

3 Chicken nuggets

Learning objective

- To investigate possible combinations using a set of numbers and begin to investigate Frobenius numbers.

Reasoning skills

- Working systematically
- Solving problems
- Conjecturing and convincing
- Finding all possibilities

Curriculum link

- 13 Number and place value: investigate numbers

The problem

Problem 3

Chicken nuggets

Quick-Fry fast-food shops sell chicken nuggets in boxes of 6, 9 and 20.

The Potter family go to Quick-Fry and they all decide to order chicken nuggets,

Mum wants 10 nuggets. Dad wants 12 nuggets.

Scott, Beth and Ben each want 7 nuggets.

So all together, they want 43 chicken nuggets.

Can they order **exactly** 43 chicken nuggets?

Your challenge

Work out if it is possible to order exactly 43 chicken nuggets from Quick-Fry.

What numbers of nuggets is it possible to order?

Things to think about

- How will you record your answers?
- How will you make sure you have tried out all the possible combinations?
- Is there an easy way to prove if it is possible to order 43 nuggets from Quick-Fry?
- How can you make sure you have found all the possible numbers of nuggets which you can order?
- What patterns do you spot?

RISING STARS
Maths

Year 5 Problem Solving and Reasoning

Background knowledge

- Children are asked to investigate the different numbers which it is possible to make using the numbers 6, 9 and 12.
- The investigation, which ultimately relates to Frobenius numbers (which is not required knowledge in KS2), is a good opportunity to develop systematic thinking and recording as well as using knowledge of properties of numbers.
- Frobenius numbers are the highest number that it is impossible to make out of any set of numbers. For example, the Frobenius number of 2 and 3 is 1, as any number above 1 can be made by combinations of 2 and 3 (e.g. $7 = 2 + 3 + 2$).
- The Frobenius number of 6, 9 and 20 is 43, as any number above 43 can be made by a combination of 6, 9 and 20.
- An optional video to support this investigation and provide further stimulus can be found on this link: http://www.numberphile.com/videos/43_nuggets.html.