World Statistics and Data Science (Primary)

TEACHER	DATE

GRADE LEVEL	SUBJECT
Primary (1st-3rd grades and 4th-6th grades)	Math, social science, some geography

LESSON OBJECTIVE(S)

- SWBAT discuss how life is different for people from different places across the world.

MATERIALS

- Graph paper
- Interview worksheet (see associated materials)
- Grades 1-3: *If the World Were a Village* written by David J. Smith and illustrated by Shelagh Armstrong (Kids Can Press, 2011) with DVD. A video sample is available online: *https://youtu.be/ QrcOdLYBlw0*
- Grades 4-6: The Miniature Earth website (*http://www.miniature-earth.com/*) for the original 2010 video and more recently updated statistics
- *Optional for older grades:* Infographic website such as Infogram or Pictochart
- Frayer model or other vocabulary strategy

ENGAGEMENT

- Describe how the teacher will capture students' interest.
- What kind of questions should the students ask themselves after the engagement?

Demographics (statistics about populations) are a very powerful tool for understanding the world. To help students understand demographics, ask them to imagine the entire world as represented by 100 people. Then ask them to make predictions about what those 100 people would be like. Start with an easy one, how many people would be male and how many would be female? Then ask students to predict a few more.

1. How many would have computers?
2. How many would have access to clean water?
3. How many would speak English, and how many would speak another language?
4. How many would never learn to read?
5. What else do they know about the world that might be reflected in statistics about a village of 100 people?

You will share answers later in the lesson. For now, you just want to capture their perceptions of the world.

EXPLORATION

- Describe what hands-on/minds-on activities students will be doing.
- List "big idea" conceptual questions the teacher will use to encourage and/or focus students' exploration

To discover the data that becomes statistics, information must be collected first through intake before it can be analyzed. Explain to the students that today the class will become "data scientists" by collecting and analyzing information about their class. Have students pair up and interview a classmate to gather some data. See interview worksheet.

Sample questions include:

1. Do you have a pet at home?
2. How many people live with you (in your household)?
3. What language or languages does your family speak at home?
4. How many places has your family lived?

Have students share out their partner's responses, with a class volunteer to lead collecting (or aggregating) the data on the board. Next, create a snapshot of the data using graph paper. You could make a pie chart of pet ownership, or a bar graph showing how many students live with 3 people, 4 people or 5+ people in their house. Depending on students' ages, you could have them create their own graphs for one or more of the questions based on the class data.

EXPLANATION

- Student explanations should precede introduction of terms or explanations by the teacher. What questions or techniques will the teacher use to help students connect their exploration to the concept under examination?
- List higher order thinking questions which teachers will use to solicit student explanations and help them to justify their explanations.

Watch the If the World Were a Village video or read the book if your school library owns it (for younger students) or watch the Miniature Earth video (for older students) and project or hand out the statistics for discussion. Page two of the interview worksheet lists prompts for active listening. Have students complete their worksheet as they watch.

Lead a class discussion, asking students to share what they found surprising and what questions they have. After returning to their initial projections ask them how them might have changed their mental picture of the world. Raise questions about why data science is important for understanding not only culture, but also wealth and resources.

ELABORATION

- Describe how students will develop a more sophisticated understanding of the concept.
- What vocabulary will be introduced and how will it connect to students' observations?
- How is this knowledge applied in our daily lives?

Throughout the lesson students have been working with statistics. You may want to complete a Frayer model (or use a different vocabulary strategy) to explicitly define statistics, data, or demographics.

- Statistics — mathematics dealing with collecting, organizing, making sense of and presenting data
- Demographics — statistical data relating to populations and particular groups within it

GOING DEEPER

Option One: Classroom Venn Diagram
After having completed the interview worksheet, identify one or two questions that may have had overlap – for example, multiple languages spoken in the home or multiple kinds of pet. After tallying up the classes' responses, demonstrate how a Venn Diagram shows areas of overlap. Use this concept to demonstrate things that the class may have in common with different world cultures, such as playing an instrument or living with grandparents.

Option Two: Classroom Infographics
Dividing the class into smalls groups, ask each group to design a survey for information that want to collect on the entire class in order to analyze and present statistics about the class. After walking through how to produce percentages for each data point they collected, have them create their own infographic (similar to the Miniature Earth poster) by using Infogram, Pictochart, or another online resource.

EVALUATION

Give students an exit ticket. You may choose to ask students about what they learned today about the world or about their class. You may also choose to ask about what they are excited about for their visit to the Gates Foundation and to think of questions they may want to ask while on their trip.

DIFFERENTIATION STRATEGIES TO MEET DIVERSE LEARNER NEEDS

POSSIBLE STANDARDS

- CCSS.MATH.CONTENT.1.MD.C.4
  Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
- CCSS.MATH.CONTENT.2.MD.D.10
  Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems1using information present-ed in a bar graph.
- Washington State Social Studies EALR 3: GEOGRAPHY — The student uses a spatial perspec-tive to make reasoned decisions by applying the concepts of location, region, and movement and demonstrating knowledge of how geographic features and human cultures impact environments.
- Component 3.3: Understands the geographic context of global issues and events.

INTERVIEW A CLASSMATE!

PERSON INTERVIEWED	YOUR NAME

1. Are you right or left-handed?

2. Can you play an instrument? If yes, which one?

3. Do you have a pet at home? If yes, what kind?

4. How many people live with you?

5. What language or languages does your family speak at home?

6. How many places has your family lived?

CLASS TOTALS
Use this blank section to tally up the entire class' totals for each question.

VILLAGE OF 100 VIDEO

Fill out the chart below as you watch the video.

What things make particular groups in the village unique and different?	What things are shared in common by everyone in the village?

Facts that Interest Me	Facts that Surprise Me

Questions I Have