# Lesson Plan: S-Curves and Snakes

Understanding population curves

**Subjects:** Environmental Science, Biology, Social Studies, Physical Education
**Time required:** 55 minutes
**Related documents:** Guampedia: Brown Treesnake

**Grade-level:** Elementary [4-5] (advanced), Middle [6-8], High [9-12]
**Materials required:** Field or gym
**Related links:** Guampedia: Native Forest Birds of Guam
Island Areas – Guam Dataset

## Description

In this lesson, students will participate in a physical activity that teaches explains s-curves in population growth data. Students will also practice creating tables and plotting data points.

**Note:** This activity is designed for incorporation into a regular science curriculum that covers population curves.

## Objectives/Skills

- Students will read and discuss population growth trends (using whichever textbook is available and normally used to cover this topic).
- Visit the US Census Guam data online as of 2010.
- Students will then experience the population growth by playing the roles of snakes and birds.

## Questions or Assessment

- How well did students understand s-curves and population growth prior to the exercise?
- Following the exercise, do students have a firmer grasp of population curves?

# Procedure

***Teacher prep.*** None

***In-class Discussion of Population Growth Curves*** **(15 minutes)**

Using a textbook, handouts, or whichever method preferred, introduce the topic of population growth and s-curves to students.

1. Conceptually, many students will be confused by the manner and reasons for s-curve population growth. List their questions on the board.
2. To provide regional context, have students read about the predominance of the brown treesnake on Guam.
3. Also have them read about the decline of Native Forest Birds of Guam.

***Activity Preparation*** **(5 minutes)**

1. After asking for volunteers, assign two students to be "field researchers".
2. Explain that these two students will be venturing into the wild to record the growth pattern of the brown treesnake on Guam.
   - Have these two students bring a notepad and pencil with them.
   - Then share that the rest of the class will play the role of snakes and food.
3. Take students to a large, open space where students may run around and be loud.

***Playing*** **(15 minutes)**

1. Identify two "safe areas" on either side of the field. Explain that students playing the food (birds) are to attempt to cross from one side to another without being tagged (eaten) by a snake.
   - Further explain that resources (food/birds) lead to an increase of snakes. When a snake eats/tags a bird, then they can sustain, reproduce, and create more snakes.
2. Pick one student to be the first snake. She/he will stand in the middle of the gym/field.
3. The rest of the students are food (birds). They will line up on one side of the gym/field and attempt to cross to the other side.
4. Have the "field researchers" record the number of snakes and birds after each round.
5. The teacher will yell, "start," and students must immediately attempt to cross the field/gym. If they are tagged, they must freeze for the remainder of the round. After the round is over, they will become a snake and must attempt to tag/eat other birds.

6. When all the students have either crossed the field safely, or been tagged/eaten by a snake, then the round is over. Have the "field researchers" record the number of birds and snakes.
7. Repeat rounds until there are no birds left.

***Classroom Recap*** **(15 minutes)**

1. Upon returning to the classroom, have the "field researchers" write on the chalkboard the number of birds and snakes after each round.
2. Ask students to describe the experience. Write notes on the board.
   - Ask students if it was easier to get past the snakes in the earlier rounds.
   - Ask students if it became increasingly difficult over time to find food/birds to eat. Prompt them to explain further when were the easiest times to find food, and the hardest times.
3. Next, plot the points on an x-y axis with the x being time (each round), and the y being number of snakes.
4. The curve will be an s-curve. Returning to the descriptions listed on the board, identify on the s-curve when the hardest times were to find food, and the easiest times. Further explain that abundance of resources (and the lack of natural predators) can lead to population booms much like those experience on Guam in relation to the brown treesnake.

***Recap*** **(5 minutes)**

Recap what we've done and learned in the lesson:

> "Today we were introduced to the concept of population growth and s-curves. We also learned about the predominance of brown treesnakes on-island. We then role-played as snakes and birds, and experienced firsthand a population explosion. After plotting our field researcher's data points onto a graph, we created our own s-curve and hopefully better understood the concept by having actively participated in it."

Ask students for their favorite parts of the lesson.