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IBL in maths lesson - is it possible?

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Science uses mathematical rules, formulas and equations. Without a mathematical description it is impossible to teach physics, astronomy, biology, geography and chemistry. I believe that mathematics should also become more experimental. Here are some examples of good practice in this matter.

Georges-Louis Leclerc, Comte de Buffon's problem was the inspiration to find the number **π**. It can be solved using integral geometry.
The experiment covers topics of probability, geometry, Monte Carlo method and great fun :-).
Entertainment has become a good point to work on finding **π** with IBSE.

FUN !!!

Exploring the Internet

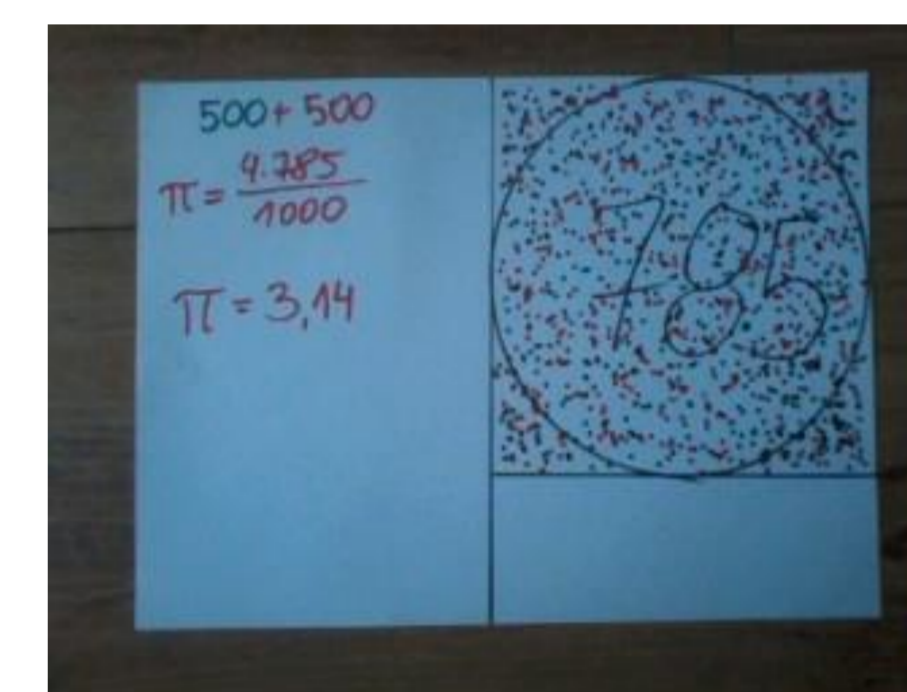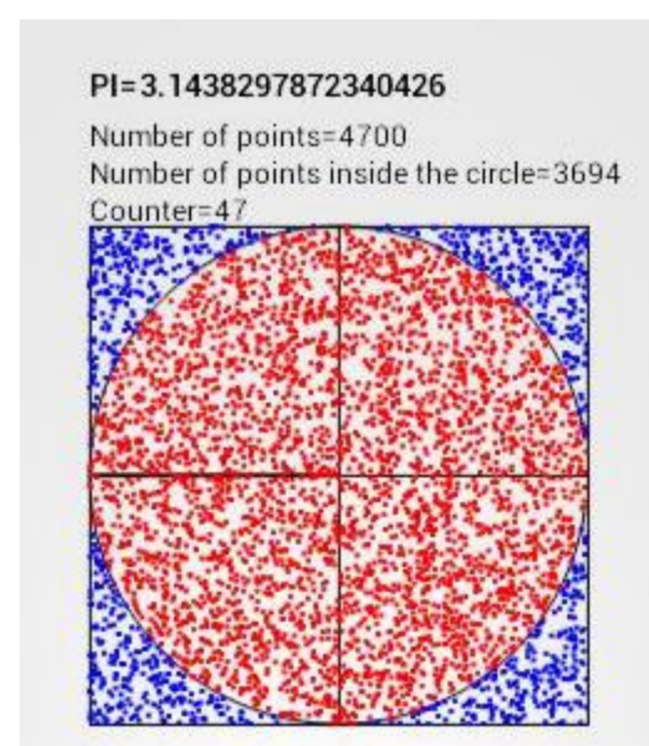$$\pi \approx \frac{2l \cdot n}{th}$$

a needle of length l

shoe

t - the width of the line
n - number of shoes on photos
h - number of shoes crossing black-white border

Pi determined from photos

π=16/5=3,2 ☺

… and more..

$$\pi = \frac{4n}{N}$$

n- number of points inside circle
N-number of points

PI=3.1438297872340426
Number of points=4700
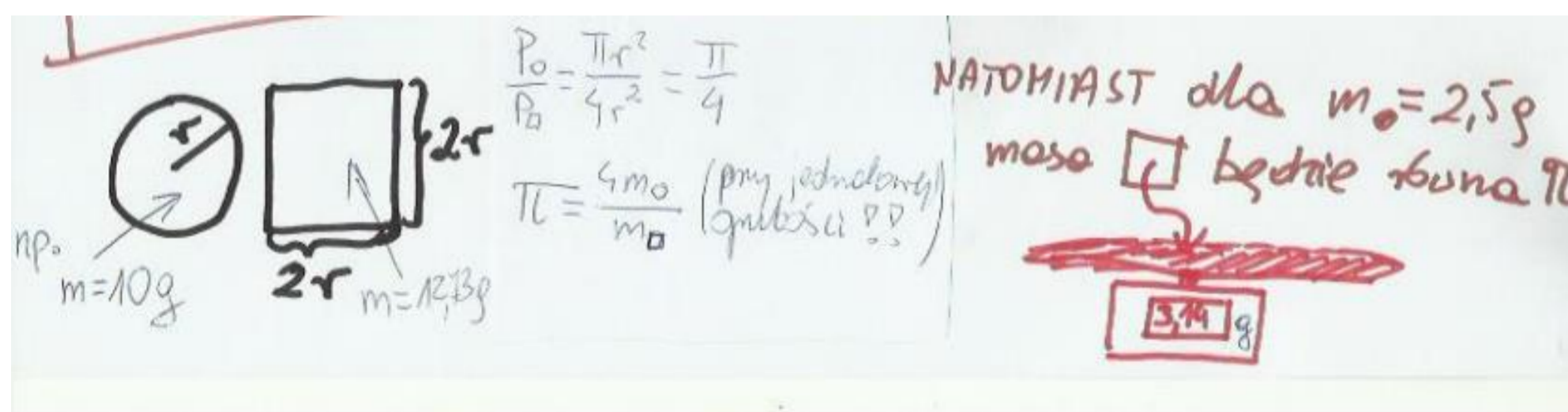Number of points inside the circle=3694
Counter=47

phone print screen   vs.   student's work
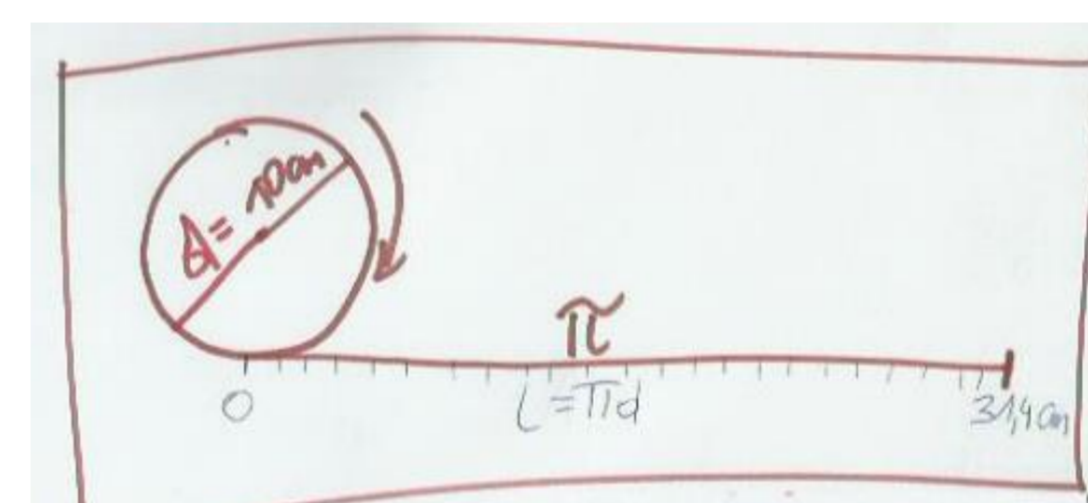
...simplification...

$$\frac{m_{circle}}{m_{square}} = \frac{\pi r^2}{4r^2} = \frac{\pi}{4}$$

...and even more simple...

$$\pi = \frac{l}{d}$$

l- circumreference of a circle
d- diameter

blueprint   final produkt

The exponential function

A half-life usually describes the decay of discrete entities, such as radioactive atoms. Thus definition: "half-life is the time required for half of the entities to decay" is inaccurate in case of small numbers of objects. Still the experiment helps to find a very good approximation of the exponential function.

a between 0 and 1

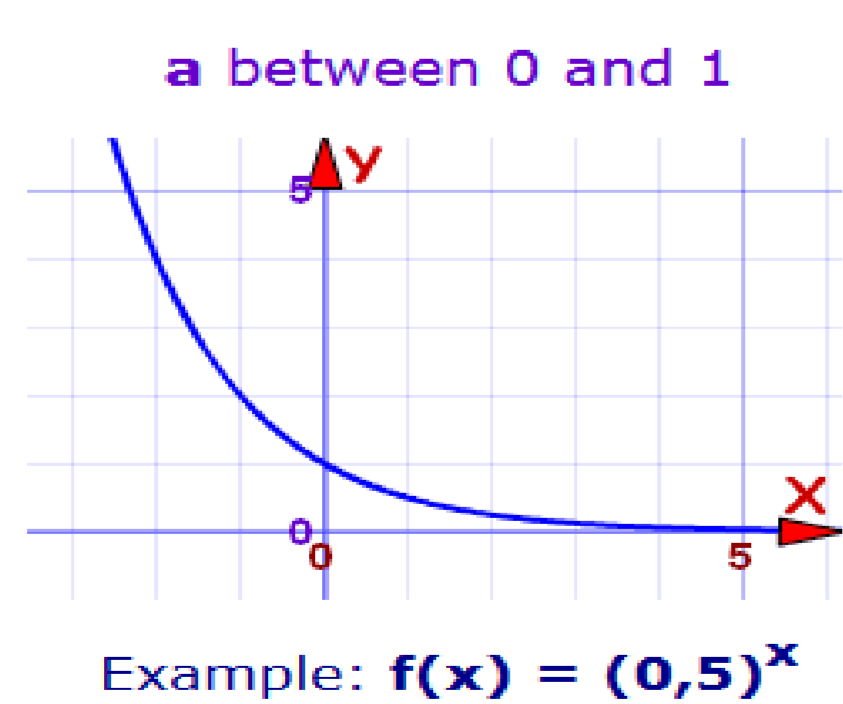Example: $f(x) = (0,5)^x$

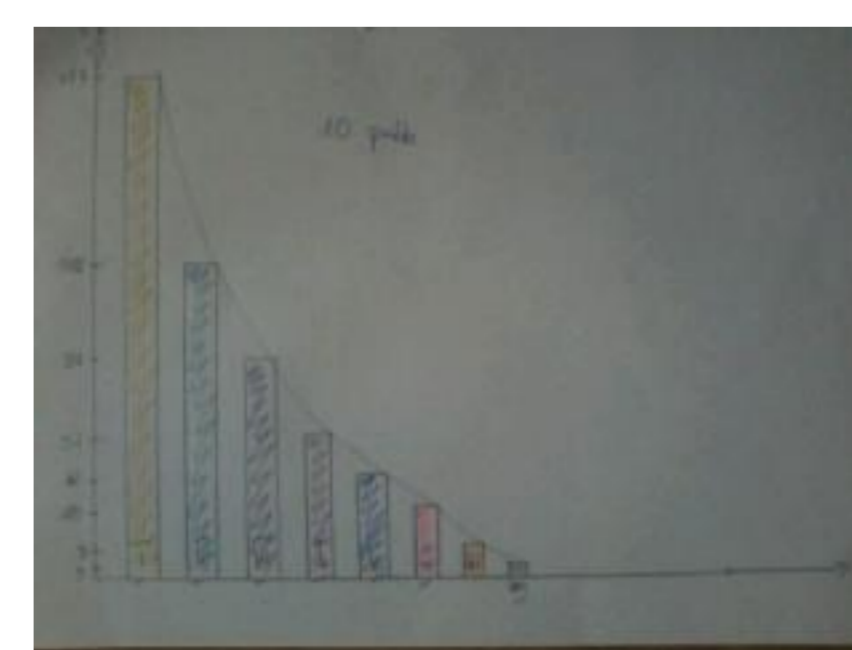Each vessel is filled half of the remaining water
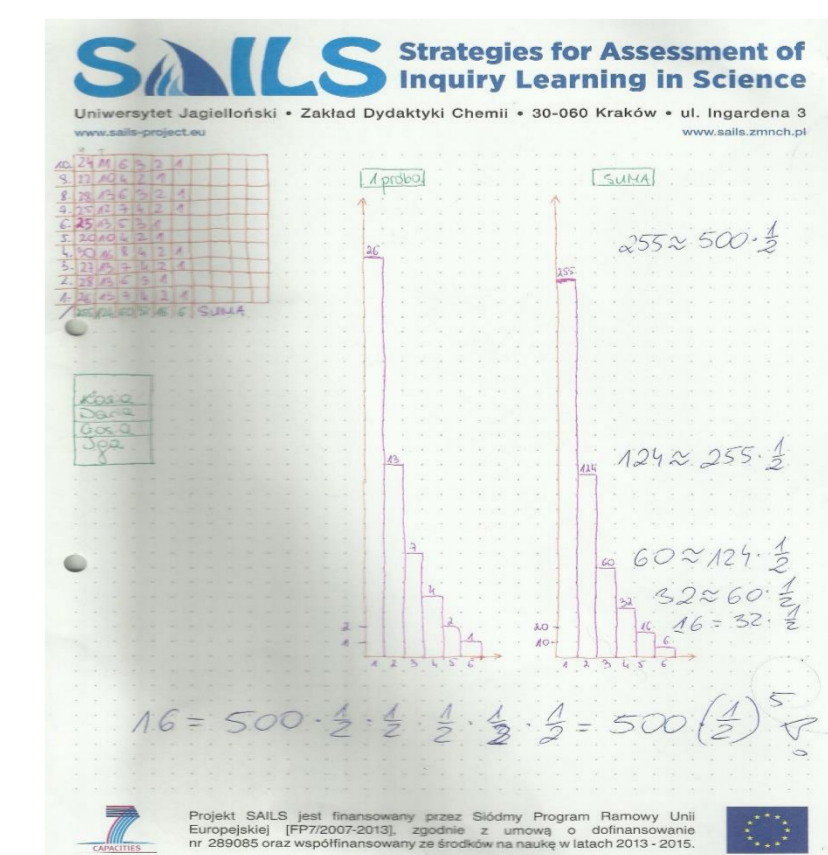

Effect of ten refills

Hundred of matches is divided in half, without counting

Brainstorming

Experimentally obtained exponential function

It works !!!