

Investigating Round Objects

Annotation

Simon can use appropriate accuracy and correct use of units when carrying out a measurement investigation. He recognises that greater precision requires greater measurement accuracy. He understands the derivation of pi.

Problem: Investigating Round Objects

The teacher poses the following task:

In my sewing kit are some round objects and a tape measure. I want you to investigate the ratio of circumference to diameter of circles, using these items.



Student Response

Circles

Shape	C (mm)	D (mm)	$\frac{C}{D}$ (3d.p.)
Big Reel	100	32	3.125
Pink Reel	71	22	3.227
Small Reel	95	29	3.276
Bobbin	66	20	3.300
Tin	217	65	3.338

average 3.253

$$\pi = \underline{3.142} \text{ (3d.p.)}$$

$$\frac{0.111}{3.253} \times \frac{100}{1} = 3.4\% \text{ (2d.p.)} \quad \text{difference } 0.111$$

So I got within 3.4% of π .

Teacher: Talk me through your investigation.

Well I measured all the circumferences and diameters to the nearest millimetre because that was as accurate as I could get with the tape. Then I divided them. I knew it wouldn't

Simon: be exact because it was really difficult to measure these small things well and the tape was a bit stretched out so I wasn't sure that it was as accurate as a good ruler, except that it bent around the curves well.

Teacher: But you gave your ratios to an accuracy of 3 decimal places. Tell me why you chose this number.

Simon: I knew I was going to find the average, so I wanted to keep a reasonable number of d.p. on so that the average...mean...was as close to the real answer as possible.

Teacher: Real answer?

Pi. Isn't that the number I was supposed to get? If I did this again with bigger objects and

Simon: a better tape, I could have got closer because my measurements would have been more accurate.