| **HG Unit 2 Population** | |
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| **Unit Overview** | |
| This unit will be exploring how population varies across Earth’s surface and over time. It will explore why humans live where they live, and why they do not live in other places. It will also explore different issues related to population, including measuring population, overpopulation, and sustainability. | |
| **Overarching Inquiry Question** | |
| How many people is too many?  *All units are created to support the* ***Overarching Inquiry Question****. Inquiry-Based Learning supports the* ***Profile of the South Carolina Graduate*** *where students use skills to explore their inquiries related to the content as indicated in the standards instead of the teacher merely providing the information.* | |
| **Theme** | |
| **Human Systems (HS)** – The HS theme encourages the study of various human activities and characteristics across Earth’s surface. The spatial distribution and movement of populations and the resultant changes form the basis of understanding. Cultural characteristics, economic systems, political systems, and settlement patterns are further examples of how human landscapes vary spatially.  **Applied Geography (AG)** – The AG theme encourages the study of how geographic literacy and geographic skills, such as mapping, are used to solve problems. An understanding of past and present spatial organizations of Earth enables people to better understand and plan for the changes in human and physical phenomena in the future.  *These themes are identified by the two letters at the end of each indicator.* | |
| **Skills Emphasis at a Glance** | |
| **M: Mapping-** Identify, use, interpret, and construct local through global scale maps  **MR: Models and Representation**- Identify, use, interpret, and construct geographic models and other visual representations from local to global scales.  **GE: Gather Evidence and Communicate Findings-** Identify, use, and interpret different forms of evidence, including primary and secondary sources, from local to global scales.  **CC: Conditions, Connections, and Regions-** Identify, compare, and evaluate the development of complex conditions, connections, and regions  **S: Scale-** Identify, compare, and interpret spatial hierarchies.  **DP: Distribution and Patterns-** Identify, analyze, and explain spatial distributions, patterns, and associations. | |
| **Standard(s)** | |
| HG.1.1.HS Identify and analyze the spatial distributions and patterns of human population using maps and geographic models and representations  HG.1.3.HS Analyze historical population and migration maps and models through time to predict future trends and patterns.  HG.1.4.HS Analyze and evaluate population and migration issues and policies from the local to the global scale using geographic models and representations.  HG.1.6.AG Gather evidence of human population and migration, construct a map to explain current or future development issues at different scales, and communicate findings. | |
| **I Can Statements** | |
| I can use different representations of data to identify and explain patterns of where human populations settle.  I can research and map population data.  I can use past trends in data to make predictions about trends in the future.  I can evaluate population issues and policies at different scales to make informed decisions. | |
| **Unit Sequence of Teacher Instructional Practices and Actions Students will Take to answer the Overarching Inquiry Question** | **Instructional Guidance and Resources**  *Instructional Guidance and resources listed below are offered as suggestions for educators to assist students in reaching the goals of the proposed sequence.* |
| **I can use different representations of data to identify and explain patterns of where human populations settle.**  **I can research and map population data.**  *Where do most people live on earth?*  Students will generate hypotheses to the question: *Where do People Live (inversely, where don’t they live) and Why?* Then students will look at the distribution of humans on the earth’s surface by creating a map of population distribution using [National Geographic’s MapMaker Interactive](https://mapmaker.nationalgeographic.org/#/). For more detail about generating hypotheses and how to use MapMaker Interactive, look in the Instructional Guidance Column.  Students can further study population density and be introduced to other important concepts like total fertility rate, natural increase rate, and mortality rates through [this GIS activity from ESRI](https://www.esri.com/content/dam/esrisites/en-us/media/pdf/geoinquiries/human-geography/3-worldpopulation-aphg-geoinquiry.pdf).  Students will compare *density* and *distribution* by creating a choropleth map of the United States in [this activity from National geographic Education](https://www.nationalgeographic.org/media/comparing-density-and-distribution/). After creating the choropleth map, the US students will compare their map with an arable land map of the [US](https://www.usgs.gov/media/images/map-croplands-united-states) or of the [World](https://www.usgs.gov/news/new-map-worldwide-croplands-supports-food-and-water-security) from the U.S. Geological Survey and as a class discuss the difference and any discoveries that are made about where we live and why. See Instructional Guidance for discussion questions.  Students will use their choropleth map to compare the US’s population density to South Carolina’s population density and explore density at various scales. South Carolina’s population density by county can be found at [World Population Review](https://worldpopulationreview.com/states/south-carolina-population/).  For additional activities about population density see the Instructional Guidance Column.  Once patterns in population density have been identified, test student hypotheses regarding where most people live on earth against this map. Be sure to explore the map at various scales (zoomed out to global scale, zoomed in to see patterns at regional and local scales). | For more on understanding population density, please see this post by the [Census Bureau](https://www.census.gov/newsroom/blogs/random-samplings/2015/03/understanding-population-density.html).  Where do People Live (inversely, where don’t they live) and Why? Hypotheses generation:   * hypotheses will be predicting patterns based on previous knowledge (e.g. “most large cities are located on rivers” or “most people live in tropical forests because those areas have large amounts of rainfall”). * Once on the National Geographic MapMaker Interactive website, in order to make a map, students should select “layers” on the right and then select “add layer.” Then, select “human populations” on the left. From the two pages that come up, go to the second page to find “population density” and click on the green plus sign to add this layer to your map. Then close out of the “layers” window and explore the map. Have students make observations and identify patterns, noting areas with more red dots (and thus greater population density) along coasts and rivers generally, and specifically in East Asia, South Asia, Southeast Asia, Western Europe, and Northeast North America. Note areas of low population density correspond with extreme climates or biomes like polar areas, deserts, or tropic forests.   In stations Students can explore maps from [Our World in Data](https://ourworldindata.org/world-population-growth) and gain a basic understanding of population. For more explanation on how to use Our World in Data and also some important key terms to go over see the Instructional Guidance column to the right. Students can also explore data from the [United Nations Population Fund](https://www.unfpa.org/world-population-trends) to understand these terms.  Our World in Data:   * Students will need to understand crude birth rate, crude death rate, age-sex distribution/sex ratio, arithmetic density, physiologic density, and agricultural density. * when you go to the website click on the All our charts on drop down menu called World Population Growth. In that drop down there are many maps that can help teach some basic population vocabulary terms.   Choropleth Map of US and Arable Land Comparison discussion questions: students will compare their map to other maps showing various types of density measurement to compare and contrast places that have high arithmetic density vs. places that have low arithmetic density, and then compare densities in a single area. Does an area with high arithmetic density also have high physiological density? Why or why not?  Additional Activities about Population Density:   * Another resource to use may be a cartogram to express population distribution on a global scale. For more information about cartograms, see these blog posts from [Population Education](https://populationeducation.org/what-cartogram/) or [National Geographic Education](https://blog.education.nationalgeographic.org/2015/01/30/new-world-population-cartogram/). * Students can compare densities in urban and rural places in different world regions by completing [this activity from the Census Bureau](https://www2.census.gov/programs-surveys/sis/activities/geography/hg-3_teacher.pdf). * For a more in-depth case study, have students study various population densities in Europe by reading [this article from City Lab](https://www.citylab.com/life/2018/02/theres-a-better-way-to-measure-population-density/552815/). Be sure to point out the issue in scale: the arithmetic density of a country doesn’t not mean that people are distributed equally throughout that county. |
| **I can research and map population data.**  **I can use past trends in data to make predictions about trends in the future.**  **I can evaluate population issues and policies at different scales to make informed decisions.**  *How do we represent demographic data?*  *Is the population growing or shrinking?* Introduce students to population pyramids by having them visit [PopulationPyramids.net](https://www.populationpyramid.net/) and focusing on the population pyramid first for the globe and then for individual countries, and compare them to the Demographic Transition Model. A reading about the Demographic Transition Model can be found at the [Population Education](https://populationeducation.org/what-demographic-transition-model/) website. Have the students complete a [Say Mean Matter](http://usddrtiliteracystrategies.weebly.com/say-mean-matter.html) with this text.  After looking at the Pyramids have a class discussion about population growth and the future. Students can watch this video from Hans Rosling about [Population Growth and Economic Development](https://www.ted.com/talks/hans_rosling_global_population_growth_box_by_box/up-next?language=en) to gain an understanding of how the Demographic Transition Model and Population interact with one another. Additional resources about population including graphs, TED Talks, documentaries, charts go to [Gapminder](https://www.gapminder.org/). For guiding questions and correlation with LDCs and MDCs see the Instructional Guidance.   Students will create a class population Pyramid. For details on this activity see Instructional Guide.  *How many people is too many?*  Students will respond in writing to the prompt: “How many people is too many?” and discuss this as a class. Students will watch a video from [Hans Rosling](https://www.youtube.com/watch?v=FACK2knC08E) about Population Growth and the earth’s carrying capacity, or this video from [NPR](https://www.youtube.com/watch?v=VcSX4ytEfcE). For discussion questions see the Instructional Guidance Column.  An interesting figure to introduce to students here is Thomas Malthus who studied population growth in Ireland during the Industrial Revolution. He proposed that eventually human populations, at various scales, would overpopulate, leading to a balancing mass-death event, particularly starvation, that would keep human populations in check. Many have refuted his findings throughout history. [This Crash Course video is helpful for this topic](https://www.youtube.com/watch?v=QAkW_i0bDpQ).  Case study: students will look at infographics, articles, and videos, and compare how China and Bangladesh dealt with overpopulation issues. Students will explore China’s One Child Policy (now Two Child Policy), with Bangladesh (widespread birth control rather than numeric limits). The class can also refer to PopulationPyramids.net and look at the population pyramid of the two countries and how they have changed over time. See resources in the Instructional Guidance Column.  Teacher will create a Gallery walk on issues associated with overpopulation: dependency ratio, lack of access to Healthcare, Gender equality, Environmental Impact, Resource distribution, Water and air quality/sanitation. To go into more detail with the dependency ratio teacher can consider using the Dependency ratio activity from the South Carolina Geographic Alliance. | Note: population growth during Neolithic revolution and industrial revolution - importance of food availability for population growth.  Students learned about rates and measurements of demographic change, such as Infant mortality rate, Crude birth rate, Crude death rate, Fertility Rate, Life expectancy, and Carrying capacity to analyze these rates in different places and predict future patterns earlier in this unit. A key concept to study here is the Demographic Transition Model, in which countries progress through stages of population growth based on economic development.  Terms to consider when discussing over population include:  -carrying capacity  -sustainability  -overpopulation  If teachers need some additional information about Say, Mean, Matter, visit [Literacy Strategies](http://usddrtiliteracystrategies.weebly.com/say-mean-matter.html).  Understanding the correlation between economic development and demographic transition may be helpful for students, but it is not necessary. When students do study this connection, either in unit 2 or later, an important model to consider is [Rostow’s Stages of Economic Growth and Development](https://www.thoughtco.com/rostows-stages-of-growth-development-model-1434564).  PopulationPyramid.net guidance: Note that population pyramids with wider bases tend to be LDCs while pyramids with less curved or angled sides tend to be MDCs with the most developed countries having inverted pyramid shapes, with smaller bases than tops  Guiding questions for exploring PopulationPyramid.net:   1. What patterns do they notice? 2. Are all population pyramids shaped like triangles (i.e. pyramids)? 3. Which countries can you find at each stage of the Demographic Transition Model? 4. What does the World’s population projection look like in the future? 5. What year will Stage 1 or Stage 2 countries reach stage 4 on the Demographic Transition Model? 6. What did population pyramids look like in different countries after major wars or genocides? 7. Some interesting and unique pyramids to compare and contrast are the United Arab Emirates, China, Japan, Algeria, and Bangladesh. There are many more pyramids that have unique population trends.   Class Discussion Questions:   1. what exponential population growth, or even continued rapid population growth, would mean for the future. 2. Will the population continue to grow at its current rate? Will it slow or stop? Why or why not? 3. Is that good or bad?   If teachers need some additional information about gallery walks, visit [Facing History and Ourselves.](https://www.facinghistory.org/resource-library/teaching-strategies/gallery-walk)  Class Population Pyramid: Students will collect data on their class and immediate family. All data should be voluntary and only needs to consist of gender identification and age. Students can create population pyramids to represent this data using paper and coloring utensils like crayons or markers or by making a bar graph in google sheets or Microsoft excel. Students who wish to make their population pyramids with these applications should follow [these instructions](https://iase-web.org/islp/apps/gov_stats_graphing/PopulationPyramids/PopulationPyramids-Instructions.pdf). Possible discussion questions based on the visual representation:   1. What general trends do you see? 2. If the class population pyramid represented an actual city, what would you believe to be true about that city?   How many people is too many writing prompt and class discussion: Have them consider this question at different scales   1. How many people is too many for a birthday party? 2. In a classroom? In a city? In a country? Etc. 3. Answers should be specific (i.e. a certain number) and/or a ratio (i.e. 100 people per hectare of farmland) but regardless should be defended with reason.)   China and Bangladesh Case Study Resources: These resources are just some examples of resources that you could use for the case study   1. [Video](https://www.youtube.com/watch?v=Fg7jIjmLyWs) from PolyMatter about why the One Child Policy was ended 2. [Infographic](https://www.aa.com.tr/en/info/infographic/13032) from Andalu Agency on the One Child Policy 3. [Article](https://www.washingtonpost.com/archive/politics/1994/08/26/in-bangladesh-population-control-national-survival/bc8bc55d-f1e2-4ddb-afcc-e65dd1737cb9/) from Washington Post about how Bangladesh lowered their population 4. [Article](https://blogs.worldbank.org/water/world-population-day-2017-what-can-we-learn-bangladesh) from WorldBank about how Bangladesh lowered their population 5. Another [Article](https://openknowledge.worldbank.org/handle/10986/26334) from WorldBank about Bangladesh lowered their population |
| **Connections to COVID-19 case study**  Students will explore how COVID-19 has affected the elderly population particularly in low income countries, and what that means for the future of those countries. Students can go to these websites to read articles about how it is affecting different populations, and how it is affecting countries differently depending on the stage they are in in the Demographic Transition Model.   1. [United Nations](https://www.un.org/development/desa/dspd/2020/04/social-impact-of-covid-19/) 2. [Center for Global Development](https://www.cgdev.org/blog/what-populations-age-structure-means-covid-19s-impact-low-income-countries) 3. [The World Bank](https://blogs.worldbank.org/opendata/impact-covid-19-coronavirus-global-poverty-why-sub-saharan-africa-might-be-region-hardest) 4. [BBC](https://www.bbc.co.uk/programmes/w3csym33)   Students will also explore how population density plays a role in the spread of COVID-19. Students can go to the following websites to look at population density and COVID-19.   1. [Our World in Data](https://ourworldindata.org/grapher/covid-19-death-rate-vs-population-density) 2. [Department of Public Health and Clinical Medicine](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7184409/pdf/taaa038.pdf) 3. [NASA SEDAC](https://sedac.ciesin.columbia.edu/mapping/popest/covid-19/) (Interactive MAP) 4. [Forbes](https://www.forbes.com/sites/sorensonimpact/2020/04/10/covid-19-and-social-impact/#44421a31546b) | This case study is a suggested way to connect the inquiry questions in each unit to authentic, on-going issues. This should allow for further inquiry on the part of the student, the application of geographic skills and concepts, and relevance to a current or contemporary crisis. Each unit includes resources for potential connections to this case study.  [The COVID-19 Dashboard](https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6) is a powerful tool for observing data on the geography of the pandemic. |

**References**

**Additional Resources**

COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. (n.d.). Retrieved from <https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>

The Agricultural Revolution: Crash Course World History #1. (2012, January 26). Retrieved from <https://www.youtube.com/watch?v=Yocja_N5s1I>