

Math Instructional Unit Template

Program	West Hartford Continuing Education
Class, Level, GLE Range	GED Preparation, CCRS Level B & C, GLE 3 – 6
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1. Copy and paste a unit column from your scope and sequence into the space below.
2. If the CCR Math standards listed in your scope and sequence only included the notation, add the descriptions in the row for standards below.

Title	Disproportional Incarceration: Graphing, Proportional Reasoning, and Social Justice.
Time <i>hours and weeks</i>	6 two-hour classes, excluding presentation time which depends on the number of students.
Purpose	Understand relationships collected from graphs. Communicate relationships using graphs.
Goals and Outcomes	<ul style="list-style-type: none"> • Develop and/or strengthen multiplicative reasoning and connect it to visual representations • Sharpen analytic skills to create more critical consumers of data <ul style="list-style-type: none"> ○ Make predictions ○ Inform decisions ○ Influence others • Practice creating and presenting an argument with visual support
Priority CCR Standards	<p>3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i></p> <p>6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. <i>For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”</i></p> <p>6.RP.2 Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. <i>For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is a $\frac{3}{4}$ cup of flour for each cup of sugar.” “We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger.”</i></p>
Standards for Mathematical Practice	MP.4 Model with mathematics.
Key Resources	<ul style="list-style-type: none"> • Reading selected from “Prisons and Justice?” issue of <i>The Change Agent</i> https://changeagent.nelrc.org/issues/issue-40/ • Slow reveal graphs and one printed graph posted at https://slowrevealgraphs.com/special-collection-incarceration-in-the-us/ • Bad Date video from https://mathsnacks.com/baddate.html (available in Spanish) • Tables from <i>Literacy Behind Bars</i> (Table 3-4 or 6-1) https://www.prisonpolicy.org/blog/2016/04/01/literacy/ • From Prison to PhD podcast https://www.gse.harvard.edu/news/18/12/harvard-edcast-prison-phd?fbclid=IwAR3F9W2-MunRBYj6S5oGdbvqH7INBwv-E9drL3kpCcegpoi7pVsByleM5go • A list of Social Justice issues students may be interested in.

Math Instructional Unit Template

Fill in the rest of the information for this unit, expanding as necessary onto additional pages.

Attachments: For the benefit of future users and curriculum developers, add these items as the unit is taught:

- Relevant assessment/evaluation forms
- Sample lesson plans
- Reflections and notes

ESSENTIAL QUESTIONS to Guide the Unit

- How do graphs tell stories?
- How can you represent a relationship between quantities?
- How can visual representations be used to predict, influence, or make decisions?
- What does it mean for something to be disproportionate (or out of proportion)?

UNIT OBJECTIVES

By the end of this unit, students will be able to:

- Represent multiplicative relationships from tables in a graph. Include verbal descriptions of the relationship.
- Use graphs to deliver a more convincing message than words alone.

ASSESSMENT

Culminating Assessment - *authentic performance task(s) that demonstrate student learning and integration of the knowledge and skills taught through the objectives*

By the end of this unit, students will demonstrate their learning by...

... creating and presenting a graph and corresponding narrative designed to reveal to us a social injustice and point out a proportional comparison.

Students/the teacher will evaluate learning by ... e.g., using a rubric, checklist, etc.

... referencing a checklist:

- ✓ I found interesting relationships in a table of data that highlights disproportionate justice.
- ✓ I created a graph to tell a story I care about.
- ✓ My narrative includes a proportional comparison.
- ✓ I presented my story and graph to the class.

Other Evidence of Learning

Participation and quality of conjecture with slow reveal graphs. Listen especially for additive and multiplicative thinking revealed here.

LEARNING PLAN

Suggested Sequence of Lessons and Activities

1. Slow reveal of “International Rates of Incarceration per 100,000” bar graph with corresponding proportional reasoning questions. Introduce the social injustice topic, Incarceration. Formative assessment of graph awareness and of proportional reasoning.
2. Slow reveal of “Number of People in Prisons and Jails for Drug Offenses 1980 and 2015” double bar graph.
3. Paper version of “US Prison Population by Offense” bar graph to circle graph. Formative assessment of understanding a whole on a bar graph. See EMPower: *Many Points Make a Point* Teacher Book Lesson 1 for a way to address misconceptions.
4. Slow reveal of “Lifetime Likelihood of Imprisonment of US Residents Born 2001” picture graph. Solicit descriptions of proportional relationships. Formative assessment of ratio. Practice making a statement that expresses a relationship between two data points.
5. Play the video “Bad Date” to connect the word “times” to the more formal word “ratio” and lend understanding to the concept.

Math Instructional Unit Template

6. Worksheet, “Stating and Representing a Relationship,” for practice (preparation for performance task) naming a relationship and making a two-category graph when data is provided. Includes working backwards by identifying the thinking given the circle graph.
7. Identify relationships from data tables 3-4 and 6-1 from “Literacy Behind Bars” and use them to create a graph.
8. Read a story or selection of stories from “Prison and Justice?” from *The Change Agent* beginning with the graph on page 35.
9. Conver-Stations to help students identify a Social Justice topic to present. To each group of 4 students, provide a different a set of pictures of social injustices. Ask each student to pick up a picture that is meaningful to them and explain why. Encourage the group to ask questions of one another; give 5 minutes. Two students from each group rotate to a new group while the other members remain where they are. Continue conversations about social justice issues, but this time, pose a discussion question, or ask the groups to rank or sort pictures.
10. Choose a social justice topic, find data in a table, and identify a relationship. Create and present a graph (bar, circle, or picture graph) highlighting an injustice. Share a corresponding narrative that contains a proportional comparison. [provide a list of topic suggestions, brainstorm, give checklist]

Key Vocabulary – *additional vocabulary may be selected by teachers at the lesson plan level*

Ratio	Incarceration
Proportional reasoning	Justice

Additional Resources – *e.g., background sources for teachers, teacher- or student-generated materials, etc.*

- Teacher background for slow reveal graphs <https://slowrevealgraphs.com/read-about-it/>
- Download slides and one printout of 4 graphs from: <https://slowrevealgraphs.com/special-collection-incarceration-in-the-us/>
- Handout of proportional reasoning questions from “International Rates of Incarceration per 100,000” bar graph
- Bad Date ratio video
- Worksheet “Stating and Representing a Relationship”
- Pictures for Conver-Stations and some prepared discussion questions
- Handout written guidance and websites for finding a topic
- Handout written guidance and checklist for performance task