High School Collaborative CMaP Project

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Project Title: High School Collaborative CMaP Project
Created by: Kimberly Brown and Debbie Morgan
Class: Geography, Earth Systems, Secondary Math I, and Language Arts

Project Description	Using technology, students will integrate learning from different subject areas to understand how community relations of physical features can affect culture, growth, and community-human and environment interactions. Students will collect and analyze data to better understand geospatial perspectives of the region by mapping data of historic places in their city and comparing it to today. Students will also collect and analyze water samples from community water sources to better inform the role water plays in community development and growth. Students will also measure and calculate distance as a factor in housing and water resources and how that plays a role in the setting, culture, and patterns of living standards/ occupations of the community. Finally, students will share and report their interpretations and conclusions.
Community Issue or Problem Selected -How project evolved?	How does the historical, cultural, and scientifically significant data in our area interact to reveal patterns in human activity and impact. This project evolved through a collaborative effort between social studies and science departments to foster integration and application of cross-curriculum topics.
Community Partner(s)	Monroe City Water Department
Project Objectives	• Students will use GPS devices to collect geographical information for their region. • Students will investigate and analyze geographical information to identify relationships and patterns within the data sets. • Students will research and report on relationships and patterns from geographical information systems (GIS). • Students will apply concepts from math, language arts,

	Earth science, and geography courses to meet the project objectives.
Utah Core Standards/Objectives	**Geography** Consider various perspectives, including political, historical, economic, cultural, and environmental aspects to analyze and explain current events. Geography students use evidence to make inferences about the interconnections and interactions between people and places. They also use spatial thinking to identify patterns and processes occurring at various scales. • Apply map-reading skills to analyze features, purposes, and uses of various types of maps, including mental maps. • Use and create maps, graphs, and other types of data sets to show patterns and processes influencing our world. • Use existing and emerging technologies, such as GIS and other geospatial technologies, whenever possible and appropriate. • Use evidence to analyze and explain the spatial organization of people, places, and environments and how they have changed over time. **WG Standard 1.3:** Students will cite evidence of how the distribution of natural resources affects physical and human systems. **WG Standard 2.3:** Students will investigate the effects of significant patterns of human movement that shape urban and rural environments over time, such as mass urbanization, immigration, and the movement of refugees. **WG Standard 3.7:** Students will demonstrate an understanding of their own culture's connection to geography. **WG Standard 5.2:** Students will describe and compare the function and distribution of economic activities in primary, secondary, and tertiary sectors. **Language Arts 9** **Writing Standard 2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. 1:Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. **Writing Standard 6** Use technology, including the internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically. **Earth Science** **Standard 4, Objective 2b** Plan and conduct an experiment to investigate biotic and abiotic factors that affect freshwater ecosystems. **Standard 4, Objective 2c** Using data collected from local water systems, evaluate water quality and conclude how pollution can make water unavailable or unsuitable for life. **Standard 4, Objective 2d** Research and report how communities manage

	water resources (e.g., distribution, shortages, quality, flood control) to address <u>social</u>, <u>economic</u>, and <u>environmental</u> concerns. **Standard 5, Objective 1c** Explain how technological advances lead to increased human knowledge and ability to predict how changes affect Earth's systems. **Standard 5, Objective 2c** Predict how resource development and use alters Earth systems. **Secondary Math I** Summarize, represent, and interpret data on a single count or measurement variable Standard I.S.ID.1: Represent data with plots on the real number line (dot plots, histograms, and box plots). ● Represent numerical data using dot plots, histograms, and box plots. ● Represent one or more numerical data sets on the same scale. ● Describe data sets from graphical representations ● Recognize attributes that may be revealed by different representations.
Essential Question(s) -Spatial Issue	● How do physical features and natural resources impact human distribution either in rural and urban areas? ● How do occupations change over time due to resources? ● How have resource developments altered Earth systems in our area? ● How are water resources managed to address social, economic, and environmental concerns? ● How is water quality affected by these relationships?
Assessments (rubrics, scoring guides)	Individualized by each department (Language Arts, Math, Earth Science, and Geography) using http://www.uen.org/rubric/
Project Products	Story map to show how our water sources have helped Monroe spread from humble beginnings to the city it is today.
Project Timeline (include a step by step Procedures)	<table><tr><td>Day 1</td><td>Students will learn how to operate a GPS in geography class.</td></tr><tr><td>Day 2</td><td>Students will participate in an activity about how technological advances in GIS have shaped the way humans observe and interact with the planet in Earth science class. Students will practice using GPS.</td></tr></table>

	Day 3	Students will collect a specific dataset of historical sites using their GPS device within walking distance during geography class.
	Day 4	Students will collect a specific dataset of water sources and water quality information using water quality test kits and GPS devices within driving distance during Earth science class. (Students will hand in GPS units, teachers will add layers to map.)
	Day 5	Students will learn how to use https://www.arcgis.com/home/index.html to story map
	Day 6	Students will learn how to use https://www.arcgis.com/home/index.html to story map
	Day 7	Students will analyze and prepare a "final report" during Geography class. (math and language art teachers may use this time to write about and calculate data)
	Day 8	Students will analyze and prepare a "final report" during Earth Science class. (math and language art teachers may use this time to write about and calculate data)
	Day 9	Students will share information with the class during Geography class.
	Day 10	Students will share information with the class during Earth science class.

Resources Needed	- GPS devices (preferably enough for students to work in pairs) - Lamotte 5886-20 Water Quality Test Kits - Computers with internet access - Bus transportation to and from selected water quality monitoring sites
Skills Required	- Basic use and function of GPS device. - Operation of computer and internet. - Familiarity with ahttps://www.arcgis.com/home/index.html and story mapping.
Project Team Member Roles	**Teacher(s):** Debbie Morgan, Kimberly Brown **Students:** 9th grade students **Partner(s):** Monroe City Water Department

Celebration/Presentation	Group Story Maps
Project Evaluation	Students will be evaluated on learning how to use the GPS, marking way-points, writing a summary blog of each location, analyzing their findings in water samples and how it has influenced the growth of Monroe City. Individualized by each department (Language Arts, Math, Earth Science, and Geography) using http://www.uen.org/rubric/
Project Bibliography	http://arcg.is/1WzLqn surface drinking water and watershed map https://storymaps.arcgis.com/en/how-to/ http://www.esri.com/esri-news/arcnews/fall13articles/gis-transforming-our-world http://www.uen.org/rubric/myRubrics.html
Plans for Future CMaP Activities	geocaching

Optional:
-Lesson Plans
-Student Artifacts
-Publicity