

# Lesson M4

## MINIATURE GULF COAST PROJECT

MATH TEKS OBJECTIVES	
§111.22	<p>6b.1 (A) apply mathematics to problems arising in everyday life, society, and the workplace;</p> <p>6b.1 (C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;</p> <p>6b.1 (D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate; 6b.1E create and use representations to organize, record, and communicate mathematical ideas;</p> <p>6b.1 (F) analyze mathematical relationships to connect and communicate mathematical ideas;</p> <p>6b.1 (G) display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication;</p> <p>6b.5 (A) represent mathematical and real-world problems involving ratios and rates using scale factors, tables, graphs, and proportions;</p> <p>6b.12 (A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots;</p> <p>6b.12 (B) use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution;</p> <p>6b.12 (C) summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution;</p> <p>6b.12. (D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data distribution;</p> <p>6b.13. (A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots;</p> <p>6b.13. (B) distinguish between situations that yield data with and without variability.</p>

CAREER EXPLORATION AND PORTALS TEKS OBJECTIVES	
§127.4 c	<p>6. The student explores labor market information. The student is expected to: (A) analyze national, state, regional, and local labor market information; (B) cite evidence of high-skill, high-wage, or high-demand occupations based on analysis of labor market information; and (C) analyze the effects of changing employment trends, societal needs, and economic conditions on career planning.</p>

**Instructional Directions** This activity is designed to take 60–90 minutes of instructional time and 6–8 hours of project time based on chosen depth of activity. The lesson components should be separated and delivered as best suited for your instructional needs.

This lesson can be delivered in two ways:

1. Show the video “Miniature Earth” found on You Tube at <http://tinyurl.com/yvurqu>. Then, have students review **Blackline Master M4.2** "Miniature Gulf Coast" Scaled Data. Ask students to write down three careers they see as critical to future societal needs before and after the video. Lead a short discussion about their initial thoughts and thoughts after viewing the video. Add additional questions of your own to enhance the discussion as time permits. This lesson can then be used to introduce other lessons that focus on high-skill, high-growth jobs for our region or initial research into one of these careers.
2. A more in-depth variation on this lesson can be done over a series of class periods where students would have time to view the video, create a data collection and analysis research project, and make informed conclusions about their research. Access to a computer with internet access is ideal.

By scaling the statistics, the numbers should have more meaning to the students than data that is based on national or global data. Have students compare the numbers used in the video and relate the same numbers to their everyday life (if you are on a campus of about 1000 students this would be a good connection).



# Lesson M4

- Instructional Directions**
- Go over rubric with students and clarify any questions. Consider also providing students a timeline for due dates and class work days on the project.
  - Students will choose a research question in one of the following “world issue” areas:
    - (Un-)Employment
    - Educational Attainment
    - Income
    - Transportation & Commuting
    - Cost of Living
    - Accessibility to Resources
    - Distribution/Availability of Career
    - Technology
    - Health & Mortality
  - Hand students the Miniature Gulf Coast Project Plan (**Blackline Master M4.1**). Discuss pros and cons of working as an individual or as a partner group. Have student choose an area they would like to investigate. Once they have done this, discuss how to develop an effect quantitative question for research.
 

For example: If a student chooses Transportation & Commuting, a good effective quantitative question could be “How many cars do you know of that your family has owned?”. All responses need to be a single numerical response and a question that their peers can answer readily when surveyed. Questions should not be “double-barrelled” (i.e. How many dogs and cats do you have?), where two numbers would be required to answer the question.
  - Hand students Final Project Plan sheet as their final approved question for research. Once teacher has these questions, create surveys either on paper or in a tool such as Google Docs or Survey Monkey. It is best to survey 50–100 peers for an appropriate sample size. Set aside adequate time for students to respond to all the survey questions. Depending on the sample size, this may take up to one or two class periods. Discuss with students about answering the questions to the best of their ability. Once the surveys are complete, give each student their raw data (responses to survey).
  - Students should then compile mean, median, and mode for the data and should graph their data as is appropriate. Graphing tools in Excel or other software might be used depending on how technologically-driven you want the exercise to be. The data should be summarized in either a final paper or project relating their data analysis to a conclusion or conclusions about their world issue.

**Learning Outcome(s)** Students will be able to relate the community at large in proportion to their immediate community within their classrooms. They will practice creating and analyzing ratios and proportions as well as functions of quantitative (raw) data. Graphed data may be an outcome of the project.

**Deliverables** Formal essay or project board detailing research question, method, data collection, and conclusions.

**Resources Needed**

**IDEAL**

- Computer
- Internet
- Excel
- PowerPoint
- Google Docs/Survey Monkey

**LIMITED**

- This project is possible without internet or technology access but may need to be scaled down to a smaller sample size to make implementation easier. Paper-based data collection, distribution, and analysis would be the immediate adaptation.

**Vocabulary or Concepts (New and/or Challenging)**

- Mean
- Median
- Mode
- Ratio
- Proportion
- Graph
- Data
- Raw Data
- Research Question
- Sample



Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

## GULF COAST COMMUNITY PROJECT PLAN

### THE PLAN

Area of interest (check one):

- |   |   |
|---|---|
| <input type="checkbox"/> Employment/Unemployment    | <input type="checkbox"/> Accessibility to Resources           |
| <input type="checkbox"/> Educational Attainment     | <input type="checkbox"/> Distribution/Availability of Careers |
| <input type="checkbox"/> Income                     | <input type="checkbox"/> Technology                           |
| <input type="checkbox"/> Transportation & Commuting | <input type="checkbox"/> Health & Mortality                   |
| <input type="checkbox"/> Cost of Living             |   |

I WANT TO WORK (choose one)

- Alone
- With a partner. My partner will be: \_\_\_\_\_

Phone #: cell \_\_\_\_\_ home \_\_\_\_\_

e-mail \_\_\_\_\_

**PROBLEM** (state your research question)

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### METHOD

Descriptive/Survey – This method will be used by all students for this project.



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Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

# GULF COAST COMMUNITY PROJECT PLAN

(Every student required to turn in a partner plan)

## RESEARCH QUESTION

(Must be an effective question one of your classmates can answer and is quantifiable; no number ranges, only individual number responses): \_\_\_\_\_

\_\_\_\_\_

## PLEASE READ AND CHECK THE APPROPRIATE BOXES.

I am aware of this major grade and the due dates.

My child is choosing to do this project alone.

- OR -

My child is choosing to do this project with a partner.

Partner's name \_\_\_\_\_

Partner's home and cell numbers \_\_\_\_\_

Partner's e-mail address \_\_\_\_\_

I understand that my child will be given 12 class days to complete this project (ample time if student(s) stays on task).

Students are welcome to come work on their project during tutorials. If the project is not completed in class, they will have to complete it on their own outside of school.

Parent Signature \_\_\_\_\_ (5 point Bonus)

\_\_\_\_\_ Teacher initials and date if final plan approved - OR -

\_\_\_\_\_ My plan needs to be revised and turned back into the teacher by \_\_\_\_\_ in order for me to receive a grade for this assignment.

## REVISED QUESTION:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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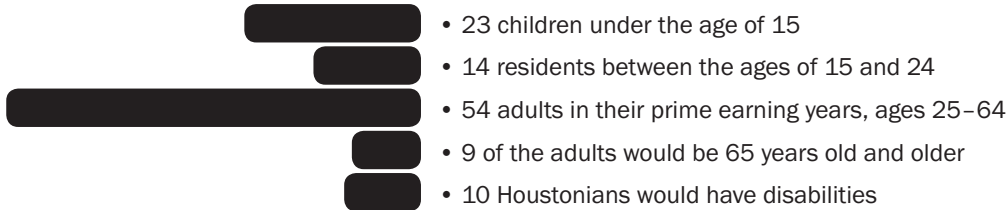
# IF HOUSTON WERE A VILLAGE OF 100 PEOPLE...

The U.S. Census Bureau estimates that metro Houston had 6,177,035 residents on July 1, 2012. Based on recent trends, the region's population probably exceeds 6.3 million today. That's a hard number for some to fathom, especially when one considers all the demographic, social and economic characteristics of 6.3 million people. But if Houston were a village of 100 people, that might be easier to grasp. Based on recently released census data, if Houston were a village of 100 people this is how our hamlet would look:

## GENDER



## AGE AND DISABILITY



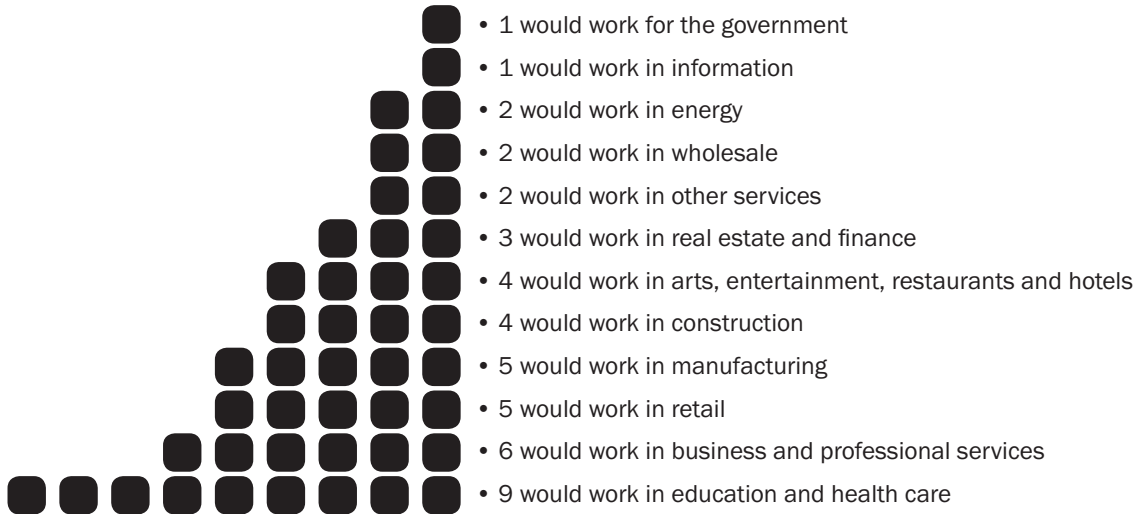
## EMPLOYMENT

*(among the residents over the age of 16)*




## OCCUPATIONS

*(among the employed residents)*




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## LANGUAGE

- 
- 62 Houstonians would speak only English at home
  - 38 would speak a language other than English

## BIRTHPLACE


- 
- 78 would have been born in the U.S.
  - 22 would have been born overseas
    - 1 would have been born in Europe
    - 1 would have been born in Africa
    - 4 would have been born in Asia
    - 16 would have been born in Latin America
      - 14 of the 22 villagers would not be U.S. citizens

## ETHNICITY


- 
- 7 Asians
  - 17 Blacks
  - 36 Hispanics
  - 39 Anglos
  - 1 person of mixed race

## EDUCATION

(among the 63 adults)

- 
- 6 would have less than a ninth grade education
  - 6 would have not completed high school
  - 15 would have a high school diploma
  - 18 would have some college or an associate's degree
  - 12 would have graduated college
  - 6 would have a graduate degree

## TRANSPORTATION

- 
- 38 would drive alone to work every day
  - 5 would carpool
  - 1 would take public transportation
  - 1 would travel by other means
  - 3 would work at home

## HEALTH CARE

- 
- 77 would have health insurance coverage
  - 23 would be uninsured

The village numbers are derived from the Census Bureau's 2012 American Community Survey. When calculating the village, the residents were rounded to the nearest whole number.



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