

Where are we? And how do we learn our way around?

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"A map says to you. Read me carefully, follow me closely, doubt me not... I am the earth in the palm of your hand." ~ Beryl Markham¹

Introduction

Oberle Elementary School is a public elementary school in the Christina School District in New Castle County, Delaware. Oberle is one of fourteen elementary schools in Christina School District. The district is the largest district in the state, largely suburban with a handful of schools in an urban setting. In addition to the elementary schools, the district has 2 early education centers, two elementary/middle schools, three middle schools, 3 traditional comprehensive high schools, and eight alternative school programs. Oberle is a Title I School, which is defined as any school that receives federal supplemental funds to assist with high student populations of poverty. There are close to 650 students enrolled, at Oberle, representing a diverse community. The school represents a diverse mixture of ethnicities, including 55% Hispanic and 28% African American population. At Oberle, 56% of the students qualify for Free or Reduced Lunch Program. The students at Oberle have access to all the academic's required for an Elementary school in Delaware. I consider myself very lucky to be a Kindergarten teacher at Oberle.

As a fully inclusive school, students of different ability levels are in my classroom, so I must ensure that all my lessons can be easily differentiated. The students are given different opportunities to apply their skills based on their abilities. In addition, we are a Leader in Me School, which follows Dr. Stephen Covey's 7 Habits of Happy Kids. As a Leader in Me School, we aim to educate the whole child and ensure that all children have a leader in them. This unit will incorporate the Leader in Me principles and provide the students with multiple learning strategies including hands-on demonstrations and team building activities. This unit incorporates Common Core Standards, and Delaware State Standards for Social Studies. This unit will allow me to cover multiple standards and apply these skills to real world applications. This unit will enhance and serve as a supplement to the current curriculum required in Christina School District.

¹ Markham, Beryl, 1999

Rationale

I have created two units through the Delaware Teachers Institute (DTI) – one which focuses on civics standards for social studies, the other unit had a focus that was truly cross-curricular unit including civics standards as well as Next Generation Science Standards (NGSS) focusing on the Earth’s System. My participation in DTI has increased my content knowledge, increased student engagement, and allowed me to raise the rigor in my classroom. “Hey, I’ve been there!” says every student that has ever entered my classroom when I share a location that they know. I have always wondered what the best way is to engage my students in having a better understanding about geography. This year when I was given an opportunity to pick a seminar in DTI, I realized this year I may be able to create a unit to prepare my students with a continuity around geographic knowledge. Through my participation in the seminar Thinking Geographically, I am developing a unit focused on maps and how they impact us every day. I plan to integrate the use of ArcGIS into the curriculum, so students will have a better understanding of maps and how to read them. This unit will allow students to become cartographers and experts at understanding different types of maps. The unit will take place over one marking period on geography. My students will begin to learn the usefulness of story maps and why they are so useful. This unit is designed to integrate social studies concepts with the reading standards that are required for all teachers to use in their classroom. This unit will provide students with more exposure to the use of maps and the importance that maps can play in their life. With little to no specific instruction around our social studies lessons, this will create a true cross-curricular unit for Kindergarten. This unit will create a curriculum that has never been available for the students.

The purpose of this unit is to expose students to maps and geography in a new and exciting way. The students will learn directional vocabulary, maps, and globes. The students will focus on creating maps of familiar locations and understand why we need maps and how maps can tell us stories. The goal for this unit is to create an engaging experience for the students that not only incorporates basic writing and reading skills as well as develop critical thinking skills. This unit will include scaffolding as the students’ progress which allows the students to learn on their level. This unit will be taught during Social Studies focusing on the geography standards. During this unit, we will focus on creating mental maps of familiar locations. We will concentrate on understanding maps and globes as well as becoming familiar with directional vocabulary.

Enduring Understanding

Students will walk away from this unit having a better understanding of maps, location, scale, and distance between locations. These concepts will be taught through an analysis of different types of maps. We will look at high resolution photographs, maps on ArcGIS Online as well as google maps. The student will be able to use maps to discuss where they are and where they want to go.

Content Objectives

With the completion of this unit, students will be able to apply what they have learned to their life in school as well as outside of school. The students will be able to identify different types of maps and globes. They will be able to make mental and physical maps that allow them to travel to familiar places. They will be able to explain the connection between maps. Students will learn how to navigate around a map using directional terms (north/south/east/west), read the legend to understand what is being displayed on a map, measure distances between places, and understand the concept of scale. In addition, the students will be able to apply the skills taught about geography into different subjects including math and English Language Arts.

Background Knowledge

Student Prior Knowledge

This may be very limited when it comes to the students' prior knowledge because the students are only 5 years old. They may have knowledge of maps because of the increased use of technology, specifically the use of Google Maps, Waze, etc. Students should have prior knowledge of directional vocabulary because it is introduced early in the math curriculum at my school. Students will have knowledge regarding the location of the school, their home, and typical locations their families go to regularly.

Teacher Background Knowledge

Vocabulary

It is important for the teacher to have full working knowledge of the following terms. With such knowledge, a teacher will be able to assist the students to get a clear grasp of these vocabulary terms and be able to incorporate them into their conversations with each other.

place – a particular position or location in space

map - a visual representation of an area of land or sea showing physical features, cities, roads, etc.

north, south, east, west – cardinal directions shown on a map via a compass

key – a guide to any notations on a map

aerial photograph – a photo taken from an aircraft or satellite in flight; an image is another term for both aircraft and satellite acquired pictures.

geographic information system – a framework for gathering, managing, analyzing, and sharing data

remote sensing – the scanning of the earth by a satellite or high-flying aircraft in order to obtain information about it, recording information without touching the object or surface

map scale – distance represented on a map to the corresponding distance on the ground (real-world)

spatial thought – visualizing, interpreting, and reasoning using location, distance, direction, relationships, movement, and change in space

Importance of Geography

Understanding our place in the world is important especially as we consider the instant global communication, environmental changes, and the global relationships that our society continues to make. Looking at the world today, we see that our knowledge of geography is even more important than ever before. It is important that students in every grade, especially targeting the kids in the early grades, have a true understanding of our world and be able to identify different locales throughout the Earth. Most people do not realize how important geography is in everyday life.

Spatial Thinking

The importance of spatial thinking cannot be stressed enough. When students are able to grasp spatial thinking, they will be able to better understand the world in which they live, and the connections between themselves and other people and places. Spatial thinking—a constructive combination of concepts of space, tools of representation, and processes of reasoning—uses space to structure problems, find answers, and express solutions. It is powerful and pervasive in science, the workplace, and everyday life². The use of spatial thinking allows students to view where they are in the world and how that impacts themselves and others.

Maps

Maps are used to share information. We see maps everywhere - in the news, in our magazine articles and on the internet. Maps are designed to deliver information in a quick and eye-catching manner that allows a reader to have a better understanding of a

² Curriculum, et al. 2006

particular phenomenon or event. There are many different types of maps. It is essential for this unit that teachers have a solid grasp on the two main types of maps for this unit. Many of us remember learning about topographic maps or using street maps to get from one place to another. Children have less exposure to traditional or print maps because of technology. A teacher needs to understand these types of maps and essentially know how to read them for basic information.

The first type of map are general reference maps. Most maps used by the general public fall into this category. A general map's main purpose is to summarize the landscape of an area and provide spatial context. General maps are usually relatively easy to read as they focus on illustrating the location of key features of the Earth. Road maps show roads boldly and may use line widths or color to distinguish between a main road or a minor road in the area. Topographic maps show the locations of mountains, valleys, and other characteristics of the physical landscape. Political maps show the location of boundaries of different administrative districts (cities, counties, states, countries). All of these maps are considered reference maps. Many reference maps show topographic features, administrative boundaries like counties, and roads all together on one map.

Next, we have thematic maps, which depict the concentration or distribution of a particular feature of the Earth's surface representing one piece of information. Thematic maps are important for highlighting trends and patterns. Examples of a thematic map includes a weather map illustrating daily precipitation, geology maps showing rock types, population density maps displaying a ratio of the total population divided by area of that population, heat maps showing where clusters of crime occur, and economic maps illustrating the number of people filing for unemployment. We see many of these maps during election years, during seasonal weather, and even during pandemics.

Maps display all kinds of information, and the information also comes in a variety of forms. Some of the data may be a category value like the type of land use or soil type, a rank value such as a crop sustainability, but also counts (total population), and ratios values like percentage of kids graduating high school.

Types of Imagery

An image refers to a photograph, usually taken by an aircraft or satellite. It is often used in a Geographic Information System (GIS) to portray images of Earth as our eyes see them. Images can also contain different band combinations as vibrant colors that our eyes are not sensitive to. Imagery provides a wonderful layer in the GIS to provide spatial reference, view change over time, and for use with geographic layers to analyze spatial patterns and relationships. An image can be one single band that can be thought of as a layer or multiple bands that form a color composite layer. The image is made up of a cell-based grid of pixels. Each pixel has one value.

In selecting imagery for a particular need or application, you need to consider three different types of resolutions: spatial, spectral, and temporal, which all specify the type of image you would look for. Each imaging sensor's (a sophisticated camera) resolution varies. Spatial resolution refers to the size of pixels on the ground comprising the image and is referred to as ground sample distance (GSD).³ Spectral resolution measures specific proportions (referred to as bands) of electromagnetic spectrum.⁴ The final type of resolution is temporal resolution which refers to the frequency of coverage of a geographic location.⁵

Google Earth

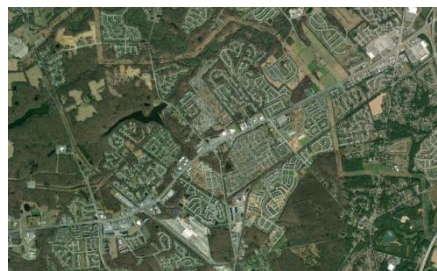
Google Earth is available **to use as a resource, and this application allows** students to explore the Earth in a dynamic manner and help them understand the spatial thought and assist them to engage each student. Google Earth also allows students to have access to images of the Earth no matter which device they use to access it. Many students may even have prior exposure to this resource, and it is a great place to start.

Esri and ArcGIS Online

Esri, a geographic information system company, created ArcGIS Online. ArcGIS Online is a cloud-based mapping and analysis solution. ArcGIS can be used to make maps, collect, and analyze data, and to share and collaborate place-based analyses. ArcGIS takes some time to learn how to navigate through the different options that it incorporates, but there are great tutorials to get you started. ArcGIS Online allows the user to create maps for many different uses. ArcGIS can also be used to create story maps, which allow you to tell a story about the spatial data you have created.



Topographic Map



Imagery Map

³ “Types of Imagery Data Used in the Image Analyst Extension—ArcGIS Pro| Documentation” n.d.

⁴ Ibid.

⁵ Ibid.

It is very easy to create basic maps like the two above using ArcGIS Online. It is also possible to create maps that have data that is specific to the lessons you are teaching or for use to demonstrate certain skills. Esri joined President Obama's call to join the ConnectED initiative, an effort to help all students in the United States become effective digital learners, by offering every K-12 school in the United States a free ArcGIS Online organizational account and accompanying instructional instruction.⁶

Once an account has been created, the user can use the "The ArcGIS Book"⁷ to explore different ways to use the system. The book is available in a pdf on ArcGIS Online website. In the book, it will give the reader an opportunity to use the system in an organized manner. You can skip to the lessons that will help with the skill you need to learn or wish to teach. On the website you access the book, there is an instructional guide that can be downloaded that provides additional lessons to use with students.

Teaching Strategies

The first thing I always ask myself is "How can I engage my students?" This unit will allow me to use several different teaching strategies and use some different approaches. The key to my success with engagement of my students is using a variety of strategies and changing the strategies throughout the unit when it is necessary. The skills that I will focus on can be applied to most lessons. In my school, there is one-to-one technology for the students. I will use a variety of technology and programs together with my students to gain access to maps, vocabulary, Google Docs and Slides

Using the social studies standards, we will concentrate on Geography. However, as with most lessons I create, it will also include ELA standards. Students will be given the opportunity to ask and answer questions about geography. Students will work to integrate their knowledge or ideas to analyze maps and contrast the differences between types of maps. Many of these opportunities will lead to a focus on speaking and listening which is a major foundation of kindergarten. My students also practice think-pair-share at every opportunity to engage in natural socialization in a controlled setting. The students will be given several opportunities to speak with each other about their thoughts they have about maps and geography.

In addition, I will have the students practice their visualization through the use of high-resolution photography. My students use journals for every subject to keep their ideas organized and kept together. In each of the journals, the students are allowed to use words or drawings to express their impressions or ideas. As always, I include in my instruction an assortment of differentiated instruction. The students will use a variety of approaches, whether working individually or small groups. The pacing and support

⁶ Fitzpatrick, Charlie, 2015

⁷ "The ArcGIS Book" n.d.

provided will be adjusted to ensure that all students are engaged and actively participating throughout the learning. Students will be given opportunities to work in cooperative groups to complete assignments and activities. This will allow students to work together taking on various roles based on the lessons with a focus on success for all. In my school, there is one-to-one technology for the students. I will use a variety of technology and programs together with my students to gain access to maps, vocabulary, Google Docs and Slides.

Activities

Introduction

Introducing this unit with the students, I will ask students “What is a Map?” I will have the students think about where they may have seen maps. After having the students do think-pair-share about what they know about maps, I will share a variety of maps, including those which utilize high resolution aerial photography, ArcGIS Online, and google maps. I will share maps that illustrate the school, the neighborhood, and the state. I will use this opportunity to show the students how close other states are to Delaware. This introduction will also include a Read Aloud by Mary Dodson Wade entitles *Types of Maps*. This book will introduce to students the many different types of maps available for them to analyze and learn from. I will also use Flocabulary to engage my students with a song about Maps. When I introduce this unit, the students will begin using a new journal that has blank pages as well as lined pages for the students to use during the entire unit.

Vocabulary

Vocabulary plays a key role in the students' understanding of the different concepts in this unit. I will spend time with each vocabulary word, giving the student an opportunity to learn the meaning by keeping a section of their journal for vocabulary. For every vocabulary word the students will learn a definition, create a drawing, or glue a picture to represent the word, and write sentences that incorporate the word accurately. This tool will be a visual tool for the students as they become cartographers and presenters of their maps. The words that we will focus on in my class are place, aerial photograph, map, scale, key, compass, reference map, topographic, and imagery. Additional words may be added as needed to assist with the student's knowledge of our unit.

How to Read Maps?

After introducing maps to the students, we will discuss how we read maps. The students will learn about reference maps, focusing on topographic and imagery. The students will analyze the information the keys on maps give us, what different symbols mean. We will look at the maps like the maps we started the unit with so that the students will have some familiarity with them. We will spend time examining multiple maps, looking at the

different places, items and what the map tells us. As we navigate through additional maps, we will continue to make a working anchor chart that lists and explains each of the different observations we have made of the maps.

Mental Maps

Mental maps allow students to make a map in their mind that is based on their knowledge of the world around them. Mental maps have different scales and levels of detail depending on how familiar an individual is with a particular part of the world. We start by creating a mental map of the school or their home – places with which they are very familiar. We will start by making a mental map of the classroom. Each student will close their eyes and walk through the room. Once we discuss the mental map, I will draw the mental map. Then I will ask students to make a mental map of their house. Once they finish thinking through their map, they will take time to create their mental map on paper. Their final mental map can be the route to or from home to school. They should be encouraged to provide as much detail as possible.

Drawing and Comparing Maps

After completing their mental maps of the school or their room, we will compare the maps. We will look to see how each student chooses to represent different items in the classroom or in their own home. As we continue through the unit of geography, students will be asked to draw maps of a variety of things. Each student will be asked to draw a map of our classroom, map of their bedroom, a map of how to get to different locations from the school, and, if time allows, maps that can take students to additional locations. We will spend time comparing the maps and point out the differences and similarities that each map may have. We will discuss why some maps of the same area may look different or provide different information.

Technology

The students and I will use iPads or Chromebooks to access different types of digital maps. We will use Google Maps and Google Earth to access maps that show where the school is. We will then work together as I log into ArcGIS to create different maps for the area. I will do most of the online work for my students to create maps, but I will share the creation with the students. The students will assist me with creating local maps so that they can see the process of making a map using ArcGIS. The goal would be for the students to be able to pull up the local map of the school and figure out ways to get to different spots in our neighborhood using the navigation tools (search by address, zoom in/out, pan). In addition, because of our location, we will expand our searches to see where we are in relation to the county, state, and region, and country. For instance, we can use the maps to show the directions and distances to get to the Philadelphia Zoo,

Christina Mall, Sky Zone, and other locations that the students want us to locate. We will compare straight line distances to the actual distance following roads and travel time.

Read Aloud

Every day we read to our students. Because of this, it is always an important part of every unit I write. This emphasizes the importance of making sure that students can see what we are learning is in our books, our practice and in their own lives. We will read books such as “Mapping My Day” by Julie Dillemath, “Follow That Map! A First Book of Mapping Skills” by Scot Richie, and “Me on the Map” by Joan Sweeney. As we read these books, we will be able to discuss the books and how what we read about is linked to our social studies lessons about maps.

Extension of Unit into English Language Arts (ELA): Mapping Storybooks

After spending time explicitly explaining and examining several different types of maps, we will continue our learning about maps by creating maps as we continue through the learning in ELA. We will read different stories and the students will be asked to create different maps. The maps will represent different parts of the stories. Some of the maps may incorporate landmarks from the story. The map may be a street map or a map of a room. This will allow us to discuss geography and help students to get a better understanding of mapping and why maps are important. Some of the stories we use will allow us to create very basic maps. For instance, if we read Little Red Riding Hood, our map will only include Red Riding Hood’s house, the woods and Grandma’s house. However, if we use the book like “Pete the Cat, I love my White Shoes” the map can include each of the locations that the story takes place. The maps can also help the students retell the stories. In addition, I would post a world map in the classroom and as we read stories that took place all over the world like, “Madeline” we can look more at maps on a global scale. Using the locations of the stories, we could map out the different places that all of the books take place. This would allow for me to offer my students additional diversity in the books they read and apply it to our geography lessons.

Bibliography

Student Resources

Dillemath, Julie. 2017. *Mapping My Day*. Magination Press.

This book is a great read aloud for students to get additional exposure to maps.

Ritchie, Scot. 2009. *Follow That Map!: A First Book of Mapping Skills*. Kids Can Press Ltd.

This book is a good introduction to mapping skills.

Sweeney, Joan. 2014. *Me on the Map*. Random House Children's Books.
This book allows students to see themselves in maps.

Teacher Resources

Curriculum, National Research Council (U.S.) Committee on Support for Thinking Spatially: The Incorporation of Geographic Information Science Across the K.-12, National Academies Press (U.S.), Committee on Geography, Support for the Thinking Spatially Committee the Incorporation of Geographic Information Science Across the K.-12 Curriculum, National Research Council, Committee on the Support for the Thinking Spatially: The Incorporation of Geographic Information Science Across the K.-12 Curriculum, Board on Earth Sciences and Resources, et al. 2006. *Learning to Think Spatially: GIS as a Support System in the K-12 Curriculum*. National Academies Press.
This is a good resource to learn more about spatial thinking.

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<https://www.esri.com/about/newsroom/arcwatch/tell-a-teacher-or-school-about-esris-free-arcgis-online-organizational-account/>.
This good resource to create an online account for ArcGIS Online.

"The ArcGIS Book | The ArcGIS Book." n.d. Accessed October 15, 2020.
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This was used only for the quote.

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<https://pro.arcgis.com/en/pro-app/help/analysis/image-analyst/imagery-and-raster-data-in-image-analyst.htm>.
This is a good resource to learn about different types of imagery.

Appendix A: Implementing District Standards

Common Core Standards

CCSS.ELA-LITERACY.RI.K.3 With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.

The students will describe the connection between different maps. They will show the connection between different texts and their locations.

CCSS.ELA-LITERACY.RI.K.9 With prompting and support, identify basic similarities in and differences between two texts on the same topic (e.g., in illustrations, descriptions, or procedures).

The students will identify the similarities and differences of maps.

Delaware State Standards for Social Studies

Geography Anchor Standard One:

K-3a: Students will understand the nature and uses of maps, globes, and other geographics.

The entire unit will focus on the understanding of geography.

Appendix B

This unit is written with a standard classroom setting in mind, however, with minor modifications the unit can be altered to support both remote and hybrid learning settings. In each of the learning scenarios, there will be need for a learning management system, as a place to contain all assignments and resources, such as Schoology. Because of the unique situation that we have found ourselves in during this pandemic my teaching styles have significantly changed to incorporate the use of the learning management system. Typically, my students will work together in small groups, with me in small groups, as well as entire whole group. I like to ensure that my students have time to not only work in collaborative groups but also independently.

The introduction to maps is written to take place in a face-to-face manner, this can be achieved either by video conference or in person. The goal is to allow students to become familiar with maps and be able to identify different types of maps. They will make observations about these maps and help to analyze what they see. In a virtual setting, the teacher can call on students to share their ideas with the class. The teacher may also give them an opportunity to “markup” the map when they are asked specific questions about the map using the annotate button in Zoom. In the hybrid or traditional classroom, this activity would have students sharing ideas in the classroom. The teacher in any of the mode of school will keep records of what the students shared so they are able to refer to it throughout the unit.

The teacher will share much of the information using a computer and SmartBoard in the classroom to share the information. In a remote setting, the teacher would still be able to share the images using Shared Screen features as well as using Google Slides or Microsoft PowerPoint to share the information in the Learning Management System.

When the students work on mental maps, we can create them using Google Slides, paper and pencils, crayons, and markers. The students can use either when they are physically in school or when they are in their homes learning. The students will be able to take pictures of their mental maps and submit them to the teacher using the Learning Management system or through the communication systems, such as ClassDojo or Seesaw, which is used by the school and teacher.

Fortunately, much of this unit uses technology so the students can easily have the same unit delivered to them in any of the three types of learning.