

Circular pave-stones backyard"

Introduction

You work as an architect/designer of exterior places.

Your client has a rather difficult taste: he doesn't like vertices; therefore he would like his backyard to be covered with pave-stones in the shape of circular discs. He also wants the pave-stones to cover the maximum possible area, so as the grass that grows between the stones is as few as possible.

Your job is to find an ordering for the circular pave-stones, that leaves the minimum possible empty space between them.



Activity 1

We will use coins to model the pave-stones. Study the two different orderings of coins in the last two pages. In which of the two orderings do you think that the coins leave less empty space? Discuss.

Activity 2

For each one of the orderings, focus on the centres of the coins and describe how they are ordered.

For each of the orderings design various patterns that are created by the repetition of a polygon.

Activity 3

Calculate the percentage of its surface that it is covered by the coins for the various patterns for the two orderings. What are your findings? How do you interpret them?

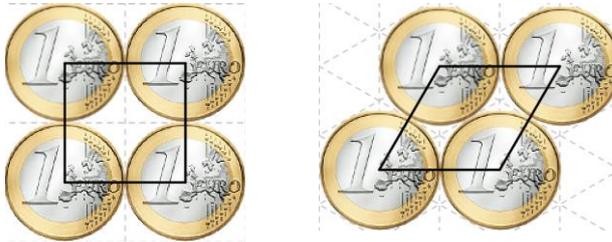
How could you define the percentage of coverage?

Activity 4

1. Try to divide the rhombus in 4 pieces, with which you will construct a normal hexagon and one coin.



2. For the following figures, compare the areas of square and a rhombus that have equal sides. Interpret the outcome.



Activity 5

Reflect on the outcomes. Think for example, how fruits are ordered in a grocery for space optimization?

