

Activity Investigate rates of population growth and decline with US census data.

MO-CLEs Standards **9-12-LS2 -1** Explain how various biotic and abiotic factors affect the carrying capacity and biodiversity of an ecosystem using mathematical and/or computational representations.

Learning Outcomes

- Students will be able to explain the types of growth models and support them using data.
- Students will be able to evaluate the effects of growth sources and evaluate the impacts on future populations.

Map URL: <http://arcg.is/Hj0aK>

Engage

How much has your county's population changed?

- Click the URL above to launch the map.
- Click the left with the layer name, **2016-2021 USA Population Growth**.
- ? How much will your county's population change from now to 2021? *[Answers will vary by county. For example, Boone county currently has a population of 177,949 and will increase to 191,620.]*
- ? Which counties have grown the most? Is there a regional pattern? *[Answers will vary.]*
- ? Which counties have declined the most? Is there a regional pattern? *[Answers will vary.]*

Explore

How does your county's growth rate compare to the rest of the state?

- ? Unlick the layer named **2016-2021 USA Population Growth**.
- ? Click the left with the layer name, **USA Projected Population Growth 2000-2021**
- ? What was your county's average annual population growth rate from 2000-2010? *[Answers will vary by county. For example, Boone county is 1.85%]*
- ? How does the growth rate compare to nearby counties? Include data in your answer. *[Answers will vary.]*
- ? How does the growth rate compare to the rest of the state? Include data in your answer. *[Answers will vary.]*
- The state of Missouri grew by 0.53% per year.

Explain

How can we describe the growth rate?

- Unlick the layer named **USA Projected Population Growth 2000-2021**.
- Click the left with the layer name, **USA Population Change 2000-2021**.
- To see data on population change, click on your state. Once the pop-up window appears, hover over the bar graph to get growth rates for 2000-2010, 2010-2016, and 2016-2021.
- ? What are the growth rates for the state of Missouri during the following time periods: 2000-2010; 2010-2016; 2016-2021? *[0.68%, 0.17%, 0.66%]*
- Next to the bar graph, click the arrow to show the line graph.
- ? Based on the line graph, what type of growth is Missouri currently experiencing? *[Logistic.]*



Elaborate

How can we estimate our future population?

- Unclick the layer names **USA Population Change 2000-2021**
- Click the left with the layer name, **2016-2021 USA Population Growth**
 - To see data on population change, click on your state. Once the pop-up window appears, hover over the bar graph to get growth rates for 2000-2010, 2010-2016, and 2016-2021.
 - ? How do the growth rates of your home county compare to the growth rates of Missouri? Is your county experiencing the same type of growth as the state? *[Answers will vary by county.]*
 - ? Would you expect your county to continue with this type of growth? Explain why or why not. *[Answers will vary by county]*
 - ? Based on the growth rate and projected population, what would your expected population be in 2035? *[Answers will vary by county]*



Evaluate

How well do you understand factors that affect population growth?

- ? What are the types of factors that affect population growth? *[Births, deaths, immigrants, emigrants.]*
- Unclick the layer names **2016-2021 USA Population Growth**
- Click the left with the layer name, **County Population Growth Source 2012-2013**
- Click the top left list named **Legend** for information about the types of sources.
 - ? What is the most predominant source of growth in your county? Does this support the growth rate of your county? *[Answers will vary by county.]*
 - ? What is the most predominant source of growth in the state? Does this support the growth rate of the state? *[Answers will vary by county]*
 - ? Based on the growth rate, projected population, and sources of population growth, would you expect a dramatic change in the growth of your county by the year 2050? Use data in your explanation. *[Answers will vary.]*

IDENTIFY A MAP FEATURE

- Click a feature on the map, and a pop-up window will open with information.
- Links and images in the pop-ups are often clickable.
- An arrow icon in the upper right of the window indicates that multiple features have been selected.
- Click the button to scroll through the features.

TURN A MAP LAYER ON AND OFF

- Make sure the 'Details' pane is selected, and click 'Show Contents of Map'.
- To show individual map layers, select the check boxes next to the layer names.
- Hint: If a map layer name is light gray, zoom in or out on the map until the name is black. The layer can no be turned on.

WWW.ESRI.COM/GEOINQUIRIES

Version Q4 2016. Send feedback: <http://mga.missouri.edu>

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