SRC ☑

No More Room

Topic **Population (Carrying Capacity)**

Objectives

- Categorize what plants and animals need to survive.
- Estimate the chances of survival based on resource allocation.
- Judge the results of management strategies in terms of consumption versus resource availability.

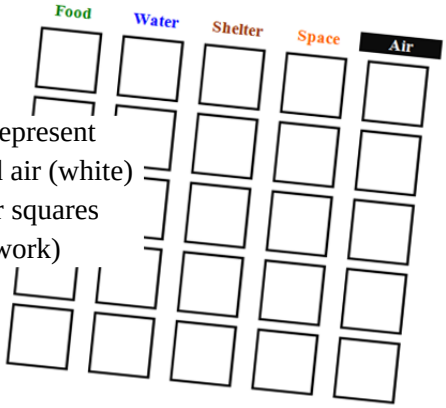
Duration 30 - 40 minutes

Assessment Type Summative

Students have difficulty connecting our need for the same resources as other organisms with the amount of life the planet can support. They also fail to associate changes in climate with the earth's ability to sustain life.

Set-up

Carrying capacity is a measure of the biomass of a population that can be supported by the ecosystem. The carrying capacity changes over time with the number of predators and resources (breathable air, food, water, shelter and habitat). Climate change is a large scale, long term process. Studies have shown a strong connection between climatic variables and carrying capacity. All organisms need food, water, shelter, plenty of space to gather these materials, and air. Animals and plants that do not get these materials in sufficient quantity and frequency will become endangered, and eventually, if the scarcity becomes a trend, will become extinct. In general, extinction is sped along by the impact of humankind on the environment. This impact is, more often than not, on the amount of space the plants and animals have in which to live. As space becomes scarce, so do food, water, and shelter. Air may also become polluted as a result of our intrusion into the organisms' space.



Materials

- ☐ Five colors of construction paper cut into one-inch squares to represent food (green), water (blue), shelter (brown), space (orange), and air (white)
- ☐ Opaque sack or bowl or similar container for distributing paper squares
- ☐ Blank sheets of paper (tabloid size is ideal, but letter size will work)
- ☐ Glue or tape

Instructions

1. Ask students to reach into the 'sack' and pull out five squares. *You may want to go around the room 5 times or draw out the squares yourself, depending on the age of the students.*
2. On the blank sheet of paper, have students set up a grid with column heading for the necessities (food, water, shelter, space, and air). For each trial, they will make a new row.
    a. Have the students sort, then glue, the color squares into each associated column.
    b. Once the squares are glued down, tell students that they must have at least one of each color square for their plant or animal to live comfortably.
3. Repeat these two steps, twice more.

Notes

If the same element is missing three times, the organism is considered endangered. If two elements (for example food and space) are missing three times the organism will become extinct.

Timesaver! Before students glue down the first trial, make sure they grouped their data in rows by year and columns by color!

You may also want to have students compare data or add their data together to see a more complete picture of a single ecosystem.

If students are very young, you may want to take elements around to each student so that he/she can save the plant or animal from extinction.

Discussion Questions

- Ask students if their plant or animal is getting enough of each of the five things they need to live comfortably.
- *If time allows, repeat the drawing and gluing twice more.* Examining each year, ask students which of the essential elements were missing from the animal or plant's environment. Ask them what will happen if their plant or animal cannot get the essential elements that it is missing.
- Ask students with endangered or extinct cases to show their data and tell about what happened to their plant or animal at the critical point in their data collection.
- Ask students to analyze their data and project what will happen to their plant or animal if the trend they see continues.

Reality Check! Evaluation

- ☐ Were students able to recognize what plants and animals need to survive?
  - o Food
  - o Water
  - o Shelter
  - o Space
  - o Air
- ☐ Using information from the data they collect, could students estimate the chances of survival based on the random resource allocations?
  - o Did they examine the columns to explain what the lack of particular resources mean in terms of the likelihood of the environment's ability to support life?
  - o Did they examine the rows to explain what the changes in particular resources over time mean in terms of the likelihood of the environment's ability to support life?
  - o Were they able to see the 'big picture' of how the two aspects impact the environment?
- ☐ Could students reasonably judge the results of management strategies in terms of consumption versus resource availability?
  - o Did students consider setting aside parkland or national park areas?
  - o Did they propose solutions based on using products that are not from endangered plants or animals?