UNIT 1, Lesson 2

Teacher’s name

Date

Class Number/Room

Understanding Geographic/Spatial Data

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| **OVERVIEW** | **Materials** |
| Engagement: Video and interactive, high-level demonstration of how GIS works.Exploration**:** Exploration of how data is represented in GIS through utilizing data layers and student mapping exercise.Explanation: Class discussion on additional data layers that could be mapped as points, lines, and polygons.Elaboration: Review slides on methods of spatial data collection and development.Evaluation: Student vocabulary and geometry quiz. | * Video and player
* Projector
* Rope and/or string of various colors
* Hardcopy paper maps or printouts of the United States, Maryland, or their local community or campus
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| **Objective/Goals** | **Prerequisites** | **Outcome** |
| Students will:1. Understand how real-world features are represented in GIS using common geometry types (points, lines, and polygons) and how various data layers can be used in combination to identify patterns, convey information, and make decisions.
2. Identify the primary ways that spatial data is collected.
 | None | Students should be able to identify the primary ways spatial data is represented (points, lines, and polygons) and understand some ways this data can be collected.  |
| **PLAN** | **Key Points for Teaching:** Key vocabulary:* Layer
* Point
* Line
* Polygon
* Remote sensing
* Map

Discuss the widely used phrase that “80% of data has a geographic component” and how the explosion of mobile devices has turned everyone into a sensor that is continually collecting data. |
| **Engagement (10 min)** Video Warm-up: http://www.esri.com/what-is-gis/howgisworksWhat is GIS?This video outlines the basic concept of GIS and is accompanied by an interactive demo that shows how spatial data is used to understand patterns and make support decision making. |
| **Exploration (30 min)** Class activity to develop a “map” on the classroom floor. Students begin by using a hardcopy paper map or projected map (of the United States, Maryland, or their local community or campus), starting with a boundary developed using string or rope. Identify this shape as a polygon.Next, students will use blue string or rope to outline major rivers or waterways and black or grey string/rope to outline major roads. Identify these shapes as lines.Finally, have a small group of students stand at the locations of major cities or other points of interest. Identify these shapes as points. Student mapping activity can be done with entire class or in groups of 5-8, depending on class size. |
| **Explanation (15 min)** Students create a list of additional “layers” that could be mapped as points, lines, or polygons using the same approach as identified in the hands-on activity. This can also be used to extend the hands-on mapping exercise or to facilitate a follow-up activity.Initiate a discussion on thematic data, and how GIS can be used to capture information that represents the natural environment, various types of infrastructure (transportation, utilities, structures, etc.) and ask them to classify the layers that they created into logical thematic categories. Discussion on the differences between spatial and non-spatial data, data representation, and how data can be overlaid to identify patterns.  |
| **Elaboration (25 min)**Lesson 2 Slides and/or Demonstration:Introduction to spatial relationships and interactions between features:* Matches or is identical to
* Touches or borders
* Crosses or intersects
* Overlaps
* Contains

https://www.e-education.psu.edu/maps/l2\_p5.htmlWhere does data come from? Common sources of GIS data and methods of spatial data collection:* Primary data capture (GPS, survey, remote sensing, etc.)
* Secondary data capture (digitizing, scanning, etc.)
* “People as sensors” through the use of mobile devices and technology
 |
| **Evaluation (10 min)**Student quiz on key vocabulary and terminology related to GIS:* Geography
* Geographic Information Systems (GIS)
* Global Positioning System (GPS)
* Geospatial/spatial
* Map
* Spatial
* Remote sensing
* Point
* Line
* Polygon
* Layer

This quiz could also provide a matching or identification exercise for students to identify features from graphics as points, lines, or polygons.**Homework:** Students research one method of spatial data collection and write a brief essay on the primary uses, advantages, disadvantages, and key considerations for that method. |