Population Circle

Introduction:

Students may know that world population is currently about seven billion, but it is instructive to put that number in the context of history. By simulating population growth over the last 510 years, students discover that most of our growth occurred in the past 210 years.

Materials:

Counting Cards
Chalk or yarn

Procedure:

1. Cut out the Population Circle counting cards.

2. Using chalk or yarn, place a 10-foot diameter circle on the floor, and ask the class to gather around it. Explain to the class that the circle represents the Earth, and that you will be looking at how the population of the Earth changed from 1500 to 2010, a 510 year span.

3. Distribute the 28 counting cards. Each card represents 250 million people. If you have fewer than 28 students, you may use chairs or some other item to represent additional people.

4. Ask the two students with the number "0" on their cards to step into the circle. Explain that these students represent everybody who lived on the Earth 510 years ago, when our population was about 500 million people. Now about seven billion people live on the Earth.

5. Tell the class, "We will be counting from 1 to 102 to find out how our population grew. As we count, we will fast forward through the past 510 years. With every number we say, we will jump ahead five years. When we reach 102, all 510 years will have passed, and we will be at the present. Listen carefully, because when we get to the number on your card, you will need to step into the circle.

6. Ask the students to forecast the number when they think the next person will enter the circle.

7. As a group, start counting at a comfortable pace. Stop when you reach 102.

Concept:

The history of human population growth is a fitting real-world example of exponential growth.

Objectives:

Students will be able to:
- Describe the trends of human population growth.
- Explain the basic attributes of exponential growth (slow start, fast finish).

Subjects:

Geography, History, Math, Science, Social Studies

Skills:

Observing patterns, critical thinking, graphing

Method:

Students experience the changing pace of population growth by simulating the Earth's population growth over the last 510 years.

Discussion Questions:

1. What did you observe about how our population changed over time?

    It took a long time to add any people to the Earth. Most of our growth happened in just the past century.

2. After we started counting, who was the first person to join the circle? What number did he/she have? From the start, how many years did it take to add 250 million people to the Earth?

    The first person to join the circle had the number 53. It took 265 years to add 250 million people (53 x 5, or 265 years).

3. Towards the end of the simulation, how long was it taking to add 250 million people to the Earth?

    It took five years or less. Between the numbers 89 and 102, we added at least one person to the Earth with each number called.

4. Based on what you saw happening by the end of the simulation, how do you think this activity would be different if we came back in five years and did it again?

    The trend suggests we would need one or two more people for the simulation if we did it five years from now.

5. What would happen if we continued to grow at this rate?

    The Earth would become increasingly crowded.

6. If current growth rates continue, the world's population would double in about 60 years. How many more numbers past 102 would we need to count before the population of the circle doubled? How many more people would enter the circle?

    We would need to count to 114, or 12 more numbers (60 years/5 years=12). We would need to add an additional 28 people to the circle.

Follow-up Activity:

Using the data chart below, have the students draw a line graph to illustrate the history of population growth over this 511-year period.

Year	Population
1500	500,000,000
1600	545,000,000
1700	610,000,000
1800	1,000,000,000
1900	1,600,000,000
1930	2,000,000,000
1960	3,000,000,000
1975	4,000,000,000
1987	5,000,000,000
1999	6,000,000,000
2011	7,000,000,000

Human Population Through the Past 511 Years
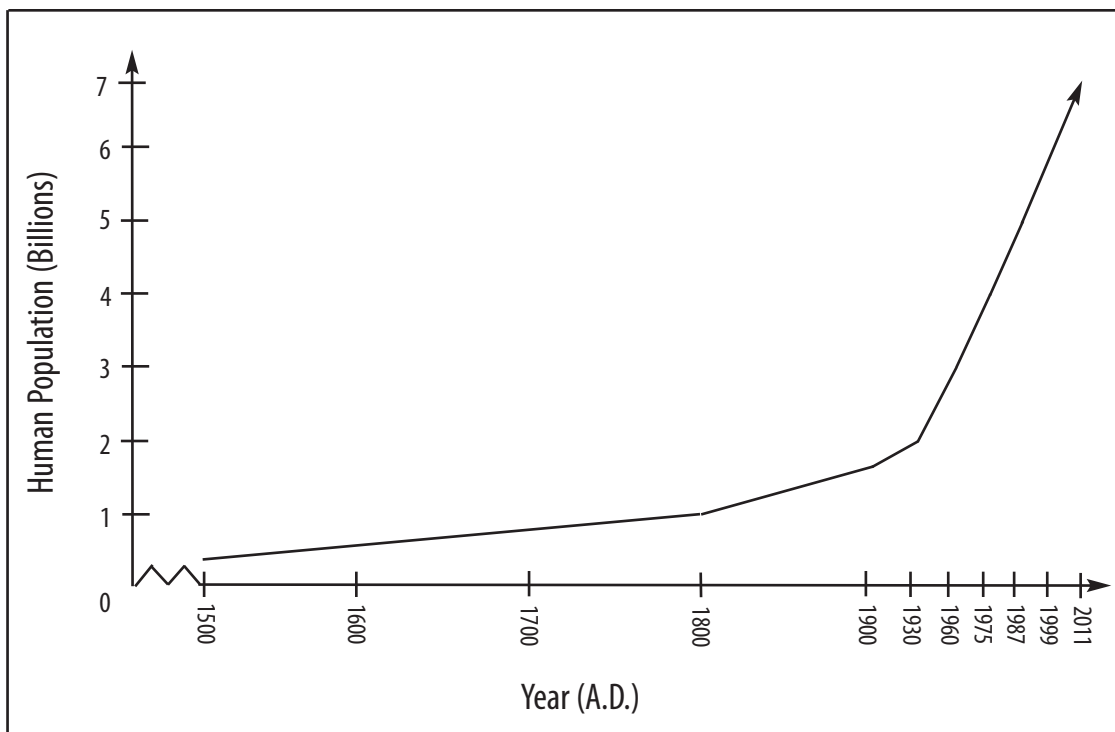
Population Circle Counting Cards

Population Circle **0** (1500)	Population Circle **0** (1500)	Population Circle **53** (1765)	Population Circle **62** (1810)	Population Circle **72** (1860)
Population Circle **77** (1885)	Population Circle **80** (1910)	Population Circle **84** (1930)	Population Circle **87** (1935)	Population Circle **90** (1950)
Population Circle **91** (1955)	Population Circle **92** (1960)	Population Circle **93** (1965)	Population Circle **93** (1965)	Population Circle **94** (1970)
Population Circle **95** (1975)	Population Circle **95** (1975)	Population Circle **96** (1980)	Population Circle **97** (1985)	Population Circle **97** (1985)
Population Circle **98** (1990)	Population Circle **99** (1995)	Population Circle **99** (1995)	Population Circle **100** (2000)	Population Circle **100** (2000)
Population Circle **101** (2005)	Population Circle **102** (2010)	Population Circle **102** (2010)		