Activity 148. Read the passage. In pairs, discuss the questions in the box.

Any topic in mathematics that makes use of the notion of a limit in its study is called analysis. Calculus comes under this heading, as does the summation of infinite series, and the study of real numbers. The Greek mathematician Pappus of Alexandria (ca. 320 C.E.) called the process of discovering a proof or a solution to a problem "analysis." He wrote about "a method of analysis" somewhat vaguely in his geometry text "Collection", which left mathematicians centuries later wondering whether there was a secret method hidden behind all of Greek geometry. The great René Descartes (1596–1650) developed a powerful method of using algebra to solve geometric problems. His approach became known as analytic geometry. The branch of mathematics that deals with the notion of continuous growth and change is called calculus (infinitesimal calculus). It is based on the concept of infinitesimals, exceedingly small quantities, and on the concept of a limit, quantities that can be approached more and more closely but never reached. The branch of calculus known as differential calculus deals with notions of slope, rates of change and ratios of change. For example, a study of velocity, which can be described as the rate of change of position, falls under the study of differential calculus, as do other concepts that arise in the study of motion. Any process that involves segmenting a quantity into manageable pieces, summing, and taking the limit of these sums as the process is refined falls under the category of integral calculus. The word "calculus" comes from the Latin word "calx" for "pebble," which in turn is derived from the Greek word "chalis" for "limestone." Small beads or stones arranged in a counting board or on an abacus were often used to aid mathematical calculations, and the word "calculus" came to refer to all mathematical activity. Today, however, the word is used almost exclusively to denote the study of continuous change.

(from Encyclopaedia Britannica)

1. Define the terms "limit" and "infinitesimal".
2. What is the origin of the word "calculus"?
3. What is the difference between analysis and calculus?
4. How has the use of the words "analysis" and "calculus" evolved?
5. Distinguish between infinitesimal calculus, differential calculus, and integral calculus.