Investigation 1
Rhyme to riches

On a lonely beach you uncover a locked treasure chest containing an ancient puzzle and a bag of rusty keys.

There is a strange rhyme inscribed in the lid of the chest. The treasure is yours if you can decipher the rhyme and unlock the chest!

Only one key in 18 will open this chest,
Choosing the right one is now your quest.

Numbers square and triangular will not succeed,
Those divisible by 5 and 7 will also impede.

Numbers past 300 won't reveal the gold,
So calculate and eliminate before you grow old.

Ten plus one won't get the job done!
But prime will be your friend, right to the very end.

Remove all these numbers, the rhyme will tease,
Now turn the lock with just one of the keys.

✓ Topics

Before you start the Investigation you need to know...

☐ **NA1** Prime and composite numbers.....p32
☐ **NA2** Square and triangular numbers.....p34
☐ **NA3** Divisibility tests.....p36

Understanding the Investigation

1 Read and plan.

Make sure you understand the meanings of: *inscribe, impede, eliminate, Pascal's Triangle, factors, decipher, quest, ancient* and *succeed*.

Read and discuss the rubric.

Download your Investigation plan. This will help you with the organisation and understanding of the Investigation.

Teacher note

- Comprehensive lesson notes, suggestions and resources are available in *iMaths 6 Teacher Book*.
- The Investigation plan and BLM for this Investigation can be downloaded from **www.imathsteachers.com.au**.

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Materials


Internet access


BLM 1.1


Calculator

Using maths

2 The puzzle and the keys.

Download BLM 1.1, *Ancient puzzle*. Your first task is to fill in the missing number pattern in the puzzle. This number pattern is known as *Pascal's Triangle*.

In a *Pascal's Triangle* pattern, each number is the sum of the two numbers directly above it, as per the example on the right. Note that the outside numbers down each side of the triangle are always one.

When completed, the numbers in this pattern will match the numbers on the rusty keys in the bag that you found on the lonely beach.

3 List the number categories.

Carefully read the rhyme on page 8. List each category of numbers to be eliminated.

4 Which key?

Work out all the numbers in each category and eliminate them to discover the key you seek. When you find the magic number, keep it a secret.

Design a key that will unlock the chest. Hide the magic number somewhere on the key.

Reasoning and reporting

5 Reveal the magic number.

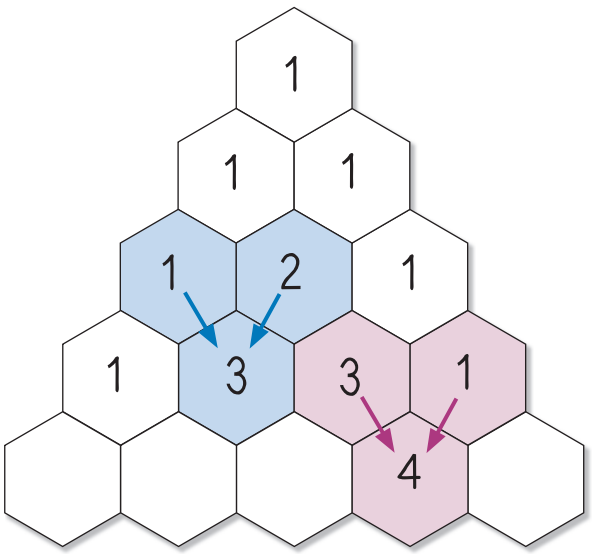
Hand in your key with the magic number.

Show evidence of how you eliminated numbers to reveal the magic number.

You could show evidence by circling numbers, underlining them or using coloured pencils to indicate the different categories of numbers that were eliminated.

imathskids.com.au

Go to **imathskids.com.au** – the Investigation 1 area contains the Investigation plan, websites and BLM that you need to complete this Investigation.



Pascal's Triangle

Inquiry

1 Write your own set of clues to open another treasure chest with a numbered key (the clues do not have to rhyme). Show how well you understand the various categories of numbers. Use the numbers 1 to 100 and write your clues so that only one number remains as the answer.

2 About 1200 AD Leonardo of Pisa established a sequence of numbers to make up the Fibonacci (fi-bon-ARCH-ee) sequence.

Go to **imathskids.com.au** and use the websites listed to investigate Fibonacci in nature or art.

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