Grade / Age: 10-14 ages
Topic: Mathematics, STEAM
Subject area: algebra
Keywords: Pi, perimeter of a circle, infinite decimals fraction, approximate calculations
Single/ team work: single/pair
Language: (English or Local) English
Duration: 2 hours

Description of the Task:

1. Collect objects in the shape of a circle or cylinder of different sizes. Measure the perimeter of the circles with a ruler by rolling them. Then measure the diameter of the circles. Divide the perimeters by the diameters. Record the results in a table. What do you find?

2. Collect interesting facts about the history of Pi. In some eras, what was the precision with which the value of Pi was determined? How many decimal places are known today? What does it mean that Pi is infinite, but its decimals do not repeat periodic? Give numbers with infinite repeating decimals. Try to form a rule for numbers infinite but not periodic repeating decimals. Is this possible? To how many decimal places does your calculator give the approximate value of Pi?

3. What is a Pi day? Search the Internet for Pi verses. Also listen to a tune inspired by the digits of Pi: https://www.youtube.com/watch?v=OMq9he-5HUU

4. Draw a nice pattern with a divider, colour it so that the neighbouring regions are different colours.

Solutions of the Task:

1. They get approximately the same value.

2. Here it is worth dealing with the exact, approximate calculation. When should you use how many decimal places of Pi? It is recommended to solve several specific problems and to discuss in each case how many decimal places the result should be given.
You can also give rules for infinite non-periodic repeated decimal places, e.g. 0.101100111000...
but this is not the case for Pi, we only know the number of digits of Pi that have been calculated by computers, but we don't know what the next digit will be.

Pieces baked for the Pi-day:

Prior knowledge:
Calculating the perimeter of plane lines bounded by straight line segments.

Comments:
It is important that, after completing the curriculum, students are able to apply what they have learned to other subjects, for example when solving physics problems.
It is also important to recognise that in practical problems, approximate values are usually given, approximate values are calculated. For example, it makes no sense to measure the width of a table to the nearest tenth of a millimetre and then calculate its perimeter to the same accuracy. This problem usually occurs when calculating with a calculator. Children think that if the calculator calculates a result to 10 decimal places, it must give the result to the same extent. Remind them to round sensibly.

Connection to other subjects/topics/areas:
Technology, drawing, physics (tasks with physical content)