



## TEACHING APPRENTICESHIP PROGRAM

### CONTEXT

Provide context for the lesson. How, if at all, does it fit within a unit? Who are the learners? How long will the lesson last?

This is a lesson on inconsistencies in maps of the world. Students will examine a globe to find out that it's impossible to create a scaled drawing of a sphere, and therefore impossible to create a perfectly accurate world map. They will notice obvious differences in representations of area. We will discuss the creation of the map, why we still use the mercator map, and think critically about whether or not we believe the mercator map should continue to be used in schools.

### COMMON CORE STANDARDS

If applicable, provide specific standards that the lesson will target. Indicate if the standard is being introduced (I), practiced (P), or assessed (A) in this lesson.

CCSS.MATH.CONTENT.7.RP.A.2.A

Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

### GOALS

What are your goals for the lesson? Specifically, by the end of the lesson, 1) what do you want students to *know*? 2) what do you want students to be able to *do*? and 3) what you want them to *understand*? Not all lessons will have all goal-types.

SWBAT use knowledge of scale drawings, scale factor, and the constant of proportionality to critically analyze maps.  
SWBAT use knowledge of scale drawings, scale factor, and the constant of proportionality to determine that we can not create a scaled drawing of a sphere.  
Students will understand that maps are not scaled drawings of the world.  
Students will understand that the map we typically use serves the culture of power

### ANTICIPATORY PLANNING

Put yourself in the shoes of your students. Where in the lesson do you anticipate that they will struggle, and why? What questions, about procedures and/or about the content, do you anticipate that they might pose? How will you respond? (Math teachers can also use this [more comprehensive anticipatory planning resource](#).)

- Adopting a critical perspective in math class; students might have trouble thinking about Eurocentrism in the context of math.
- Add points on the map so they don't get confused where things are
- Show how to measure from dot to dot on the globe
- Check that they know where things are on the globe
- Add dot stickers on globes/maps

### PROCEDURE

Lesson Title: Maps

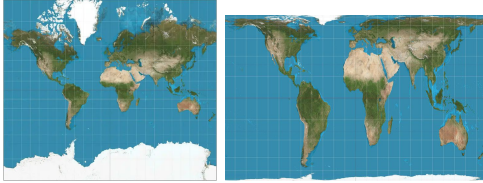
Subject / Grade Level: Math/7

Please provide specific descriptions of all activities, including estimated times and who/what/where, scripts of key points you plan to emphasize and questions that you plan to ask, and examples of what students might think or do.

**Framing or Launching the lesson** (connections, context, norms, or objective):

[Warm Up](#) (12 min)

What do you notice about these 2 maps?



If you're not sure what to write, think about: Which one are you familiar with? What differences are there? What similarities? Are these scaled drawings of each other? Are they proportional?

We are going to get some ideas about what you think you know and what puzzles you, and I am going to use the sticks to call on people. When I say go, turn and talk to the person next to you about what you think you know, and what puzzles you about these maps. Remember that if I pull your stick, it's okay to share your idea, your partner's idea, or you can ask your partner to share your idea.

**During the lesson:**

Instructions (6 min)

- We are going to continue to explore maps today, and we are going to use the globes to dig a bit deeper. Can someone please read the instructions at the top of your worksheet?
- You will use a piece of string and a ruler to measure the distances across continents/countries: Africa, Greenland, North America, Europe, and South America
  - Demonstrate how to use a piece of string and a ruler to measure (measure from the middle of the dot)
- Fill out the measurements in the table, and answer the 3 questions that ask you to consider the proportional relationship between the map and globe based on what you find out.
- Each table group has 4 maps. Because there are only 4 globes, tables 1, 2, 3, and 4 will start by measuring the distances on the maps. Tables 5,6, and 7 will start with the globes. Then we will switch.
- Check for understanding question: Give me a thumbs up if you are starting with measuring the globe

Pass out worksheet, rulers, string, globes (1 min)

Work time (20-25 min)

- Look for students noticing and wondering about the proportional relationship between the maps

**Closing the lesson** (synthesizing, checking for understanding, or connecting to the future):

Debrief (20 min)

- Let's look at question a. When I say go, turn and talk to the person next to you about what you noticed. I am going to use the sticks, so make sure you have one thing to share (it can be your partner's idea or your own)
- Question b: Why do you think that there is *not* a proportional relationship between the map and the globe? Can you draw any conclusions from that fact?
- Go over question C: Which do you think is more accurate?
- [Slides](#)
- The map that we looked at is called the Mercator map. It was created by this German dude, Gerardus Mercator, in 1569.
  - He was a cartographer, or mapmaker, and he made and dedicated his maps for wealthy and powerful people (like King Charles V)
  - He made this map during a time of European conquest, in order to best chart the routes from Europe to the Americas. They thought they were the first people to discover these places, but actually, people had already been living there for thousands of years.
- There are actually many more representations of the earth, like the one that we looked at during the warm up earlier. This is called an area map. What do you think that means?
- The map most accurate displays *area*. This doesn't necessarily mean that it's more accurate, because it's still a 2D representation of a 3D shape (planet earth), but it is an accurate representation of the size of things. Looking at this comparison now, do you notice anything else?
- Here is another map
  - Pacific-centered map
- Knowing what you know now about maps, globes, why do you think we still accept and use the Mercator map 450 years later (when we have made vast discoveries in space and mathematics)?
  - We don't typically question the systems that serve the dominant culture (usually, and in this case, European)
  - It fits well with the history that we usually learn about, centered around Europe and not looking at the perspectives of the people who were in the Americas first
  - We often frame the history of European conquest as "discovery" of new land, when the truth is that people were already living and thriving in those places
  - We have a pattern of giving white men credit for things P.o.C. already did ("Colombusing")
  - These aren't things that most people consciously think about. More like an invisible set of values that we become comfortable with because we don't really know any different or it doesn't affect us personally

### SUMMATIVE ASSESSMENT

How will you know if your students meet the goals of the lesson? What artifacts of student work will you collect?

Exit Card:

(5 min)

Do you think that we should continue using the Mercator map? Why or why not?

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### **MATERIALS & PREP**

What materials will you need to prepare ahead of time? How will the room be set up? What other logistical considerations do you want to plan for? Provide links to documents and/or slides if applicable.

- Globes
- [Worksheets](#)
- Rulers
- String
- Maps
- Dots
- Notecards (exit ticket)
- [Slides](#)