PART 2: ENVIRONMENTAL JUSTICE CASE STUDY: SEATTLE, WA[1]

Lesson Plan 5: Environmental Justice Matters: Mapping Environmental Justice Impacts (Part 1)[2]

Goal: Using maps and a variety of indicators, participants will evaluate whether different parts of Seattle have disproportionate environmental burdens and benefits in some geographic areas relative to others in order to make an environmental justice determination.

Learning Objectives:

By the end of this lesson plan, participants will be able to:

- Compare Seattle neighborhoods (ZIP code) using a variety of indicators
- Discuss whether environmental benefits and burdens in Seattle are equally and/or equitably distributed.
- Explain why ZIP code 98108 could be identified as a community with EJ concerns or not

Materials:

- Colored pencils or pens ranging from dark shades to light in several different colors – (To save time, the pencils should be pre-bundled by color, so that each color has five shades, for example: five shades of blue, five shades of green, etc.)
- Tape for hanging maps on the wall (or they can be spread out on a table)
- Figure 1 (ZIP codes included in the Duwamish Valley Cumulative Health Impact Analysis (CHIA)). Make 20 copies, assuming five groups, each group needs four maps. Attached below.
- Tables 1-5 (below) divided among the five groups (socioeconomic, sensitive populations, environmental exposures, environmental effects, public health effects) with one category per group with instructions. (Tables 1-5 are also available in a separate pdf file if the ones below are difficult to read "Lesson Plan 5 Tables")
- Example map to show how to color (percent adults with no leisure time for physical activity[3]). Attached below.
- White board or butcher block paper
- Optional - CHIA poster, in large and small format for closing discussion (online – see below)

Time Required: 50-75 minutes

---

[1]This product was funded through a grant from Washington State Department of Ecology. While these materials were reviewed for grant consistency, this does not necessarily constitute endorsement by Ecology.

[2]Many thanks to Dana Canfield (Sea Mar Community Health Centers HealthCorps volunteer in 2013/2014) for helping JHA develop this lesson plan and Lesson Plan 6 (part 2)

[3]In addition to using this example to show participants how to color the maps, the subject (no leisure time for physical activity is an indicator used by the Centers for Disease Control to illustrate how ones geography or ZIP code can influence ones ability to exercise including but not limited to: presence of sidewalks; having a destination/walking to a particular place; access to public transportation; traffic density; and access to neighborhood or school play area and/or recreational equipment.

Background: This mapping and coloring exercise gives participants the opportunity to qualitatively distinguish a variety of environmental benefits and burdens in the city of Seattle by comparing multiple indicators (e.g., toxic waste, tree canopy, asthma) using a ranking method. The exercises were developed based upon a document (cited below) that addresses how one area of Seattle, WA (Duwamish Valley) is disproportionately impacted by high environmental burdens and risk with fewer positive benefits, relative to the rest of Seattle. The authors used a cumulative impacts method (Lesson Plan 6) to provide evidence that this area merits attention from decision makers regarding health protective and proactive environmental regulations, policies, practices, and actions.

Note: If this exercise is conducted in the city of Seattle, there may be participants who come from areas of Seattle (ZIP codes) that are disproportionately burdened compared to other parts of the city, and they may feel uncomfortable. We recommend opening the exercise by explaining that some of the facts that will be reviewed today may be startling and may make some people feel uncomfortable or sad. We also recommend explaining that the purpose of the exercise is to examine unfair differences in Seattle and explore ways to remedy these inequities. In addition, this case study provides the evidence for taking action.

Suggested Preparation for the Facilitator/Teacher:
Gould, L., & Cummings, B.J. (March 2013). Duwamish Valley Cumulative Health Impacts Analysis. Seattle, WA: Just Health Action and Duwamish River Cleanup Coalition/Technical Advisory Group. http://justhealthaction.org/wp-content/uploads/2013/03/Duwamish-Valley-Cumulative-Health-Impacts-Analysis-Seattle-WA.pdf.

Note: For the full report, a poster, and appendices go to: http://justhealthaction.org/resources/jha-publications/.

Word Wall

- Review from earlier lesson plans:
  - *Indicator* (Lesson Plan 1)
  - *Whose Backyard?: EJ and Toxic Waste Management meeting* (Lesson Plan 2)
  - *Equality/equity* (Lesson Plan 3)
- New terms:
  - *Poverty level*: A minimum level of income deemed adequate to live. In 2014, for a family of four the federal poverty level was approximately $24,000/year.
  - *200% poverty level*: Living on an income two times the federal poverty level, or in 2015 approximately $48,500/year.
  - *Built environment*: The human-made space in which people live, work, and recreate on a day-to-day basis. (http://en.wikipedia.org/wiki/Built_environment).
  - *Toxic Release Inventory site*: Facilities in certain industry sectors that manufacture, process, or use chemicals in amounts above an established

level must report how they are managed (http://www.epa.gov/enviro/facts/tri/).
- *Cumulative*: Increasing or becoming better or worse over time through a series of additions; including or adding together all of the things that came before (http://www.merriam-webster.com/dictionary/cumulative).
- *Disproportionate*: A difference that is not fair.

Activity Instructions: Mapping Seattle's neighborhoods (60 minutes)

1) *Prompts:*

Opening: How do you think that your ZIP code can affect the quality of your life?

a) What do we remember about the word *indicator* (from Lesson Plan 1). What were some indicators (measurements) that we used to describe what is and isn't healthy in our neighborhood?
b) What do we remember from our toxic waste management meeting (Lesson Plan 2)?
c) What examples do we remember about equality versus equity (from Lesson Plan 3)?
d) What would you think if you found out some of these indicators are different (not equal) in some neighborhoods (ZIP codes) in your city compared to others?

2) Indicator map exercise

Blank CHIA maps (Figure 1 below)

a) Divide students into five groups and hand out colored pencils before giving instructions. Hand out three blank maps to each group, along with one copy of Table 1 A-E.

b) Prompt:

Using indicators, we are going to investigate whether some neighborhoods (ZIP codes) are different in the City of Seattle compared to others (we can decide later whether these differences are unequal or inequitable). We are going to do an exercise that includes some of the indicators you mentioned and color them in on maps. We have divided you into five groups because we are looking at five different categories to examine how a community (ZIP code) is doing. We are giving each group a blank map and a table (which has descriptions of the indicators and some questions). Each category has three indicators (or measurements) that you are going to color in on a map.

Example on the board or an LCD projector:
Here is an example of how to do the coloring on your map (Percent of adults with no leisure time (see Footnote 3)).

Have each group of students color in the legend on their maps, and then color the maps accordingly. Use a similar color scheme for each map. For example, with three shades of blue use dark for the highest rank and light for the lowest rank (1 would be light blue and a 3 would be a dark blue).
Note 1: We advise that you follow the color schemes in the original analysis

Note 2: If some groups finish coloring and answering their questions before others, have them look at the key to rankings and discuss differences.

3) Map review

Tape the 15 maps (three per category) in the front of the room where everyone can see them. *Arrange the different maps on the board in the five different categories. After everyone has walked around and looked at the different maps, each group can explain what they saw in their own map. The questions are slightly different on each table but generally cover the following concepts:*

a) What patterns do you observe on the maps?
b) Where do people with low versus high ranking live?
c) Is there anything on these maps that surprise or concern you? Why or why not?

4) Cumulative effects

Prompt: If you added up all of the indicators (cumulative effects) that you are observing, what do you think that means in terms of overall health? Do you think that people live longer in a ZIP code where there are more benefits? Why or why not?

5) Environmental Justice

Prompts:

a) Recall the Environmental Justice definition[4]
b) What is the difference between ZIP codes in terms of income? Race?
c) What are the demographics of the communities with more pollution?
d) Could you make an argument that the community with the most environmental burdens is disproportionately burdened compared to the rest of the Seattle? Why or why not?

6) Equality versus equity

Prompts: When you think about what you have seen today on the maps, do you think it is fair that some ZIP codes are better places to live than others? Why or why not? What can be done? (See Lesson Plan 1, Part 3).

7) Closing[5]

We are going to review these maps in more detail in our next session and we will also talk about how communities are taking action to change these conditions.

[4] **Environmental Justice (EJ) -** EPA defines EJ as "The *fair* treatment and meaningful involvement of all people regardless of *race, color, national origin*, or *income* with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." (http://www.epa.gov/environmentaljustice/)

[5] See note in the Background section

Figure 1.
Seattle, Washington, 5 yr. Average 2006-2010

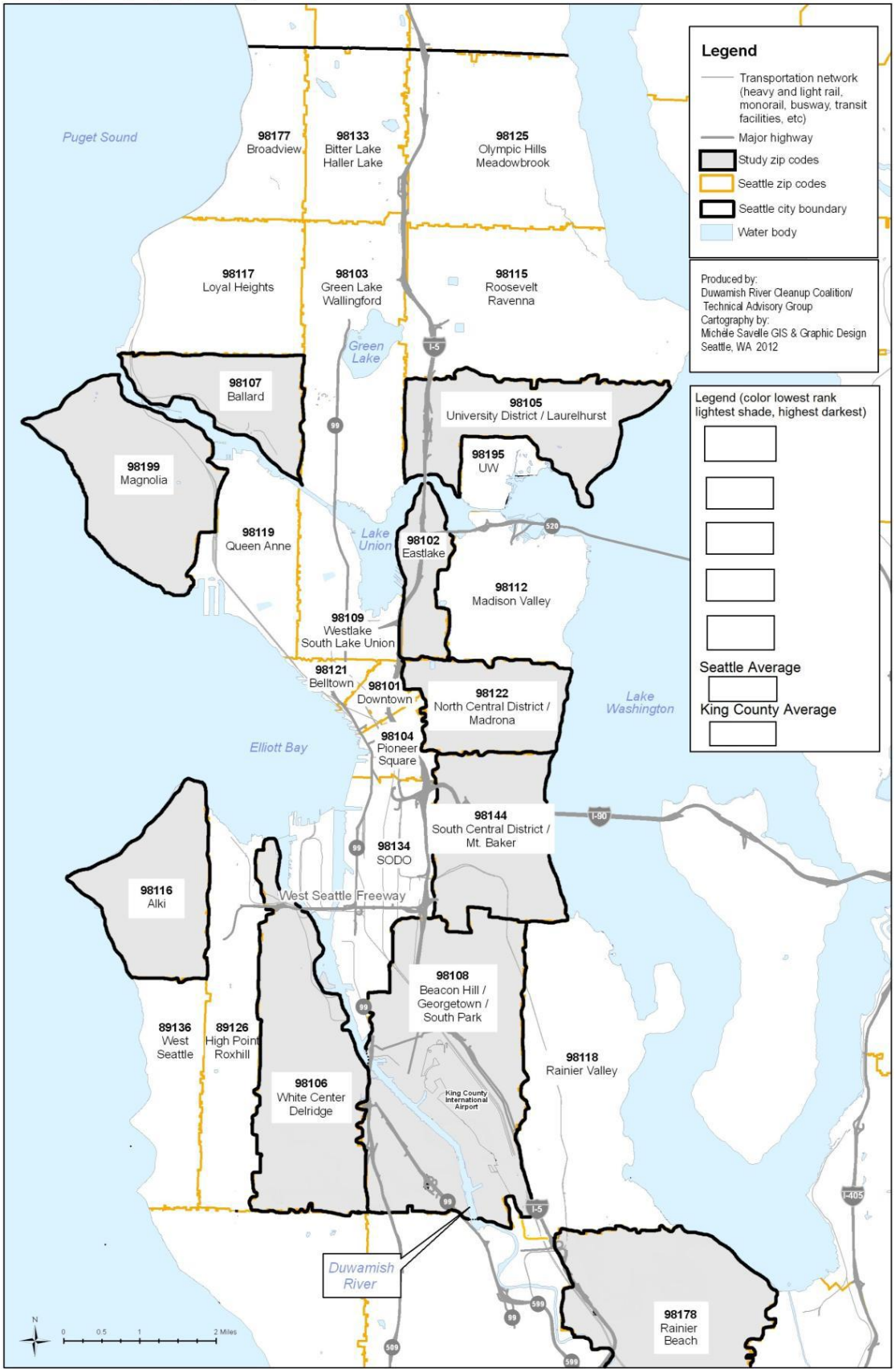
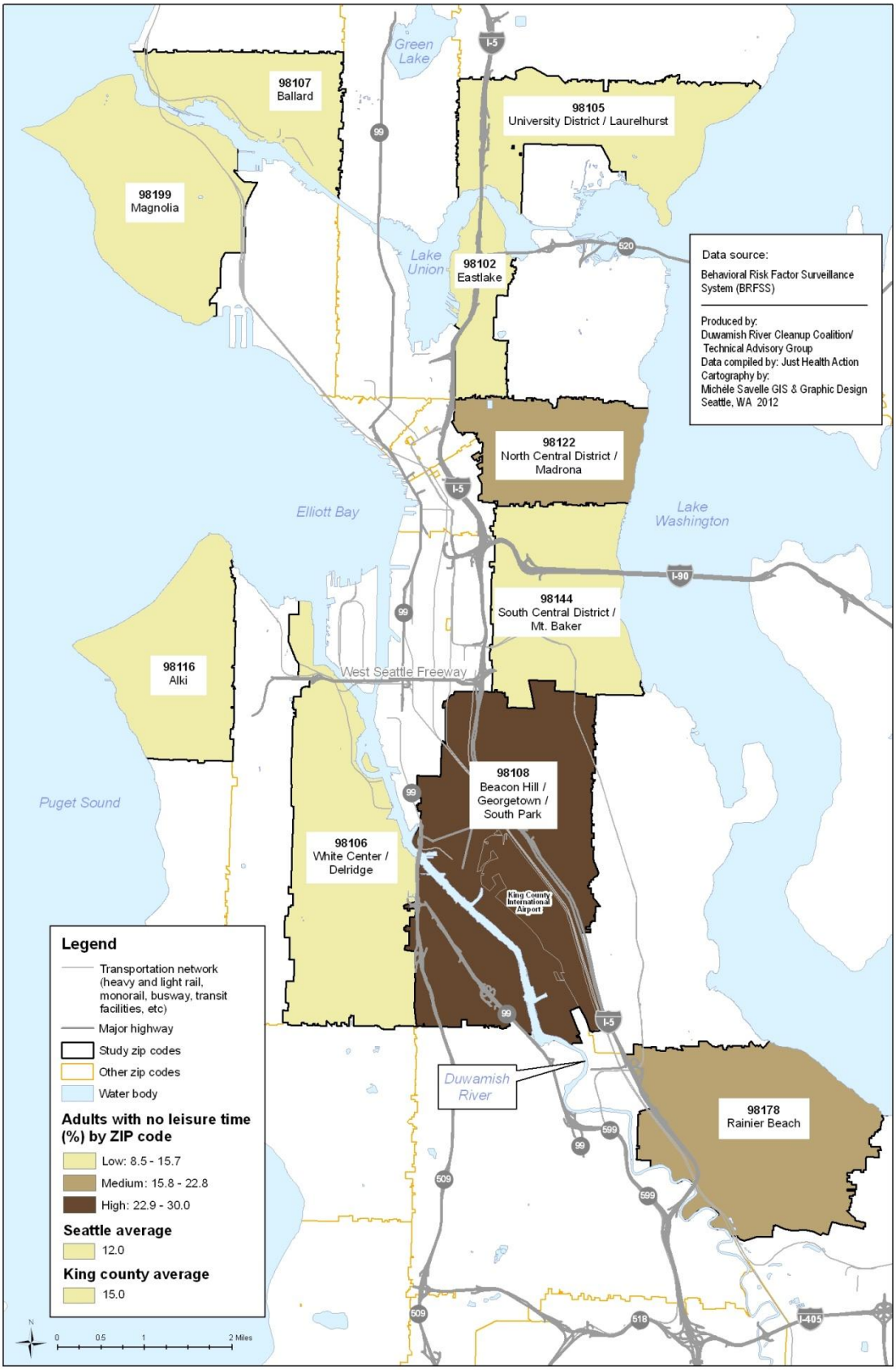


Figure A2. Percent Adults With No Leisure Time Physical Activity, by ZIP Code
Seattle, Washington, 5-year Average 2007-2011



Group 1. Socioeconomic factors by ZIP Code, Seattle, Washington

Component	Indicator	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
Socio-economic factors (Rank 1-3)	No college education (percent)	3	3	3	3	2	1	2	1	2	1
	Below 200% poverty level (percent)	3	3	3	2	3	2	1	3	1	1
	Non-white minority population (percent)	3	3	3	2	2	1	1	1	1	1

Coloring Instructions:

1) Assign an indicator from the table above to each of your three maps. Title each map accordingly.
2) Assign a shade from your set of pens/pencils to each rank in the table above so that the lowest number corresponds with the lightest color, the second lowest number with the second lightest color, and so on. Fill out the empty legend on each map to designate the color/number pairs.
3) Color each ZIP code on each map with the shade that corresponds to its rank in the table above. If it helps, feel free to write the rank from the table in each ZIP code before coloring.

Ranking: *The higher the number, the higher the likelihood that people who live in this community fall into this category..*
Description of indicators : *The poverty level is the minimum level of income deemed adequate to live. In 2014, for a family of four, the poverty level is approximately $24,000 per year. Many people believe that it is impossible to live at this level without government assistance. People who are living below the 200% poverty level (living on an income twice as high as the poverty level) would have an annual income of approximately $48,000 a year for a family of four.*

Questions

1) What patterns do you observe on the maps?
2) Where are people with no college education, in poverty, and people of color more likely to live?
3) What kinds of things might a person living below 200% poverty lever not have access to?
4) Does any of this surprise or concern you? Why or why not?

Group 2 - Sensitive Populations by ZIP Code, Seattle, Washington

Component	Indicator	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
Sensitive Populations (Rank 1-3)	Presence of children under 5 years (percent)	3	3	3	3	2	1	2	1	2	2
	Presence of elderly 65 years and older	3	3	3	1	1	1	2	1	3	3
	Foreign born (percent)	3	2	3	2	1	1	1	1	1	1

Coloring Instructions:

1) Assign an Indicator from the table above to each of your three maps. Title each map accordingly.

2) Assign a shade from your set of pens/pencils to each rank in the table above so that the lowest number corresponds with the lightest color, the second lowest number with the second lightest color, and so on. Fill out the empty legend on each map to designate the color/number pairs.

3) Color each ZIP code on each map with the shade that corresponds to its rank in the table above. If it helps, feel free to write the rank from the table in each ZIP code before coloring.

Description of Indicators: People who are young, old, or who don't speak English as a first language are more vulnerable to stressors. A stressor is a physical, social, chemical, or psychological agent that puts a demand on your body. The higher the rank, the more vulnerable the population in that ZIP code is to stress.

Questions

1) What patterns do you observe in the maps?

2) Where are there more children and elderly?

3) The title of this table is "Sensitive populations." Give some examples of things that might affect children or the elderly differently

4) What surprises you or concerns you the most about your maps. Why or why not?

Group 3 - Environmental Exposures by Zip Code, Seattle, WA

Component	Indicator	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
Environ-mental Exposures (Rank 1-5)	particulate matter (ug/m3 annual av)	5	3	2	3	3	5	1	2	1	1
	Benzene (ug/m3 annual av)	5	4	1	1	3	5	1	2	1	1
	Confirmed and suspected con-taminated sites	5	1	1	2	2	1	2	1	1	1

Coloring Instructions:

1) Assign an Indicator from the table above to each of your three maps. Title each map accordingly.

2) Assign a shade from your set of pens/pencils to each rank in the table above so that the lowest number corresponds with the lightest color, the second lowest number with the second lightest color, and so on. Fill out the empty legend on each map to designate the color/number pairs.

3) Color each zip code on each map with the shade that corresponds to its rank in the table above. If it helps, feel free to write the rank from the table in each ZIP code before coloring.

Description of Indicators: These are indicators of pollution in a ZIP code and are ranked with 5 being the worst and 1 being the best. The first two are how much particulate matter and benzene people are exposed to in an individual's breathing zone. Benzene can cause cancer. Breathing particulate matter deep in the lungs can cause both cancer and heart and lung diseases.

Questions

1) What patterns do you observe on the maps?

2) Where is there more pollution? Less pollution?

3) Why is there less pollution in some parts of Seattle than others?

4) Is there anything that surprises you or concerns you about these maps? Why or why not?

Group 4 - Environmental Effects (Built environment) by ZIP Code, Seattle, Washington

Component	Indicator	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
Environmental Effects (Built Env) (Rank 1-5)	Tree canopy (percent)	5	4	4	4	2	5	5	2	2	1
	Park area per resident	4	4	5	3	5	5	5	5	5	1
	Number of Toxic Release Inventory sites	5	2	1	3	1	2	4	1	1	2

Coloring Instructions:

1) Assign an Indicator from the table above to each of your three maps. Title each map accordingly.

2) Assign a shade from your set of pens/pencils to each rank in the table above so that the lowest number corresponds with the lightest color, the second lowest number with the second lightest color, and so on. Fill out the empty legend on each map to designate the color/number pairs.

3) Color each zip code on each map with the shade that corresponds to its rank in the table above. If it helps, feel free to write the rank from the table in each ZIP code before coloring.

Description of indicators: *For trees, the higher rank means there are not as many trees as other parts of Seattle. For parks, the higher rank means there are not as many parks as the rest of Seattle. For Toxic Relase Inventory sites, higher rank means more industry that pollutes. The built environment refers to the human-made surroundings that provide the setting for human activity such as buildings, parks, or green space, transportation, water supply, etc.*

A Toxic Release Inventory (TRI) site is an industrial facility that manufactures or processes more than 25,000 pounds of a TRI-listed chemical or otherwise uses more than 10,000 pounds of a listed chemical in a given year.

Questions:

1) What patterns do you observe on the maps?

2) What ZIP codes have more environmental benefits (parks) and less environmental burdents (TRI sites) and which ones

3) Why should people have parks and trees in their neighborhood?

4) What factors do you think control where Toxic Release Inventory sites are placed?

5) Is there anything that surprises or concerns you about these tables? Why or why not?

Group 5 - Public Health Effects by ZIP Code, Seattle, Washington

Component	Indicator	98108 Beacon Hill Georgetown South Park	98144 South Central District Mt Baker	98178 Rainier Beach	98106 White Center Delridge	98122 North Central District Madrona	98102 Eastlake	98107 Ballard	98105 University District Laurelhurst	98116 Alki	98199 Magnolia
Public Health Effects	Heart disease death rate per 100,000	2	2	3	4	5	1	3	1	2	2
	Childhood (0-17) asthma hospitalization rate per 100,000	5	5	2	4	4	2	2	5	1	1
	Lung cancer death rate per 100,000	3	3	5	3	4	1	4	1	1	2

Coloring Instructions:

1) Assign an Indicator from the table above to each of your three maps. Title each map accordingly.

2) Assign a shade from your set of pens/pencils to each rank in the table above so that the lowest number corresponds with the

3) Color each zip code on each map with the shade that corresponds to its rank in the table above. If it helps, feel free to write the rank from the table in each ZIP code before coloring.

Description of indicators: *The lower the rank, the lower the number of people afflicted by the factors in each category. Heart Disease death rate/100,000 means the number of people who die from heart disease per 100,000 people. Childhood asthma hospitalization rate per 100,000 means the number of children between the ages of 0-17 who are hospitalized because of a severe asthma attack. Lung cancer death rate per 100,000 means the number people who die of lung cancer per 100,000 people*

Questions:

1) What patterns do you observe on the maps?

2) People with worse health problems are likely to live in which areas?

3) What factors do you think contribute to these health problems?

4) Is there anything that surprises or concerns you about these maps? Why or why not?