to major regional activity centers. How do you arrive at local malls, at local downtown centers, at local airports, or other service areas? Another function is to connect people to local activity centers or recreation centers; the focus growth transit vision in this case will be connected with the high quality, well-balanced fiscally responsible public transportation system.

Slide 16

**Text:** Fundamental Geographic Questions

**Audio:** Some fundamental questions we might ask in spatial analysis are the following: Why are certain phenomenon located or centered in certain places? We also might ask, how did those phenomenon get there and why? And we might ask, why or how is there pattern of origin, evolution and development significant to us?

Slide 17

**Text:** Conclusion – Standard 3: Spatial Analysis

- _Description & analysis_ of patterns of spatial organization must occur at scales ranging from _local to global_.
- Students confront a world that is _increasingly interdependent_.
- Widely _separated places are interconnected_ as a consequence of improved _transportation and communication networks_.

Human decisions at one location have physical impacts at another location (for example, the decision to burn coal rather than oil in a power plant may result in acid rain damaging vegetation in a location hundreds of miles away).

Audio: In conclusion, the description and analysis of patterns of spatial organization must occur at scales ranging from local to global. As students and educators, we confront a world that is increasingly interdependent. And widely separated places are interconnected as a consequence of improved transportation and communications networks. And probably most importantly because human decisions at one location have physical impacts at another location. Just one example of that is the decision to burn coal rather than oil in a power plant may result in acid rain damaging vegetation in a location hundreds of miles away. Therefore, analyzing our space and the space around us is a very important geographic activity.

Slide 18

Text: By Elizabeth Larson, PhD

Lecturer, School of Geographical Sciences and Urban Planning, Arizona State University, 2012

[Photo of Elizabeth Larson]

Audio: Elizabeth Larson: This lecture was presented by Elizabeth Larson, lecturer, School of Geographical Sciences and Urban Planning at Arizona State University.