



The Most Populous Country

Key Learning Content

This film provides a high-level introduction to inequalities. It illustrates the use of inequalities by comparing the populations of China and India. China currently has the largest population of any country in the world. The projected growth of China's population is shown on a line graph. India's population is then projected to be greater than China's by 2024. Inequalities are used to illustrate these relationships on screen.



No prior knowledge of inequalities is assumed prior to watching the film.

Core Outcomes

Learning Points

- Be able to understand and use the symbols $>$, $<$, \geq and \leq .
- Be able to understand the multiplicative nature of percentages when expressing growth, e.g. 1.5% growth corresponds to multiplication by 1.015.
- Be able to interpret information presented in linear and non-linear graphs.

Suggested Activities

- Order the populations of different countries using inequality symbols.
- Use inequalities to express the range of accuracy of numbers rounded to so many decimal places, significant figures, or nearest whole number.
- Calculate the rate of growth of countries' populations from historical data.

Extension Outcomes

Learning Points

- Be able to understand that when both sides of an inequality are multiplied or divided by a negative number, the inequality changes.
- Be able to use graphs to solve problems involving quadratic inequalities.

Suggested Activities

- Solve simple linear inequalities by algebraic manipulation.
- Model the height of a ball thrown up in the air and determine when it is above a given height.
- Work out how long it takes for a quantity to double in size at different percentage growth rates.



India's population is increasing by almost 1.5% each year.

Related Films

To use before the lesson plan:

Most Popular Pet

This film demonstrates the use of simple graphs to convey information.

Chinese Development of Maths

This film looks at how the world's most populous country developed mathematics by exploring number patterns.

To use after the lesson plan:

The Fibonacci Sequence

This film shows a different type of relationship between numbers, this time explaining the population growth of rabbits.

Could You Owe More Than America?

This film provides an exploration of compound percentage growth applied to America's national debt.

Hyperinflation: 1920s Germany

This film relates what happened in Germany when the compound growth of prices got out of control.

Calculating Pi: Archimedes

This film explains why any calculation with Pi always gives an answer within a certain range, but is never exact.

Guide Lesson Plan

Introduction

Give students a list of countries and ask them to put them in order of population size, using the inequality symbols to express the relationships between the quantities. Check answers for correctness, and for correct use of inequalities.

Show Film

The Most Populous Country

Main Activity

Foundation

Give students historical data on the population of different countries and get them to work out the percentage population growth rates year-to-year. Then ask questions expressed in terms of inequalities, e.g. for which country X is population $X >$ population UK? For which countries X and Y is population $X <$ population Y , but growth $X >$ growth Y ?

Main Activity cont ...

Advanced

Write inequalities using algebraic terms and get students to solve the inequalities by algebraic manipulation, e.g.:

$$\begin{aligned} \text{If} \quad & X + 7 > 3X + 2 \\ \text{then} \quad & 7 > 3X - X + 2 \\ & 7 - 2 > 2X \\ & 5 > 2X \\ & X < 2.5. \end{aligned}$$

Explore what happens when both sides of an inequality are multiplied by a negative number and derive general rules.

Extension Activity

Foundation

Ask students what they can say about the population of China if they are told that it is 1.3 billion to one decimal place. Use inequalities to express the range of possible values as $1.25 \text{ billion} \leq \text{population} < 1.35 \text{ billion}$.

Explain the difference between the different inequality symbols.

Advanced

Tell students that the height in metres of a ball thrown up into the air is given by the formula:

$$h = 10t - 5t^2 \text{ where } t \text{ is time.}$$

By drawing a graph of h against t , work out when the ball is above 2m, expressing the answer with inequalities.

Optional Extra

Set problems involving compound percentage growth and inequalities, e.g. if I invest £100 at 10% p.a. interest, how long will it be until my money $> \text{£}200$?

