GRADE **8**

# COAST TO CACTUS
## IN SOUTHERN CALIFORNIA

## Curriculum and Lesson Plan Resource Guide

**theNAT**
SAN DIEGO NATURAL HISTORY MUSEUM

# Grade 8
# Population Growth

## Essential Question

*How will human population growth affect the natural habitats in and around San Diego?*

Once upon a time, natural habitat covered San Diego's coast and foothills. So many people living and building here has transformed this natural place. The relationship between population and the environment is complex. Societies' environmental impacts take different forms. We consume resources such as land, food, water, soils, and services from healthy ecosystems. Habitat loss due to destruction, fragmentation, or degradation is the major threat to the survival of wildlife. An ecosystem can be dramatically changed by human activities such as agriculture and urban development.

## Activity: Predicting Changes Over Time

In this activity students calculate the average population growth rate for the city of San Diego, estimate San Diego's population in 2050, and predict how that population change will affect the region's natural habitats.

### Materials

- Printed work sheets, one for each student
- Notebook
- Writing tools
- Calculator
- Access to a computer with internet (optional)

This activity is best done by students working individually before or after a visit to the *Coast to Cactus in Southern California* exhibition. *(See page 2 for activity instructions.)*

## Predicting Changes Over Time

### Advance Preparation
- Read through the activity instructions.
- Print worksheets, one for each student.

### Activity:

1. Begin by giving your student an introduction to San Diego's population. San Diego is currently the eighth largest city in the Unites States and the second largest city in southern California. San Diego also has a high population growth rate. Discuss with your students the habitat regions of southern California, which include the desert, mountain, chaparral, and coast. *What regions do they think are most threatened by urban or suburban growth?*

2. Pass out the population growth worksheet. Follow along with your students as they calculate the population growth rate and, based on that rate, estimate San Diego's population in the year 2050.

3. Discuss their findings as a class. *Based on their calculation, how large will the population be in San Diego in 2050?*

4. Discuss the effects that this population increase might have on local wildlife and habitats. *Do your students think there will need to be an increase in housing development? If so, do they think this will create pressure to develop currently undeveloped land? How will this impact habitats and wildlife? What conservation solutions can your students think of that might help to preserve natural habitats?*

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## NGSS Alignment for Grade 8
**Performance expectation:** MS-ESS3-3

| Science & Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
|---|---|---|
| Analyzing and Interpreting Data<br><br>Constructing Explanations and Designing Solutions | **ESS3.C:** Human Impacts on Earth Systems | Patterns<br><br>Cause and Effect<br><br>Stability and Change |

**Interdisciplinary Common Core Connections:** RST.6-8.1, RST.6-8.7, WHST.6-8.7, WHST.6-8.8, WHST.6-8.9

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## Key words

### Population
The number of people who live in a place.

### Population growth
The increase in the number of individuals in a population.

### Census
An official count or survey of a population, typically recording various details about individuals.

### Habitat
The place or type of place where a plant or animal naturally or normally lives or grows.

### Disruption
To cause something to be unable to continue in the normal way; to interrupt the normal progress or activity of something.

### Ecosystem
Everything that exists in a particular environment. An ecosystem includes living things, such as plants and animals, and things that are not living, such as rocks, soil, sunlight, and water.

## Extension
Have your students research animals or plants affected by habitat loss. Local examples include the San Bernardino Flying Squirrel and the Torrey Pine. More information about these species can be found on the *Explore the Region from Coast to Cactus* website. You can find more information at **coasttocactus.sdnhm.org.**

## What will they learn?
During this activity students learn about the relationship between population growth and habitat loss. Using past population data, students calculate an estimate for the future population of San Diego in the year 2050. Students predict the effect that this change in population will have on the various southern California habitats.

## Additional Resources
- Visit the *Explore the Region from Coast to Cactus* website to learn more about the different habitats in the southern California region. You can find more information at **coasttocactus.sdnhm.org.**
- Check out a specimen from our Nature to You Loan Library. For more information visit **sdnat.org/specimensearch** or contact the Loan Library at **loanprogram@sdnhm.org** or 619.255.0236.
- Visit the San Diego Natural History Museum and explore our *Coast to Cactus in Southern California* exhibition. San Diego is known for its incredibly diverse terrain, ranging from the beaches and chaparral near the coast, to the mountains and the desert farther afield. Using specimens from the Museum's scientific collections, alongside immersive environments, hands-on exhibits, live animals, and innovative media, *Coast to Cactus in Southern California* illustrates that richness by taking visitors on a journey through these habitats to explore the plants and animals that live in them.

Name: _____

### San Diego Population Data Provided by the U.S Census

**1990: 1,110,549**
**2000: 1,223,400**
**2010: 1,307,402**

1. Using the population numbers above, calculate the average population growth percentage using the data above from the last three U.S. censuses.

   To calculate the percentage growth:
   - First, work out the difference (increase) between the two numbers you are comparing.
   - Then, divide the increase by the original number and multiply the answer by 100.
   - Calculate this growth percentage for 1990 to 2000 and 2000 to 2010.
     Combine these two numbers and divide by two to calculate the average growth rate
     for the last 20-year period.

2. Calculate an estimate for the San Diego population in the year 2050 using your calculated growth rate. The formula to calculate future population given current population and a growth rate is:

   Population FUTURE = Population PRESENT x [(1+ Growth rate percent in decimal form) x Number of Years]

   For the Population PRESENT, use the most recent census population on record (1,307,402).