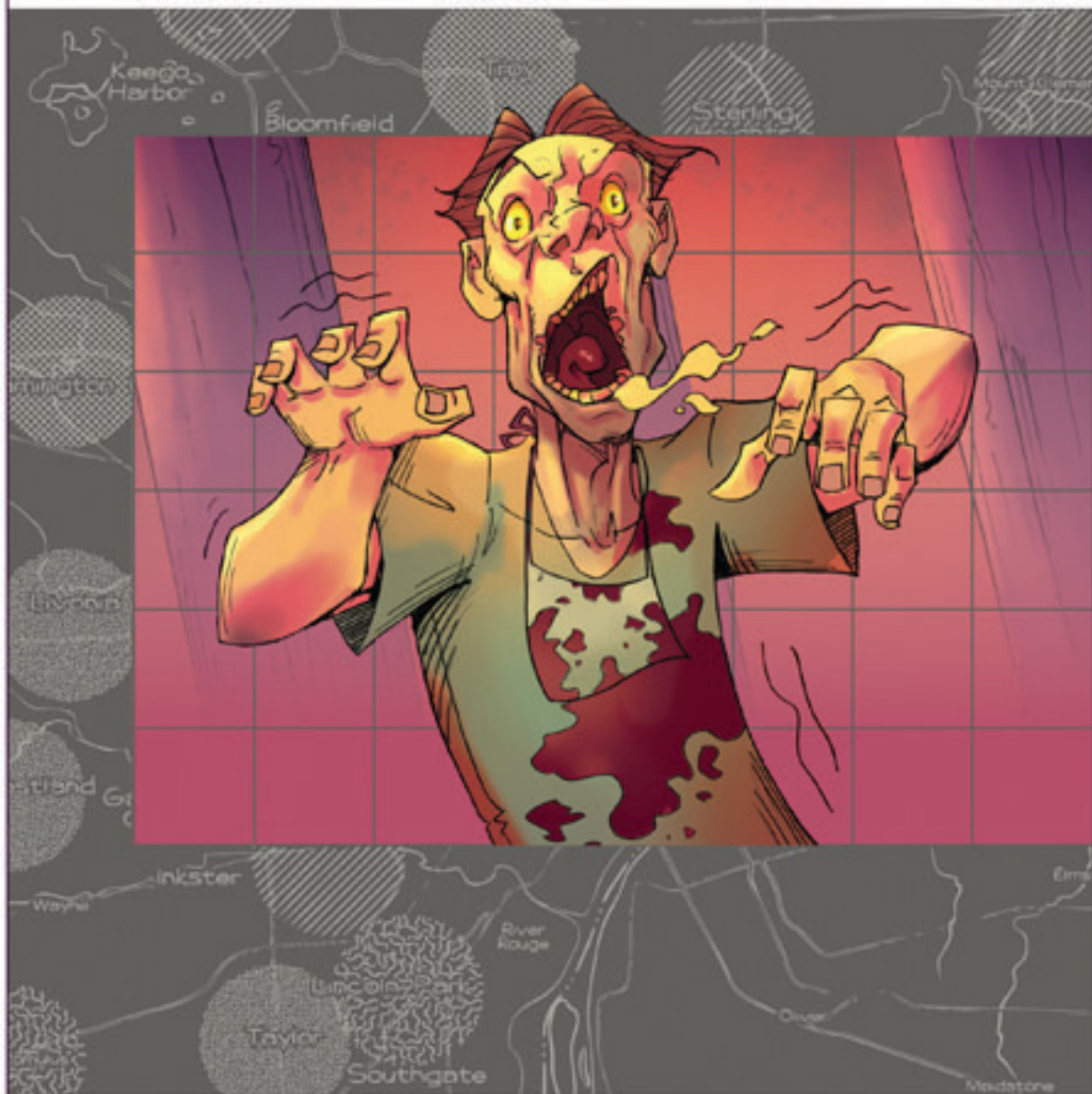


# ZOMBIE BASED GEOGRAPHY

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# OUTBREAK



# OUTBREAK

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**Zombie-Based Geography**  
Book 1

Second Edition  
David Hunter



### **About the author**

**David Hunter**, the author of the Zombie-Based Learning program, holds a master's degree in teaching. As a teacher, he designed this curriculum to allow teachers to focus on teaching and not have to track down resources—to make teaching easier. He has been a teacher of social studies and language arts at the middle school level, helping to develop the Bellevue Big Picture School project-based humanities curriculum. He has served as an advisory board member for Amplify Education, Inc., and as a curriculum consultant for such companies as Valve Software, TED-Ed, and Microsoft.

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# WELCOME TO OUTBREAK!

When the zombies attack, where should we run, where regroup, and where rebuild our lives? These critical survival questions can focus student attention on a highly motivating and dangerously overlooked fact: Geography skills can save you from an impending zombie apocalypse!

Developed by David Hunter, *Zombie-Based Geography* uses students' natural desire to survive zombie assaults to motivate study of a complete curriculum based on the 2012 8th Grade National Geography Standards.

Students then apply those skills in a simulation based on surviving when hordes of slaving zombies threaten to overrun their neighborhoods.





## Thanks

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—David Hunter

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## ● Why Zombie-Based Geography? ●

I love geography and I love zombies, but most of all, I love when learning happens outside of school and engagement happens in school. By building this curriculum, I wanted to show that learning could be done through far-out scenarios, or even just based on student interests. My hope is that this project will engage students, provide standards-based lessons for teachers, and support project-based learning.

This curriculum uses the 2012 8th Grade National Geography Standards. These standards were developed by the National Council for the Social Studies, the American Geographical Society, the American Association of Geographers, the National Council for Geographic Education, and the National Geographic Society. Students will learn to think like geographers and also learn to survive the zombie outbreak.

This curriculum also includes a companion graphic novel. *Dead Reckon* tells the story of a student struggling to survive in a zombie outbreak. The challenges set up in *Dead Reckon* are the same challenges students face in this curriculum. *Dead Reckon* is meant to keep students engaged and give them reasons to tackle the geographic problems they need to solve.

My goal was to prove that rigorous academic concepts could be learned through engaging scenarios. I believe I've been successful, but this is also just the beginning. The true opportunities in education and curriculum are just being approached. I look forward to a future where engaging learning experiences are built with students in mind.

—David Hunter



## ● General Instructions for Projects ●

Zombie-Based Learning contains a total of ten interactive projects designed to engage students with geographical tools and knowledge. Each project contains an explanation of the project's goals and an outline of the unit's lessons to introduce and guide the teacher through the project. At the conclusion of each project, students will have created some form of report to help them prepare for a zombie outbreak. Instructions and a rubric are provided for each report, along with a sequence of lessons to build the necessary geographical knowledge to compile the project report.

### Teacher Guide

#### ***Entry Event***

Before launching into the first project, get students excited about the prospect of a zombie apocalypse. Pick their brains about what they would do in such an event—where they would go, what they would need, and what advantages would help them survive. These are the questions you will return to again and again, but with the aid of specific geographical tools and knowledge to help students find useful answers.

#### ***Explaining the Project***

Starting off each project, this element summarizes the standards-based *project goal*, describes the *main final product* of the project, and suggests *options* for expanding or simplifying project work.

#### ***Outline***

The second element of each project briefly describes the unit content and its purpose, including:

- Final Project Task—a brief description of the final report to be created
- Driving Question—the question the unit is designed to answer
- Student Learning—a list of specific learning goals
- Lessons—a list of the lesson plans including in the project
- National Standards—a list of the National Geography Standards covered in the project

#### ***Rubrics***

The *final product*, or report, draws on all of the knowledge acquired in the project's lessons. A rubric is provided for assessing each report, ensuring that students have grasped each of the standards covered in the project. Rubrics or answer keys may also be provided for other forms of assessments, such as quizzes.

### **Final Report Instructions**

A master is provided of the student handout that outlines the goals and requirements of each project product, usually a report. These instructions reiterate the *driving question*, describe the *final product* and what it must include, and identify what the student is expected to have learned from the unit. This handout can be given to students at the end of a project, or it can be given to students at the beginning of the project so they can track their learning and check off the items they will need to include in their final report.

### **Lessons**

Each lesson begins with an outline of what students are expected to do and what the teacher needs to do to be prepared to guide the class from introduction of the subject through the various steps to the exit ticket. A brief description of the lesson is followed by a note on what will be taught in the next lesson. Elements included are:

- Materials Needed—to help set up for the lesson. This item is accompanied in the margin by copy instructions for student handouts and supporting resources.
- National Standards—the specific standard(s) covered in the lesson.
- Learning Objectives—to help the teacher focus instruction on the learning goals necessary to meet the standard(s).
- Evidence of Learning—what the student will do to demonstrate a grasp of the geographic knowledge imparted by the lesson.
- Lesson Sequence—the order of the lesson's steps.

### **Lesson Sequence Elements**

Every lesson is designed to engage students and encourage interaction with the information and with their classmates and teacher. Lessons draw on a variety of activities and help develop a strong suite of skills that are useful far beyond the classroom. Every lesson opens with a question to be explored using the think/pair/share strategy. Every lesson ends with some presentation of evidence that the student has grasped the lesson, usually in the form of an exit ticket. In between, various methods, strategies, and activities will come into play. Here are some examples:

- Think/Pair/Share—open each lesson with a question. The prompt provided will spur discussion and a sharing of ideas and knowledge among students, who are allowed to pair off with neighbors and explore what they already know and what they wonder about the subject.

- Define—Define key terms.
- Redefine—Define key term from another angle; difficult concepts may benefit from a simplified definition that is still adequate for the purposes of the lesson and project.
- Lecture—Read over the lesson’s first handout with the class and offer clarification or supplemental information in response to student interest.
- Discussion—Discuss information or concepts interactively with students.
- Review—Briefly go back over concepts or information learned earlier.
- Jigsaw—Divide students into groups and distribute handouts; then have students divvy up responsibilities for individual tasks and assemble their combined efforts to complete a classroom exercise.
- Group Activity—Divide students into groups to work collectively as a discussion, research, and/or presentation team. Groups will be asked to share what they have learned with the rest of the class.
- Presentation—Instruct students to create some form of presentation demonstrating or sharing what they have learned. This is usually either an oral report or a poster, but some lessons allow students to select from a teacher-approved list of presentation types. Keep in mind that preparing a presentation can be time-consuming. More elaborate types of presentation may need to be completed as homework or extended to another day. Ensure that students have appropriate supplies for making maps, drawings, diagrams, and posters.
- Gallery Walk—Display illustrative presentations. The gallery setup may be as simple as briefly exhibiting posters on student desks, or a wall may be devoted for extended display. The walk itself is a self-guided student tour of all the presentations during which gallery strollers should take notes and absorb as much information as they can. Some lessons will require them to know what students have learned in other groups, so it is important that students take advantage of shared information.
- Homework—Have students complete an activity that requires more time for research or execution than is allowed for in these one-hour lessons.

## Margin Notes

The pages of the teacher guides have a wide margin to accommodate helpful notes. These contain important instructional details for conducting the lesson.

- Teaching Tips—offer suggestions to enhance learning and help orient cross-page instruction.
- Copy Instructions—list how many copies of which handouts and other materials will need to be run off in preparation for the lesson.
- Handouts—shows which handouts go with a particular lesson step.
- Ask—supplies appropriate questions to prompt discussion or exploration.

## Assessment

Each project includes two assessment handouts. The Pre-assessment Quiz gives students a chance to demonstrate what they may already know about the material and concepts to be covered in the project. The Post-assessment Quiz gives you a chance to assess how students have absorbed the materials and concepts they have learned after completing the project.

## Handouts

Masters are provided for all student handouts. Each project contains a handout describing the final product or report. Most have an exit ticket; a lesson plan will note where some other assessment serves as an exit ticket or evidence of learning. Other types of handouts include readings, worksheets, assessments, and map outlines. A note in the margin of the Lesson Sequence of the teacher guide shows where each handout is used in the course of the lesson. Worksheets and quizzes may be turned in for assessment and then returned to students. Handouts should be kept by students for reference as they work on their final reports and for review as they build on their geographic knowledge in future lessons.

## Other Materials

Most materials are supplied as handouts. Some lessons provide teachers with reference lists or other supplemental information necessary for the lesson. Students will be expected to use maps, globes, atlases, and other standard tools found in a geography classroom. Some lessons will require internet access or materials downloaded by the teacher and printed out or projected for student use.

## Zombie-Based Geography Program

The complete Zombie-Based Geography program comprises four books. The program can be purchased and implemented as a package of ten projects, or individual volumes can be purchased separately. Book 1, which comes with the graphic novel *Dead Reckon*, is essential, but Books 2 and 3 can be purchased later to complete the program.

### ***Dead Reckon***

This companion to Book 1 is a graphic novel about the zombie outbreak that gives rise to the geographic concepts explored in the first three projects.

### ***Book 1: Outbreak***

Book 1 lays a foundation for understanding geographic concepts and tools.

- Project 01—Mapping the Outbreak
- Project 02—Mapping Safe and Unsafe Regions
- Project 03—Mental Maps in the Zombie Outbreak
- Final Projects: Student Map Project, Zombie Attack Map, and Neighborhood Mental Map

### ***Book 2: Survival***

Book 2 builds on the knowledge acquired in Book 1 while exploring the physical characteristics of Earth, its natural hazards and resources, and human migration.

- Project 04—Surviving the Physical Environment
- Project 05—Natural Resources for Survival
- Project 06—Zombie and Human Migration Patterns
- Final Projects: Settlement Location Report, parts 1–3

### ***Book 3: Resettlement***

Book 3 integrates the geographic skills, information, and reasoning developed in Books 1 and 2 as students become planners and problem solvers, learning to create models and make predictions for a long-lasting, zombie-proof settlement.

- Project 07—Planning Safer Settlements
- Project 08—Human–Environment Impact
- Project 09—Predictive Geography: Ecosystems, Demographics, and Historical Models
- Project 10—Cultural Geography after the Apocalypse
- Final Projects: Settlement Design Report, parts 1–2; Future Plan Portfolio, parts 1–5

# PROJECT 01: MAPPING THE OUTBREAK





# Explaining the Project

## *Concept of Project 01*

### **Mapping the Outbreak: Project 01**

#### ***Project Goal***

The main goal of this project is to have students show their ability to display data on a map and analyze spatial relationships. Along the way they learn about geographic tools and how to choose appropriate tools.

#### ***Main Final Product***

At the end of the project, students will have completed a regional map displaying the four days of zombie attack data. The map will be accompanied by a short written prediction of the highest-risk locations for Days 5 and 6, with an explanation of how the student identified those locations.

#### ***Project Options***

With the exception of lesson 8, all of the mapping exercises in “Project 01: Mapping the Outbreak” use a blank outline map of the United States, which is provided as a handout in lesson 3. In lesson 8, students may use one of the three regional outline maps provided in that lesson: Southern California, the Puget Sound region of Washington State, or the U.S. Northeast. The choice can be yours or theirs. Or to make lesson 8 more relevant and challenging to your students, you might want to use a regional map of your area, however large or small you choose to define your region. This will require more effort and time from you and/or your students, including generating a regional outline map handout, similar to the three maps provided in lesson 8, and drawing up a Regional Attack Data handout for your region similar to the three such handouts provided in lesson 8. If you choose to have your students generate an alternative regional map, direct them to an atlas or a satellite photo of the region. Tracing a satellite image to create a map models the work that cartographers often used to do. However, many mapmakers are now working digitally with geographic information systems (GIS). Weigh the learning value against any time constraints to decide whether to expand the lesson with this option.

# Mapping the Zombie Outbreak

## Outline of Project 01

### Teaching Tip

The included graphic novel, *Dead Reckon*, tells a story of a student trying to deal with this same situation in order to warn others about the zombie outbreak.



### Handout

- Mapping the Zombie Outbreak

### Ask

How does geography help us stay ahead of the zombie outbreak?



### Handout

- Mapping the Zombie Outbreak Pre-assessment Quiz

### Teaching Tip

Through this project, students will be expected to learn these skills.



## Before the Outbreak: Project 01

Studying the Earth is at the heart of geography. In this first project, students are introduced to some of the *questions* geographers ask and the *tools* they use to try and find answers. Students will apply these tools as they create their own map and analyze the *spatial relationships* between cities. By recognizing these relationships, students will be able to predict the movement of the zombie outbreak and where zombies are most likely to attack next.

### Final Project Task

Students will need to create a map of the zombie attacks using data provided.

### Driving Question

How are geographic tools used to make predictions and find solutions?

## Pre-assessment

### Student Learning

1. How to *choose* appropriate maps and tools.
2. How to *create* maps to display data.
3. How to *analyze* distance and connections of major metropolitan cities.
4. How to *describe* patterns of migration and diffusion.

### Lessons

1. Intro to Geography
2. Different Types of Maps
3. Map Elements
4. Intro to Analyzing Spatial Relationships
5. Structures: Identifying Cities
6. Relationships: Examining Connections
7. Processes: What Moves and How?
8. Using Maps to Answer Questions and Show Data

## Pre- and Post-assessment Quiz Answers

1. What is *geography*?

Geography is the study of the Earth, its features and its people.

2. What is *migration*?

Migration is the movement of a group of people or animals.

3. What is *diffusion*?

Diffusion is the spread of ideas, disease, or technology.

4. Match the following maps with their definitions:

1E, 2A, 3D, 4B, 5F, 6C

5. Match the following geography tools with their definitions:

1B, 2F, 3D, 4A, 5C, 6E

### Handout

- Mapping the Zombie Outbreak Post-assessment Quiz

## National Geography Standards

### 8th Grade

1.1.A—Analyze and explain the properties and functions of geographic representations.

1.1.B—Explain why particular maps are appropriate for a specific purpose.

3.1.A—Describe the spatial organization of people, places, and environments.

3.2.A—Describe and compare the processes that influence the distribution of human and physical phenomena.

### 12th Grade

1.1.A—Explain how multiple geographic representations and geospatial technologies could be used to solve geographic problems.

1.1.A—Explain how multiple geospatial technologies can be used to solve land-use problems.

1.2.B—Evaluate the quality and quantity of geospatial data appropriate for a given purpose.

3.1.A—Describe and explain the spatial organization of people, places, and environments.

3.2.A—Analyze and explain the human and physical characteristics of regions that have changed over time because of the interaction among processes.

## Project 01: Mapping the Outbreak

### Mapping the Zombie Outbreak

#### Summative Assessment Rubric—Pre- and Post-assessment Quizzes

	1	2	3	4
<b>Characteristics of Geographic Tools</b> NGS 1A Recognize characteristics and applications of maps, globes, aerial, and other images.	Cannot distinguish the following geographic tools: <ul style="list-style-type: none"> <li>• Maps</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> </ul>	Recognizes tools, but has trouble identifying distinguishing characteristics of one or two of the following tools: <ul style="list-style-type: none"> <li>• Maps (different types)</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> </ul>	Clearly identifies most geographic tools and identifies distinguishing characteristics of: <ul style="list-style-type: none"> <li>• Maps</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> <li>• GIS</li> </ul>	Clearly identifies all geographic tools and identifies distinguishing characteristics of: <ul style="list-style-type: none"> <li>• Maps (different types)</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> <li>• GIS</li> </ul>
<b>Applications of Geographic Tools</b> NGS 1C Evaluate when to use certain maps or other tools and technology to solve geographic problems.	Mixed up more than two of the geographic problems that the tools are suitable for.	Mixed up one or two of the tools that the geographic problems would be suitable for.	Clearly links each tool to the geographic problem that it would be suitable for: <ul style="list-style-type: none"> <li>• Maps</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> <li>• GIS</li> </ul>	Clearly identifies when to use each tool, and suggests geographic problems that would be suitable for each tool: <ul style="list-style-type: none"> <li>• Maps (different types)</li> <li>• Globes</li> <li>• Aerial images</li> <li>• Satellite images</li> <li>• Graphs</li> <li>• GIS</li> </ul>

## Summative Assessment Rubric—Zombie Outbreak Data Map

	1	2	3	4
<b>Map Design</b> Includes important map design elements. NGS 1B Make and use different globes, graphs, charts, databases, and models.	Is missing more than one important map element: <ul style="list-style-type: none"> <li>• Key or legend</li> <li>• Symbols and labels</li> <li>• Grid and index</li> <li>• Scale</li> <li>• Direction</li> </ul> Or map is messy.	Is missing an important map element: <ul style="list-style-type: none"> <li>• Key or legend</li> <li>• Symbols and labels</li> <li>• Grid and index</li> <li>• Scale</li> <li>• Direction</li> </ul> Or map is not clear.	Includes all important map elements, including: <ul style="list-style-type: none"> <li>• Key or legend</li> <li>• Symbols and labels</li> <li>• Grid and index</li> <li>• Scale</li> <li>• Direction</li> </ul>	Creatively and clearly integrates all important map elements, including: <ul style="list-style-type: none"> <li>• Key or legend</li> <li>• Symbols and labels</li> <li>• Grid and index</li> <li>• Scale</li> <li>• Direction</li> </ul>
<b>Identifies Major Cities</b> NGS 2A Identify important physical and human features on maps.	Two or more of the following issues: <ul style="list-style-type: none"> <li>• Lack of major cities</li> <li>• Unclearly labeled</li> <li>• Inaccurate placement</li> <li>• Did not identify connections</li> </ul>	Does not identify at least seven major cities or unclearly labeled or inaccurately placed or did not identify connections.	Accurately identifies at least seven major cities on the map. <ul style="list-style-type: none"> <li>• Clearly labeled</li> <li>• Accurately placed</li> <li>• Identifies connections between cities</li> </ul>	Accurately identifies and clearly labels at least seven major cities. <ul style="list-style-type: none"> <li>• Includes other important features (e.g., major landforms)</li> <li>• Identifies connections</li> </ul>
<b>Accurately Shows Diffusion Data</b> NGS 3D Describe patterns of migration and diffusion	Patterns of zombie spread are not visible at all.	A person using this map would have a hard time seeing the pattern of the spread of the zombie virus.	Map shows clear patterns of the diffusion of the zombie virus. Readers can recognize patterns of virus spread.	Clearly and directly explains the patterns of the diffusion of the zombie virus. For example: Includes a time line, or labels extra information within map to make patterns very clear.
<b>Explanation of Zombie Outbreak Spread</b> NGS 3B Analyze and explain patterns such as distance, accessibility, and connections.	Contains no explanation of the zombie outbreak spread.	Attempts to analyze or explain the patterns of zombie spread, but does not identify relationships between cities.	Analyzes and explains the patterns of zombie spread using <i>any</i> of the following: <ul style="list-style-type: none"> <li>• Distance between cities</li> <li>• Directional relationships of cities</li> <li>• Links cities have with each other</li> </ul>	Very thoroughly analyzes and explains patterns of the zombie spread using <i>all</i> of the following: <ul style="list-style-type: none"> <li>• Distance between cities</li> <li>• Directional relationships of cities</li> <li>• Links cities have with each other</li> </ul>



# MAPPING THE ZOMBIE OUTBREAK

## Introduction

If the zombie virus was spreading, wouldn't you want to *know where it was going*? In this project, you will learn to *use geographic tools and data* to track the spread of the zombie apocalypse.

### Driving Question

How are *geographic tools* used to *make predictions* and *find solutions*?

### What You Will Produce

Create a map using the zombie attack data provided.

### Your Map Will

- Include important *map features* (direction, symbols, legend, index, scale)
- Identify *major cities*
- Show the *spread* of zombie attacks
- Show the *connections* between cities that help the zombie virus spread

### You Will Also Explain

- How you decided where the zombies would spread

### By the end of this project, you will be able to answer these questions:

- What the heck is geography?
- What tools do geographers use and why?
- How do I design a map?
- Where are the major cities in my country?
- How are major cities connected and how do they relate to each other?
- What is the process of diffusion?
- How do I display data using maps?



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAPPING THE ZOMBIE OUTBREAK

## *Pre-assessment Quiz*

Answer the following questions. You will soon learn all about these concepts.

1. What is **geography**?

2. What is **migration**?

3. What is **diffusion**?

4. **Match the following maps with their definitions:**

- |                             |   |
|-----------------------------|---|
| 1. Physical Map             | A. Shows average weather and rain of a region.  |
| 2. Climate Map              | B. Includes contour lines to show the elevation or height of an area.                       |
| 3. Economic or Resource Map | C. Shows major highways, airports, cities, railroad tracks, and local points of interest.   |
| 4. Topographical Map        | D. Includes symbols to show the locations of different resources or economic activity.      |
| 5. Political Map            | E. Shows the features of an area, such as mountains, rivers, and lakes. Usually uses color. |
| 6. Road Map                 | F. Doesn't show physical features, but shows borders or boundaries and major cities.        |

5. **Match the following geography tools with their definitions:**

- |                         |  |
|-------------------------|--|
| 1. Atlas                | A. Image from space used to take measurements or create maps.                            |
| 2. Globe                | B. A compiled book of maps.  |
| 3. Aerial Photograph    | C. Visual symbols of data showing change or comparing numbers.                           |
| 4. Satellite Photograph | D. Image from the sky used to take measurements or create maps.                          |
| 5. Graphs               | E. A computer program used to store, manage, and analyze geographic data.                |
| 6. GIS                  | F. A model of the Earth used to avoid distortions in spatial relationships in the world. |

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAPPING THE ZOMBIE OUTBREAK

## *Post-assessment Quiz*

1. What is **geography**?
2. What is **migration**?
3. What is **diffusion**?
4. **Describe the following tools and give an example of when this tool would be used:**
  - A. Map
  - B. Globe
  - C. Aerial Image
  - D. Satellite Photograph
  - E. Infographic
  - F. GIS

# HOW DID YOU DO?

Rate how well you did in creating a map.

	You can do better. Or you will become a zombie.	Okay. You will survive if someone helps you.	Great! You're a survivor.	Awesome! You are the leader of the survivors!
<b>Map Design</b> (see Map Elements Handout)	You made a messy map. Or you forgot multiple important elements.	Either your map isn't too clear or you missed an important map element.	You made a clear map using all of the important map elements including: • Key or legend • Symbols and labels • Grid and index • Scale • Direction	You made a creative and clear map. It is a work of art. You also used all of the important map elements including: • Key or legend • Symbols and labels • Grid and index • Scale • Direction
<b>Identifies Major Cities</b> (cities are going to have a lot of zombies)	Your map was inaccurate or unclear.	You either didn't get too many cities or didn't put the connections between them.	You identified a bunch of big cities and the connections between them.	You identified a bunch of big cities, the connections between them, and other important locations (major landforms, transportation networks, etc.).
<b>Accurately Shows Spread of Zombies</b>	Patterns of zombie spread are not visible at all. This map won't help anyone survive.	A person using this map would have a hard time seeing the pattern of the spread of the zombie virus.	You showed how the zombies spread. The map helps tell people where they are spreading.	Your map was extra clear, showing the spread of the zombie virus. For example: Includes a time line, or labels extra information within the map to make patterns very clear.
<b>Explanation of Zombie Outbreak Spread</b> (see Spatial Analysis Handout)	You can't explain any patterns in this zombie outbreak!	You have a hard time explaining how zombies get from one city to the next.	You can explain how the zombies spread using <i>any</i> of the following: • Distance between cities • Directional relationships of cities • Links cities have with each other	You can explain how the zombies spread using <i>all</i> of the following: • Distance between cities • Directional relationships of cities • Links cities have with each other

# Lesson 1—Intro to Geography

## *Understanding Geography, Geographic Questions, and Geographic Tools*



One class period of instruction

This lesson helps to give students a deeper understanding of what geography is and who actually uses it. Students will try to understand the *definition of geography*, read *interviews with people who use geography*, learn about the *basic tools used in geography*, and design their own *geographic question*.

Lesson 2 will look at the different types of maps and why they would be used.

### **Copy Instructions**

Print one handout for each student.



For the geographer interviews, provide each group with a different interview and enough copies for all students in the group.

### **Materials Needed**

- **Geographer Interview** jigsaw readings
- **Geography Interview Analysis**
- **Geography Tools**
- **Geographer Question Design**

### **National Geography Standards**

#### **8th Grade**

1C—Evaluate when to use certain maps or other tools and technology to solve geographic problems.

#### **12th Grade**

1.1.A—Explain how multiple geographic representations and geospatial technologies could be used to solve geographic problems.

### **Learning Objectives**

1. Understand the purpose of geography.
2. Understand tools used by geographers.
3. Understand the types of questions geographers investigate.

### **Evidence of Learning**

Students create a geographic question and decide on the tools they would use to investigate that question.

## Lesson Sequence

### 1. Think/Pair/Share

What is geography? What do geographers do?

### 2. Define

**Geography:** study of Earth and its features and of the distribution of life, including human life, and the effects on human activity.

### 3. Redefine

Study of Earth, its features (landforms and climate), and people.

### 4. Jigsaw

Divide class into seven groups of students. Each group reads a different **geographer interview**. Students take notes of the tools geographers use and the questions geographers investigate.

### 5. Lecture

Explain the different kinds of tools geographers use. Include student input and examples from the jigsaw.

### 6. Design a Question

Students work individually to design a question they could try to answer using geography and geographic tools. This worksheet will serve as their exit ticket.

### 7. Share (if there is time)

Call on students to share their question and tool.

#### Handouts

- Geographer Interviews
- Geographer Interview Analysis

#### Handout

- Geography Tools

#### Handout

- Geographer Question Design



# GEOGRAPHER INTERVIEW

*Julie Bassuk, Makers Architecture, Seattle, WA*

Read an interview of a real person who uses geography in his or her career. Answer the questions on your **Geographer Interview Analysis** sheet. Be ready to share your answers and ideas.

## 1) What is your job title?

My title is Co-Managing Partner of MAKERS Architecture and Urban Design LLP and I am the current chair of the Seattle Design Commission. I am a planner, sometimes called an “urban planner,” “city planner,” “land use planner,” or “facility planner.”

## 2) How would you describe what you do?

I do a lot of different things. I help cities transform neighborhoods, ports manage waterfronts, and organizations develop campuses. The common theme is that I work with my clients to create a “vision” of what is desired in the future and then make a plan to get there.

## 3) How do you work with geography? What kinds of questions do you try to answer? What problems do you try to solve?

For each project, I build a series of maps to show existing conditions, problems, and opportunities, answering questions like the ones below:

### Existing Conditions

- Who lives and works in the area?
- Where are the houses, schools, stores, and businesses?
- Where are people going? Are they on foot? On bikes? In cars? On the bus?
- Where are the parks and playgrounds? Natural forests, wetlands, or streams?
- Are there any beautiful views in the neighborhood?

### Issues and Opportunities

- Where isn't it safe or fun to walk or bike?
- Where are more houses, schools, stores, or businesses needed?
- Where should there be more places to play? Walk the dog? Go to school?

## 4) Why is geography important to you?

Geography is important to me for three reasons—it helps me understand projects, communicate ideas, and get people to work together.

## 5) What kinds of geographic maps or tools do you use in your work?

Typically in my office, we start our background research on the internet using Google

Maps. Then, we use geographic information systems (GIS) to prepare base maps and gather information about a project. If the project requires a more detailed design, we use AutoCAD [computer-aided design]. We then prepare analysis maps, typically using GIS and Adobe Illustrator. We also prepare a lot of hand sketches and 3D models using SketchUp.

### 6) How do you decide which tools to use?

It depends on the project needs and what information is available. At a neighborhood, city, or regional planning scale, GIS and illustration tools are most useful to communicate information and generate ideas. Design projects demand a higher level of accuracy and lend themselves to AutoCAD. Hand sketches are great for rough drafts, quick illustrations, or evoking a particular feel. If the project requires a greater contextual understanding, we'll build a 3D model of the site and surroundings in SketchUp.

### 7) How would your skills help you in the event of a zombie apocalypse?

Great question: We would employ our skills to develop a survival plan, with five areas of focus:

- A. **Know Your Enemy.** Analyze zombie movement patterns to map existing behavior and predict future movement.
  - ♦ Will they tend to move down unobstructed areas, like major roads?
  - ♦ Are they attracted to population centers as their food source?
  - ♦ Do they move toward bright lights? Loud noises?
  - ♦ What areas are difficult for zombies to access? Rooftops? Underground?
  - ♦ What barriers restrict zombie movement? Water bodies? Tall fences or walls? Hidden passageways?
- B. **Retreat to Safety.** Map a network of "safe havens" for apocalypse survivors. We'd use geographic tools to identify areas likely to be safe from zombies.
  - ♦ Away from zombie attractors (see above)
  - ♦ Protected by zombie barriers (see above)
  - ♦ With access to essential resources like clean water and food, shelter, fuel, weapons, etc.
- C. **Help Your Friends.** Use maps to communicate safe haven locations and access routes to survivors. For example, the sketch identifies safe haven islands in Seattle's Ship Canal between Lake Washington and Lake Union. This assumes zombies can't swim, have taken over downtown Seattle, and move most freely on highways and major arterials.
- D. **Rebuild the World.** Once the safe haven network is established, rebuild a post-apocalyptic society.

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Betsy Jacobsen, Wesley Kirkman, Rachel Miller, and Alex Wallace (MAKERS' urban design, planning, and geographic information system special forces team) helped answer this question. Graphic by Wesley Kirkman.

- Create a system to fairly distribute resources between the safe havens.
- Reduce dependence on resources that require trips outside the safe havens.
  - Establish “urban agriculture” on rooftops, hanging from walls, behind fortress walls, etc.
  - Develop a sustainable, renewable source of energy harnessing solar, wind, water, ground source heat, etc.
  - Focus on bicycle and other non-fuel dependent methods to move people around the safe haven network.
- Prevent zombie kills. Employ zombie prevention through environmental design (ZPTED) principles to create safe places. For example, if zombies are attracted to loud noises, strategically place loud noise-making devices to lure zombies away from safe havens, essential resources, and access routes.

E. **Play It Safe.** Prevent future zombie outbreaks.

- Develop a ZERP (Zombie Emergency Response Plan).
- Learn to recognize early stage outbreaks and identify, map, and limit exposure to conditions that lead to outbreaks.



# GEOGRAPHER INTERVIEW

*Yuko Caras, King County, WA*

Read an interview of a real person who uses geography in his or her career. Answer the questions on your **Geographer Interview Analysis** sheet. Be ready to share your answers and ideas.

**1) What is your job title?**

Senior GIS Analyst.

**2) How would you describe what you do?**

Currently I work with the Solid Waste, Parks and Airports department for King County. I make paper maps, interactive online maps, and do analysis, depending on what my clients want.

**3) How do you work with geography?**

Overlay different information on top of each other and find answers.

**4) Why is geography important to you?**

Some things are difficult to conceptualize but easy to understand when you actually see them. Geography makes it easy to understand spatially and leads to making a good decision.

**5) What kinds of geographic questions do you try to answer?**

Analysis is interesting. One of my projects on and off has been estimating an amount of debris due to large earthquakes in the area. The solid waste department needs to plan temporary debris dumping stations when big earthquakes hit the area. One part is to find property where we can place debris and the other part is to figure how much debris we will have due to an earthquake. We found where the temporary debris-managing locations would be considering landscape, environmental restrictions, accessibility, and capacity. We also have a software system to estimate how much building debris will be produced by inputting the epicenter and magnitude of earthquake.

**6) What kinds of geographic maps or tools do you use in your work?**

Predominantly Esri (GIS) software in King County.

**7) How do you decide which tools to use?**

Depends on your resources and questions. There are open source GIS, which are free for use and share. If you are making simple maps or doing simple analysis, this is probably fine. If you are doing analysis, you do need some sort of GIS software, either Esri's ArcGIS or open source. If you are making a sophisticated map, you probably use some graphic software (e.g., Adobe Illustrator) after making a simple map and export to those formats to tweak.

**8) How would your skills help you in the event of a zombie apocalypse?**

You do need to understand the characteristics of zombies first. What they can do and what they can't. Once you have all that information, you can create a layer for each piece of information. For example, knowing how fast they move each day will create a buffer from where they are for each day until they get to you. The more information you have, the more accurate your map will be. I could overlay all those layers spatially and locate the last place they reach and head there. Also, I could place any objects to slow them down along the way, or place a barricade to protect unharmed areas before they come (because I will know how long it will take them to get there).



# GEOGRAPHER INTERVIEW

*Mary Ullrich, King County, WA*

Read the interview of the real person who uses geography in his or her career. Answer the questions on your **Geographer Interview Analysis** sheet. Be ready to share your answers and ideas.

## 1) What is your job title?

GIS specialist.

## 2) How would you describe what you do?

I take information that has some sort of geographic component like an address or coordinates and analyze it to answer questions and then put the results on a map.

## 3) How do you work with geography?

Geography is a way to study patterns on our Earth. We have data sets that represent features located in King County. They range from things we can see like manholes, sign posts, roads, sewer lines, and building footprints to things we can't see like parcel boundaries, sewer district boundaries, and school district boundaries. These data sets have location information that allows us to pin them to the Earth in a known place with a dimension. They also have attributes detailing size, length, name, and anything else we are interested in collecting about those features. Once these data sets are complete, I can start asking questions and analyze the resulting patterns.

## 4) Why is geography important to you?

I majored in geography because it was so interesting. While I did learn how to make a good map, the focus of the program was learning about the patterns that exist on our planet. *Physical Geography:* Why do deserts and rain forests occur where they do? *Cultural Geography:* Why do humans utilize land and resources in one part of the world differently from those in another part of the world? And how does that affect the planet? *Economic Geography:* Where's the best place for a certain business? How are we using resources to meet our needs? Is growth good? I like what [wiki.answers.com](http://wiki.answers.com) has to say about geography and why it is important: It helps us to know things around us and how to utilize them. It helps us to know places on Earth. It helps us to choose a career for living. It helps us to understand the way of life of other people.

**5) What kinds of geographic questions do you try to answer?**

Some examples are: Where do the people who speak Korean live? Where are all the five-year-olds? Where do the people using the park and ride lots live? What is the percentage of rural population in the school districts in King County? Where is the best place to put a wastewater treatment plant? Which areas in King County don't have access to healthy food? Who needs to be alerted to an upcoming construction project? Which roads meet the criteria for evacuation routes? Which properties are vulnerable to a flood? Which sewer lines are letting storm water into the system and what is the best way to fix this? Where are the vulnerable people and what is the best way to get them out in case of a flood? What's the best place for a coffee shop?

**6) What kinds of geographic maps or tools do you use in your work?**

I use a specialized software program called ArcGIS that lets me collect and manipulate data and query and analyze the data to answer questions: and it has a pretty good mapping component so I can display the results of my analysis on a map. This program also has an online version that I'm starting to learn. Also I utilize Microsoft Office tools like Excel and Access. Finally I do some programming using a language called Python.

**7) How do you decide which tools to use?**

It depends on what I'm doing. Generally, I use ArcGIS for all my work. However, if I'm doing a lot of tabular analysis, I'll use Access. If I have a repetitive task I'll build a model in ArcGIS and then transfer it to Python to make it possible to run in the background. People like spreadsheets, and often I have to transfer data to and from Excel, depending on what is needed.

**8) How would your skills help you in the event of a zombie apocalypse?**

Since my work requires a computer, my skills would be most useful in a planning phase. A few years ago King County planned for a possible imminent disaster. The Howard Hansen Dam was compromised and the event of a major flood on the Green River was a reality. We spent several months helping folks around King County identify what resources and people were at risk and how to mitigate that risk. We identified where people with disabilities were and figured out evacuation routes for them; we identified properties at risk and installed sand bags to protect them; we made maps identifying areas of greatest risk and evacuation routes so folks would have paper copies available when needed. The State Department of Transportation brought in small platforms so they could raise their equipment above flood level without having to move it.

For the zombie apocalypse I'd want to know where the zombies are and how fast they are moving; what areas are defensible and will provide the resources I need to survive (food, water, shelter); how I would get to those areas; who has the supplies I need, like weapons, food, maps, compasses, fuel, etc., while I travel to those areas. I'd also like to know who offers survival classes, including weapons training, wilderness survival, and how to keep a vehicle running on chewing gum and wire.



# GEOGRAPHER INTERVIEW

*Roger White, Dept. of Geography,  
Memorial University of Newfoundland*

Read the interview of the real person who uses geography in his or her career. Answer the questions on your **Geographer Interview Analysis** sheet. Be ready to share your answers and ideas.

## 1) What is your job title?

Honorary research professor.

## 2) How would you describe what you do?

Mostly I develop computer-based models of geographical systems, working with a team at the Flemish Institute for Technological Research in Belgium. I develop and test the models, while the people I work with program them and prepare data necessary to run them.

*What are these models?*

Most of them predict the future changes in land use in cities and regions. Some of the more recent ones also predict the changing locations of where people live and work. Examples of output maps are shown below. These predictions are spatially very detailed; often the resolution is 100 or 200 meters. These models are being used in Belgium, Ireland, The Netherlands, France, and Puerto Rico, among other places.

I also supervise graduate students (mostly PhD level) at my home university, Memorial University of Newfoundland in Canada, and co-supervise graduate students at several other universities in Canada, Belgium, The Netherlands, and France. I used to teach urban, economic, and theoretical geography at Memorial University.

## 3) How do you work with geography?

I try to create a new way of doing geography. Geography is a very old field, going back at least to Ptolemy, who devised the first scientific map projection. But geographers have mostly been content to describe the world by writing about it, mapping it, or photographing it from the air or from space. When we look at the geography of the Earth—the agricultural areas, the location of the cities, the way they grow, the changes in the transportation networks as the years go by—we must wonder what causes these patterns and the changes in them that we see over the years. Theoretical geography seeks to explain the processes that generate the geography that we live in. If we understand the processes, then we can predict what the geography of our world will be like in the future. Not only that, we can predict the effect of some of our actions. For example, if we build a new highway connecting two cities, how will that change the pattern of growth in the region over the next twenty-five years? Do we like the long-term effects of the road? Would the impact be better if it were built following a different route? Or if it were not built at all? The models help us make better decisions by giving us some idea of what the long-term impacts of our projects will be. If we don't like the predicted effects, we can change the plan.



**4) Why is geography important to you?**

Geography is important to me because I want to understand why the world is the way it is. Also, I want to be able to provide tools that will be useful for planners and other decision makers who are intervening in a practical way with actions that will affect the future geography for better or worse.

**5) What kinds of geographic questions do you try to answer?**

I try to answer the basic geographical questions of why things are where they are, whether they will stay there, and if not, where will they move to. Being able to answer these questions allows many practical problems to be solved. For example, being able to predict where growth will occur permits us to know where we will need to build infrastructure, like roads, schools, and hospitals. It also allows businesses to plan where they can most profitably locate new facilities like power centers, supermarkets, or coffee shops.

We sometimes develop geographic modeling tools for other kinds of systems. For example, we have developed a model of the lobster fishery, which can be used to test the impact of possible regulations. This is more efficient than testing the regulations by imposing them and then seeing what their effect is.

**6) What kinds of geographic maps or tools do you use in your work?**

I use maps of many sorts as inputs to the models: maps of the topography (digital elevation maps), maps of transport networks (roads of various categories, commuter rail, light rail transit), land-use and land cover maps, zoning maps, population density maps, employment maps, etc. Many of these maps are generated or pre-processed using a GIS (geographical information system). For testing the models, I use several types of pattern analysis tools (statistical techniques), as well as fractal analysis. All of these maps and tools are used in our work of creating new geographical tools that can be used by businesses, transportation engineers, urban planners, and emergency response personnel.

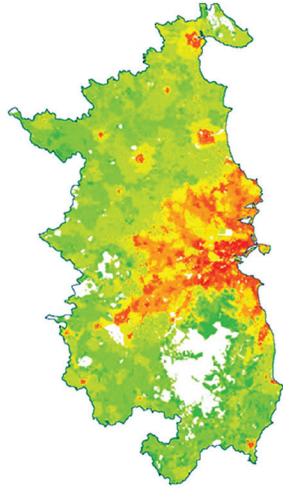
**7) How do you decide which tools to use?**

We use whichever tools we can find that allow us to get the results we want. How do we find them? We do Google searches. We go to conferences and workshops and talk to others to keep up to date on new tools that are being developed. Frequently we must develop our own tools because no one else has yet done so. For example, we have developed several new statistical tools for pattern analysis of maps so that we can better understand the performance of the models we are developing.

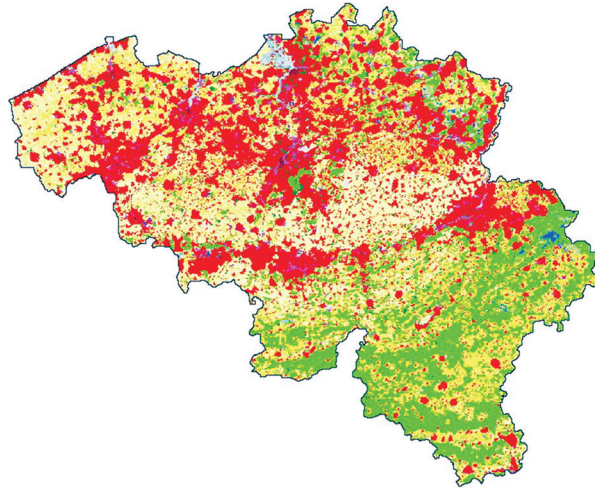
**8) How would your skills help you in the event of a zombie apocalypse?**

We've never had the thrill of working with an actual zombie apocalypse. But in collaboration with a team at Los Alamos National Labs we did once work with a disaster scenario for Los Angeles, where the city was destroyed by a mega-earthquake on an unknown fault. In this project we got together with a group of seismologists who, with supercomputers, could predict the pattern of destruction in the LA area in real time, and the resulting scenarios were fed to representatives of the utilities (gas, electric, water), Caltrans (freeways and traffic), and local emergency response organizations. Our geographical software was used to let the

participants practice coordinating their responses so that they could learn to work together rather than at cross purposes. It was also used to show how, in the longer term, the pattern of development in the LA area could be guided to lessen the impact of a giant earthquake. Zombies would be an interesting add-on to the software, since they would multiply rapidly in a disaster situation, and diffuse rapidly to cause problems even in relatively undamaged areas.



The greater Dublin, Ireland, area: Predicted population density in the year 2050.



Predicted land use in Belgium, 2060.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# GEOGRAPHER INTERVIEW ANALYSIS

## *How Do Real People Use Geography?*

Read an interview of a real person who uses geography in his or her career. Answer the following questions based on the interview. Be ready to share your answers and ideas.

1. What is his or her *job title*?
2. How does this person *use geography*?
3. What *kinds of questions* does this person try to answer?
4. What *tools* does this person use?
5. Would you want this person on your team of zombie apocalypse survivors? *Why*?

# GEOGRAPHY TOOLS

## What Are the Different Types of Tools Geographers Use?

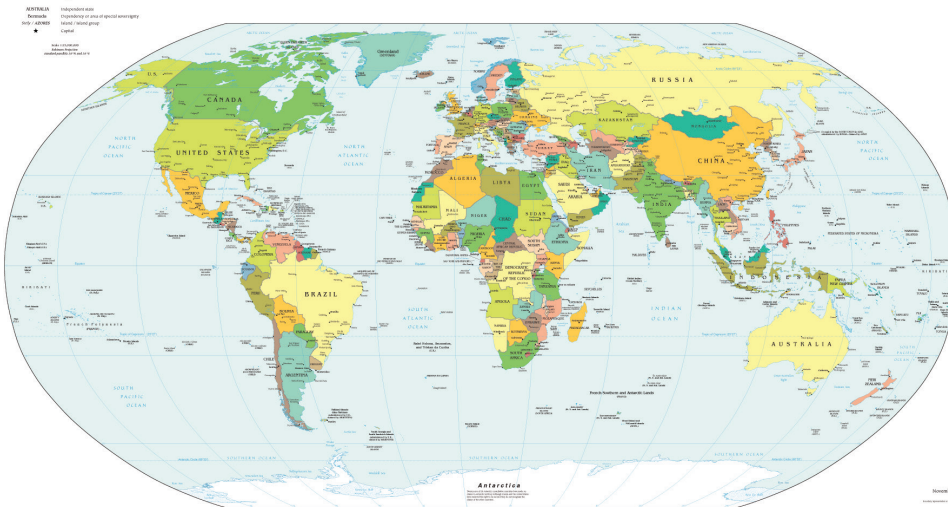
Geographers use all sorts of tools to help them investigate their questions. They commonly use *maps*, *globes*, *atlases*, *aerial photographs*, *satellite photographs*, *information graphics*, and a computer program called *GIS*. Read below to learn about different tools.

### Some Tools Geographers Use

#### Maps

A *map* is a flat representation of a part of Earth.

Political Map of the World, November 2011



Geographers use many different types of maps. Maps can show lots of different information, including the location of places in the world.

Maps use **projection** to try and display a round object (Earth) on a flat surface (a map). **Cartographers** (mapmakers) have long struggled with trying to find the most accurate projection for making maps.

#### Atlas

An *atlas* is a book of maps.

An atlas contains maps of the world or a region of the world. Some atlases also include more information about the places they include in the maps.

Atlases can be very helpful for traveling. Instead of bringing many maps, you can bring one atlas.







### **Globe**

A *globe* is a three-dimensional model of the Earth, used to *avoid distortions* in spatial relations on the world.

Maps of the world are distorted from trying to make a round object fit on a flat surface. The globe is round, so it remains accurate.

The globe provides an accurate scale of how far apart locations are. You can also use a globe to get a comparison of the sizes of different locations.

### **Aerial Photographs**

*Aerial photographs* are photographs taken from the sky and used to take measurements or create maps.

Aerial photographs can be taken from airplanes, balloons, drones, or even kites.

*The image on the right is an aerial photo of South Boston, MA. It was taken in 1978. You can download aerial photos at <http://earthexplorer.usgs.gov>.*



Image courtesy of the U.S. Geological Survey.



Image courtesy of the NASA Earth Observatory. Image created by Jesse Allen, using EO-1 ALI data provided courtesy of the NASA EO-1 team and the United States Geological Survey.

### **Satellite Photographs**

*Satellite photographs* are like aerial photographs, but they are taken from space.

Satellite photographs can capture large areas of the Earth, but they can also zoom in pretty close.

*The image on the left is a satellite photo of Marion Island, South Africa. Marion Island is a protected island and is inhabited only by researchers studying it.*

## Information Graphics

Information Graphics or *infographics* are images that show information using pictures or symbols.

Information graphics can be as simple as a **bar graph** or as complex as the image to the left.

The infographic on the right is a display of land cover change in the mid-Atlantic between 1996 and 2006. This graphic shows that over ten years, forests and wetlands have decreased, while other types of land cover, including developments, have increased. The graphic does not represent actual locations of land cover, just numbers representing its changes.

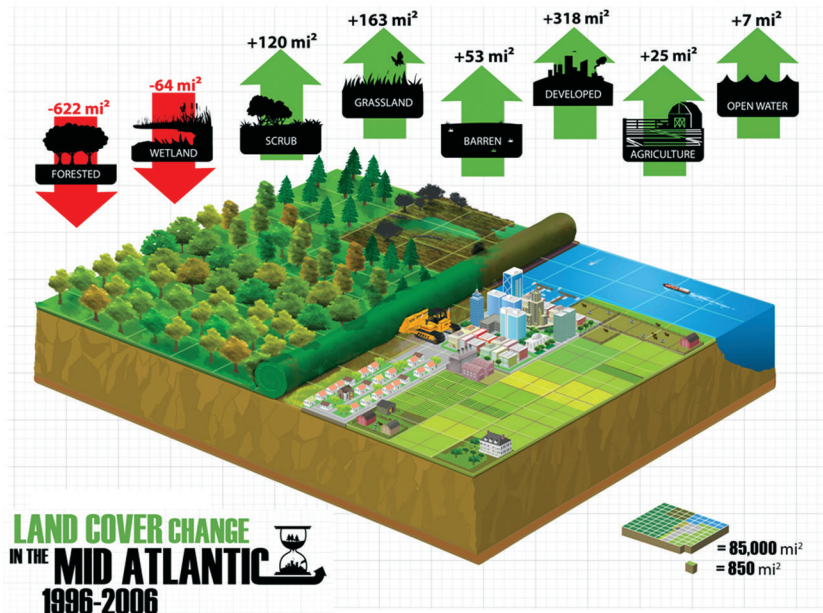


Image courtesy of the the National Oceanic and Atmospheric Administration (NOAA).

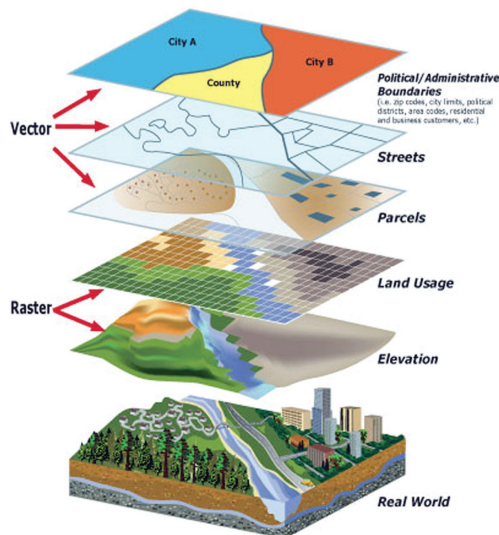


Image courtesy of the San Bernardino County Information Services Department.

## GIS (Geographic Information System)

GIS is a computer-based program used to store, manage, and analyze data.

A GIS map is more than a map because it can pull up a lot of information. Geographers use GIS to help make decisions.

Imagine that you wanted to make sure schools were not near any factories that might pollute the air. With GIS, geographers can use the **database** (app that stores information) to show where all the schools are. They can then use the database to also show where all the factories are. GIS helps geographers see all kinds of information and how it relates to locations.

The image to the left is an example of how GIS layers information.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# GEOGRAPHER QUESTION DESIGN

*Show That You Can Think like a Geographer!*

You have heard some examples of the real questions people try to answer with geography. *Create* your own *question* about the world. *Explain* why you would like to ask that question. *Decide* which kinds of *geographic tools* you would use to answer this question. *Explain* why you would use those tools. *Remember:* Try to think of a question that requires *geographic concepts* to find an answer.

1. What *question* would you try to answer using *geographic concepts*?

2. *Why* would you choose this *question*?

3. What *tools* would you use to help find answers for this question?

4. *Why* would you choose these *tools*?



## Lesson 2—Different Types of Maps

### *Understanding the Purposes of Different Maps*

This lesson introduces students to the multiple kinds of maps that geographers use for different purposes. Students learn the different *elements of a map*, are introduced to types of *geographic maps*, and analyze a *variety of maps* to try to identify the purpose and characteristics of each map.

Lesson 3 will give students a chance to really understand each of the map elements.

#### **Materials Needed**

- **Different Types of Maps**
- **Map Elements**
- **Map Gallery Notes**
- **Map Use Questions Assignment**
- Several different maps for map gallery walk
  - Find maps online; in textbooks, used-book stores, and thrift stores; or through travel agents—but try to get a variety.

#### **National Geography Standards**

##### **8th Grade**

1A—Recognize characteristics and applications of maps, globes, aerial and other images.

1C—Evaluate when to use certain maps or other tools and technology to solve geographic problems.

##### **12th Grade**

1.1.A—Explain how multiple geographic representations and geospatial technologies could be used to solve geographic problems.

1.2.B—Evaluate the quality and quantity of geospatial data appropriate for a given purpose.

#### **Learning Objectives**

1. Recognize characteristics of different map types.
2. Decide how to choose different maps for different purposes.

One class period of instruction



#### **Copy Instructions**

Print one of each handout for each student.



#### **Teaching Tip**

Gather different types of maps for the map gallery walk. Use as many different types as you want, but include some nongeographic maps (mall directory, tourist maps, etc).



### ***Evidence of Learning***

Students are given a task and must choose a map that is best suited to complete that task.

### **Lesson Sequence**

#### ***1. Write Your Ideas***

What are maps used for? What are some different types of maps?

#### ***2. Define***

**Map:** representation, usually flat, of the whole or part of an area.

#### ***3. Redefine and Discuss***

What are maps and what are they used for?

#### **Handout**

- Map Elements

#### ***4. Introduce***

Introduce map elements: direction, scale, symbols and legend, labels, grid and index.

#### **Handout**

- Different Types of Maps

#### ***5. Lecture or Review***

Read over Different Types of Maps and discuss different purposes.

#### **Handout**

- Map Gallery Notes

#### ***6. Map Gallery Walk***

Students walk to stations and observe maps, or groups rotate to different stations. Students take notes and identify the types of map, the purposes of each map, and the elements on the various maps.

#### ***7. Discuss***

Call on students to share quickly what they have observed about each map.

#### **Handout**

- Map Use Questions Assignment

#### ***8. Map Use Questions (in class or as homework)***

Students read each task and decide which type of map they would use and why.

## Map Use Questions Assignment Answers

1. You need to plan a delivery route for a trucking company that delivers furniture. What kind of map do you use and why?

Road map—It shows the roads and highways needed to design a route.

2. You are buying some land to build a house. You want to make sure that the land is not too steep to build on. What kind of map do you use and why?

Topographical map—It shows the slopes and steepness of land.

3. It is the zombie apocalypse and you are trying to find a location to rebuild a city. You want to make sure you will enjoy the weather all year round. What kind of map do you use and why?

Climate map—It shows the weather in different locations year-round.

4. You are gathering intelligence for the CIA. You are required to describe the landforms of a country. What kind of map do you use and why?

Physical map—It displays mountains, rivers, and other landforms.

5. It is still the zombie apocalypse and you are still trying to find a location to rebuild a city. You want to make sure you choose somewhere that has all the things you'll need to survive. What kind of map do you use and why?

Resource map—It shows the locations of resources.

6. You are planning a trip to another continent. You want to see which countries you might be able to visit on your trip. What kind of map do you use and why?

Political map—It shows the boundaries of countries.

# DIFFERENT TYPES OF MAPS

## *What Are the Different Types of Maps Geographers Use?*

Geographers definitely use maps, but there are *different kinds of maps*. Read on below to learn about different maps and their uses.

### Some Maps Geographers Use



©OpenStreetMap contributors, CC BY-SA.

#### **Physical Map**

A *physical map* shows the **natural features** of an area, such as mountains, rivers, and lakes.

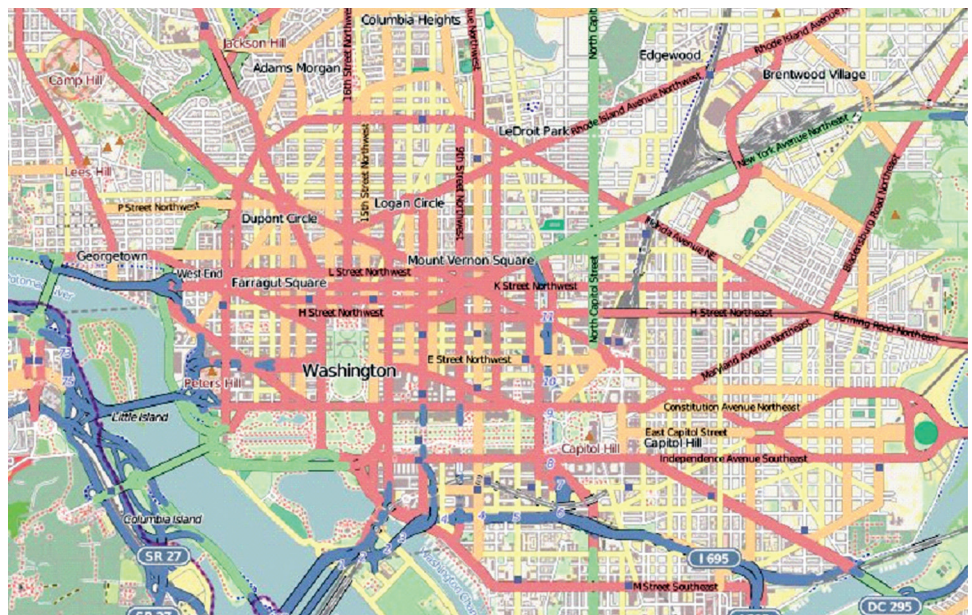
These maps usually use color to show the different geographic features.

*The map on the left is a physical map of the United States. In this map you can see mountain ranges, rivers, lakes, and oceans.*

#### **Road Map**

A *road map* shows **transportation routes**—highways, roads, railroad tracks, and airports, as well as cities and neighborhoods.

Road maps are most suitable for people who are trying to figure out driving directions. Road maps can have different *scales*, showing all the streets in a city or even all the highways in a country.

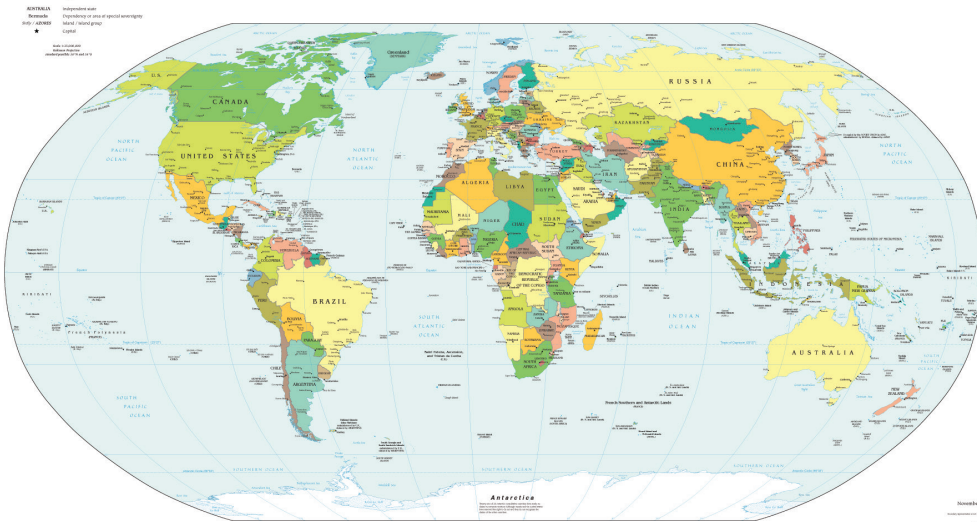


©OpenStreetMap contributors, CC BY-SA.

*The map above is a road map of Washington, DC. It shows some of the major roads and locations.*



Political Map of the World, November 2011



### Political Map

A political map shows **political divisions** such as countries, borders, and major cities.

This kind of map doesn't usually show physical features like mountains. A political map of the U.S. would show state boundaries, capitals, and major cities.

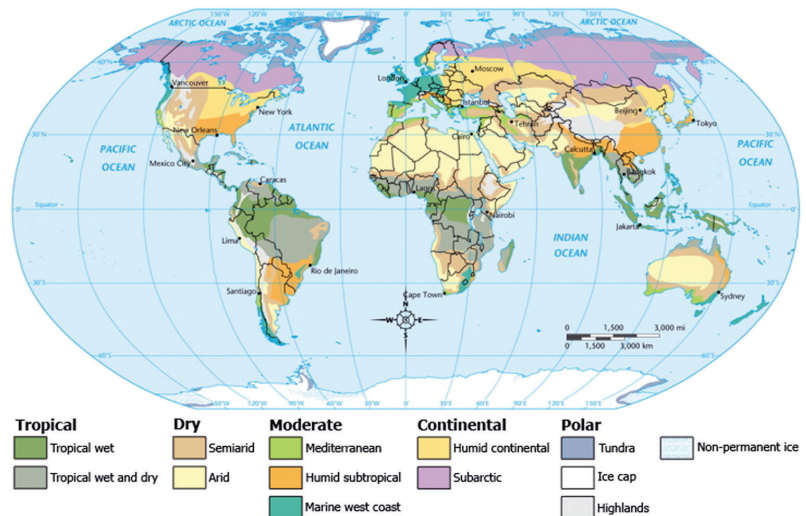
The map above is a political map of the world. It shows country names and borders.

### Climate Map

A climate map shows the **average weather** of a region.

These maps show the different climates a region may have. A common way to classify climates is to use average precipitation and temperature.

The map on the right is a climate map of the world. In this map you can see regions of the world divided into several different climates, designated by color.



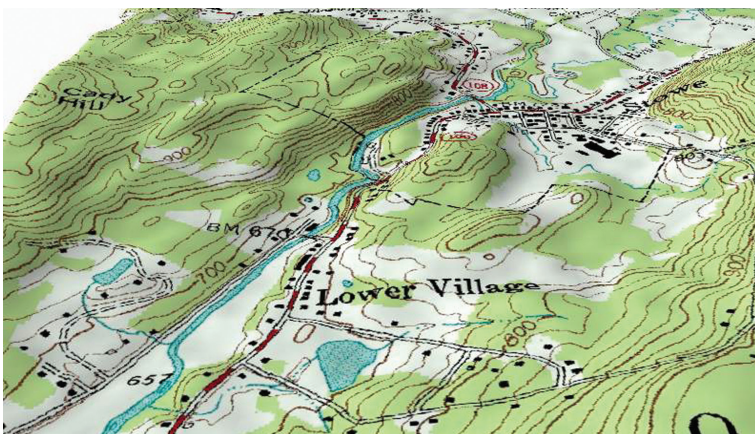
Wikimedia Commons, File:ClimateMap\_World.png, CC BY-SA.  
Map by Waitak and Splette.

### Topographical Map

A topographical map includes **contour lines** to show the **elevation** or altitude of an area.

The closer together the contour lines are, the steeper the land is.

The map on the left is a topographical relief map of Stowe, Vermont. Stowe is a popular destination for skiing. With this map you can distinguish steep hills from flatter land.



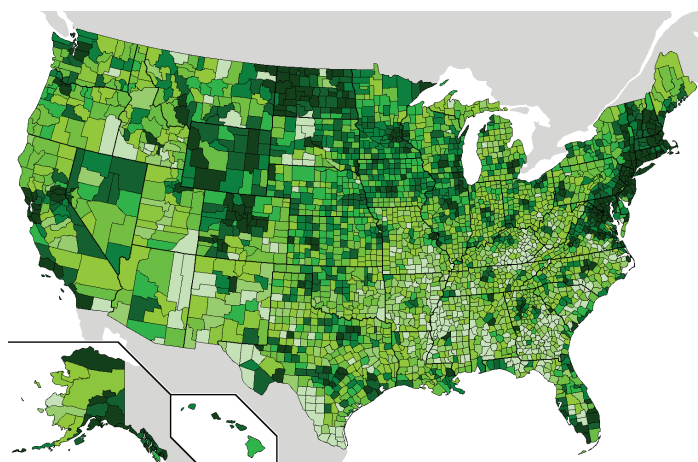
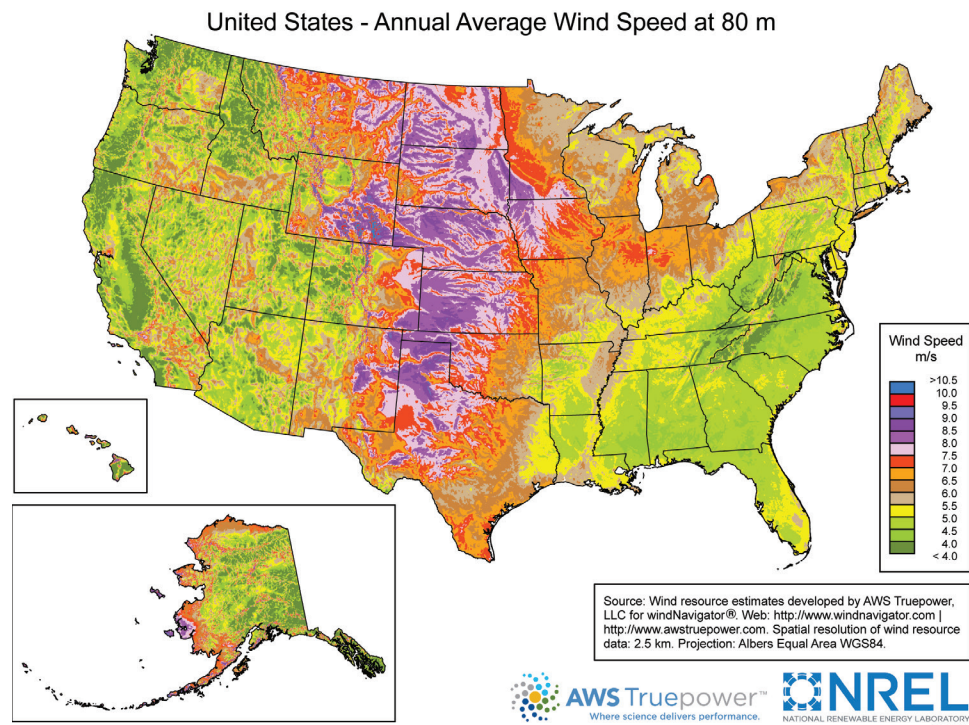
Wikimedia Commons, File:Topographic-Relief-perspective-sample.jpg, CC BY-SA.  
Map by Kbh3rd.

## Resource Map

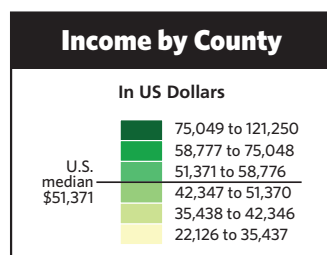
A **resource map** shows the distribution of various **resources**.

Resources (such as minerals, timber, agriculture) are not distributed equally around the world. Resource maps help to show the amount of resources in an area.

The map on the right is a wind resource map of the United States. This map shows the average wind speeds for an entire year. Colors show the different amount of wind an area gets. This would be useful for placing tall wind turbines to generate electricity.



© Bill Rankin, [www.radicalcartography.net](http://www.radicalcartography.net). CC BY-SA 3.0



## Economic Map

An **economic map** shows information about **wealth** and money.

Just as natural resources are not distributed equally, wealth or money is not distributed equally either.

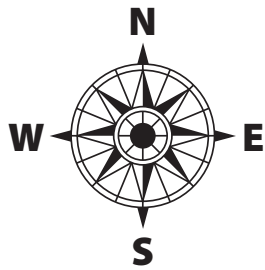
The map on the left is an economic map of the United States. This map shows the average household incomes in different regions. The data to make this map came from the U.S. Census Bureau. The Census Bureau does a big survey (the census) of all U.S. citizens every ten years.

# MAP ELEMENTS

## What Are the Important Parts of a Map?

Maps are very helpful tools. *Map elements* are the parts of a map that make it easier to read. The basic elements of a map are *direction*, *scale*, *symbols and legend*, *labels*, and *grid and index*. Almost all maps use most of these elements.

### Common Map Elements



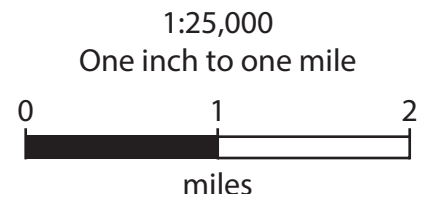
#### Direction

*Direction* is shown on a map by using a *compass rose*. The compass rose shows the directions of the map so that map readers can relate those directions to the real world.

Sometimes a compass rose will just show *north*. If you know which way north is, you can figure out *east*, *west*, and *south*.

#### Scale

*Scale* shows the *distance* measurements on the map. If a map is *to scale*, map readers can measure parts of the map to calculate accurate distances in the real world.



*Scale* can be displayed *numerically*, *verbally*, or *graphically*.

	Interstate		NPDES Facilities
	US and State Highway		Dams
	Local Thoroughfare		ESA Points
	Toll Road		State Boundary
	Ramp		Public School
	Railroad		Private School
	USGS 100K Index		Airports
	Municipal Boundary		ESA
	Water Bodies		Tribal Land
	Rivers		USCG Jurisdiction

Map Legend produced by the EPA Region 1 GIS Center on April 20, 2006.

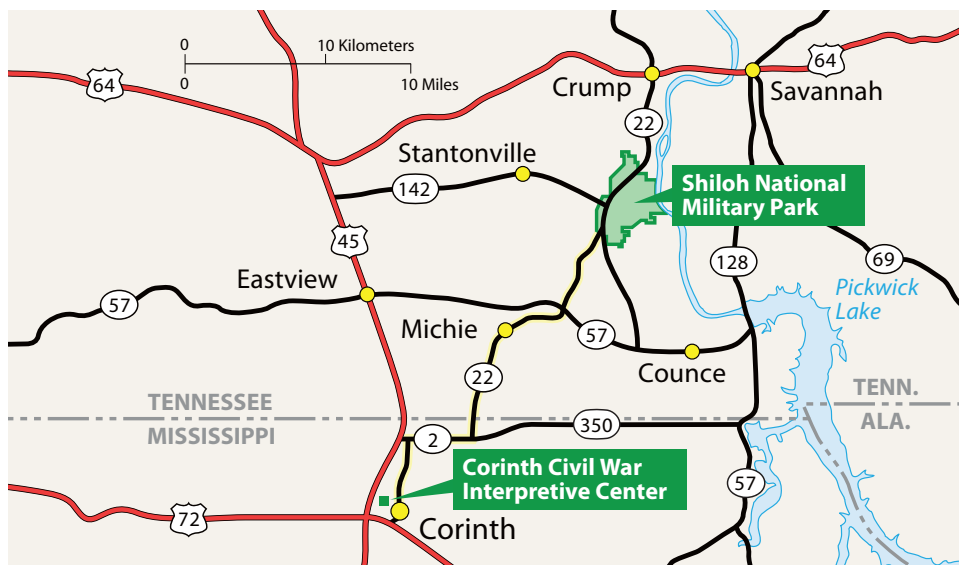
#### Symbols and Legend

*Symbols* are graphics that represent something on a map. They can be a dot, a line, a shape, or an icon that looks similar to what it represents.

Symbols are identified in the *legend*. The legend is usually a small box in a corner or on the side. It includes the symbols and their meaning. It is also referred to as the **key**.



## Map Elements



Map courtesy of the National Park Service.

**Labels**

*Labels* are the words that identify a location or other point of interest. They may show something with a specific name (streets or rivers).

Labels can also be used to represent something if there is only one of it, instead of making up a symbol to represent one thing.

**Grid and Index**

Not all maps use a *grid and index*, but it is very helpful if the map will be used to find locations. A grid and index is common in an atlas and on road maps.

A *grid* is a series of horizontal and vertical lines running across the map. Sometimes maps will use *latitude and longitude*, but smaller maps use a more basic grid with numbers and/or letters.

The *index* helps the map reader find a specific location, by following the numbers and letters in the grid.

Notice that the index is in *alphabetical order*, so it is easy to look up the name of the place.

Follow the *coordinates* (A2, B3, etc.) next to the location's name to find the location on the map.

*The map above on the right shows the Galápagos Islands.*

**Index**

- Española—C3
- Fernandina—A2
- Genovesa—C1
- Isabela—B2
- Marchena—B1
- Pinta—B1
- San Cristóbal—D2
- San Salvador—B2
- Santa Cruz—C2
- Santa Fe—C3
- Santa María—C3

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAP GALLERY NOTES

*Take Notes on Each of the Maps You Observe*

As you travel around to each map during your gallery walk, try to identify the *map elements* it uses, the *purpose* of the map, and the *type* of map it is. Be ready to discuss your notes.

## Random Notes:

### Map #1

1. Draw some of the common *symbols* this map uses.

2. Do you think this map's *scale* is accurate?

Yes

No

Not Really

3. Can you tell which way is north (*direction*)?

Yes

No

Not Really

4. Is there a *legend* or *key*?

Yes

No

5. What is the *purpose* of this map?

6. What *type* of map do you think this is?



## Map #2

1. Draw some of the common *symbols* this map uses.

2. Do you think this map's *scale* is accurate?

Yes

No

Not Really

3. Can you tell which way is north (*direction*)?

Yes

No

Not Really

4. Is there a *legend* or *key*?

Yes

No

5. What is the *purpose* of this map?

6. What *type* of map do you think this is?

## Map #3

1. Draw some of the common *symbols* this map uses.

2. Do you think this map's *scale* is accurate?

Yes

No

Not Really

3. Can you tell which way is north (*direction*)?

Yes

No

Not Really

4. Is there a *legend* or *key*?

Yes

No

5. What is the *purpose* of this map?

6. What *type* of map do you think this is?

**Map #4**

1. Draw some of the common *symbols* this map uses.
2. Do you think this map's *scale* is accurate?  
Yes                      No                      Not Really
3. Can you tell which way is north (*direction*)?  
Yes                      No                      Not Really
4. Is there a *legend* or *key*?  
Yes                      No
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

**Map #5**

1. Draw some of the common *symbols* this map uses.
2. Do you think this map's *scale* is accurate?  
Yes                      No                      Not Really
3. Can you tell which way is north (*direction*)?  
Yes                      No                      Not Really
4. Is there a *legend* or *key*?  
Yes                      No
5. What is the *purpose* of this map?
6. What *type* of map do you think this is?

**Map #6**

1. Draw some of the common *symbols* this map uses.

2. Do you think this map's *scale* is accurate?

Yes

No

Not Really

3. Can you tell which way is north (*direction*)?

Yes

No

Not Really

4. Is there a *legend* or *key*?

Yes

No

5. What is the *purpose* of this map?

6. What *type* of map do you think this is?

**Map #7**

1. Draw some of the common *symbols* this map uses.

2. Do you think this map's *scale* is accurate?

Yes

No

Not Really

3. Can you tell which way is north (*direction*)?

Yes

No

Not Really

4. Is there a *legend* or *key*?

Yes

No

5. What is the *purpose* of this map?

6. What *type* of map do you think this is?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAP USE QUESTIONS ASSIGNMENT

*Which Map Would You Use to Answer These Questions?*

Read the scenarios below. Determine *which type of map* you would use to help you solve the problem. *Explain your answers.*

1. You need to plan a delivery route for a trucking company that delivers furniture. What kind of map do you use and why?
2. You are buying some land to build a house. You want to make sure that the land is not too steep to build on. What kind of map do you use and why?
3. It is the zombie apocalypse and you are trying to find a location to rebuild a city. You want to make sure you will enjoy the weather all year round. What kind of map do you use and why?
4. You are gathering intelligence for the CIA. You are required to describe the landforms of a country. What kind of map do you use and why?
5. It is still the zombie apocalypse and you are still trying to find a location to rebuild a city. You want to make sure you choose somewhere that has all the things you'll need to survive. What kind of map do you use and why?
6. You are planning a trip to another continent. You want to see which countries you might be able to visit on your trip. What kind of map do you use and why?

## Lesson 3—Map Elements

### *Understanding the Elements of a Quality Map*



One class period of instruction

#### **Teaching Tip**

You may decide to have students finish the map for homework. If this is the case, students will require time in the next class to peer review the maps.



#### **Copy Instructions**

Print at least six copies of the map elements handouts and **Map Elements Poster Directions** (one per group). Print a class set of the **Blank Map** and **Map Design Exit Ticket**. Print at least one **Formative Rubric for Lesson 3—Map Elements** per pair of students.



This lesson goes into detail about the *important elements of a map*. Students learn about *direction, scale, symbols, labels, legend, and grid and index*. Through a jigsaw activity groups of students create posters showing details of each element. Students then try to create a better version of a map using those elements. They peer review a partner's map using the map elements rubric.

Lesson 4 introduces students to analyzing spatial relationships.

#### **Materials Needed**

- Individual Map Elements handouts
- **Map Elements Poster Directions**
- **Blank Map**
- **Formative Rubric for Lesson 3—Map Elements**
- **Map Design Exit Ticket**

#### **National Geography Standards**

##### **8th Grade**

1A—Recognize characteristics and applications of maps, globes, aerial and other images.

1B—Make and use different globes, graphs, charts, databases, and models.

##### **12th Grade**

1.1.A—Explain how multiple geographic representations and geospatial technologies could be used to solve geographic problems.

#### **Learning Objective**

Understand and design important elements of maps (direction, scale, symbols and legend, labels, grid and index).

#### **Evidence of Learning**

Students apply elements to a practice map.

#### **Lesson Sequence**

##### **1. Think/Pair/Share**

What are the important parts of maps?

**2. Jigsaw**

Students are split into six different groups. Each group reads about a specific element, discusses, and then designs a poster about the element to present (see poster directions).

**3. Poster Presentations**

Groups present their posters to the class.

**4. Student Map Project**

Students are given a blank map to apply all of the elements to.

**5. Map Rubric Peer Review**

Students pair up to share and critique the maps they created, based on the rubric.

**6. Share (if there is time)**

Share some of the students' map work that their partners thought was high quality.

**7. Exit Ticket**

Have students turn in exit tickets on their way out of the class.

## Student Map Project Directions—Assessing Application of Map Elements

The purpose of this assignment is to see that students can clearly use each of the map elements: direction, scale, symbols and legend, labels, grid and index.

The main purpose of this assignment is to have students practice placing and using map elements.

**Optional Map Ideas**

To help boost students' facility with maps, consider handing out more blank maps and having students use their new skills to:

- Create a map of the cities and rivers they can remember
- Create a map of the places they have visited (use different symbols for family, amusement, etc.)
- Create a map of famous sports teams or stadiums (use different symbols for different sports)
- Create a map of famous historical sites

**Handouts**

- Masters for individual map elements
- Map Elements Poster Directions

**Handout**

- Blank Map

**Handout**

- Formative Rubric for Lesson 3—Map Elements

**Handout**

- Map Design Exit Ticket

**Teaching Tip**

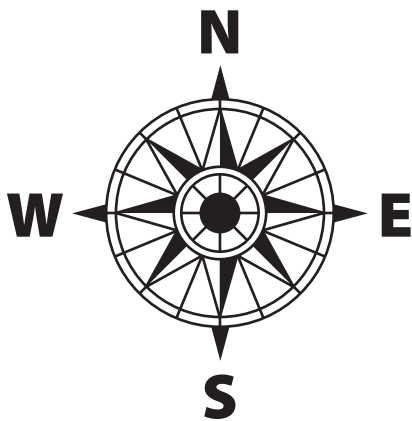
The student map project using the blank U.S. map handout will be picked up again in lessons 5–7 of Project 01, with students adding components (structures, connections, and processes) with each lesson.

# DIRECTION

## *How to Represent Direction*

The *compass rose* shows how the direction on a map relates to direction in the real world. The compass rose usually shows at least north, south, east, and west. A compass rose is very important when maps are used for travel or to find directions to somewhere.

### **Examples**



A compass rose may show the four cardinal points of north (N), south (S), east (E), and west (W). Sometimes it will show intermediate points, such as northeast, southeast, southwest, and northwest.



Sometimes only north will be given on a map. For this reason, it is very important for us to be able to determine which directions are west, east, and south, based on just north.

Some *important things* to keep in mind when making a compass rose:

- It needs to be accurate.
- North is not always “up” on a map.
- Display of scale should be clear.
- As you plan your map, think where you will place the compass rose.
- Consider the design of your compass rose.
- Look at other compass roses for ideas.

A *good-quality* compass rose is easy to find and clear to read. It is also accurate.

A *high-quality* compass rose will often be not only clear but creative as well. The style of the compass rose may match the style of the map.

# LEGEND

## How to Create a Legend

The *legend* (also called the *key*) is the place on the map that shows the important information needed to be able to understand the *symbols* on the map. The *legend* most often includes the definitions of symbols used on the map, but sometimes it will also include the scale.

### Examples

#### Legend

	Interstate		NPDES Facilities
	US and State Highway		Dams
	Local Thoroughfare		ESA Points
	Toll Road		State Boundary
	Ramp		Public School
	Railroad		Private School
	USGS 100K Index		Airports
	Municipal Boundary		ESA
	Water Bodies		Tribal Land
	Rivers		USCG Jurisdiction

Map legend produced by the EPA Region 1 GIS Center on April 20, 2006.



Image courtesy of the U.S. Fish and Wildlife Service.

Without a legend, a map reader may have a very difficult time understanding what all of the symbols mean.

Some *important things* to keep in mind when making a legend:

- Be clear.
- Include examples of the symbols.
- Label as "Legend" or "Key."
- Consider using a border to separate it from the rest of the map.
- Remember to include all the symbols your map uses.
- As you plan your map, think about the space you will need for a legend.
- Consider typing the text in your legend.

A *good-quality* legend is easy to find and clear to read. It shouldn't be so large that it distracts from the rest of the map, but it shouldn't be so small that it is hard to find or read.

A *high-quality* legend or key will often be not just clear but creative as well. The style of the legend might match the overall style of the map.



# MAP GRID

## How to Create a Map Grid

The *map grid* is a set of vertical and horizontal lines overlaid on the map. Not all maps use a *grid* and *index*, but it is very useful if the map will be used to find locations. A grid and index are common in atlases and on road maps. Sometimes maps will use *latitude and longitude*, but smaller maps use a more basic grid with numbers and/or letters.

### Example



A location on a map can be identified by following the intersection of the rows and columns. If a mapmaker wants to display where San Salvador is, the mapmaker would look at the top and side of the map to see that it is in the cell where column B and row 2 intersect. In the *index*, San Salvador would be listed as B2.

Some *important things* to keep in mind when making a map grid:

- Be clear.
- Make the grid lines light enough to still be able to read the map; consider using a lighter color for the grid lines.
- Label the top, bottom, and sides of the grid.
- Use a ruler to measure the grid spacing before drawing the lines.

A *good-quality* grid is easy to understand and clear to read. It shouldn't be so pronounced that it distracts from the rest of the map.

A *high-quality* grid will have appropriate spacing between grid lines. The lines will also be straight, even, and not distracting.

# MAP INDEX

## *How to Create a Map Index*

The *map index* helps the map reader find a specific location. A map with an index often uses a *grid*. The reader can look at the index for a listing of locations included in the map.

### **Example**

#### **Index**

- |                 |                    |
|-----------------|--------------------|
| • Española—C3   | • San Cristobal—D2 |
| • Fernandina—A2 | • San Salvador—B2  |
| • Genovesa—C1   | • Santa Cruz—C2    |
| • Isabela—B2    | • Santa Fe—C3      |
| • Marchena—B1   | • Santa Maria—C3   |
| • Pinta—B1      |                    |

Notice that the index is in *alphabetical order*, so it is easy to look up the name of the place.

The numbers next to the names of the cities are *coordinates*. These help the map reader find the city by using the *map grid*.

Some *important things* to keep in mind when making an index:

- Be clear.
- Make the list in *alphabetical order* by place-name (*not* grid location).
- It is best to type the index and then apply it to a map.
- Label the index.
- While planning your map, consider where you will place the index.

A *good-quality* index is easy to understand and clear to read. It is in alphabetical order, typed, and in an appropriately sized font.

A *high-quality* index includes all important locations and features. It is also organized and blends in well with the map. It is easy to find, easy to read, and not distracting.

# SCALE

## How to Represent Scale

The *scale* shows the map reader how the distance on the map compares to the distance in the real world. If a map is *to scale*, real-world distances can be calculated using the map. If a map is *not to scale*, you could use a map to find where something is, but not exactly how far. For example, on a map of stores in a mall, you may not care how many feet away your favorite store is; you probably just care about going in the right direction.

### Examples

# 1:25,000

#### Numerical

Scale is shown as a ratio. In this scale, every 1 foot on the map equals 25,000 feet in the real world. Maps that show large areas (e.g., world maps) often use numerical scales. They may also use a different unit of distance—say, a mile instead of a foot.

## One inch to one mile

#### Verbal

This scale tells you how the measurements on the map match the real world. If you measure 3 inches on the map, it is 3 miles in reality.



#### Graphical

With a graphical scale, a bar appears on the map and the distances marked on the bar correlate with distances on the map. If the bar shows 1 mile and actually measures 1 inch, then every inch on the map equals a mile.

Some *important things* to keep in mind when making a scale:

- It needs to be accurate.
- Include the unit of length if using verbal or graphical (miles, feet, etc.).
- If a map is going to be “to scale” it must proportionally match distances in the real world.
- Display of scale should be clear.
- As you plan your map, think of the space you will use to place your scale.
- Consider typing the scale or use a ruler when making a graphical scale.

A *good-quality* scale is easy to find and clear to read. It is also accurate.

A *high-quality* scale will often be not just clear but creative as well. The style of the scale might match the overall style of the map.

# SYMBOLS AND LABELS

## How to Represent Places

*Symbols* and *labels* help the reader to identify important locations or information on a map. *Symbols* are graphics that represent something on a map. Symbols can be simple shapes, colors, patterns, or icons. *Labels* are words that identify something. Labels can show the name of a street, city, or river. Sometimes symbols have a label.

### Examples

#### Map Symbols

 Interstate highway	 U.S. highway
 State highway	 County route
 Interchange	 Town or park
 Buildings	 Specific building
 Parking lot	 Quarry, road cut, or borrow pit
 Pullover or parking area	 Collecting site
 Large bridge	 Small bridges
 Railroad	 Hiking trail
 Compass rose	 Mine
 Camping area	 Scale

The mapmaker decides on what symbols are used on the map, and explains them in the *legend*.

A *label* simply provides the words to identify a specific place on a map. When there are multiple cities, rivers, or other places, labels are helpful.



Some *important things* to keep in mind when making symbols and labels:

- As you plan your map, think of what you need to label or identify.
- Symbols and labels should be clear.
- Symbols should be distinct enough that they aren't confused with other symbols.
- Provide labels and symbols only for parts of the map that are important to the reader.
- Look at other maps for symbol ideas.

*Good-quality* symbols and labels are easy to spot and clear to understand.

*High-quality* symbols and labels will often be not just clear but creative as well. The style of the symbols may match the style of the map.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAP ELEMENTS POSTER DIRECTIONS

## *Create a Poster Explaining Your Map Element*

Read the handout describing your map element. Discuss the element as a group to answer the following questions. Create a poster about your element and be ready to share!

1. What is your group's *map element*?
2. What is the *purpose* of this map element?
3. Why is this map element *important*?
4. How do you make a *clear* and *high-quality* example of this element?
5. When would a map *not need* this element?

### **Create your poster**

Your poster must include:

- The *name* of the element
- A *large example* of the map element
- The *definition* and *purpose* of the element
- Tips on how to make a *very high-quality* example

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## BLANK MAP

Apply *legend*, *compass rose*, *scale*, *grid*, *index*, and *symbols* and *labels* to this map. This is your chance to show that you can create all the elements of a map. On this map, 1 inch is equal to 355 miles.



# MAP ELEMENTS SELF-RUBRIC

## Formative Rubric for Lesson 3—Map Elements

	1	2	3	4
<b>Legend</b>	Legend is unable to be read or missing.	Legend is messy or distracting from the rest of the map.	Legend is easy to find and clear to read. Doesn't distract from the rest of the map. Not so small that it is hard to read.	Legend is clear and creative as well. The style of the legend matches the overall style of the map.
<b>Symbols and Labels</b>	Symbols and labels are unable to be read or missing.	Symbols and labels are messy or distracting from the rest of the map.	Symbols and labels are easy to spot and clear to understand.	Symbols and labels are not just clear but creative as well. The style of the symbols matches the style of the map.
<b>Direction—Compass Rose</b>	Compass rose is unable to be read or missing.	Compass rose is messy, inaccurate, or distracting from the rest of the map.	Compass rose is easy to find and clear to read. It is also accurate.	Compass rose is not just clear but is creative as well. The style of the compass rose matches the style of the map.
<b>Scale</b>	Scale is unable to be read or missing.	Scale is messy, inaccurate, or distracting from the rest of the map.	Scale is easy to find and clear to read. It is also accurate.	Scale is not just clear, but creative as well. The style of the scale matches the overall style of the map.
<b>Map Grid</b>	Map grid is unable to be read or missing.	Map grid is messy or distracting from the rest of the map.	Grid is easy to understand and clear to read. It isn't so large that it distracts from the rest of the map.	Grid has appropriate spacing between grid lines. The lines are also straight, even, and not distracting.
<b>Map Index</b>	Map index is unable to be read or missing.	Index is messy, inaccurate, or distracting from the rest of the map.	Index is easy to understand and clear to read. It is in alphabetical order, typed, and in an appropriately sized font.	Index includes all important locations and features. It is also organized and blends in well with the map. It is not distracting but is easy to find and easy to read.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAP DESIGN EXIT TICKET

*Show Your Thoughts on Map Design*

You have learned about the important parts of a map. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. Can you make your own map from scratch?
2. What other *tools* or *materials* would help you make a map?
3. What is your *favorite element*? Why?
4. What else do you *need to know* in order to make your own map?



# Lesson 4—Intro to Analyzing Spatial Relationships

## *Understanding How Places Affect Other Places*



One class period of instruction

This lesson introduces students to *analyzing spatial relationships*. This is done by first discussing what *analyzing* means. The definition of *spatial relationships* is also broken down. Students are introduced to the three steps of analyzing spatial relationships (structures, relationships, processes). Through a short discussion and activity, students apply spatial relationship analysis to the classroom.

Lessons 5, 6, and 7 will go deeper into each step of spatial relationship analysis.

### **Copy Instructions**

Print one copy of both the handout and the exit ticket for each student. Have one copy of the activity directions available for your reference.



### **Materials Needed**

- **Analyzing Spatial Relationships**
- **Spatial Relationship Analysis Exit Ticket**
- Spatial Relationship Analysis Activity directions
- Piece of paper with “IDEA” written on it

### **National Geography Standards**

#### **8th Grade**

3B—Analyze and explain patterns of land use such as distance, accessibility, and connections.

#### **12th Grade**

1.1.A—Explain how multiple geospatial technologies can be used to solve land-use problems.

### **Learning Objectives**

1. Understand what analyzing is.
2. Understand why we analyze space and relationships.

### **Evidence of Learning**

Students answer questions about spatial analysis.

## Lesson Sequence

### 1. Define

**Analyzing:** examining details to discover or reveal something.

### 2. Think/Pair/Share

Why do we analyze? What is an example of something people analyze?

### 3. Introduce

Spatial = space. Spatial relationship = how spaces relate to each other.

### 4. Explain Why

Why we analyze how places relate: Each place affects other places. Finding connections and understanding relationships helps us to *better understand our world*. It is how we can answer questions like “Where will the next zombie attack be?” or “Where do people travel?”

### 5. Explain How

Go over the Analyzing Spatial Relationships handout.

### 6. Class Practice

Follow the Spatial Relationship Analysis Activity directions (below).

### 7. Exit Ticket

Have students turn in their exit tickets on their way out of the class.

## Spatial Relationship Analysis Activity Directions—Practicing Spatial Relationship Analysis in the Classroom

This activity is to help students think through the steps of spatial relationship analysis on a smaller scale. By analyzing spatial relationships within the classroom, students will get a better understanding of the steps. After practicing it in the classroom, they should consider how the steps apply to a country or the world.

## Activity Sequence

### 1. Give one student an “IDEA.”

Give the student a piece of paper that has “IDEA” written or printed very large on it. Point out to the class that the student has an “IDEA.”

### 2. Have the student pass it to another student, like a note.

Instruct the student to pass the “IDEA,” like a note, to another student.

#### Handout

- Analyzing Spatial Relationships

#### Materials

- Spatial Relationship Analysis Activity directions
- “IDEA” paper

#### Handout

- Spatial Relationship Analysis Exit Ticket

**Bright Idea**  
Get someone involved: Have a student volunteer to write on the board; then you can get out into the classroom as you analyze spatial relationships with the students.



**Teaching Tip**  
If you continue for a third round, push the student to try to deliver the “IDEA” in a new process.



**Teaching Tip**  
Reveal this in a way that is comfortable to you. If you share a sense of humor with the students, play that up!



**3. Pause: When the second student receives the note, pause the class.**  
Ask the students to stop there. Tell them it is time to analyze this scenario.

**4. Chart the analysis on the board.**  
Draw, or have prepared, a chart on the board.

	Classroom	Country
Structures		
Relationships		
Processes		

**5. As a class, analyze the scenario of the moving idea.**  
Take notes in the column beneath the classroom heading.

**6. What are the structures or locations in this situation?**  
Students may answer that it was the two students (the one passing the note and the one receiving the note). Point out that we are analyzing space, or places. The structures then would be the two places the students sit.

**7. What are the relationships or connections between the locations?**  
Did the students sit really close to each other? Do they share a table group? Are they in the same row or next to each other? Did the student get up and walk to the other student? If so, what path did he or she take?

**8. What are the processes? How did the “IDEA” move?**  
Was it handed? Did the student walk it to another student? Was it thrown?

**9. (Optional) Continue this process a couple more times.**  
Analyze it with each transfer of the “IDEA.” If something happens in the same way, highlight the pattern. If the student passes it back to the original student, really emphasize that pattern and connection.

**10. Ask the students: Why would anyone want to analyze how an idea moves around the classroom? Who could use the analysis?**  
Point out that the students have just demonstrated many ways that an idea moves around the classroom. A teacher (maybe you) could now use this information to prevent cheating on tests. A teacher could create rules to prevent anyone from transferring ideas: no passing notes, no walking, friends can’t sit near each other, etc.

### 11. Go from the classroom to a larger place.

As a class, convert the structures, relationships, and processes of the classroom to what you would analyze when looking at a country.

	Classroom	Country
<b>Structures</b>	Seats	Cities (states/countries)
<b>Relationships</b>	Table groups Paths between seats	Highways Rivers Train tracks
<b>Processes</b>	Walking Passing notes Throwing the note Paper airplane, etc.	People going to work People moving Goods being shipped, etc.

### 12. Why would we analyze this?

Ask students if they can come up with any questions that they could use to analyze the relationships between two cities or places.

#### Possible question examples:

- How do people commute to work?
- Where should you put an airport lots of people can use?
- Where is a good place for a sports stadium?
- What cities do people pass through on road trips?
- Where will the zombie virus spread next?



#### Ask

- What connects two different cities?
- How do things move across those connections?

# ANALYZING SPATIAL RELATIONSHIPS

## *How Do We Understand How Places Relate?*

*Analyzing* means looking at something very closely, including the details, in order to understand it more.

*Spatial relationships* are how different spaces are oriented to each other.

We *analyze spatial relationships* so that we can better understand how different places affect each other in many detailed ways.

### Steps to Analyzing Spatial Relationships

#### 1. Structures

*Structures* mean the places or things that you are analyzing.

The *first step* is to *choose the two places* you will analyze. These might be two cities, countries, neighborhoods, schools, parks, or anything on the map.

You will often choose your structures based on the geographic question you are asking.

If you are asking “How did the zombie virus spread from this city to that city?” you have already chosen your two structures: the two cities.

#### 2. Relationships

*Relationships* are what connects the two structures.

The *second step* is to *identify any connections* between the places. If it is two cities, maybe the relationship is a highway or river, or maybe they are right next to each other and share a border.

Relationships are the actual connections that exist between the two structures: the two cities.

When researching zombies, imagine that there may be a busy highway between two cities. Could a zombie or infected person easily travel on that connection?

#### 3. Processes

*Processes* are the patterns that happen across that relationship.

The *third step* is to *analyze what happens* across that connection. If it is a highway, maybe people commute from one city to the other for work. Processes or patterns can include geographic concepts such as *migration*.

It is helpful to ask questions when analyzing processes. What commonly happens along this connection between these two points? Do people, goods, or ideas move? How?

If you are analyzing zombie outbreaks, try to think about the patterns that are helping zombies travel and move along this relationship.

### To Simplify

1. Find two places.

2. What connects them?

3. What moves and how?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# SPATIAL RELATIONSHIP ANALYSIS EXIT TICKET

*Show What You've Learned about Spatial Relationship Analysis*

You have learned about analyzing spatial relationships. *Consider* what you have learned. *Answer* the questions below.

1. What is *analyzing*?
2. *Why* do we analyze?
3. What are *spatial relationships*?
4. *Why* do we analyze spatial relationships?



# Lesson 5—Structures: Identifying Cities

## *Spatial Relationship Analysis Step 1*



One class period of instruction

This lesson takes on Step 1 of analyzing spatial relationships. Step 1 is really to choose locations to analyze. This lesson asks students to identify the major cities on their map project. These cities or structures will become clear parts of the analysis through the next few lessons.

Lesson 6 will have students plot relationships between these structures.

### **Copy Instructions**

Either print the satellite night photo, or project on the board. Have the major cities per region list available if students need it.



### **Materials Needed**

- Atlases, country map, or internet access
- U.S. Map Project from lesson 3
- Satellite night photo of U.S.
- Major U.S. Cities List

### **National Geography Standards**

#### **8th Grade**

2A—Identify important physical and human features on maps.

3B—Analyze and explain patterns of land use such as distance, accessibility, and connections.

#### **12th Grade**

1.1.A—Explain how multiple geographic representations and geospatial technologies could be used to solve geographic problems.

1.1.A—Explain how multiple geospatial technologies can be used to solve land-use problems.

### **Learning Objectives**

1. Identify major cities on a map.
2. Plot structures for spatial relationship analysis.

### **Evidence of Learning**

Students accurately plot major cities on map.

## Lesson Sequence

### 1. Review

Steps for analyzing spatial relationships: structures (places), relationships (connections), processes (patterns or movements). Explain that in this lesson, students will focus on structures.

### 2. Plot Major Cities

Provide students with satellite photos of the country from space. Discuss what this is a picture of, and how we can figure out what are large cities. Have students choose the places they want to plot using a map or atlas. Be sure to have them underline cities with zombie outbreaks as indicated on **Major U.S. Cities**. Option: Have students plot their maps using the satellite images. Have them plot locations on their maps.

Plot the first couple of cities as a class. As students work, float around the room to assist them. Some students may need help plotting where cities are.

Students will need to look up the locations of cities to be accurate. Help students to learn to find cities and copy them into their maps. Avoid just telling students where they should plot cities. Transferring a location from the atlas to their map is important practice.

Encourage students to think about the map elements and keeping their maps accurate.

### Homework:

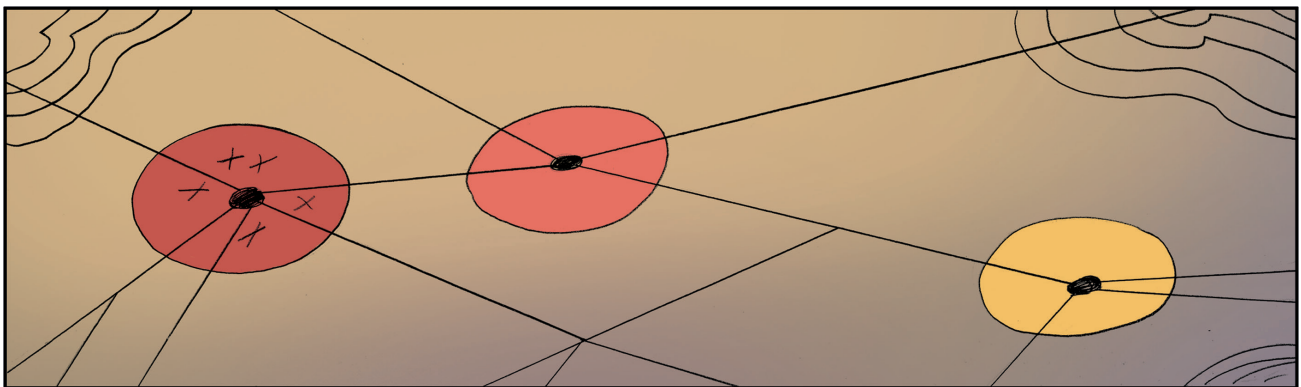
Finish plotting locations from the U.S. Major Cities List on the Student Map Project.

### Handouts

- Satellite night photos
- Major U.S. Cities List

### Materials

- Atlases, maps, or internet access



## Project 01: Mapping the Outbreak

### Lesson 5—Structures: Identifying Cities

#### Major U.S. Cities List\*

Atlanta

Boston

Chicago

Dallas

Denver

Detroit

Houston

Los Angeles

Miami

Minneapolis

New Orleans

New York

Phoenix

St. Louis

San Francisco

Seattle

Washington, DC

\* Underlined cities have zombie outbreaks.

## Lesson 6—Relationships: Examining Connections

### *Spatial Relationship Analysis Step 2*

This lesson takes on Step 2, analyzing spatial relationships.

Step 2 is to identify the *relationships* or *connections*

between the *structures* (cities). Everyone in this lesson should find highways or major roads that connect cities from lesson 5. Motivated students can go further to find even more connections.

One class period of instruction

Lesson 7 teaches students about processes that move across these connections.

### **Materials Needed**

- Atlases, country map, or internet access
- Student Map Project from lessons 3 and 5

### **National Geography Standards**

#### **8th Grade**

3B—Analyze and explain patterns of land use such as distance, accessibility, and connections.

#### **12th Grade**

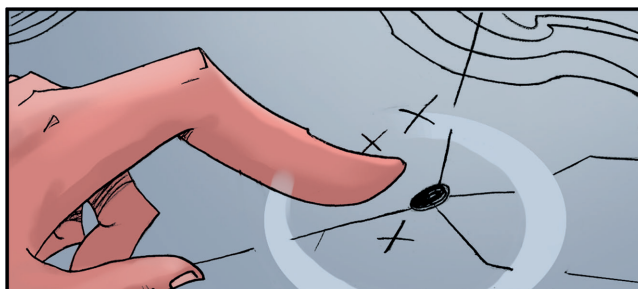
3.1.A—Describe and explain the spatial organization of people, places, and environments.

### **Learning Objectives**

1. Identify how different locations relate.
2. Understand how to plot specific information on a map.

### **Evidence of Learning**

Students accurately plot highways between major cities. (Extension: plot other relationships.)



## **Lesson Sequence**

### **1. Think/Pair/Share**

How do places connect? What kinds of relationships can two different locations have?

### **2. Review Analysis Steps**

1. Identify *structures* or places to compare.
2. Find *relationships* or connections between places.
3. Understand *processes* or patterns of movement between places.

### **3. Review Project Goal**

Goal: Analyze the relationships between places with attacks and places near attacks to figure out how the outbreak is spreading and which places should be warned first.

### **4. Find Major Connections**

Students will find major connections between cities. Some could be water or railroads, but almost all have major roads. Ask students to identify the biggest roads or highways connecting cities.

### **5. Plot Major Connections**

Students will display the major connections on their maps. Discuss what symbols they can use to display these connections. The maps will serve as their exit tickets.

### **Homework:**

Students will finish plotting connections on their maps.

## Lesson 7—Processes: What Moves and How?

### *Spatial Relationship Analysis Step 3*

This lesson introduces students to *diffusion* and *migration*.

These are two examples of processes that occur in spatial relationships. Students analyze the connections between their cities and rate them on how much they facilitate movement.

One class period of instruction

Lesson 8 will provide students with zombie attack data to apply to region maps. They will then need to make predictions on the movements of the zombies.

#### **Materials Needed**

- **Major Connections Sheet**
- Atlases, country map, or internet access
- Student Map Project

#### **National Geography Standards**

##### **8th Grade**

3B—Analyze and explain patterns of land use such as distance, accessibility, and connections.

3D—Describe patterns of migration and diffusion.

##### **12th Grade**

3.1.A—Describe and explain the spatial organization of people, places, and environments.

3.2.A—Analyze and explain the human and physical characteristics of regions that have changed over time because of the interaction among processes.

#### **Learning Objectives**

1. Recognize how movement occurs across relationships and between places.
2. Describe how movement occurs across relationships and between places.

#### **Evidence of Learning**

Students rate the different connections between locations, identifying the connections that zombies are most likely to move across.



#### **Copy Instructions**

Print one copy of the **Major Connections Sheet** for each student.



## **Lesson Sequence**

### **1. Review Project Goal**

Goal: Analyze the relationships between places with attacks and places near attacks to figure out how the outbreak is spreading and which places should be warned first.

### **2. Define**

**Diffusion:** the spread of ideas, disease, technology, etc.

### **3. Think/Pair/Share**

How could ideas, disease, technology or other things diffuse or spread?

### **4. Define**

**Migration:** a group of individuals (people, animals, zombies) moving from one location to another.

### **5. Analyze Connections**

Look at the connections from lesson 7. Do people move across any of these connections? How? Why? How often?

### **6. Demonstrate Analyzing Connections**

Walk through a demonstration connection with students.

- From a major city to the suburbs: Why do people move?

For work or commuting.

- What other connections are there, other than work?

Entertainment, supplies, tourism, family, travel, etc.

## **Handout**

- Major Connections Sheet

### **7. Rate the Zombie Movement across Connections**

Students identify the busiest and strongest connections that people move across. These might be most likely for zombies to move across as well. On the Major Connections Sheet, students list the most important connections on their maps. This list will serve as the lesson's exit ticket.

### **Homework:**

Finish rating connections.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MAJOR CONNECTIONS SHEET

Describe the connections on your map. Rate the connections 1–10. 10 means it is *very* busy and lots of processes move across this connection. 1 means it doesn't facilitate movement.

#	Connection	Rate the Connection
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		

## Lesson 8—Using Maps to Answer Questions and Show Data

### *Plotting the Zombie Attack Data*



One class period of instruction

In this lesson, students are given data on zombie attacks. They record the data and then apply that information to their maps.

This is the last lesson of this project. However, students will need some work time to finalize their maps and place all of the map elements. Students may also need more time to write a short description of where they think the next attacks will be. Use class time as needed.

Project 02 builds from this map. Students learn about regions and create regions of high risk for zombie attacks on their maps.

#### **Copy Instructions**

Print one copy of the **Data Tracking Sheet** and **Next Zombie Attack Questions** for each student. Consider printing enough **Regional Data Reports** for students to access. Print enough copies of each of three regional maps so that each student who chooses, or is assigned, a region receives an appropriate map.



#### **Materials Needed**

- Atlases, country or state map, or internet access
- Regional maps
- **Zombie Attack Data Tracking Sheet**
- **Regional Attack Data**
- **Next Zombie Attack Questions**
- Set of colored pencils, pens, or markers

#### **National Geography Standards**

##### **8th Grade**

3B—Analyze and explain patterns of land use such as distance, accessibility, and connections.

3D—Describe patterns of migration and diffusion.

##### **12th Grade**

1.1.A—Explain how multiple geospatial technologies can be used to solve land-use problems.

3.1.A—Describe and explain the spatial organization of people, places, and environments.

3.2.A—Analyze and explain the human and physical characteristics of regions that have changed over time because of the interaction among processes.

## Learning Objectives

1. Plot data on maps.
2. Analyze patterns of distance, accessibility, and connections.
3. Describe patterns of migration and diffusion.

## Evidence of Learning

Students plot data on the map and develop ideas about which places to warn first and why.

## Lesson Sequence

### 1. Review Project Goal

Goal: Analyze the relationships between places with attacks and places near or connected to places with attacks to figure out how the outbreak is spreading.

### 2. Record Data

Provide the **Regional Attack Data Tracking Sheet**. Students copy down data on their tracking sheets, leaving boxes in the connection column blank for now.

### 3. Plot Data on Selected Regional Map

Students plot data on the map to show when, where, and how many attacks took place.

### 4. Draw Connections

Students research and draw in major freeways and metro or intercity rail lines (major ferry lines as well, for the Puget Sound regional map). Based on these connections, students then go back and fill in the connection column on the **Regional Attack Data Tracking Sheet** with the number of major connections.

### 5. Exit Ticket

Where do students think new attacks will occur on Days 5 and 6? Why?

### Homework:

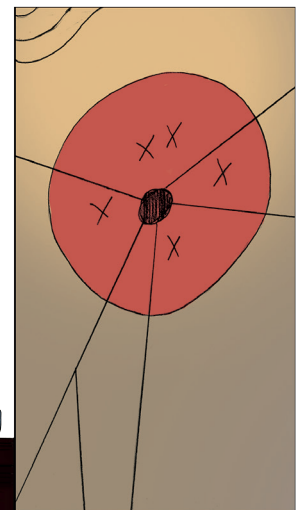
Finish plotting data on the map. Finish **Next Zombie Attack Questions**.

#### Handouts

- Regional Attack Data
- Zombie Attack Data Tracking Sheet
- Regional maps

#### Handout

- Next Zombie Attack Questions



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# ZOMBIE ATTACK DATA TRACKING SHEET

Use this form to track the location and number of zombie attacks.

#	City	Connection: Freeway number or rail or ferry line	Day 1	Day 2	Day 3	Day 4	Total
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
Total Cities Attacked		Total Attacks	Day 1	Day 2	Day 3	Day 4	Total

# REGIONAL ATTACK DATA

## Southern California Zombie Attack Data—Reports for Four Days of Zombie Attacks

This data shows the first four days of zombie attacks in California.

### **Day 1**

- 1 attack in Los Angeles

### **Day 2**

- 5 attacks in Los Angeles
- 2 attacks in Santa Clarita
- 1 attack in Anaheim

### **Day 3**

- 27 attacks in Los Angeles
- 11 attacks in Santa Clarita
- 7 attacks in Anaheim
- 3 attacks in Bakersfield
- 4 attacks in Oceanside
- 2 attacks in Riverside
- 3 attacks in Oxnard

### **Day 4**

- 132 attacks in Los Angeles
- 57 attacks in Santa Clarita
- 42 attacks in Anaheim
- 12 attacks in Bakersfield
- 18 attacks in Oceanside
- 11 attacks in Riverside
- 16 attacks in Oxnard
- 1 attack in Fresno
- 5 attacks in San Diego
- 2 attacks in Barstow
- 2 attacks in Santa Barbara



## U.S. Northeast Zombie Attack Data—Reports for Four Days of Zombie Attacks

This data shows the first four days of zombie attacks in the Northeast U.S.

### Day 1

- 1 attack in New York City

### Day 2

- 5 attacks in New York City
- 2 attacks in Trenton, NJ
- 1 attack in Bridgeport, CT

### Day 3

- 27 attacks in New York City
- 11 attacks in Trenton, NJ
- 7 attacks in Bridgeport, CT
- 3 attacks in Philadelphia, PA
- 4 attacks in Hartford, CT
- 2 attacks in Parsippany, NJ

### Day 4

- 132 attacks in New York City
- 57 attacks in Trenton, NJ
- 42 attacks in Bridgeport, CT
- 19 attacks in Philadelphia, PA
- 18 attacks in Hartford, CT
- 11 attacks in Parsippany, NJ
- 6 attacks in Wilmington, DE
- 5 attacks in Springfield, MA
- 2 attacks in Providence, RI
- 1 attack in Hazleton, PA



## Puget Sound, Washington, Zombie Attack Data—Reports for Four Days of Zombie Attacks

This data shows the first four days of zombie attacks in Washington State.

### **Day 1**

- 1 attack in Seattle

### **Day 2**

- 5 attacks in Seattle
- 2 attacks at Seattle-Tacoma International Airport
- 1 attack in Shoreline

### **Day 3**

- 27 attacks in Seattle
- 11 attacks at Seattle-Tacoma International Airport
- 7 attacks in Shoreline
- 3 attacks in Federal Way
- 4 attacks in Edmonds
- 2 attacks in Bellevue
- 3 attacks in Tacoma

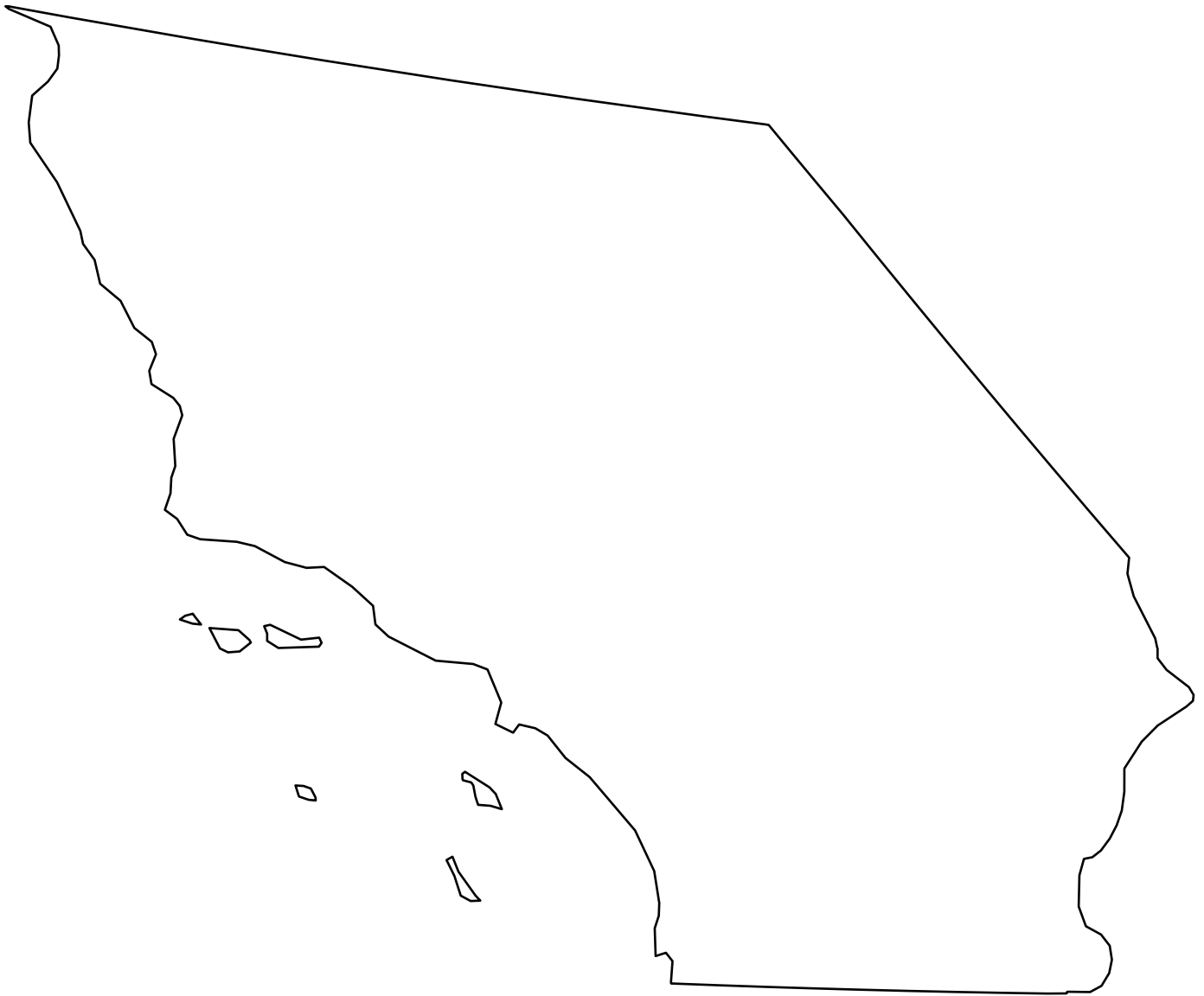
### **Day 4**

- 132 attacks in Seattle
- 57 attacks at Seattle-Tacoma International Airport
- 42 attacks in Shoreline
- 12 attacks in Federal Way
- 18 attacks in Edmonds
- 11 attacks in Bellevue
- 16 attacks in Tacoma
- 1 attack in North Creek
- 5 attacks in Redmond
- 2 attacks in Bainbridge Island

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK MAP: SOUTHERN CALIFORNIA

Completing this regional map of zombie attacks requires three steps. First, using a road atlas or internet map, plot all of the cities listed in the Regional Attack Data handout on the map in black ink or pencil. Second, indicate the number of attacks on each day by location, giving each day's attack numbers in a different colored ink or pencil. Third, draw in major freeways (and, if you want to be ambitious, commuter rail lines as well) for the entire region in black ink or pencil. Be sure to include a legend indicating which color goes with which day's attack.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK MAP: U.S. NORTHEAST

Completing this regional map of zombie attacks requires three steps. First, using a road atlas or internet map, plot all of the cities listed in the Regional Attack Data handout on the map in black ink or pencil. Second, indicate the number of attacks on each day by location, giving each day's attack numbers in a different colored ink or pencil. Third, draw in major Interstate highways (and, if you want to be ambitious, major passenger rail lines as well). Be sure to include a legend indicating which color goes with which day's attack.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK MAP: PUGET SOUND, WASHINGTON

Completing this regional map of zombie attacks requires three steps. First, using a road atlas or internet map, plot all of the cities listed in the Regional Attack Data handout on the map in black ink or pencil. Second, indicate the number of attacks on each day by location, giving each day's attack numbers in a different colored ink or pencil. Third, draw in major freeways and ferry routes for the entire region in black ink or pencil. Be sure to include a legend indicating which color goes with which day's attack.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# NEXT ZOMBIE ATTACK EXIT TICKET

*Show Your Thoughts on Future Zombie Attacks*

Utilizing your completed regional map of zombie attacks, *analyze* the spatial relationships between places that have been attacked on different days. Use a road atlas or internet to find other cities in your region. *Answer* the questions below.

1. Where do you think zombies will attack on Day 5?

2. *Why?*

3. Where do you think zombies will attack on Day 6?

4. *Why?*





# **PROJECT 02: MAPPING SAFE AND UNSAFE REGIONS**



# Explaining the Project

## Concept of Project 02

### Mapping Safe and Unsafe Regions: Project 02

#### **Project Goal**

The main goal for this project is for students to show their ability to create regions and display regions on a map. Along the way they learn how we use regions and the different types of regions.

#### **Main Final Product**

At the end of the project, students will have a completed Zombie Attack Map displaying multiple regions based on the different warnings they would provide to citizens.

#### **Project Options**

Students use one of the three Regional Zombie Attack maps provided in Project 01, lesson 6 to plot their attack warning regions. (These are the same regions used in Project 01, lesson 8: Southern California, the U.S. Northeast, and Puget Sound.) As with Project 01, lesson 8, you may offer students the option of choosing their own region as the basis for their Regional Zombie Attack Warning Map.

For students who did well with the Student Map Project in Project 01, lesson 8, you might have students draw transportation connections or natural obstacles on the Student Map Project for lesson 6 in this project and see how those might alter their Regional Zombie Attack Warning Map.

This project also sets up an opportunity to integrate English language arts. Check with your English teaching colleagues and see if they would be interested in having students write either an *informative essay* instructing people how to prepare for the outbreak in their region or an *argumentative/persuasive essay* supporting their ideas about which region will be attacked next.

# Creating Regions

## Outline of Project 02

### Teaching Tip

The included narrative, *Dead Reckon*, tells a story of a student trying to solve this same situation in order to warn others about the zombie outbreak.



### Handout

- Warning about the Outbreak

### Ask

How can we warn people about zombies most effectively?



### Handout

- Warning about the Outbreak Pre-assessment Quiz

### Teaching Tip

Through this project, students will be expected to learn these skills.



## Regions in Geographic Thinking: Project 02

Regions are a requirement of anyone studying the world around us. Regions are created to help us better understand and think about the complexity of our environments, both physical and human. In this project, students will learn about the different types of regions and how they are used in geographic thinking.

### Final Project Task

Students will need to create a map displaying multiple regions based on the different warnings they would provide to citizens. Have students take the pre-assessment quiz before moving on to Project 02. At the end of the project have students take the post-assessment quiz and use the **How Did You Do?** self-check rubric to assess their own maps.

### Driving Question

How are *regions* created and how can they help *inform* our decisions?

## Pre-assessment

### Student Learning

1. How we *use* regions.
2. What the *different types of regions* are.
3. How to *create* regions.
4. How to *display* regions on a map.

### Lessons

1. Defining Regions
2. Why We Use Regions
3. Types of Regions
4. Creating Regions
5. Choosing Criteria
6. Displaying Regions

## Pre- and Post-assessment Quiz Answers

1. What *tools* could you use to find out how populated a place is?

U.S. Census data (available online) or an atlas index that lists populations for towns, cities, or regions.

2. What is a *region*?

An area of the world that has definable characteristics but not always fixed boundaries.

3. How are regions *defined*?

An area where locations share similarities but that may not have fixed boundaries.

## National Geography Standards

### 8th Grade

4.1—The physical and human characteristics of places.

4.1.A—Explain how personal, community, or national identities are based on places.

5—People create regions to interpret Earth's complexity.

5.1.A—Identify and explain the criteria used to define formal, functional, and perceptual regions.

### 12th Grade

4.1—The effects of place-based identities on personal, community, national, and world events.

4.1.A—Explain how and why place-based identities can shape events at various scales.

5—People create regions to interpret Earth's complexity.

5.1—Regions are defined by different sets of criteria, and places can be included in multiple regions of different types.

5.1.A—Identify and explain how a place can exist within multiple regional classifications.

## Summative Assessment Rubric for Project 02—Mapping Safe and Unsafe Regions

	1	2	3	4
<b>Choosing Criteria for Regions</b>  NGS 4B Analyze the human characteristics of places.	Criteria for regions is unclear.	Criteria for creating regions are not very helpful for creating warnings about zombie attacks.	Chooses appropriate criteria for creating warnings of zombie attack.	Chooses and applies multiple forms of appropriate criteria for creating warnings of zombie attack (e.g., population, distance, landforms).
<b>Creating Regions</b>  NGS 5A Identify the criteria used to define a region.	Regions are unclear.	Some regions do not seem to match the criteria used for creating warnings.	Accurately splits country into multiple regions based on who would benefit from different warnings.	Accurately splits country into regions based on multiple criteria OR uses and identifies the different types of regions: formal, functional, perceptual.
<b>Clear Display</b>  NGS 1B Make and use different globes, graphs, charts, databases, and models.	Map and regions are unclear or messy.	Some parts of map or regions are unclear.	Clearly designs a map/tool to show and define the regions.	Clearly, creatively, and artistically designs a map or tool to show and define multiple regions.

# WARNING ABOUT THE OUTBREAK

## Introduction

Now that you know where the zombies are spreading, how can you warn everyone? Who should be warned first? In this project, you will learn to *create regions* to get warnings about the zombies out there to the right people and places.

### Driving Question

How are *regions* created and how can they help *inform* our decisions?

### What You Will Produce

Create a map displaying regions used to warn citizens of a zombie attack.

### Your Map Will

- Show multiple *regions* based on how people should be warned about the zombie attacks.

### You Will Also Explain

- The *criteria* you used for making the regions.
- The different *types* of regions.

### By the end of this project, you will be able to answer these questions:

- What is a region?
- Why do we use regions?
- What are the different types of regions?
- What are the criteria for making a region?
- How do I create regions?
- How can I display regions on a map?
- What is the best way to warn people about the zombie apocalypse?





Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# WARNING ABOUT THE OUTBREAK

## *Pre-assessment Quiz*

Answer the following questions. You will soon learn all about these concepts.

1. What *tools* could you use to find out how populated a place is?

2. What is a *region*?

3. How are regions *defined*?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# WARNING ABOUT THE OUTBREAK

## *Post-assessment Quiz*

1. What *tools* could you use to find out how populated a place is?
2. What is a *region*?
3. How are regions *defined*?

# HOW DID YOU DO?

Rate how you did creating regions. Use this rubric grid to get an idea of the quality of your project.

	<b>You can do better. Or you will become a zombie.</b>	<b>Okay. You'll survive if someone helps you.</b>	<b>Great! You're a survivor.</b>	<b>Awesome! You are the leader of the survivors.</b>
<b>Choosing Criteria for Regions</b>  (see Choosing Criteria handout)	You did not choose criteria.	You chose some criteria, but you think it could be better.	You chose only one characteristic on which to base your regions.	You chose multiple characteristics and used them to create regions.
<b>Creating Regions</b>  (see Creating Regions handout)	Your regions are hard to understand.	Some of your regions might not really match the criteria you chose.	You used your criterion to make different regions so that each region could get a more helpful warning.	You used multiple criteria to make different regions so that each region could get a more helpful warning.
<b>Clear Display</b>  Use your skills from the map-making project to show your regions clearly.	You made a messy map.	Some parts of your map or geographic tool are unclear.	You made a clear map or geographic tool to show your regions.	You made a really clear and creative map or geographic tool to show your regions. Very artistic!

# Lesson 1—Defining Regions

## *Understanding What a Region Is*

This lesson introduces students to *regions*. Students will learn the definition of a region, redefine it in their own words, and discuss examples of regions. They will work to come up with their own examples as well.

One class period of instruction

Lesson 2 looks at why we use regions.

### **Materials Needed**

- **Regions**
- **Create a Region**
- **Region Examples Assignment**
- **Region Exit Ticket**

### **National Geography Standards**

#### **8th Grade**

5.1.A—Identify the criteria used to define a region.

#### **12th Grade**

5.1—Regions are defined by different sets of criteria, and places can be included in multiple regions of different types.

5.1.A—Identify and explain how a place can exist within multiple regional classifications.

### **Learning Objective**

Understand and define *region*.



### **Copy Instructions**

Print one of each  
handout for each  
student.



***Evidence of Learning***

Students can define *region* and provide their own examples of regions.

**Lesson Sequence**

***1. Think/Pair/Share***

What is a *region*? How do we use regions?

***2. Define***

**Region:** an area of the world that has definable characteristics but not always fixed boundaries.

***3. Redefine***

An area where locations share similarities but that may not have a fixed boundary.

***4. Lecture***

Read over the examples of regions. Ask students if they can think of any other examples.

***5. Create a Region***

Come up with as many ways as you can think of to break your country up into regions.

***6. Pair***

Students talk with a partner to show what region ideas they came up with.

***7. Share (if there is time)***

Call on students to share their idea for a region.

***Homework:***

Find examples of regions.

***8. Exit Ticket***

Define what a region is and give an example.

**Handout**

- Regions

**Handout**

- Create a Region

**Handout**

- Region Examples Assignment

**Handout**

- Region Exit Ticket

# REGIONS

## *What Is a Region and What Are Some Examples?*

Geographers use *regions* to help them think about the world around them. Read on below to learn about *regions* and see some examples.

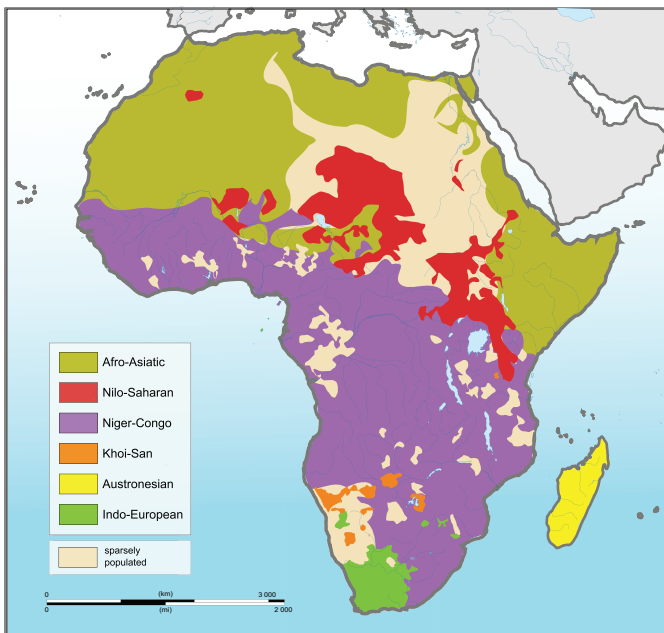
### **Definition**

**Region:** area of the world that has definable characteristics but does not always have fixed boundaries.

### **Simpler Definition**

**Region:** area with locations that share similarities but that might not have set borders.

### **Examples**



Map by Seb az86556, File:Languages\_of\_Africa\_map.svg, CC BY 3.0.

### **Region Based on Language**

Regions can be created based on the popular languages people speak in different areas.

This map of Africa shows that languages are not necessarily contained within the boundaries of countries.

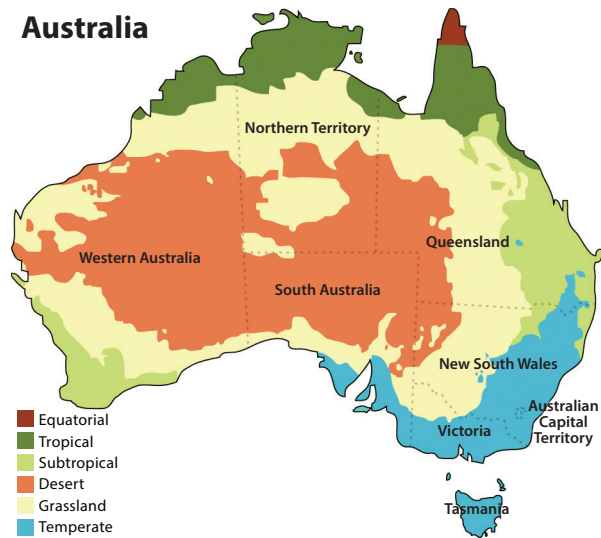
### **Region Based on Religion**

Regions can be created based on the popular religions of people in different areas.

This map of Indonesia shows the major religions of different areas. Notice that there are smaller regions within larger regions.



## Regions



Map by Martyman at the English language Wikipedia.  
File:Australia-climate-map\_MJC01.png, CC BY 3.0.

**Region Based on Climate**

Regions can be created based on climate and weather patterns.

This map of Australia shows locations of various climates.

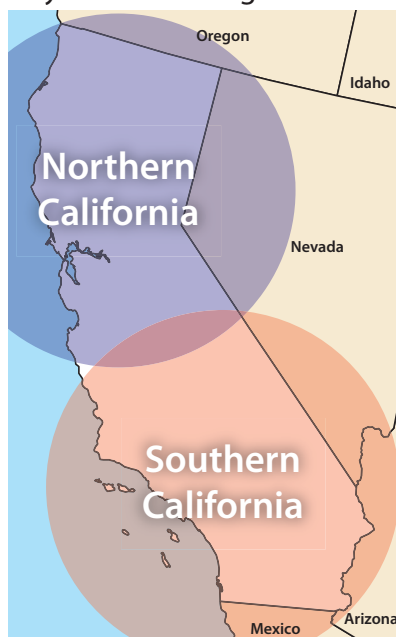
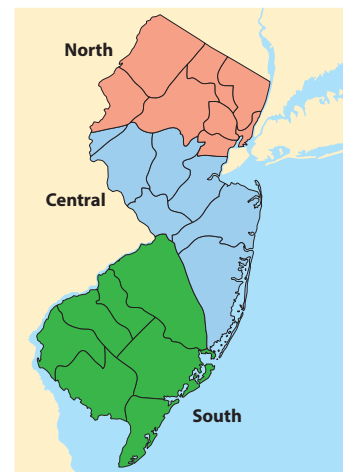
Defining climates by regions is very helpful. If you understand the subtropical climate of southwestern Australia, you also have a good idea of what the climate of Southern California is like and what those regions have in common.

**Region Based on Transportation**

Regions can be created based on transportation connections.

This map of the state of New Jersey shows the three different regions for the Department of Transportation.

Splitting areas into regions can be helpful for management. The North region works with a lot of people who commute to nearby New York City. The South region has more commuters heading to Philadelphia.

**Region Based on Perceptions or Ideas**

Regions can be created based on what people believe or think about a place.

This is a map of California. People often refer to Southern California, or SoCal, but there is no border dividing the state, just an idea.

Many times, people may create a region in their minds based on stereotypes. They may often be incorrect. Some people might believe that most people in Southern California are laid-back surfers with long hair or drive convertibles. This is creating a region based on an idea.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## CREATE A REGION

How many ways can you split up the United States? Make a list. Choose one way and show it on this map. Base the regions on any criteria you can think of.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGION EXAMPLES ASSIGNMENT

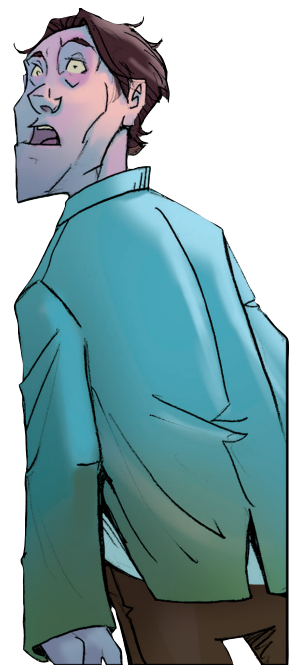
*Find Examples of Regions*

Try to find examples of regions.

**Hints:**

- Look at maps national businesses give to their customers.
- Ask people you know if they know any regions or deal with regions.
- Think about what region(s) you are in.
- Is there something that defines a certain area?

**List Examples Below**



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGION EXIT TICKET

*Show Your Understanding of Regions*

You have learned about regions. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. *Define* region:
  
  
  
  
  
  
  
  
  
  
2. *Give an example* of a region:

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGION EXIT TICKET

*Show Your Understanding of Regions*

You have learned about regions. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. *Define* region:
  
  
  
  
  
  
  
  
  
  
2. *Give an example* of a region:

## Lesson 2—Why We Use Regions

### *Understanding How Regions Help Us*



One class period of instruction

This lesson explains why we use *regions*. Students learn that regions help us to *simplify, organize, and understand* the world around us.

Lesson 3 will look at the different types of regions.

#### **Copy Instructions**

Print one of each  
handout for each  
student.



#### **Materials Needed**

- **Why Regions?**
- **Why We Use Regions Exit Ticket**

#### **National Geography Standards**

##### **8th Grade**

5.1.A—Identify the criteria used to define a region.

##### **12th Grade**

5.1—Regions are defined by different sets of criteria, and places can be included in multiple regions of different types.

5.1.A—Identify and explain how a place can exist within multiple regional classifications.

#### **Learning Objective**

Understand why we use regions.

#### **Evidence of Learning**

Students can explain why we use regions and explain the usefulness of example regions.

#### **Lesson Sequence**

##### **1. Think/Pair/Share**

Why do we use regions?

##### **2. Lecture**

Go over the handout. Explain that using regions helps to *simplify, organize, and understand* complex ideas about the world around us.

#### **Teaching Tip**

Review what a  
region is.



#### **Handout**

- **Why Regions?**

### 3. Think/Pair/Share

How does your example of a region help to organize, simplify, or understand the world or area around you?

### 4. Region Examples Exit Ticket

How do these regions help us to understand the world around us? Do they organize or simplify information? Why is it helpful?

#### Materials

- Last night's homework

#### Handout

- Why We Use Regions Exit Ticket



# WHY REGIONS?

## *Why Do We Use Regions?*

Now that we understand that regions are basically geographic generalizations, let's consider why we make regions. Read on below to see the three main reasons we use regions.

### Reasons for Using Regions

#### 1. Simplify

The world is a complicated place.

By *choosing just one characteristic*, we can focus our attention as we try to understand. Looking at a place to see if it either has or does not have a characteristic is much simpler than looking at all the details at once.

There may be a lot of information during the zombie outbreak. You would hear about number of attacks, who was attacked, what time attacks happened, etc.

Wouldn't it be simpler to create regions based on if there is or is not an attack?

#### 2. Organize

Information about the world isn't neatly organized.

Creating regions can help to *arrange* the information in a way that is easier to look at, recognize patterns, and ask questions about.

Information may be scattered and all over the place when first looking at it. By creating regions, we aren't moving information, but we are organizing it to think about it.

Creating a region based on any zombie attack, will help us ask questions about that information.

#### 3. Understand

When information is simplified and organized, we can ask the questions and look for the patterns that will help us understand the world.

Creating regions can help us better read information, make sense of it, recognize patterns, and ask important questions. All of this leads to a better understanding.

In a zombie outbreak, we need to understand what is happening. We need to figure out what is happening so we can make the right decisions. But we don't have a lot of time to figure out all of the data. Creating regions that focus on the characteristics we want to know about can help us understand and react quicker and smarter.

### Regions Help Us:

1. Simplify complicated things.
2. Organize messy information.
3. Understand what is going on.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# WHY WE USE REGIONS EXIT TICKET

*Show Your Understanding of Why We Use Regions*

You have learned about why we use regions. Reflect on what you have learned. Consider what you still want to know. Answer the questions below.

1. *Why* do we use regions?

2. *Explain* why these regions would be helpful:

A. *Regions based on the most popular languages spoken in each area:*

B. *Regions defined by the vegetation (plants) native to an area:*

C. *A set of regions based on population density (how busy a place is) when trying to warn about zombie outbreaks:*

**Extension:** *How would regions based on the political party people identify with be helpful?*



## Lesson 3—Types of Regions

### *Understanding the Different Types of Regions*



One class period of instruction

This lesson introduces students to the *different types of regions*. Students will learn about *formal, functional, and perceptual* regions. They will work together to try and figure out the types of regions based on example regions. They will then work alone to try and complete a similar goal.

Lesson 4 will look at how to create regions.

#### **Copy Instructions**

Print one class set each of **Different Types of Region** and **Identify Types: Solo** handouts. Print enough **Identify Types: Group** handouts for each group.



#### **Materials Needed**

- **Different Types of Regions**
- **Identify Types of Regions: Group**
- **Identify Types of Regions: Solo**

#### **National Geography Standards**

##### **8th Grade**

5.1.A—Identify and explain the criteria used to define formal, functional, and perceptual regions.

##### **12th Grade**

5.1—Regions are defined by different sets of criteria, and places can be included in multiple regions of different types.

5.1.A—Identify and explain how a place can exist within multiple regional classifications.

#### **Learning Objective**

Understand the definitions of different region types.

#### **Evidence of Learning**

Students can identify the types of regions based on an example.

#### **Lesson Sequence**

##### **1. Lecture**

Different types of regions. Explain:

- Formal—based on physical or human characteristics
- Functional—based on connections with surrounding ideas
- Perceptual—based on feelings and idea of a place

#### **Handout**

- Different Types of Regions

**2. Group Activity**

In groups of three or four, have the students read examples of regions. They identify the type of regions. The groups then come up with their own examples of each type of region.

**3. Group Presentation**

Groups elect a presenter who shares one example from the activity.

**4. Solo Task**

Students work on their own to identify types of regions and come up with examples of the types.

**Answers****Identify Types of Regions—Group**

1. As a group, work to *identify* which type of region the following examples are:
  - A. A region based on *where the best colleges* are located:  
Perceptual
  - B. A region based on *the percent of college graduates*:  
Formal
  - C. A region based on *the altitude above sea level*:  
Formal
  - D. A region based on *the internet service provider* available to residents:  
Functional

**Identify Types of Regions—Solo**

1. *Identify* which type of region each of the following examples is:
  - A. A region based on *the average rainfall* received annually:  
Formal
  - B. A region based on *where the best music* comes from:  
Perceptual
  - C. A region based on *where a specific radio station* is broadcast:  
Functional
  - D. A region based on *the average income* per household:  
Formal

**Teaching Tip**

Consider using group roles such as:

- Facilitator
- Timekeeper
- Recorder
- Presenter

**Handout**

- Identify Types of Regions: Group

**Handout**

- Identify Types of Regions: Solo

# DIFFERENT TYPES OF REGIONS

## *What Are the Different Types of Regions?*

Now that we understand what regions are and why we use them, let's understand the different types of regions. This understanding will really help us to see how regions are used and how they affect people's thinking.

### Different Types of Regions

#### 1. Formal

*Formal regions* are based on a common characteristic about humans or the world.

Examples of *regions based on human characteristics* would be language, religion, nationality, political identity, or culture. Examples of *regions based on physical characteristics* would be climate, landform, or vegetation.

*Formal* means related to actual things. Formal regions are related to *people* or the *Earth* and how the Earth is.

This is probably the easiest type of region to understand and to work with.

#### 2. Functional

*Functional regions* are based on the connections surrounding areas have with a central location.

Examples of *regions based on connections* would be large cities with transportation systems that branch out to other cities, communication systems, or other economic systems that include manufacturing and trading. Functional regions are not based on people or physical characteristics but instead on the connections between places.

Functional means it is related to how things work. It is based on the connections or network that makes a bigger system successful.

A functional region of New York City would reach out to include surrounding areas. These areas are connected by transportation such as trains and subways. These connections help people outside of New York commute to work.

#### 3. Perceptual

*Perceptual regions* are based on feelings and attitudes people have about a place. These are often based on stereotypes that may be incorrect.

Examples of *regions based on feelings and attitudes* would be Southern California, "Dixie," and the upper Midwest. People sometimes picture a certain "type" of person who comes from one of these areas.

*Perceptual* means based on how the place is perceived or on the sense someone gets of a place.

Perceptual regions may not be very helpful, and can often be wrong. However, they do play a large role in how people view the world around them.

### Different Types of Regions:

1. Based on a human or physical characteristic
2. Based on a connection
3. Based on a belief

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

# IDENTIFY TYPES OF REGIONS: GROUP

*Show Your Understanding of Types of Regions*

There are three different types of regions:

- *Formal*—based on human or physical characteristics.
- *Functional*—based on connections to a central place.
- *Perceptual*—based on what people think or believe.

1. As a group, work to *identify* which type of region the following examples are:

A. A region based on *where the best colleges* are located:

B. A region based on *the percent of college graduates*:

C. A region based on *the altitude above sea level*:

D. A region based on *the internet service provider* available to residents:

2. *Provide* an example of each type of region:

A. *Formal*:

B. *Functional*:

C. *Perceptual*:

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# IDENTIFY TYPES OF REGIONS: SOLO

*Show Your Understanding of Types of Regions*

There are three different types of regions:

- *Formal*—based on human or physical characteristics.
- *Functional*—based on connections to a central place.
- *Perceptual*—based on what people think or believe.

1. *Identify* which type of region the following examples are:

- A. A region based on *the average rainfall* received annually:
- B. A region based on *where the best music* comes from:
- C. A region based on *where a specific radio station* is broadcast:
- D. A region based on *the average income* per household:

2. *Provide* an example of each type of region:

- A. *Formal*:
- B. *Functional*:
- C. *Perceptual*:

## Lesson 4—Creating Regions

### *Choosing Criteria to Create Regions*

This lesson introduces students to *creating regions*. Students will learn how to *choose criteria* for regions.

Lesson 5 will look at how to display regions on a map.

One class period of instruction

#### **Materials Needed**

- **Creating Regions**
- Drawing and coloring supplies
- **Detroit Area Map**
- **Detroit Data 1** (plus table), **2**, or **3**

#### **National Geography Standards**

##### **8th Grade**

5.1.A—Identify and explain the criteria used to define formal, functional, and perceptual regions.

##### **12th Grade**

5.1—Regions are defined by different sets of criteria, and places can be included in multiple regions of different types.

5.1.A—Identify and explain how a place can exist within multiple regional classifications.

#### **Learning Objective**

Understand how to define criteria for regions based on the different types of region.

#### **Evidence of Learning**

Students can use data to define regions.



#### **Copy Instructions**

Print one handout for each student.

Print one class set of **Detroit Data 1** (plus table), **2**, OR **3**.



**Handout**

- Creating Regions

**Handout**

- Detroit Data
- Detroit Area Map

**Materials**

- Mapping Regions Activity

## **Lesson Sequence**

### **1. Think/Pair/Share**

How would you decide what area a region covers?

### **2. Lecture**

Share the steps to creating a region.

- Choose criteria (based on data)
- Identify borders or extent of region
- Display regions

### **3. Creating Regions**

Follow the steps on the Mapping Regions Activity page.

### **4. Share**

Have students share their observations of the map and regions they have created. How would it be useful? Is it easy to understand the information? This activity will serve as this lesson's exit ticket.

### **Homework:**

Finish map if not completed.

# CREATING REGIONS

## *What Are the Steps to Creating Regions?*

Now that we understand what regions are, why we use them, and what the different types are, let's understand how to create regions. This is where we will be able to start working with information and getting a better understanding of our world.

### Steps to Creating Regions

#### 1. Choose Criteria

The first step to creating a region is to *choose the criteria it will be based on*. What data or information do you want to simplify? Many times, you will have a reason you want to create a region, and that reason will indicate your criteria.

Criteria include any identifiable piece of information about a place. Criteria may include the *presence* or *absence* of something or a *varying amount* of something.

Criteria can be a *presence* or *absence* of something. For example:

- Places that have cellular coverage
- Places that have zombie attacks

Criteria can be a *varying amount* of something. For example:

- Multiple regions based on amount of annual rainfall
- Multiple regions based on number of zombie attacks per day

#### 2. Identify Border or Extent of Region

Once you have identified the criteria on which you plan to base your regions, you need to *identify the borders* of those regions.

This requires criteria-related data or information from the locations. You then use the data to distinguish between places that meet the criteria you set in Step 1.

If you are creating regions based on whether or not they have had a zombie attack, you can plot attack data on a map and create two different regions: places with attacks and places without attacks.

If you are creating regions based on the number of attacks, you decide how many attacks define each region.

#### 3. Display Regions

After you have chosen criteria and used the data to identify the borders, you can place the regions on a map. Draw the borders (which show how the location meets the criteria) onto a map. Use shading, symbols, labels, or colors to distinguish different regions.

You may have multiple criteria that you want to use to create regions. That is okay, but focus on one criterion at a time.

Create a map to show each set of regions, and it will help you to recognize patterns or display information.

### Different Types of Regions:

1. Based on a human or physical characteristic
2. Based on a connection
3. Based on a perception



# Mapping Regions Activity

## Practicing Making Regions and Plotting on a Map

This activity provides students with data in order to create regions and plot them on a map. The data for all the **Detroit Data** spreadsheets are the same, but the presentation of the data varies in difficulty. Decide how much of a challenge your students are up to or how much support they will need.

### Activity Sequence

#### Teaching Tip

Students will need color pencils, markers, or crayons.



#### 1. Provide Materials

Give students the Detroit Area Map and one **Detroit Data** spreadsheet. There are three versions of the data. Choose the version based on the challenge suitable for your class.

- **Detroit Data 1**—Students are provided with an unordered list of cities and incomes. Students will have to organize the information on their own.
- **Detroit Data Table**—Provide this table with **Detroit Data 1** if students will need help classifying the data to create criteria.
- **Detroit Data 2**—The data are arranged in ascending order of median household income. Students will have an easier time creating their criteria but still get to choose their own criteria.
- **Detroit Data 3**—This provides the most assistance, great for younger students or students with special needs. It provides the list and the criteria.

#### 2. Examine Data

Give students time to examine and discuss what this data is. Answer questions about it. Remind them that they are coming up with a way to create regions out of this data.

#### 3. Have Students Decide on Criteria

The best practice for this map is probably to have the criteria based on *variable* levels of median household income. For **Detroit Data 3**, the criteria levels are chosen. Either walk students through choosing an amount or have them choose their own criteria.

#### 4. Organize the Data

If students are working with **Detroit Data 1** or **Detroit Data 2**, have them arrange the cities into the criteria levels they have set.

#### Teaching Tip

Explain the meaning of *median household income*—half the houses earn less, and half the houses earn more than this amount. It is *not* the same as the average, which divides total income by the number of households.



### 5. Create the Borders

For this exercise, it may be simplest to keep the sizes of the cities similar. Our main focus is to practice putting region information on a map and to see how simplifying criteria can help us visualize complex data.

Have students trace a small circle around each of the cities in their data. A 1-inch circle (using a quarter) works very well for this map size.

### 6. Display the Information

Use colors to represent the different levels of median household income. Color the circles around the cities to match the criteria.

### 7. Create a Legend

Once cities are colored, create a legend that shows what each color represents.



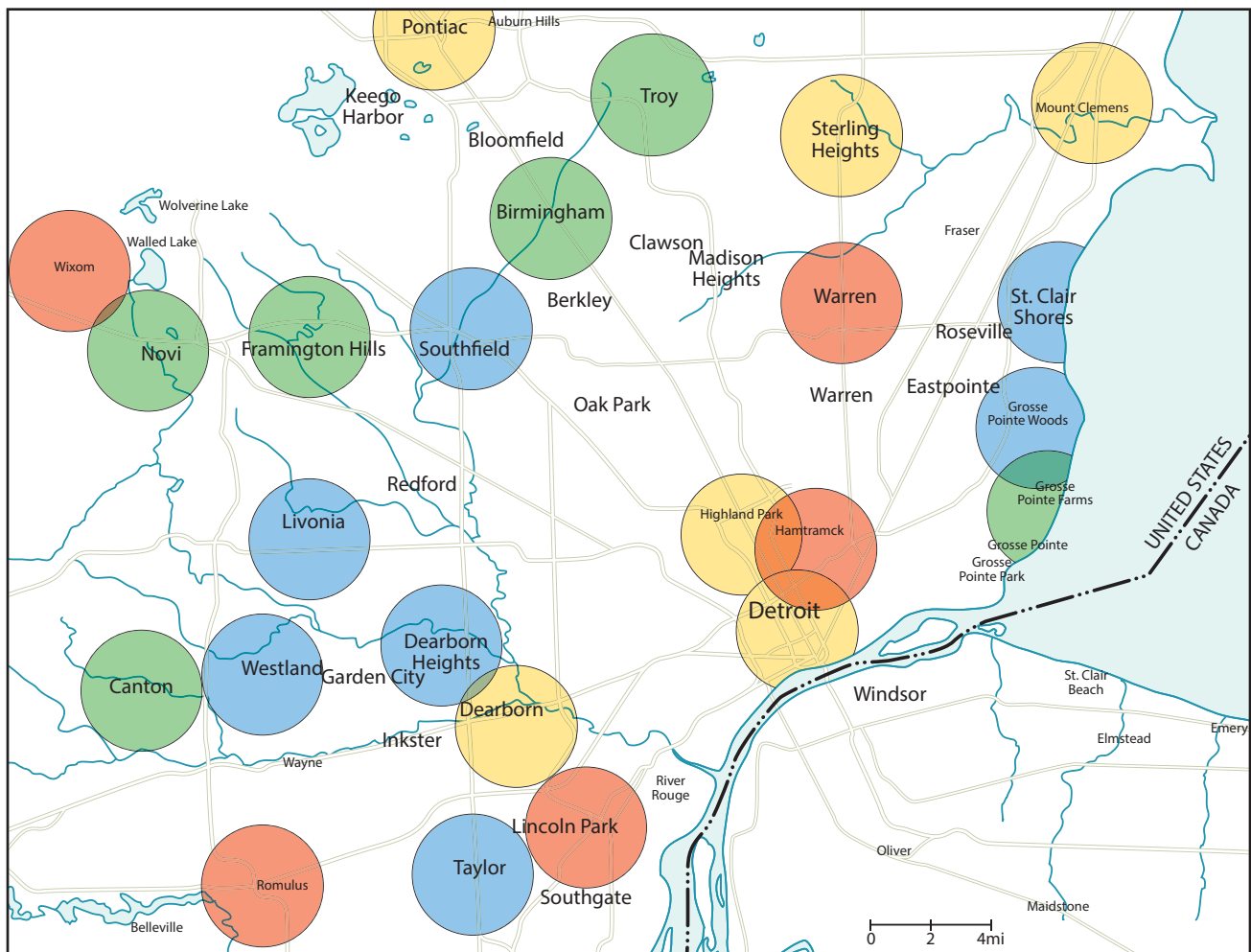
#### Teaching Tip

There is room in the bottom right of the map (in Canada) for a legend.



#### Teaching Tip

Provide students with scale—1 inch = 4 miles  
1 quarter coin = 2 mile radius.



[illegible]

# DETROIT DATA

## Detroit Data 1: Median Household Income

City	Median Household Income
Highland Park	\$24,578
Hamtramck	\$30,362
Detroit (downtown)	\$15,413
Dearborn	\$28,365
Dearborn Heights	\$53,394
Taylor	\$64,184
Lincoln Park	\$32,340
Romulus	\$48,369
Canton	\$79,701
Westland	\$55,417
Livonia	\$63,860
Novi	\$95,153
Farmington Hills	\$100,000
Wixom	\$33,656
Southfield	\$50,159
Warren	\$44,157
Grosse Pointe Farms	\$110,737
Grosse Pointe Woods	\$52,205
Saint Clair Shores	\$65,911
Birmingham	\$76,175
Pontiac	\$18,736
Troy	\$92,492
Sterling Heights	\$28,200
Mount Clemens	\$26,238

Detroit Data Table: Median Household Income

City
Less than \$30,000
\$30,000 to \$50,000
\$50,000 to \$75,000
More than \$75,000

## Detroit Data 2: Median Household Income

City	Median Household Income
Detroit (downtown)	\$15,413
Pontiac	\$18,736
Highland Park	\$24,578
Mount Clemens	\$26,238
Sterling Heights	\$28,200
Dearborn	\$28,365
Hamtramck	\$30,362
Lincoln Park	\$32,340
Wixom	\$33,656
Warren	\$44,157
Romulus	\$48,369
Southfield	\$50,159
Grosse Pointe Woods	\$52,205
Dearborn Heights	\$53,394
Westland	\$55,417
Livonia	\$63,860
Taylor	\$64,184
Saint Clair Shores	\$65,911
Birmingham	\$76,175
Canton	\$79,701
Troy	\$92,492
Novi	\$95,153
Farmington Hills	\$100,000
Grosse Pointe Farms	\$110,737

### Detroit Data 3: Median Household Income

City	Median Household Income
Less than \$30,000	
Detroit (downtown)	\$15,413
Pontiac	\$18,736
Highland Park	\$24,578
Mount Clemens	\$26,238
Sterling Heights	\$28,200
Dearborn	\$28,365
\$30,000 to \$50,000	
Hamtramck	\$30,362
Lincoln Park	\$32,340
Wixom	\$33,656
Warren	\$44,157
Romulus	\$48,369
\$50,000 to \$75,000	
Southfield	\$50,159
Grosse Pointe Woods	\$52,205
Dearborn Heights	\$53,394
Westland	\$55,417
Livonia	\$63,860
Taylor	\$64,184
Saint Clair Shores	\$65,911
More than \$75,000	
Birmingham	\$76,175
Canton	\$79,701
Troy	\$92,492
Novi	\$95,153
Farmington Hills	\$100,000
Grosse Pointe Farms	\$110,737

# Lesson 5—Choosing Criteria

## *Deciding Which Data Define the Region*

This lesson helps students think through *choosing the criteria* to define their regions for the zombie map.

One class period of instruction

Lesson 6 will introduce students to different ways to display data on a map.

### **Materials Needed**

- **Choosing Criteria Practice**
- **Choosing Criteria**

### **National Geography Standards**

#### **8th Grade**

2.B—Construct maps using data acquired from a variety of sources and in various formats (e.g., digital databases, text, tables, images).

#### **12th Grade**

1.2.B—Evaluate the quality and quantity of geospatial data appropriate for a given purpose.

### **Learning Objective**

Understand how to create a region from data.

### **Evidence of Learning**

Students can identify the purpose of a map or regions based on different data.

## **Lesson Sequence**

### **1. Think/Pair/Share**

What data do we have for the zombie attacks?

### **2. Practice Choosing Criteria for Regions**

Students read the facts about China and develop ideas for different regions based on those facts. They should also identify the data they would need to create those regions. Allow students to share their ideas and answers. For homework or an extended lesson, have students research one of the six facts in the **Choosing Criteria Practice** handout and develop a regional map of China based on that research.



### **Copy Instructions**

Print one of each handout for each student.



### **Teaching Tip**

The region referred to in this lesson is not the region featured in lesson 8 of Project 01. The region here is a region as defined in the **Regions of the United States of America Key** in lesson 6 of Project 02.

### **Handout**

- **Choosing Criteria Practice**



**Handout**

- Choosing Criteria

**3. Choosing Criteria for Zombie Attack Warnings**

Students work through the **Choosing Criteria** handout. Discuss each section before giving students time to work. Provide students with some examples to help them get started on coming up with different regions that would require different warnings about the attacks. Students will apply criteria to a U.S. map in lesson 6.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# CHOOSING CRITERIA PRACTICE

## *What Regions Could You Make?*

Use the following facts about China to think about the different types of regions you could make. Read the fact, then answer the questions.

1. *China has a variety of different landforms. It has mountains, plateaus, forests, and deserts.*
  - A. Based on this fact, what are some ways you could *create regions* for China?
  - B. What *data or information* would you need to define these regions?
2. *China is the most populated country. One-third of the people live in cities. The rest live in the countryside.*
  - A. Based on this fact, what are some ways you could *create regions* for China?
  - B. What *data or information* would you need to define these regions?
3. *China is on its way to becoming the largest center of Christianity in the world.*
  - A. Based on this fact, what are some ways you could *create regions* for China?
  - B. What *data or information* would you need to define these regions?
4. *China has an estimated 100,000 mass protests each year.*
  - A. Based on this fact, what are some ways you could *create regions* for China?
  - B. What *data or information* would you need to define these regions?

5. *China faces major issues of water pollution.*

A. Based on this fact, what are some ways you could *create regions* for China?

B. What *data* or *information* would you need to define these regions?

6. *In 2008, 40% of small businesses in China went bankrupt or came close.*

A. Based on this fact, what are some ways you could *create regions* for China?

B. What *data* or *information* would you need to define these regions?

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# CHOOSING CRITERIA

## *What Regions Could You Make to Warn of the Zombie Attack?*

Discuss the following questions and try to come up with the regions you will create to warn people about the zombie outbreaks.

1. Identify some U.S. regions that would *benefit from different zombie attack warnings*.
2. For your map and warnings, *how would you like to split up the regions?*
3. What *data or information* would you need to define these regions?
4. What regions would your map show?

## Lesson 6—Displaying Regions

### *Deciding How to Display Regions on a Map*



One class period of instruction

This lesson introduces students to *displaying regions*. Students will learn different ways to display regions on a map.

#### **Copy Instructions**

Print one  
Displaying



Regions handout for  
each student.

Print either one class set of one matched outline map/key handouts of your choice or enough copies of all four map/key handouts to allow students to make their own choices.

Print enough copies of each of three regional maps (Southern California, U.S. Northeast, or Puget Sound) so that each student who chooses, or is assigned, a region receives the appropriate map.

After completing this lesson, students display their Zombie Attack Maps.

#### **Materials Needed**

- **Displaying Regions**
- **Regional Zombie Attack Warning Maps**
- Choice of map outline/key handouts
- Set of colored pencils, pens, or markers

#### **National Geography Standards**

##### **8th Grade**

1.2.B—Construct maps using data acquired from a variety of sources and in various formats (e.g., digital databases, text, tables, images).

##### **12th Grade**

1.2.B—Evaluate the quality and quantity of geospatial data appropriate for a given purpose.

#### **Learning Objective**

Understand how to display region information on a map.

#### **Evidence of Learning**

Students can clearly display regions on a blank map

## Lesson Sequence

### 1. Think/Pair/Share

How can you show regions on a map?

### 2. Lecture

Share the different ways to display regions.

- Colors
- Labels
- Shading

### 3. Displaying Region Practice

Either choose a map and key for students to practice displaying regions on, or give them the choice. Instruct students to use the information on the key to fill in the blank outline map and to use color, shading, or labeling to convey that information. Keep in mind the level of difficulty of these maps:

- Regions of the United States of America (easiest)
- Regions of the Department of Labor (easier)
- Motor Vehicle Death Rate for California (harder)
- Literacy Rates for Africa (hardest)

### 4. Displaying Regions on Zombie Attack Map

Students choose, or you assign each student or student group, one of the three Regional Zombie Attack Warning Maps. They use population data, as explained on the maps themselves, to draw regions for varying levels of zombie attack warnings. For a more challenging but relevant option, you may have students create a zombie attack warning map for the region where they live, however big or small they may want to define that region.

### Homework:

Finish displaying regions on one of the Regional Zombie Attack Warning Maps.

#### Handout

- Displaying Regions handout

#### Handout

- Choice of regions: map and key handouts

# DISPLAYING REGIONS

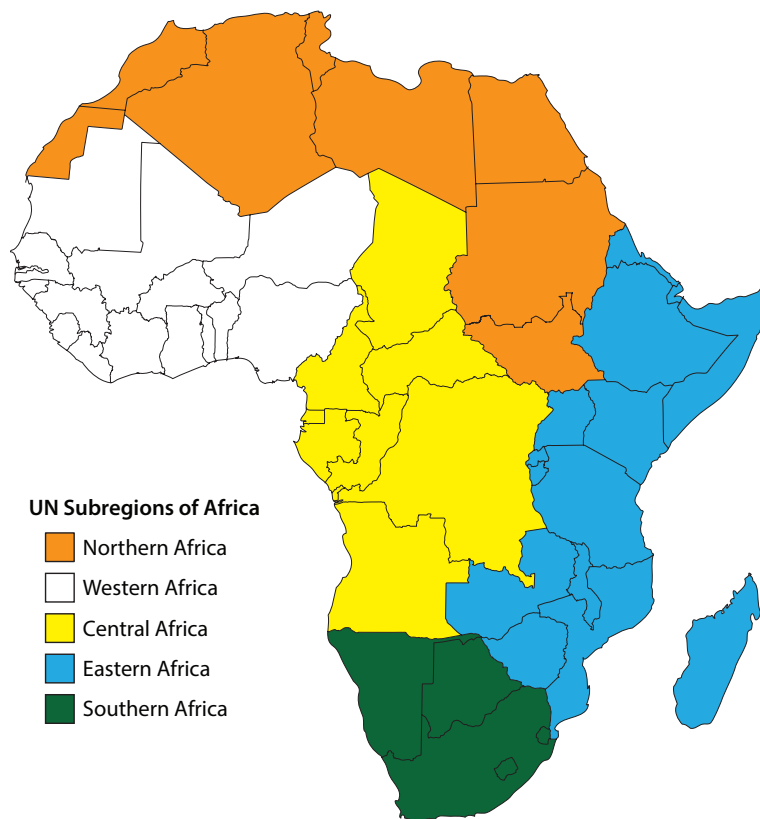
## *What Are the Different Ways to Display Regions on Maps?*

Once you've defined your regions, you will most likely need to display the regions on a map. There are a few different options for how to clearly show your regions.

The main ways to *display regions* are:

- Colors
- Labels
- Shading

### Examples



#### Colors

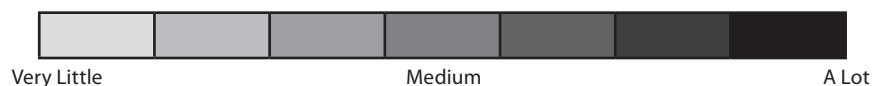
Displaying regions with colors is probably the most popular option. The regions are easy to read visually.

Sometimes color is just used to show a certain area, as in the map to the left. The colors do not have any other meaning.

#### Shading

Different degrees of shading can be used to distinguish regions.

*How some maps can show data and regions:*



There are also maps that use shades of one color to show varying degrees of information. These are called *choropleths*. The gradient to the right shows how colors (here gray to black) can be shaded. Then each shade is given a particular significance, using a map legend or key.

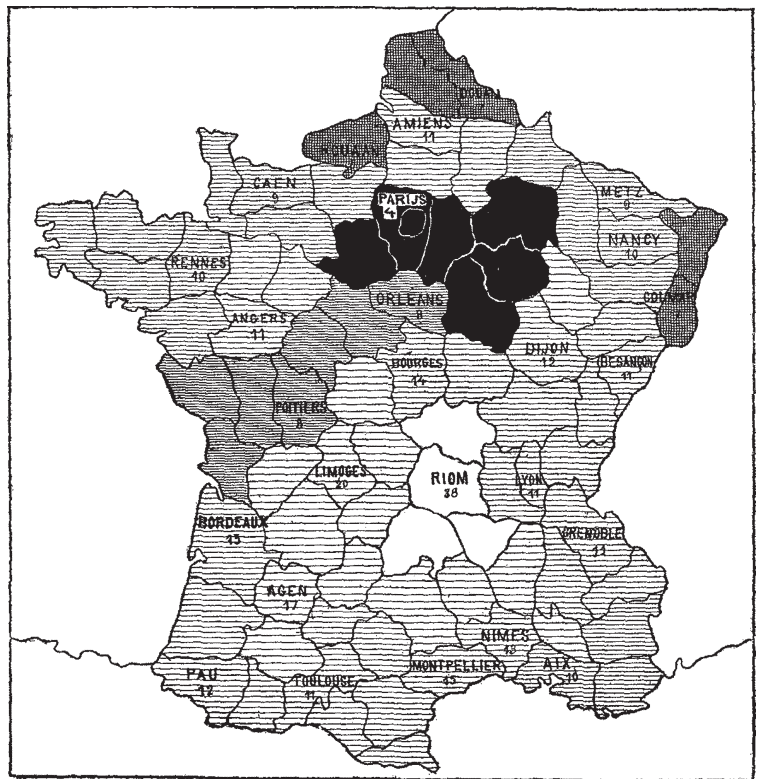


### Labels

Some maps simply label the regions. On the map of Somaliland to the left, the entire country is one color. Light gray borders show boundaries between regions. Light gray labels are placed within the borders of the regions they name.

The map on the right shows different literacy levels in France during the 1800s. This map was created by Charles Dupin in 1826 and is the first known choropleth.

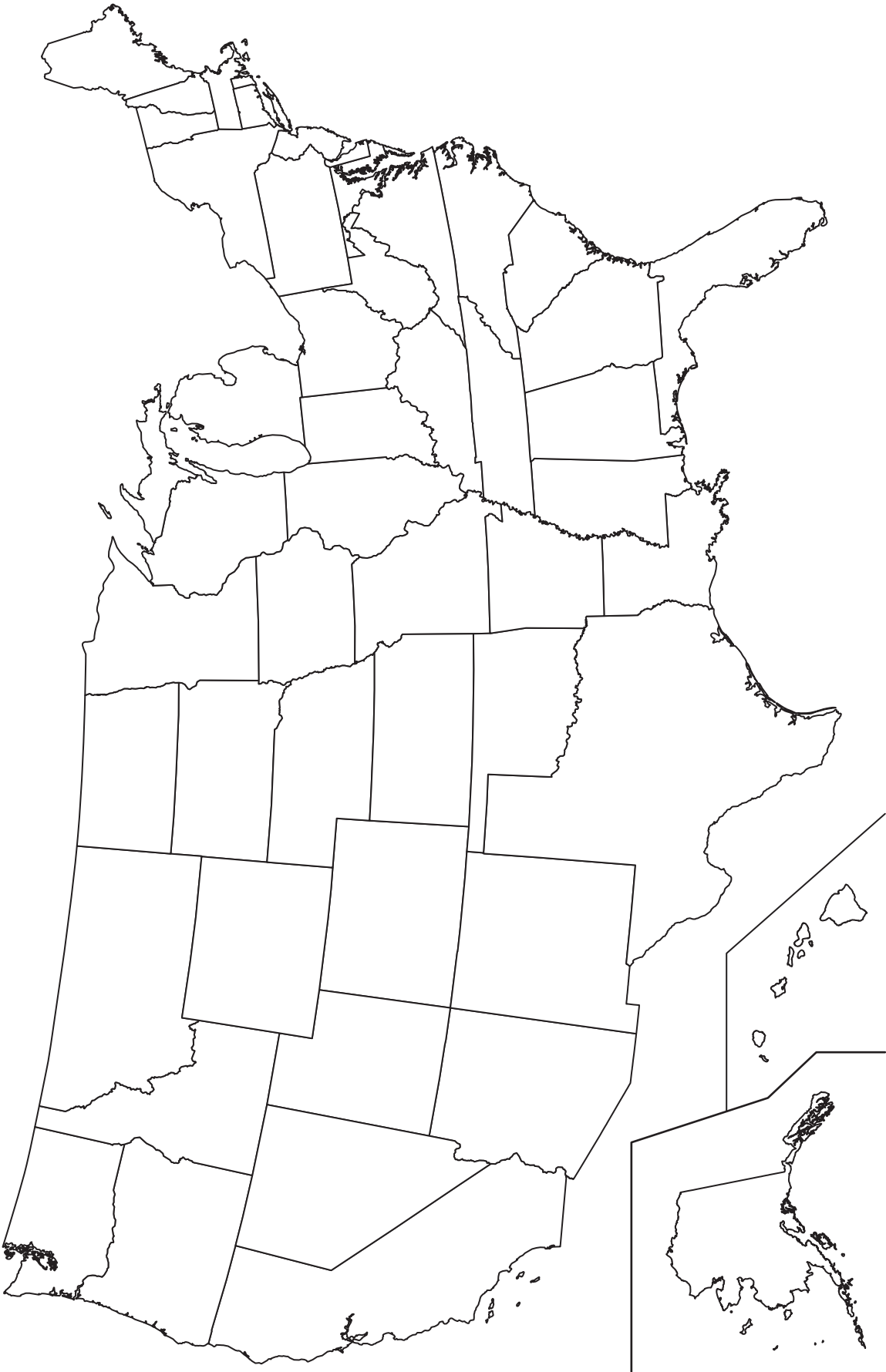
Shading that uses white, grays, and black can be valuable when you are not able to publish your map in color.



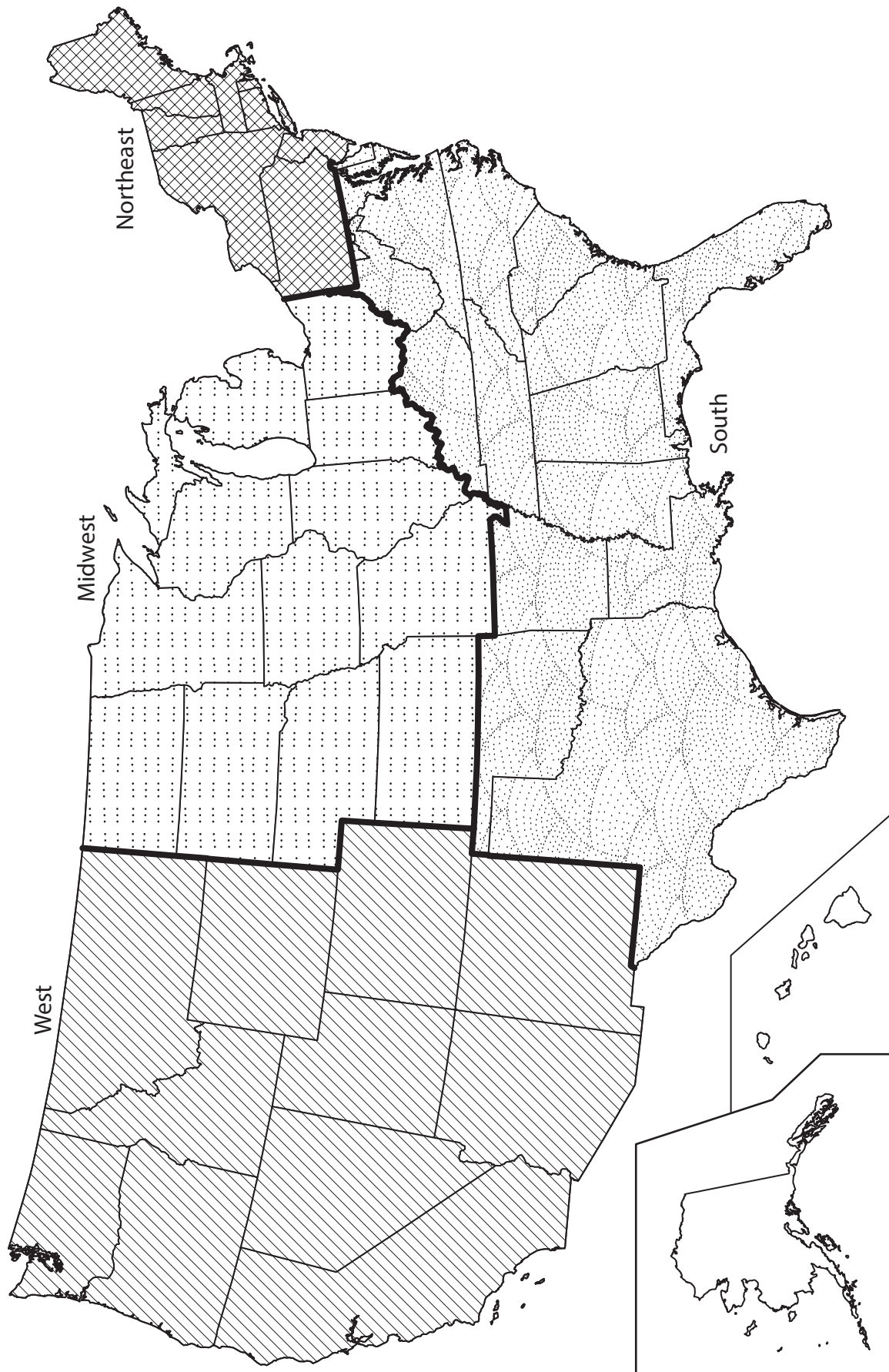


Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

REGIONS OF THE UNITED STATES OF AMERICA MAP



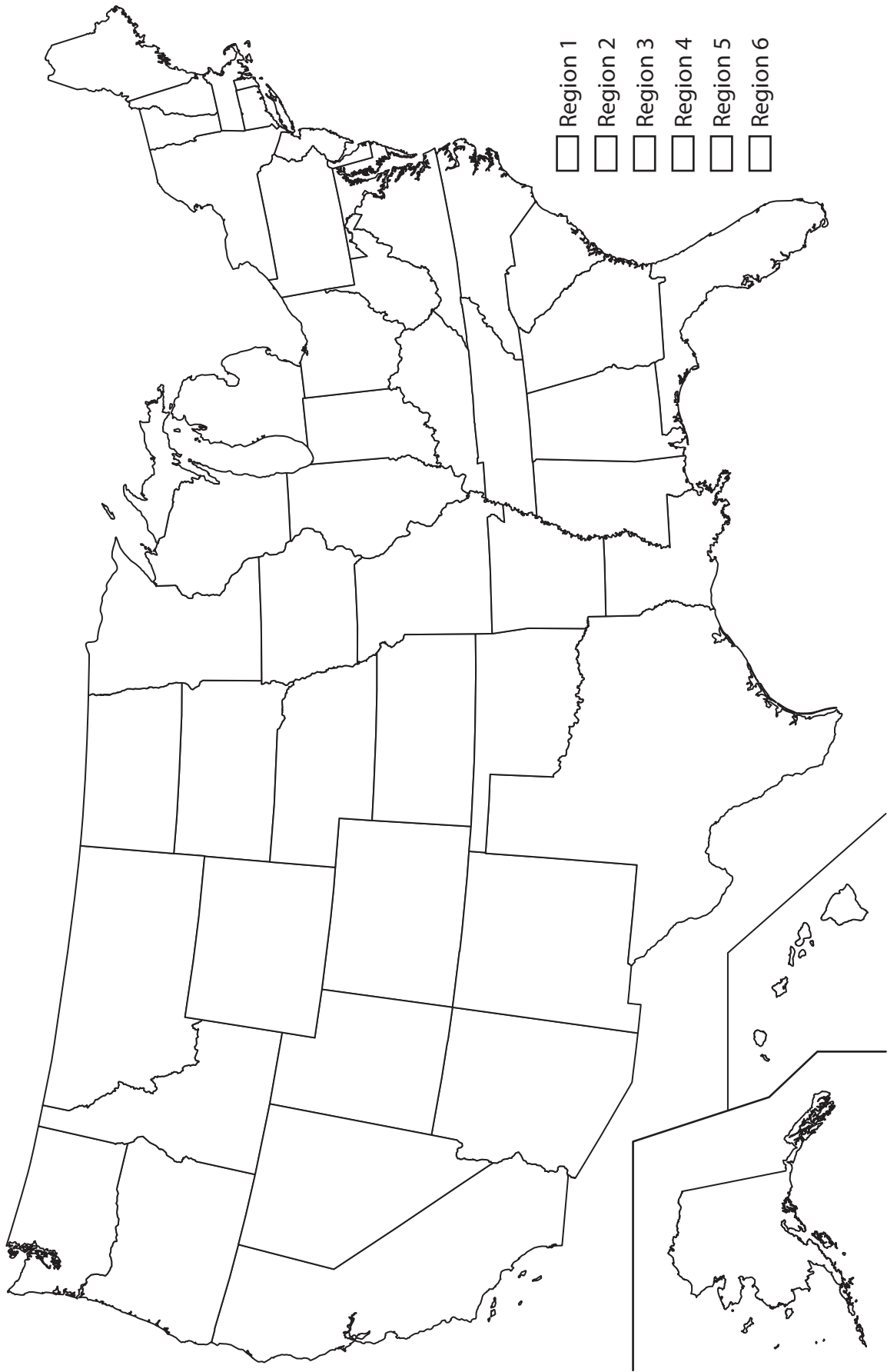
# REGIONS OF THE UNITED STATES OF AMERICA KEY



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

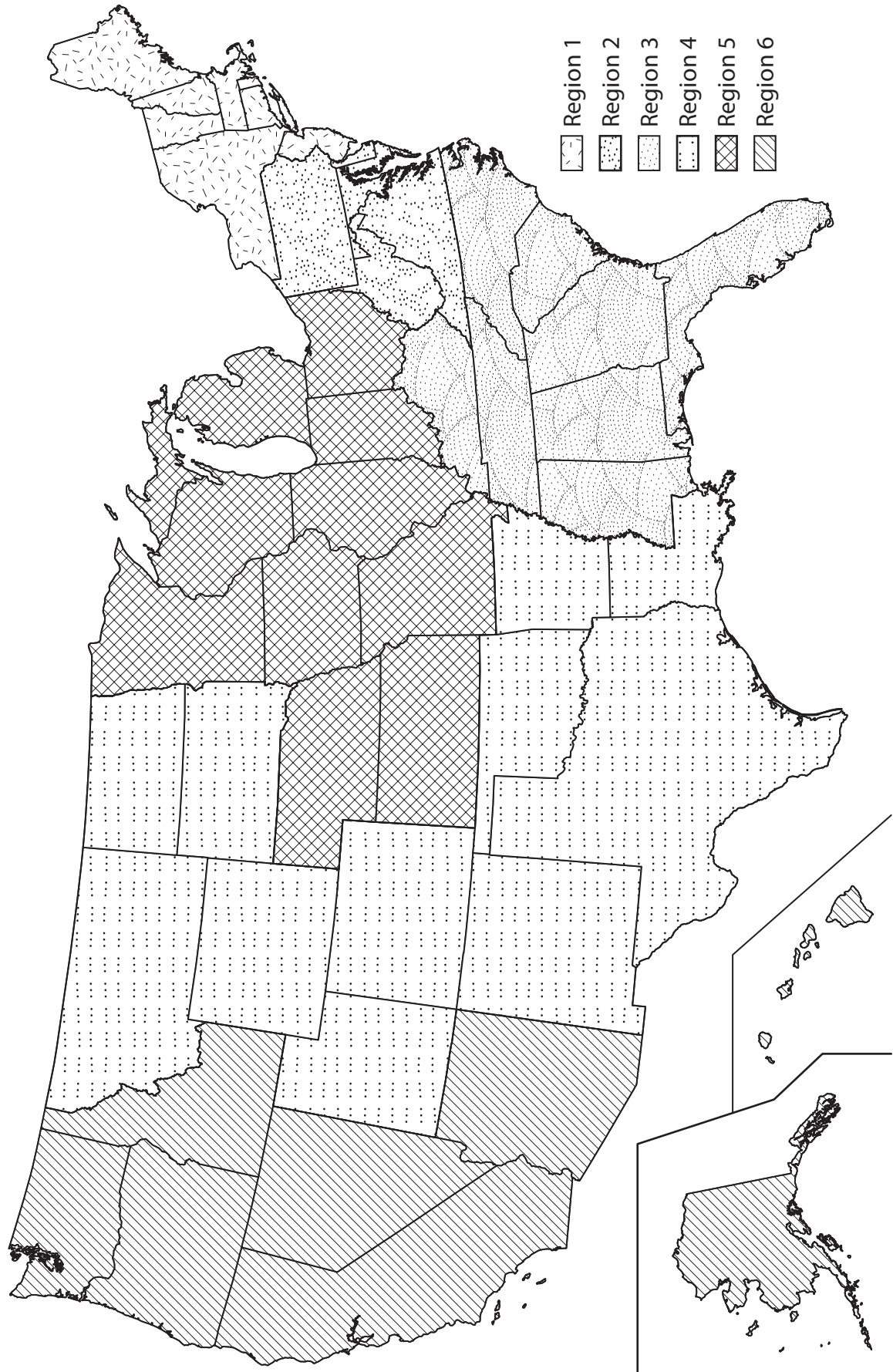
# REGIONS OF THE DEPARTMENT OF LABOR MAP

*Employment and Training Administration*



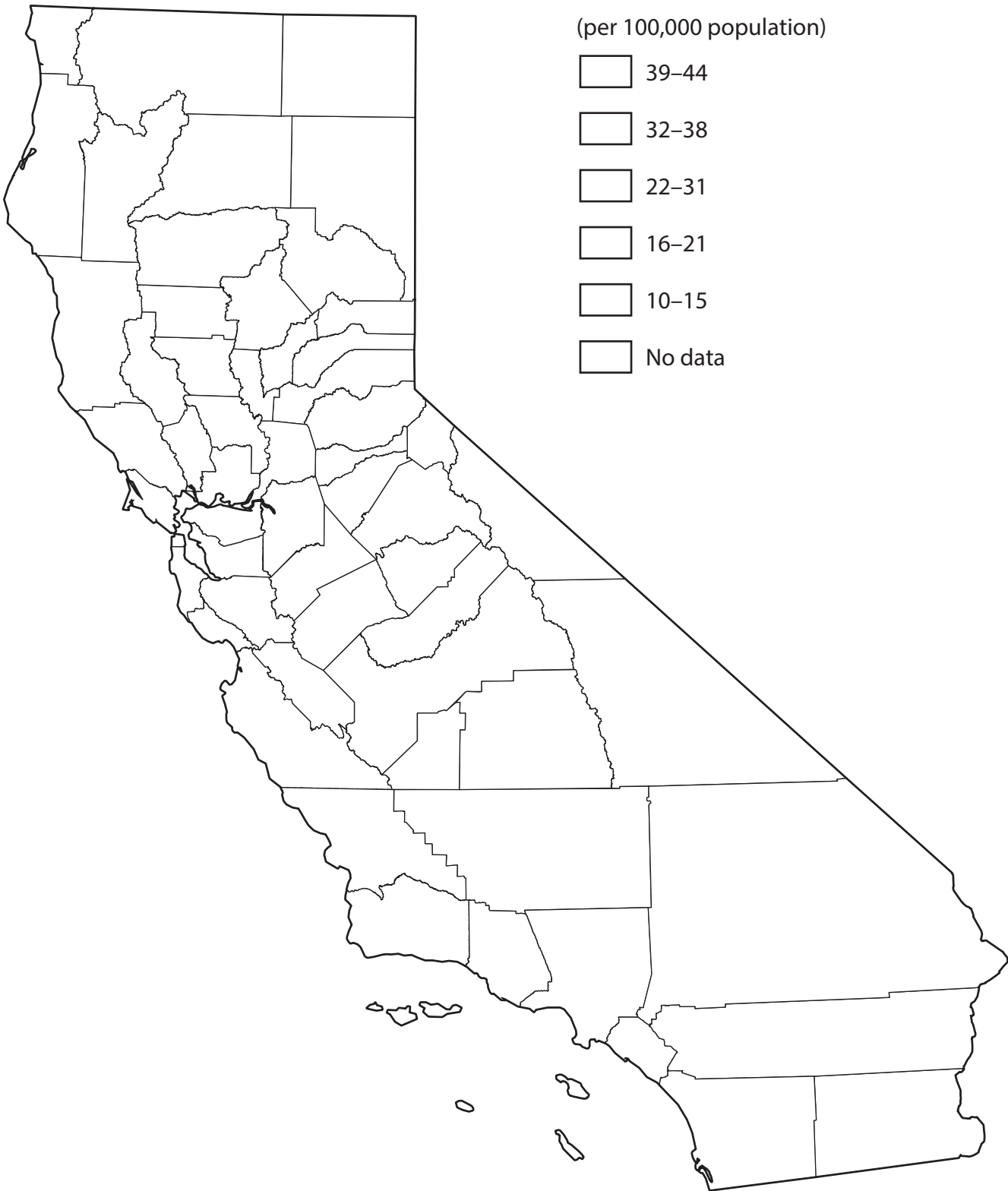
# REGIONS OF THE DEPARTMENT OF LABOR KEY

*Employment and Training Administration*

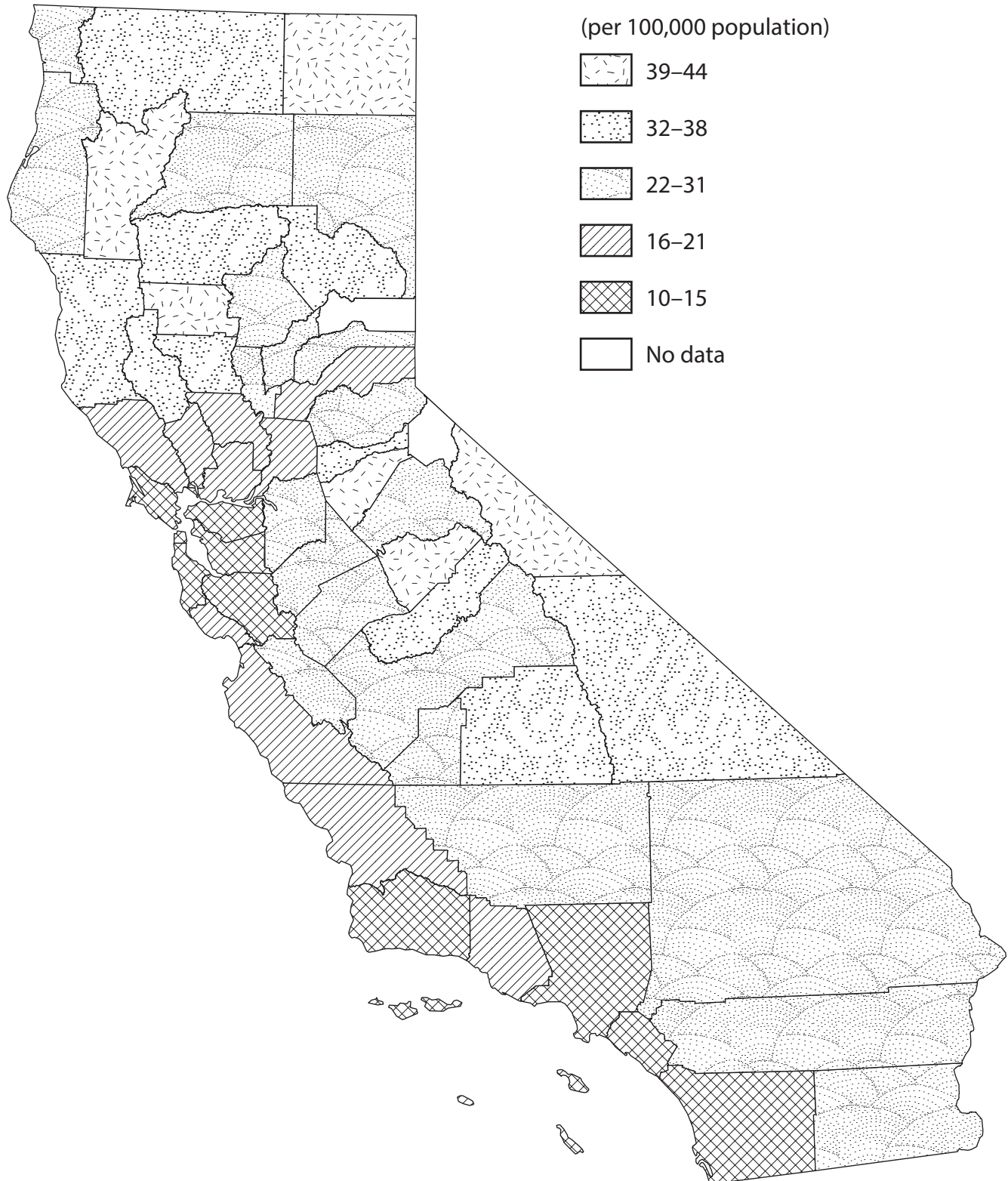


Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MOTOR VEHICLE DEATH RATE FOR CALIFORNIA MAP



# MOTOR VEHICLE DEATH RATE FOR CALIFORNIA KEY

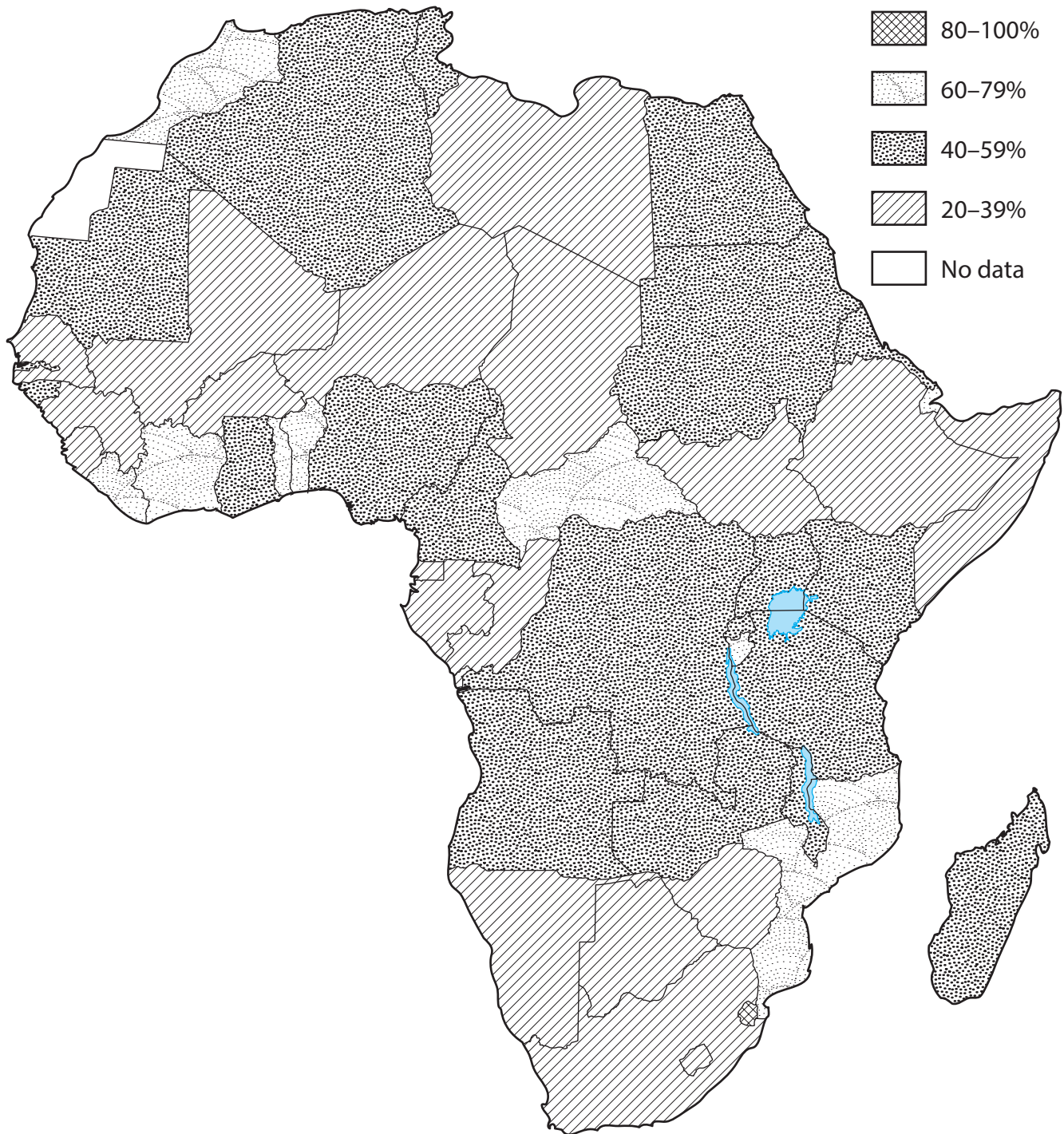


Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# LITERACY RATES FOR AFRICA MAP



## LITERACY RATES FOR AFRICA KEY

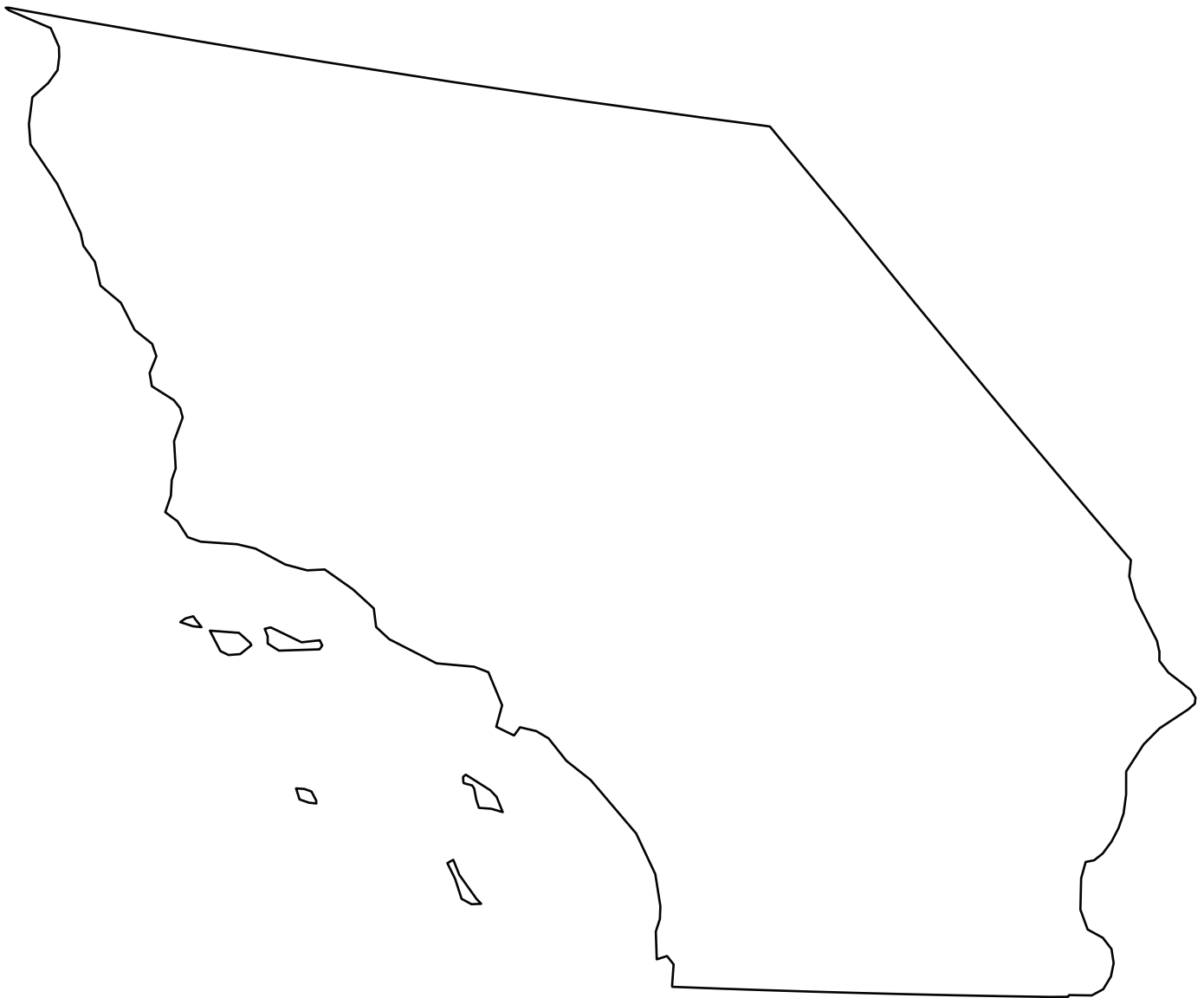




Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK WARNING MAP: SOUTHERN CALIFORNIA

Zombies attack where people (and their brains) are. Go to Google images and type in the terms "population density map Southern California." This will call up maps showing how densely populated different parts of that area are. Utilizing this data, draw in regions that are *very likely* to be attacked (Urgent Zombie Warning!!!), *somewhat likely* to be attacked (Zombie Warning!!), and *least likely* to be attacked (Zombie Watch!). Use a different color for each region and provide a colored legend for the map.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK WARNING MAP: U.S. NORTHEAST

Zombies attack where people (and their brains) are. Go to Google images and type in the terms "population density map United States Northeast." This will call up maps showing how densely populated different parts of that area are. Utilizing this data, draw in regions that are *very likely* to be attacked (Urgent Zombie Warning!!!), *somewhat likely* to be attacked (Zombie Warning!!), and *least likely* to be attacked (Zombie Watch!). Use a different color for each region and provide a colored legend for the map.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# REGIONAL ZOMBIE ATTACK WARNING MAP: PUGET SOUND, WASHINGTON

Zombies attack where people (and their brains) are. Go to Google images and type in the terms "population density map Puget Sound." This will call up maps showing how densely populated different parts of that area are. Utilizing this data, draw in regions that are *very likely* to be attacked (Urgent Zombie Warning!!!), *somewhat likely* to be attacked (Zombie Warning!!), and *least likely* to be attacked (Zombie Watch!). Use a different color for each region and provide a colored legend for the map.



# **PROJECT 03: MENTAL MAPS IN THE ZOMBIE OUTBREAK**



# Explaining the Project

## Concept of Project 03

### Mental Mapping in the Zombie Outbreak: Project 03

#### **Project Goal**

The main goal for this project is for students to show their ability to *create a mental map (drawn from memory) and learn the skills to practice mental mapping the world*. Along the way they learn *what mental maps are* and *why mental maps are important for geographic thinking*.

#### **Main Final Product**

Students will create a mental map of their neighborhood displaying local resources that would be useful in a zombie outbreak. They will also create a mental map of the world.

#### **Project Options**

When creating a mental map, students should think of a place they are familiar with. This is why their neighborhood is suggested. However, if they would really like to make the mental map of somewhere else they are familiar with, that should be acceptable. If you would like to practice mental mapping together or as a class, consider mental mapping the neighborhood around the school. (Ask students, "If there were an outbreak while we were at school, where would we go?")

In order to help students determine if their neighborhood mental map is of good quality, ask them to consider if someone else would be able to use the map without their help. Encourage them to ask a family member if they can read it and figure out where the resources are just from the map.

# Mental Maps

## Outline of Project 03

### Teaching Tip

Refer students to the narrative, *Dead Reckon*, which tells a story of a student trying to survive after the zombie outbreak. The student also tries to use mental maps to create a plan.



### Handout

- Mental Mapping Your Neighborhood

### Ask

How could we survive a zombie apocalypse in our town without maps?



### Handout

- Mental Mapping Pre-assessment Quiz

### Teaching Tip

Emphasize to students that this project's objective is to test the mapping skills they have learned in previous lessons. Are they ready to put them to work?



## Putting Memory to Work: Project 03

Students learn about mental maps and create a mental map (drawn from memory) of their local neighborhood, showing where they would try to get supplies and where they would avoid. They also learn skills to practice mental mapping the world and why having a high-quality mental map is important.

### Final Project Task

Students will need to create a mental map of their neighborhood displaying useful local resources. They must also create a mental map of the world that has improved since their pre-assessment quiz.

### Driving Question

How do geographic thinkers use mental maps to inform their thinking?

## Pre-assessment

### Student Learning

1. *Understand* what mental maps are and how they help geographic thinkers.
2. Develop skills to *practice mental maps*.
3. *Understand* how to continue updating a mental map.

### Lessons

1. Mental Map?
2. Why Mental Maps?
3. Practicing Mental Mapping
4. Mental Mapping the Globe
5. Mental Maps in the Zombie Outbreak

## Pre- and Post-assessment Quiz Answers

1. What is a mental map?

A mental map is an idea of a place based on our knowledge of a place we have been to or our imagining of a place we have not been to.

2. Why do we use mental maps?

It allows us to organize information about people, places, and environments in a spatial context.

3. Describe how to mental map the globe.

Begin with rough locations of different continents and major islands, use geometric shapes to give rough outlines of continents and islands, and refine rough outlines of continents and islands.

## National Geography Standards

### 8th Grade

2—How to use mental maps to organize information about people, places, and environments in a spatial context.

2.2.A—Identify from memory with increasing detail and accuracy mental maps of a place or region.

2.3.A—Identify from memory and describe locations and patterns of places and regions to answer geographic questions.

### 12th Grade

2.1—The locations, characteristics, patterns, and relationships of physical and human systems are the basis for mental maps at local to global scales.

2.1.A—Identify from memory and explain the locations, characteristics, patterns, and relationships among human and physical systems.

2.3.A—Identify from memory and explain the locations, characteristics, patterns, and relationships of places and regions to answer geographic questions.



## Summative Assessment Rubric for Project 03—Mental Mapping

	1	2	3	4
<b>Increased Skill in Mental Mapping the World</b>  NGS 2.2.A Identify from memory with increasing detail and accuracy mental maps of a place or region.	Skills do not increase or decrease.	Skills seem to increase, but not enough to move up a rubric level.	Increases skills by one rubric level or pre-assessment mental map was at a 4 while post-assessment map did not become more accurate.	Increases skills by more than one rubric level or pre-assessment mental map was at a 4 while post-assessment map became even more accurate.
<b>Mental Maps to Plan for Zombie Outbreak</b>  NGS 2.3.A Identify from memory and describe locations and patterns of places and regions to answer geographic questions.	Very unclear map; does not seem to address the prompt or too few locations and landmarks to accurately address the prompt.	Identifies few locations or does not include landmarks between important locations.	Identifies and labels locations that would be important to the student in a zombie outbreak. Includes landmarks between important places.	Clearly identifies and labels specific locations, routes, and areas that would be important to the student in a zombie outbreak. Includes extensive landmarks between important places.

### Mental Map of the World Rubric

	1	2	3	4
<b>Skills to Mental Map the World</b>  Use to compare skills in pre- and post-assessment.	Unable to display all continents quite accurately.	Places all continents quite accurately and labels major oceans but has many inaccuracies.	Places all continents quite accurately, labels major oceans, and labels some of the major countries.	Places all continents accurately; reflects their general shape, labels major bodies of water, and identifies multiple countries in all continents (except Australia and Antarctica).

# MENTAL MAPPING YOUR NEIGHBORHOOD

## Introduction

The zombies have reached you. You'd know you are going to have to get more supplies before you can find more permanent safety. You'd better start planning the best places to go first. But without GPS or Google Maps, what do you do? In this project, you will learn to *create mental maps*, or maps from your own memory. You'll learn techniques to help you remember familiar places so you can map out your plans for survival.

### Driving Questions

- How do geographic thinkers use *mental maps* to inform their thinking?
- How can we survive a zombie apocalypse in our neighborhood if we don't have any maps?

### What You Will Produce

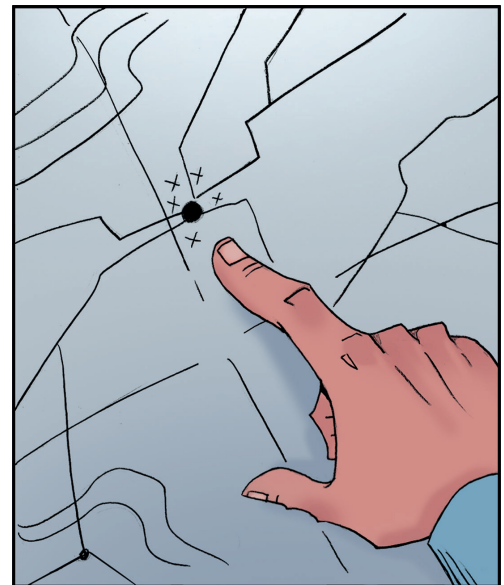
You'll create a map of your neighborhood using only your memory. You will label the most important places in your neighborhood to gather resources. Identify the locations that would be important for you to reach. Where would you get supplies? What places would you avoid? Where would you find shelter?

### You Will Also

- Understand the *importance of mental maps* in geography.
- Learn skills to *practice* mental maps.
- Understand how to *continue updating* a mental map.

### By the end of this project, you will be able to answer these questions

- What is a mental map?
- How do mental maps affect geographic thinking?
- How do I practice and improve mental mapping?
- How do I mental map the globe?
- Where will I find resources when the zombies arrive?



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MENTAL MAPPING

## *Pre-assessment Quiz*

Answer the following questions. You will soon learn all about these concepts.

1. What is a mental map?
2. Why do we use mental maps?
3. Describe how to mental map the globe.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period:\_\_\_\_\_

# MENTAL MAPPING

## Post-assessment Quiz

1. What is a mental map?
2. Why do we use mental maps?
3. Describe how to mental map the globe.

# Lesson 1—Mental Maps

## *What Is a Mental Map?*



One class period of instruction

This lesson introduces students to *mental maps*. Students will learn what a mental map is, see an example, and try to make a mental map of their own.

Lesson 2 will look at why mental maps are important.

### **Materials Needed**

- Mental Maps
- Mental Map Practice
- Mental Map Exit Ticket

### **National Geography Standards**

#### **8th Grade**

2—How to use mental maps to organize information about people, places, and environments in a spatial context.

#### **12th Grade**

2.3.A—Identify from memory and explain the locations, characteristics, patterns, and relationships of places and regions to answer geographic questions.

### **Learning Objective**

Understand what a mental map is.

### **Evidence of Learning**

Students can define what a mental map is and provide an example.

### **Lesson Sequence**

#### **1. Think/Pair/Share**

What is a *mental map*? Based on the name, what do you think it is?

#### **2. Define**

**Mental map:** the map in your head when you think about the world.

#### **3. Explain**

Review the handout to see what a mental map is:

- How you picture the world

### **Copy Instructions**

Print one of each  
handout for each  
student.



### **Handout**

- Mental Maps

- Where you think things are
- Knowledge and perceptions
- Groundwork for thinking about the world

#### 4. Try Creating a Mental Map (Pre-assessment)

Students should attempt to draw the world as they think it is. Issue the following prompts:

- This isn't graded.
- Try your best.
- Guess based on what you think.

#### 5. Compare Mental Maps

Have students share with partners. Have volunteers share with class. Issue the following prompts:

- This isn't about who was right.
- This is about seeing the differences in how we picture the world.
- Enjoy it. We'll all get better.

#### 6. Exit Ticket

Students define mental maps and give an example of a mental map.

#### Handout

- Mental Map Practice



*Read or say*



*Read or say*

#### Handout

- Mental Map Exit Ticket

# MENTAL MAPS

## *What Is a Mental Map and What Are Some Examples?*

Everyone uses *mental maps* to help them think about the world around them, even if they don't realize it.

Read on below to learn about *mental maps* and see an example.

### **Definition**

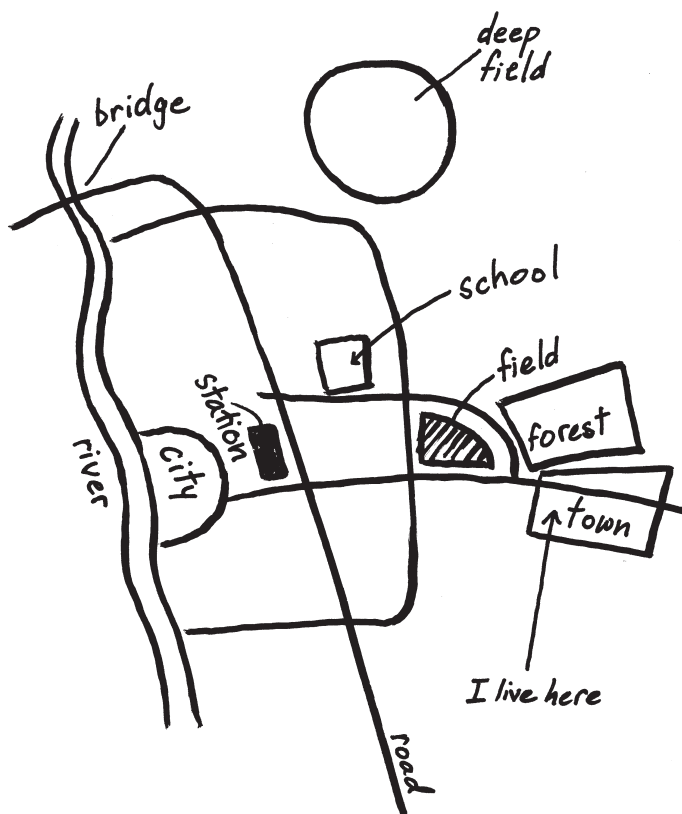
A *mental map* is the map in your head when you think about the world or places around you.

### **Explanation**

A *mental map* is:

- How you *picture* the world
- *Where* you think things are
- A combination of *what you know* and *what you believe*
- An idea that *influences* the way you think about the world

### **Example**



### **Mental Map of Local Area**

Here is an example of a mental map of the area surrounding where somebody lives.

It is probably not completely accurate, and only some places are identified on the map. However, you can get a good sense of what is important to the person making the map or what influences how that person thinks about the area near his or her home.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

# MENTAL MAP PRACTICE

*Try to Draw a Mental Map*

Try to draw your own mental maps. First try one of your neighborhood, then try one of your whole city.

## ***Neighborhood Mental Map***

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## ***City Mental Map***



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MENTAL MAP EXIT TICKET

*Show Your Understanding of Mental Maps*

You have learned about mental maps. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. *Define* what a mental map is:
  
  
  
  
  
  
  
  
  
  
2. *Give an example* of a mental map someone may have:

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# MENTAL MAP EXIT TICKET

*Show Your Understanding of Mental Maps*

You have learned about mental maps. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. *Define* what a mental map is:
  
  
  
  
  
  
  
  
  
  
2. *Give an example* of a mental map someone may have:

## Lesson 2—Why Mental Maps?

### *Why Are Mental Maps Important?*

This lesson looks at *why mental maps are important*. Students will learn why mental maps are needed for thinking about the world.

Less than one class period of instruction

Lesson 3 will provide ways to practice mental mapping.

#### **Materials Needed**

- **Why Mental Maps? Exit Ticket**

#### **National Geography Standards**

##### **8th Grade**

2—How to use mental maps to organize information about people, places, and environments in a spatial context.

##### **12th Grade**

2.1.A—Identify from memory and explain the locations, characteristics, patterns, and relationships among human and physical systems.

#### **Learning Objective**

Understand the important role of mental maps.

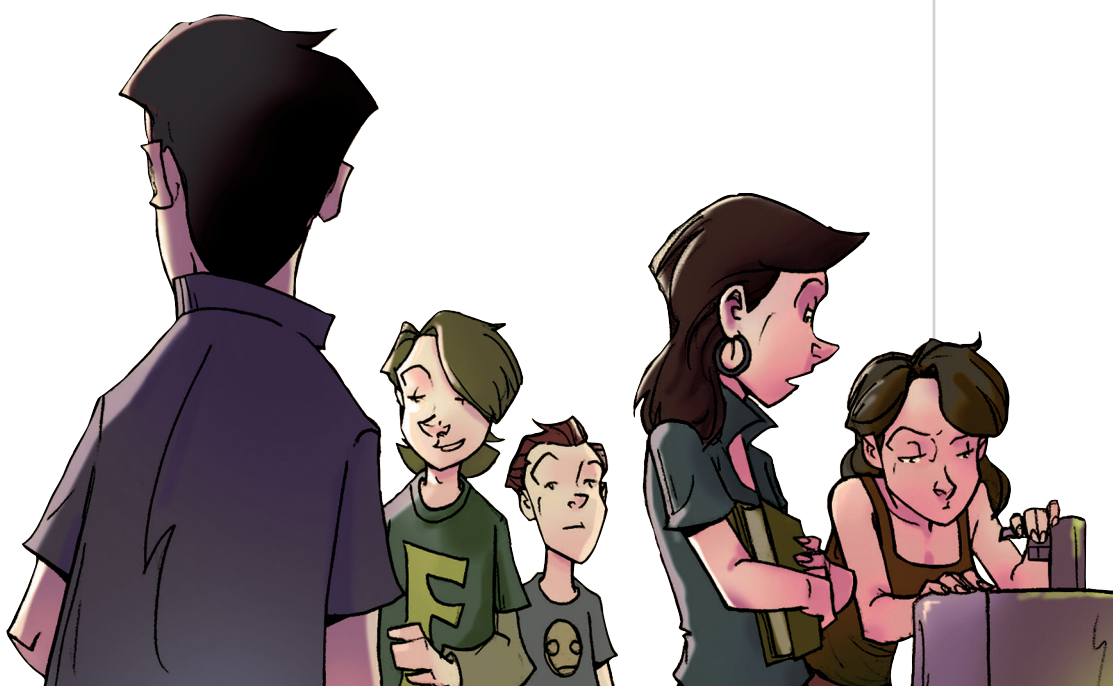
#### **Evidence of Learning**

Students can describe why mental maps are important.



#### **Copy Instructions**

Print one of each  
handout for each  
student.



**Ask**



- What happens if you have a strong/weak mental map?
- What if it is wrong or right?

**Ask**



- Who do mental maps help?
- Why do these people need strong mental maps?
- What happens if they don't have a strong mental map?

**Handout**

- Why Mental Maps? Exit Ticket

## Lesson Sequence

### 1. Define

**Mental map:** the map in your head when you think about the world.

### 2. Think/Pair/Share

Why are *mental maps* important?

### 3. Discuss

Continue to discuss the importance of mental maps, supporting student ideas.

- Your ideas are where you start.
- If you have misconceptions, they may conflict with the facts.
- Strong ideas of places will help make connections easier to remember.
- A strong mental map will help you connect ideas.

### 4. Examples

As a class, generate and discuss examples of needs for strong mental maps.

Possible examples:

- Reporter
- Politician
- Cable TV technician
- Zombie survivors

### 5. Exit Ticket

Students provide a description of why mental maps are important and give examples.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

# WHY MENTAL MAPS? EXIT TICKET

## *Show How Mental Maps Are Important*

You have learned about the importance of mental maps. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. Why are mental maps *important*?
2. Give an example of someone who would need a strong mental map and why.
3. Why are mental maps *important to you*?

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

# WHY MENTAL MAPS? EXIT TICKET

## *Show How Mental Maps Are Important*

You have learned about the importance of mental maps. *Reflect* on what you have learned. *Consider* what you still want to know. *Answer* the questions below.

1. Why are mental maps *important*?
2. Give an example of someone who would need a strong mental map and why.
3. Why are mental maps *important to you*?

## Lesson 3—Practicing Mental Mapping

### *How to Practice Making Mental Maps*



One class period of instruction

This lesson looks at how to *practice mental mapping*. Students will learn skills to create, practice, and improve mental mapping.

The next day's lesson will look at how to practice mental mapping the globe.

#### **Copy Instructions**

Print one handout  
for each student.



#### **Materials Needed**

- **Practicing Mental Maps**

#### **National Geography Standards**

##### **8th Grade**

2.2.A—Identify from memory with increasing detail and accuracy mental maps of a place or region.

##### **12th Grade**

2.1.A—Identify from memory and explain the locations, characteristics, patterns, and relationships among human and physical systems.

#### **Learning Objective**

Understand how to practice and improve mental mapping.

#### **Evidence of Learning**

Student practices mental mapping in steps.

#### **Lesson Sequence**

##### **1. Think/Pair/Share**

How can you practice mental mapping? What would help you understand or get a better picture of the world?

##### **2. Review Steps to Practice**

1. Start with a familiar spot.
2. Place other nearby landmarks.
3. Draw familiar routes (consider, if you can, scale and direction).
4. Check accuracy: What important parts did you miss?
5. Identify what you *knew* and what you *perceived*.

#### **Handout**

- Practicing Mental Maps

**3. Create a Memory Game**

Students should take time to create their own memory game. There is a sample memory game in the Practicing Mental Maps handout.

**4. Explain Adding to the Mental Map**

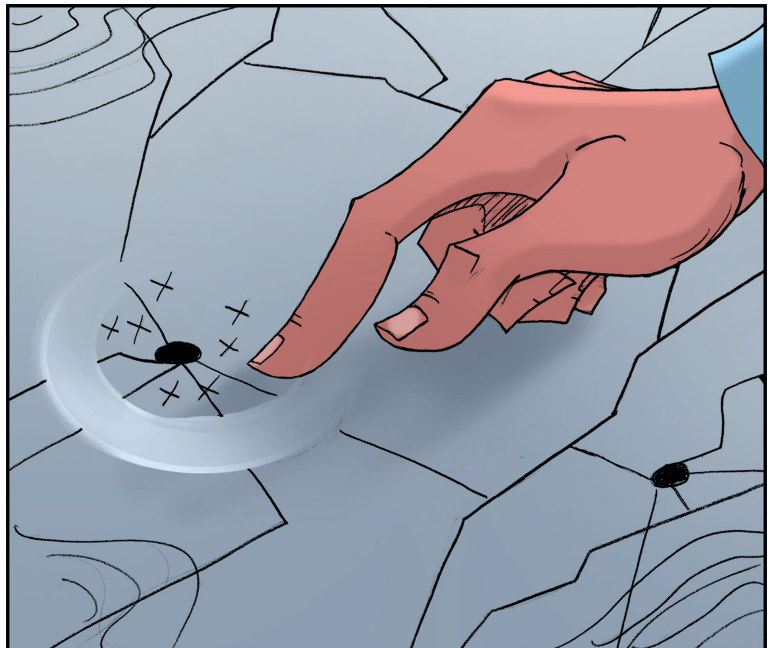
As you learn more about the world or areas around you, you should add to your mental map. As you learn, recognize the things that you should remember and add to your mental map. Think of the connections you can make to your mental map as you hear about different places. You might even consider things on your previous mental map that you want to change.

**5. Check Practice Handouts**

Check to see if students understood practice steps and are ready to check for accuracy.

**Homework:**

Compare your mental map to an actual map. Finish designing a memory game.



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# PRACTICING MENTAL MAPS

## *How Do You Get Better at Mental Mapping?*

Your mental map will grow as you learn about the world. You can also practice mental maps to make the most of what you know. Read on below to learn about *practicing mental maps*.

### **Steps**

1. Start with a familiar spot.
2. Place other landmarks near that spot.
3. Draw familiar routes between places.
4. Check for accuracy. What are important places you forgot?
5. Identify what you *knew* and what you *guessed* based on your perceptions.

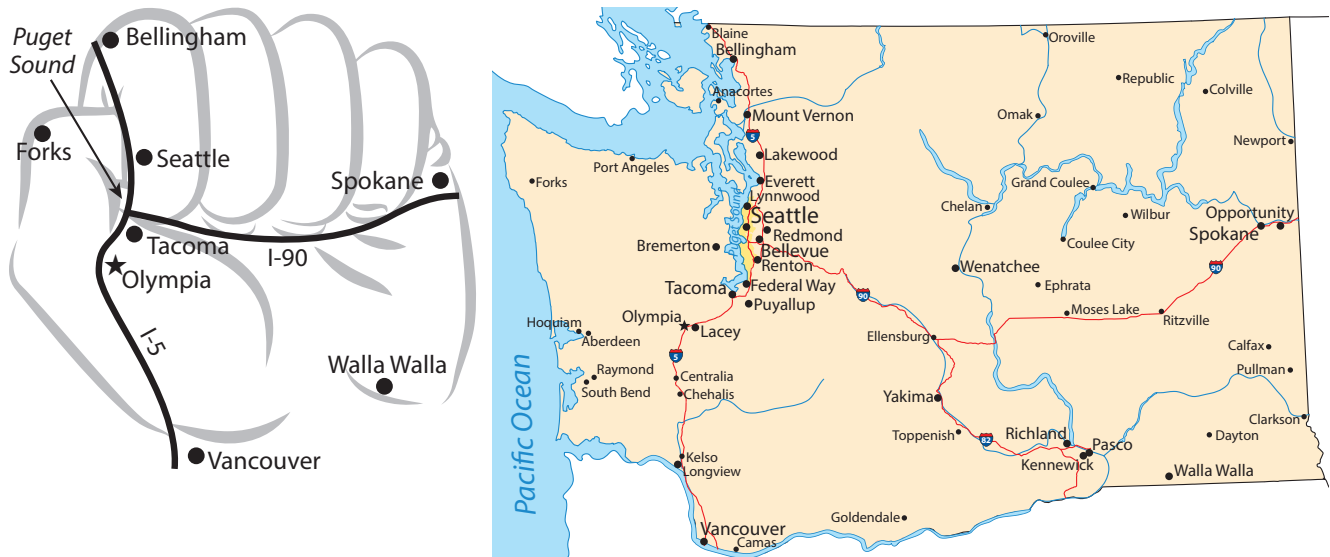
### **Practice**

1. Choose somewhere you would like to mental map (maybe your neighborhood or area around your school).
2. Practice drawing your mental map in the space below.
3. Start by mapping a place you know, like your house or school.
4. After drawing your map, check it for accuracy.
5. Compare your map with an atlas or take it home to check for accuracy.

## Create a Memory Game

Come up with your own trick to easily remember how to draw an accurate mental map of this location. This takes a lot of creativity!

The memory game below uses a fist to remember the shape and major locations of Washington State.



**Create your own memory game below:**



## Lesson 4—Mental Mapping the Globe

### *What Are Some Tricks to Map the World?*



One class period of instruction

This lesson looks at how to *mental map the world*. Students will learn steps to help them move from a general mental to a fine-tuned mental map of the world.

Lesson 5 will have students mental map their neighborhood in the context of a zombie outbreak.

#### **Copy Instructions**

Print one handout  
for each student.



#### **Materials Needed**

- **Practicing Global Mental Maps**
- Globe, world map, or atlas to check for accuracy

#### **National Geography Standards**

##### **8th Grade**

2.2.A—Identify from memory with increasing detail and accuracy mental maps of a place or region.

##### **12th Grade**

2.1—The locations, characteristics, patterns, and relationships of physical and human systems are the basis for mental maps at local to global scales.

#### **Learning Objective**

Understand steps to mental mapping the globe.

#### **Evidence of Learning**

Practice mental mapping the globe.

## Lesson Sequence

### 1. Think/Pair/Share

What do you need in order to get better at mental mapping the world?

### 2. Review Steps to Practice

1. Quick-draw the continents as circles.
2. Turn the continents into squares and triangles.
3. Add more lines of detail and label as many places as you can.
4. Check for accuracy.
5. Plan which parts you want to practice adding and practice again.

Issue the following prompts:

- Take it in steps.
- Remember very broad things first, then add details.

### 3. Practice, Check, and Practice

Allow students to practice, check, and re-practice their skills in mental mapping the globe.

### Homework:

Practice mental mapping the globe.



#### Ask

- What will help you think geographically?
- Think about the first mental map you did in lessons 1, 2 and 3.

#### Handout

- Practicing Global Mental Maps



#### Read or say



#### Teaching Tip

Compare early practice with later practices.



#### Teaching Tip

Have students study the three mental map steps in **Practicing Global Mental Maps** but have them turn those maps face down and practice on blank sheets of paper.

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# PRACTICING GLOBAL MENTAL MAPS

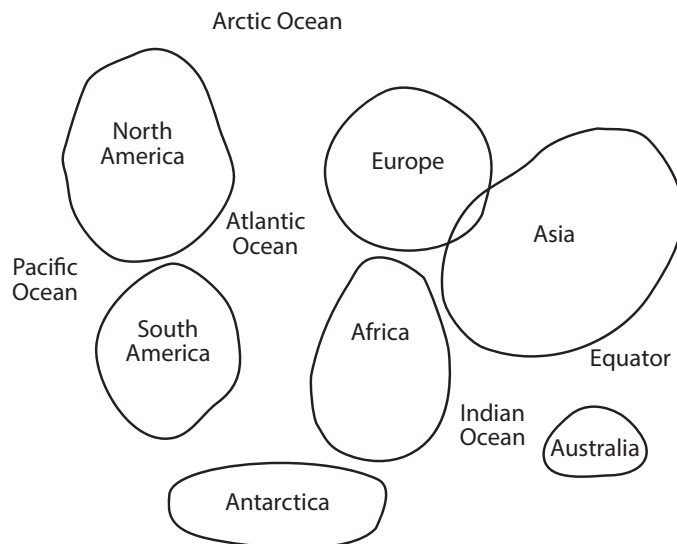
*How Do You Get Better at Mental Mapping the World?*

Your mental map will grow as you learn about the world. You can follow some simple steps to help you get a better mental map of the world.

## Steps

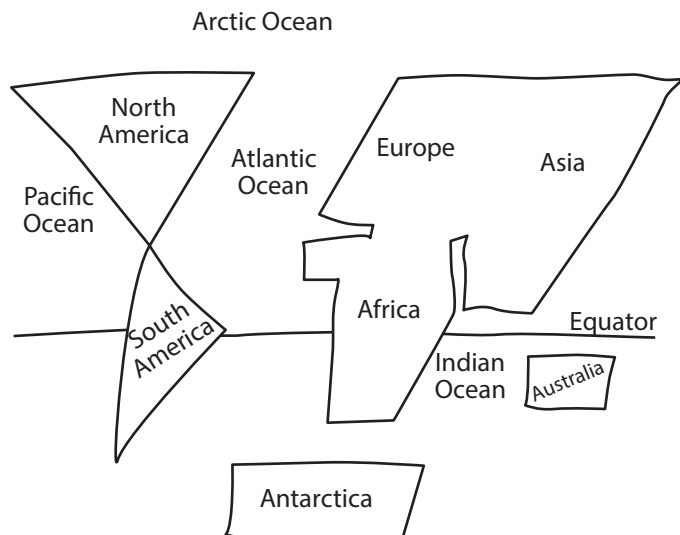
### 1. Quick-draw the continents as circles.

Quick Practice



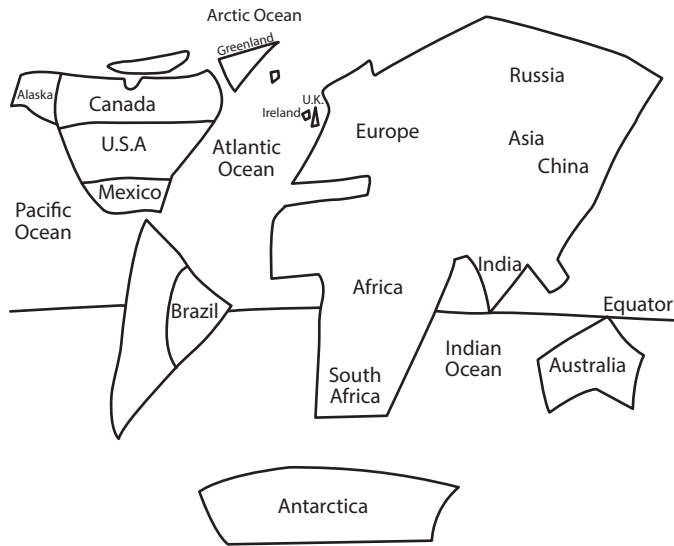
### 2. Turn the continents into squares and triangles.

Quick Practice



**3. Add more lines of detail.**

*Quick Practice*



**4. Check for accuracy.**

*Use a map, atlas, or globe.*

**5. Plan which parts you want to practice adding.**

*Practice again!*

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

# GLOBAL MENTAL MAPPING ASSESSMENT

*Draw a Mental Map of the World*

Draw a map of the world from memory. Try to label as many places and features as you can.

# Lesson 5—Mental Maps in the Zombie Outbreak

*Where Would You Go in Your Neighborhood?*

This lesson has students create a final mental map of the world to be assessed and compared with the pre-assessment from lesson 1. Students will also apply their learning about mental maps as they create a map of their neighborhood in the context of a zombie outbreak. This is the last project in this unit. After completing this lesson, students will check their neighborhood maps against the **Mental Mapping Your Neighborhood** handout and make any adjustments and finishing touches. The next unit requires students to choose a settlement location based on physical geography.

One class period of instruction



## Materials Needed

- Global Mental Mapping Assessment
- Mental Mapping in the Zombie Outbreak

## National Geography Standards

### 8th Grade

2.3.A—Identify from memory and describe locations and patterns of places and regions to answer geographic questions.

### 12th Grade

2.3.A—Identify from memory and explain the locations, characteristics, patterns, and relationships of places and regions to answer geographic questions.

## Learning Objectives

1. Students should be able to mental map their neighborhood.
2. Students should be able to mental map the world.

## Evidence of Learning

Mental maps of the neighborhood and the world.



## Copy Instructions

Print one of each handout for each student.

## Project 03: Mental Maps in the Zombie Outbreak

### Lesson 5—Mental Maps In the Zombie Outbreak

#### Handout

- Global Mental Mapping Assessment

#### Ask



- Where would you get supplies?
- What places would you avoid?
- Where would you find shelter?

#### Handout

- Mental Mapping in the Zombie Outbreak

## Lesson Sequence

### 1. Assessment

Students mental map the world. This assessment will be applied to the summative rubric to assess growth in mental mapping abilities.

### 2. Think/Pair/Share

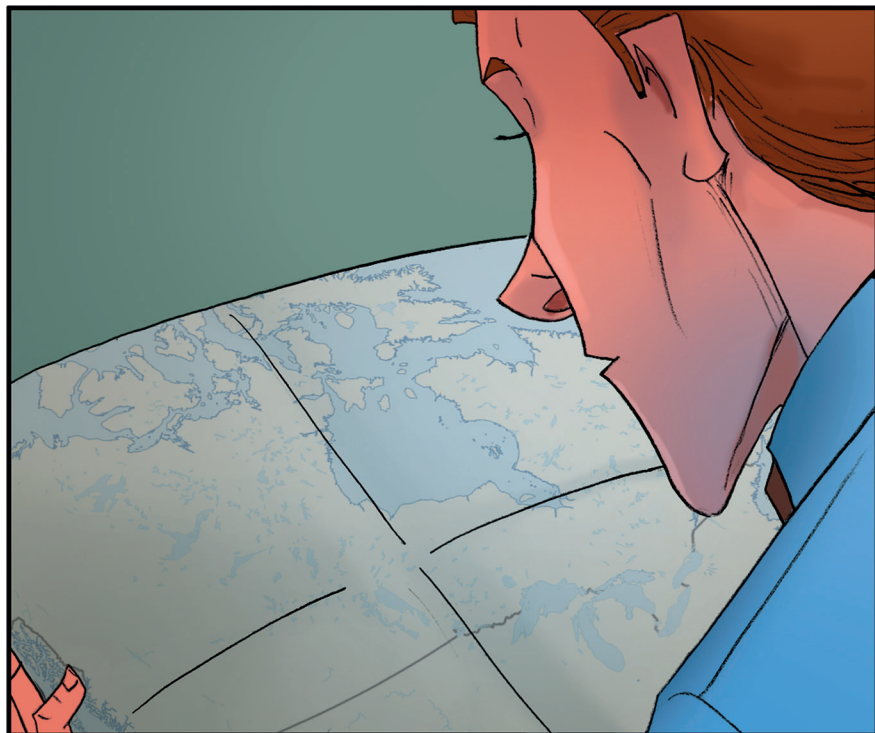
What places in your neighborhood would you go to in a zombie outbreak?

### 3. Mental Map Your Neighborhood

Students mental map their own neighborhoods.

### 4. Add Places of Apocalyptic Importance

Students add and label places that are important to them in the event of a zombie outbreak.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

# MENTAL MAPPING IN THE ZOMBIE OUTBREAK

*Design a Mental Map of Your Neighborhood in the Zombie Apocalypse*

*Draw a map of your neighborhood from memory. Label as many places as you can. Identify the locations that would be important for you to get to. Where would you get supplies? What places would you avoid? Where would you find shelter?*



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# RELEASE FORM FOR PHOTOGRAPHIC IMAGES

## *To Teachers:*

To help illustrate to others the experiential activities involved and to promote the use of simulations, we like to get photographs and videos of classes participating in the simulation. Please send photos of students actively engaged so we can publish them in our promotional material. Be aware that we can only use images of students for whom a release form has been submitted.

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I give permission for photographs or videos of my child to appear in catalogs of educational materials published by Interact.

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Age of student: \_\_\_\_\_ (print)

Parent or guardian: \_\_\_\_\_ (print)

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

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