MIGHTY MINDS
Educational Consultants

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SAMPLE

Pattern

Numeracy

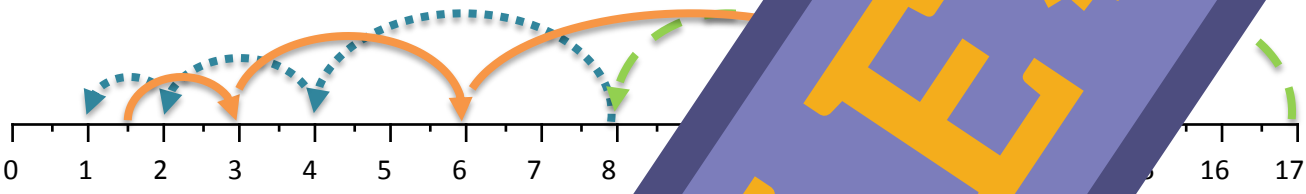
- Nature's Patterns
- Fossilised Fractions
- Ridiculous Ravines

Resource code: 27052646

Nature's Patterns

A NAP Mate ® Resource

As the Earth's surface changes, animals are sometimes f
to survive. ***Sometimes, some animals of the same species s***
Over a very long period of time, if these groups stay separa
become two different and unique species.



Q1 The number line above represents the … species are from a certain valley. Fill … oups of … rovided.

Each year, the tree frogs move _____ … . The tree frog moves _____ kilometres each year. This … _____ sequence.

Each year, the mice move _____ … _____ the valley. Their distance from the valley could be describ…

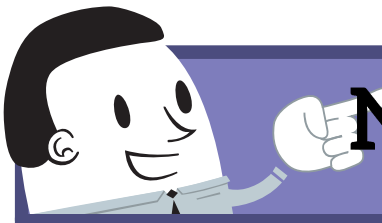
Each year, the e… …res _____the valley. Their distance from the valley cou…

the…	…ards	three	an addition
a…	…a smaller	away from	a division

…as not used to complete any of the sentences. Describe …ung the sentence below.

_____ number of kilometres _____ the valley.

… 1.5 kilometres each year, draw their movement on the number line at …ge, starting from the valley.



Nature's Patterns

A NAP Mate ® Resource

Q4 If each arrow represents one year of movement, how many
for the frogs to reach the valley from their current location?

Q5 If the mice continue to move following the s
valley in five years time?

Q6 Why might the mice be mo

Fossilised Fraction

A NAP Mate ® Resource

Fossils are the remains of prehistoric plants or animals.
rock, which can be analysed to determine how old the fossil

Q1 Fill in the blanks in the patterns below. Convert each an
draw each fossil at the correct depth in the rock belo

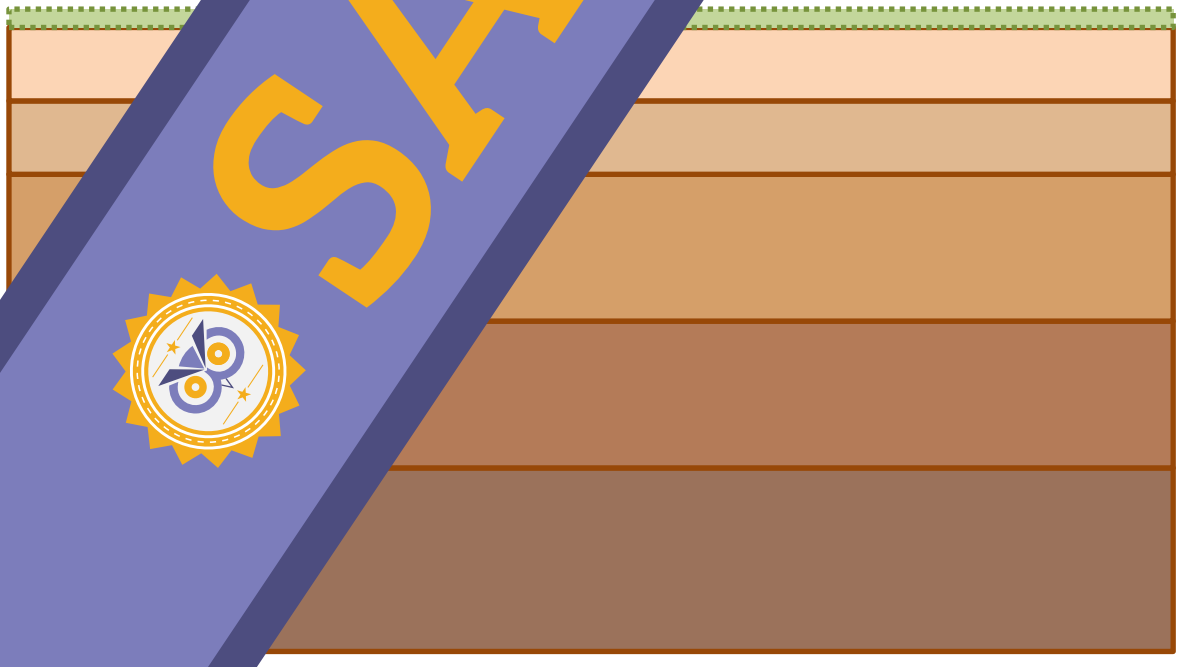
$\frac{4}{5}$ → $1\frac{3}{5}$ → ☐ → $3\frac{1}{5}$

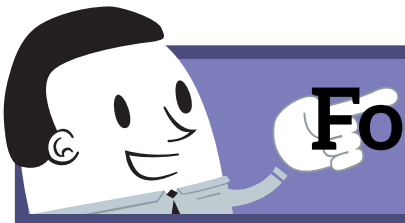
$4\frac{1}{3}$ → $1\frac{2}{3}$

☐ → $6\frac{7}{8}$ → $7\frac{5}{8}$

$3\frac{2}{3}$ → $1\frac{7}{9}$

$\frac{3}{4}$ → $1\frac{1}{2}$

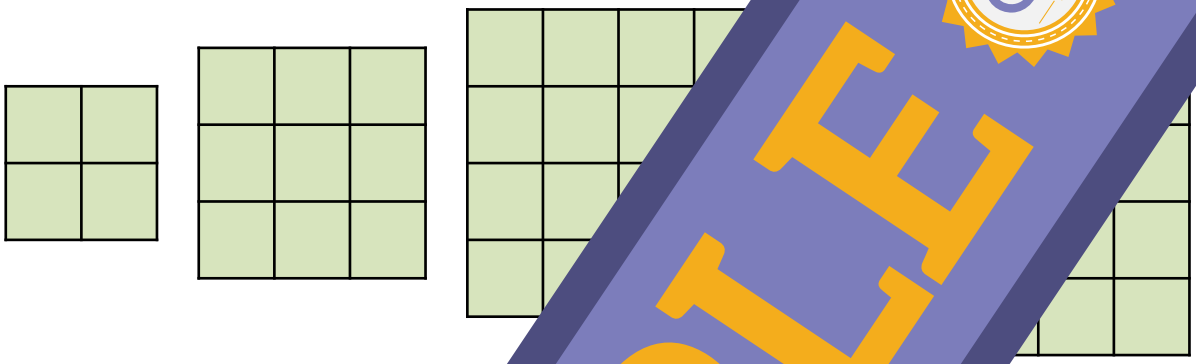




Fossilised Fraction

A NAP Mate ® Resource

Q2 Because it is very difficult to study large areas of land, scien
sample squares to study. Calculate the size of each samp



_____m² _____m² _____m²

Q3 Counting up each small sq e the area, but using
width x height is much q ee squares in the pattern.

Q4 Scientists uares to estimate information about the
total are n below to fill in the blanks.

Total grid area: _____

Fossils in sample area: _____

Average fossils per metre²: _____

Estimated fossils in 100m²: _____

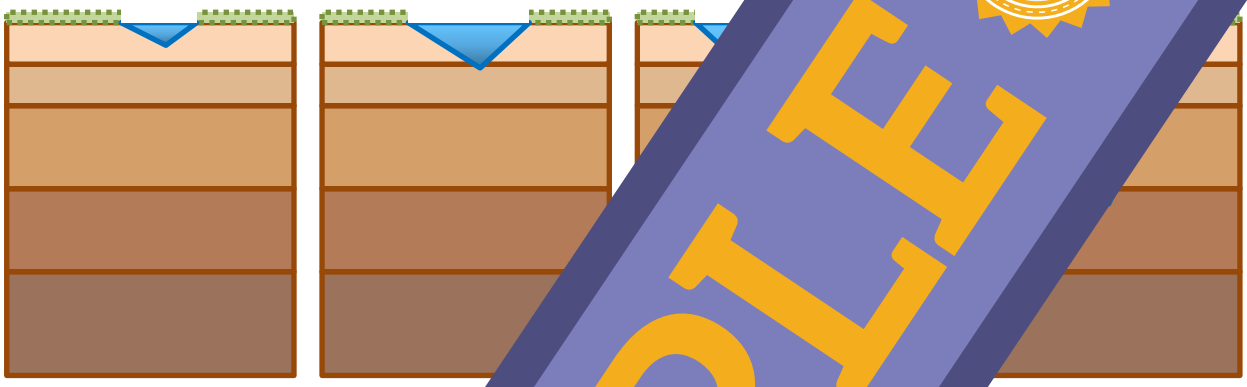
Estimated fossils in 3500m² _____

Ridiculous Ravine

A NAP Mate ® Resource

Fast-flowing rivers can cut through solid rock to form de
called erosion and usually occurs over many years.

Q1 Below is the cross section of a river. Measure the depth
point in time. Measure the surface of the water when



1700 18 2000

Depth: _____

Width: _____

Q2 Consider the measu atterns.

_____

_____

Q3 Calculat 00, 2100 and 2200. On the cross section below

1600 Dept _____

1600 W _____

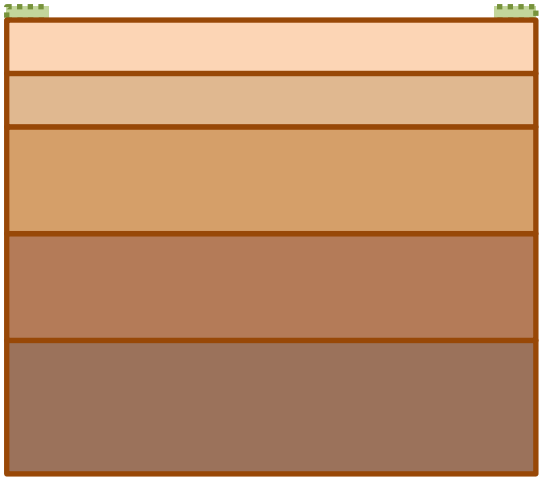
_____

_____

_____

_____

_____



2100

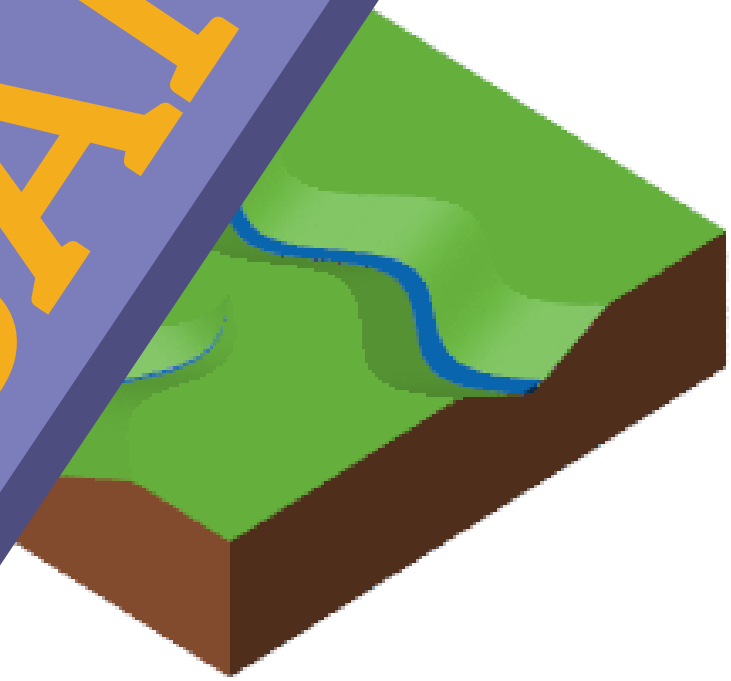
Ridiculous Ravine

A NAP Mate ® Resource

Q4 Do you think the river will continue to grow according to this

Q5 If you were only considering river depth, wha ck in time using this pattern? Would the river dis

Q6 Is it possible to use the pattern t nt past?




SAMPLE
MIGHTY MINDS
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FOR THE TE

Mighty Minds Lesson Inst

'Fundamentals' Lesso

Firstly, thank you for your support of Mighty Minds and our reso
quality resources that are both educational and engaging, and
works.

To assist you in using this resource, we have compiled s

About this resource

This Mighty Minds 'Fundamentals' Lesson focus ests and
presents this skill through a theme from the Au Geography).
This lesson is also targeted at a certain skill l mpleting work
that is suited to them.

How to use this resource

Our 'Fundamentals' Lessons are sp contain different types of
resources.

The student workbook contain
- The main title page; and
- The blank student work

The teacher resources
- This set of instruct
- The Teacher's C be needed to teach the lesson;
- The Item Desc e lesson and its aims, as well as extension ideas;
- The studer ponses on the student worksheets to ensure that ansv
- The te nore detailed explanation of the model responses or an
- Fin

W book (the first set of pages) for the students. If students a , you may also like to provide them with the student answer

ng us

s that if you email us with suggested changes to any lesson, we will send you the revised lesson – free of charge.

o resources@mightyminds.com.au and we'll get back to you as soon as we

Number Patter

Number patterns involve a sequence of numbers, in either asce
each number follows the same rule. Students will often be ask
sequence, which involves them first working out the rule tha

Addition and Subtraction Sequences

These are the most simple type of sequence, where ea by
adding or subtracting a value from the previous numb nce, the
first step should always be to check the difference h s the
same between each number, then the rule is eith

3, 1

This pattern is ascending and each number s number in the
sequence. The next number in the seque ple:

This pattern is descending and eac **4** from the previous
number in the sequence. The ne 14 = 29.

Multiplication and

These sequences are slight er is calculated by multiplying or
dividing the previous numb mple:

This pattern is asc **multiplying the previous number by 3.**
The next number

3, 14

This patter culated by **dividing the previous number by 2.**
The next = 7.

The students, but do not abide by addition, subtraction,
m s important to familiarise students with them.

1, 4, 9, 16, 25, 36, 49, 64

culated by squaring each consecutive integer. The numbers in this
x1) = 1, 2^2 (2x2) = 4, 3^2 (3x3) = 9...

This teaching guide is continued on the next page...

...This teaching guide is continued from the previous page.

Cube Numbers

1, 8, 27, 64, 125, 216, 3

Numbers in this sequence are calculated by cubing each
numbers in this series are calculated thus: 1^3 (1x1x1) =

Complex Sequences

Complex sequences involve a rule that requires t
number in
the sequence from the previous. For example:

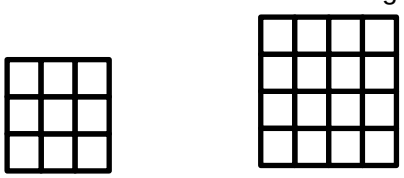
Each number in this sequence is calcula
by 2 then subtracting
1. Complex sequences are often very
working out a
complex sequence is to list the ways
culated from the first
number, then seeing if any of thes
mber. For example, in the
sequence above, 5 can be calcu

- 3 **+ 2** = 5
- 3 **+ 3 – 1**= 5
- 3 **/ 3 + 5** = 5
- 3^2 **– 4** = 5
- 3 **x 2 – 1** = 5

When applying th
in the sequence, only the last rule
produces the rig
nce.

Diagram

A diagra
of diagrams, each diagram changes (often by
increas
rtain rule. Consider the following sequence of
diagr



ncreasing its size by increasing the length of each side by one
increases the number of boxes according to a square number
s page). A strategy for solving diagrammatic patterns is to use a
to colour the part of the diagram that has changed from the previous
nally, often diagrammatic patterns are related to numerical patterns, so
nstituents (in this cases the number of small squares), can help determine
the next diagram in the series.

Item Description

Please note: any activity that is not completed during class time undertaken at a later date.

'Nature's Patterns', 'Fossilised Fr… Ravine…

- **Activity Description**:
  - In this activity, students are require… …cal and diagrammatic forms.
    - In the first activity, 'Natu… …terpret data presented on a numbe… …ity is designed to enhance students' a… …erent type of patterns.
    - In the second activ… …equired to identify addition and sub… …tudents are also required to calculate the… …tern involved.
    - In the final ac… …required to measure depth and width o… …mment on the patterns of growth.

  - ***Purp…***
    - …pret and extend addition and subtraction … fractions and multiplication and division …egers.

…ing of pictures/ illustrations (α5)
…aning of tables or diagrams or maps or graphs (α6)
…ns (β49)
…θ35)
…5)
… presenting/ arranging/ displaying (π20)
…g with or without calculators (Φ16)
…g a progression of steps to achieve the required answer (Φ37)

…d Time Allocation:

…is lesson is designed to take approximately one hour to complete – 20 …minutes per activity.

This Item Description is continued on the next page...

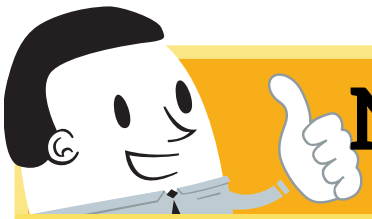
Item Description – continued

…This Item Description is continued from the previous page.

‘Nature’s Patterns’, ‘Fossilised Fr
Ravine

- **Teaching Notes:**
  - Students should understand the ba… …ltiplication and division sequences before beginni…
  - Students should complete each… …lutions as a class.
  - Students will require a calcula…
  - If students are struggling wit… …om revision of the principles behind patterns…
  - As an extension to activi… …special sequences’, such as cube numbers, and… …life.
  - Activities one and tw… …nature of patterns. An extension to either… …patterns can be seen in real life.

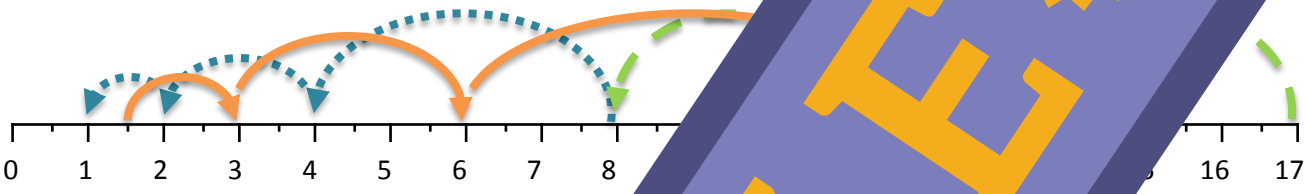
- **Follow Up/ Class D…**
  - What are so… …ntire species might relocate?
  - What do st… …patterns?
  - What do t… …? Why are humans so close to the surface?
  - What… …he world?



Nature's Patterns

A NAP Mate ® Resource

As the Earth's surface changes, animals are sometimes f
to survive. ***Sometimes, some animals of the same species s***
Over a very long period of time, if these groups stay separa
become two different and unique species.



Q1 The number line above represents the … species are from a certain valley. Fill … oups of …rovided.

Each year, the tree frogs move the same … . The tree frog moves three kilometres each year. This … ion sequence.

Each year, the mice move a … n the valley. Their distance from the valley could be describ…

Each year, the e… res towards the valley. Their distance from the valley cou…

the…	…ards	three	an addition
a…	…a smaller	away from	a division

… as not used to complete any of the sentences. Describe … ung the sentence below.

… ame number of kilometres away from the valley.

… 1.5 kilometres each year, draw their movement on the number line at … ge, starting from the valley.

Nature's Patterns

A NAP Mate ® Resource

Q4 If each arrow represents one year of movement, how many
for the frogs to reach the valley from their current location?

8km from valley / 3km per year

8 / 3 years = 2 and 2/3 years = 2 years and 8 months

Q5 If the mice continue to move following the s
valley in five years time?

384km from the valley in five years time

Q6 Why might the mice be mo

The mice might be moving a
towards the valley, as ea

es which are moving

Nature's Patterns

Question One:

Students were required to interpret a number line marked wit
species. The number line represented the distance of each
were required to fill blanks in sentences describing the inf

Model Response:

Each year, the tree frogs move the same n *The tree frog moves three kilometres each year. T* *raction sequence.*

Each year, the mice move a greate *lley. Their distance from the valley could be*

Each year, the eagles move a *e valley. Their distance from the valley could be des*

Question Two:

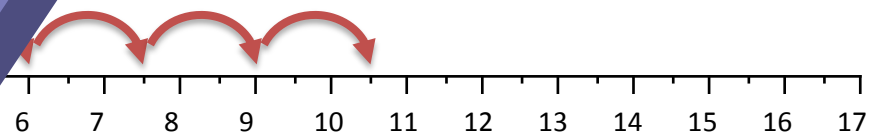
Students were then requi not been used to complete any of the sentences. The corr ents were required to complete a sentence describing t

Model Response:

Each y *of kilometres away from the valley.*

Q

Stude t of the snakes on the number line. They were told that the from the valley.



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Question Four:

Students were required to calculate how many years and mo
valley from their current location. The frogs' distance from
subtraction pattern: decreasing by 3km each year.

Model Response:

8km from valley / 3km per year
8 / 3 years = 2 and 2/3 years = 2 years

Question Five:

Students were required to calculate how
assuming they continue to move acco

e years time,

Model Response:

12 x 2 = 24
24 x 2 = 48
48 x 2 = 96
96 x 2 = 192
192 x 2 = 384km

Question

Students were a
picture provide

nice moving away from the valley. The

Model Res

e valley to avoid the eagles which are moving
mice.

Fossilised Fraction

A NAP Mate ® Resource

Fossils are the remains of prehistoric plants or animals.
rock, which can be analysed to determine how old the fossil

Q1 Fill in the blanks in the patterns below. Convert each ar
draw each fossil at the correct depth in the rock belo

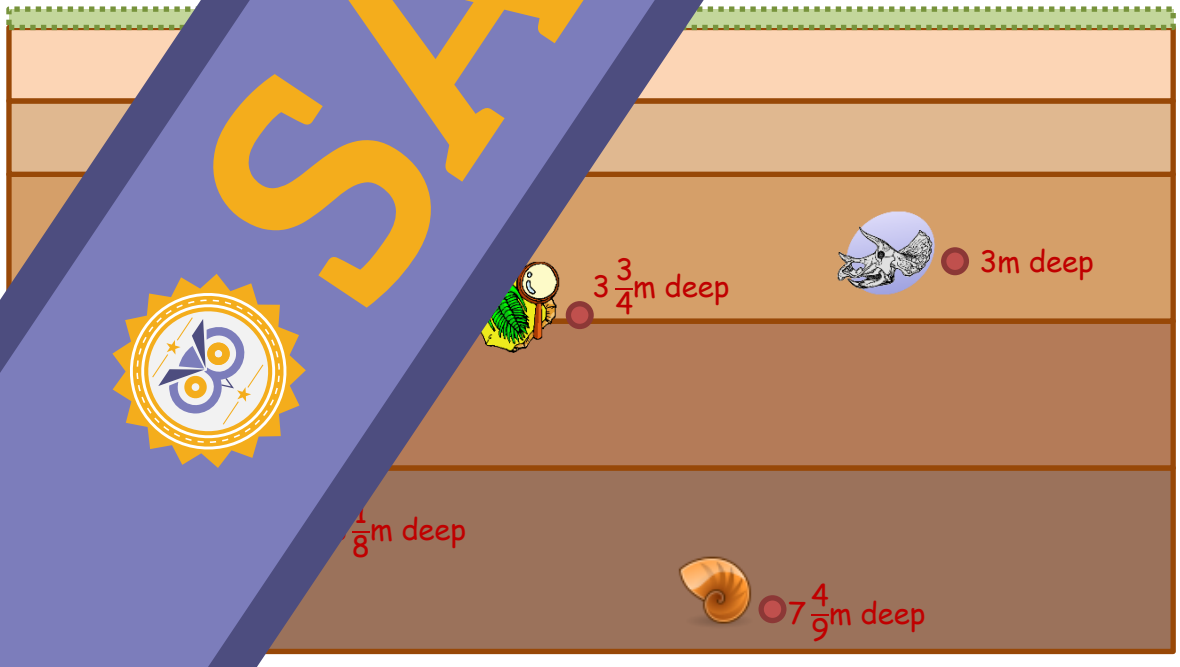
$\frac{4}{5}$ → $1\frac{3}{5}$ → $2\frac{2}{5}$ → $3\frac{1}{5}$ →

$4\frac{1}{3}$ → $1\frac{2}{3}$

$6\frac{1}{8}$ → $6\frac{7}{8}$ → $7\frac{5}{8}$ →

→ $3\frac{2}{3}$ → $1\frac{7}{9}$

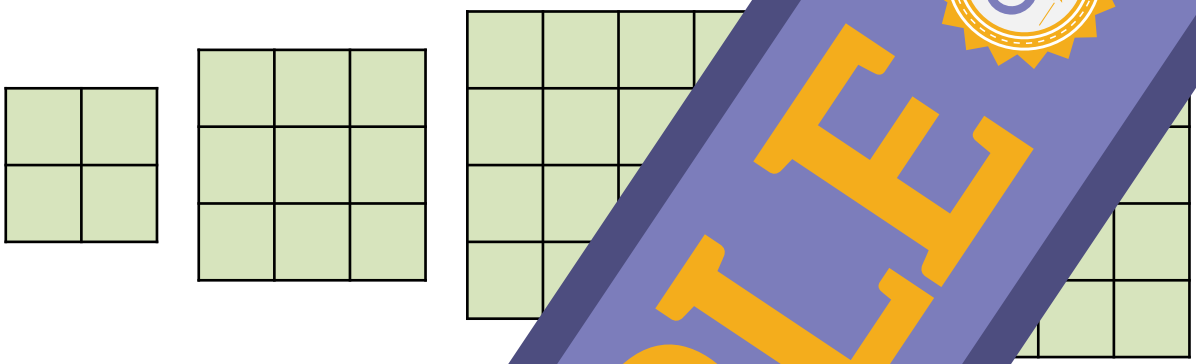
$\frac{3}{4}$ → $1\frac{1}{2}$ → $\frac{4}{4}$



Fossilised Fraction

A NAP Mate ® Resource

Q2 Because it is very difficult to study large areas of land, scien
sample squares to study. Calculate the size of each samp



4 m² 9 m² 25 m²

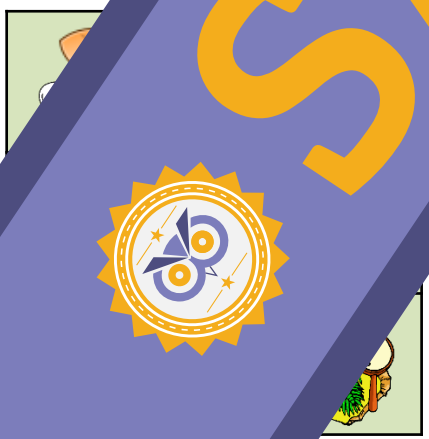
Q3 Counting up each small sq e the area, but using
width x height is much q ee squares in the pattern.

6 x 6 = 6^2 = 36m²

7 x 7 = 7^2 = 49m²

8 x 8 = 8^2 = 64m²

Q4 Scientists uares to estimate information about the
total are n below to fill in the blanks.



Total grid area: 3 x 3 = 9m²

Fossils in sample area: 7 fossils

Average fossils per metre²: 7/9 = 0.78 fossils per metre²

Estimated fossils in 100m²: 0.78 x 100 = 78 fossils

Estimated fossils in 3500m² 0.78 x 3500 = 2730 fossils

Fossilized Fractions

Question One:

Students were required to calculate missing numbers in addit
fractions. Some fractions needed to be changed to have the
series.

Model Response:

Human Skull:

Based on given numbers, patte
Missing number = 2 and 2/5

Dinosaur Skull:

Based on given number
Missing number = 3

Leaf:

Based on given
Missing numbe
ch step.

Shell:

Based on
Missing
y 1 and 8/9 each step.

Trilobite:

Ba
sing by 3/4 each step.

Students we
swers to depths in metres and plot each fossil at
the correct
el response is shown on the following page.

This answer guide is continued on the next page...

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Model Response:

Question Two:

Students were require rent sample spaces. They may have done this by countin nt and width and calculating area based on these.

Model Respon

2 x
3

e next three squares following the pattern. Students should ows the sequence 1^2, 2^2, 3^2, 4^2... n^2.

This answer guide is continued on the next page...

...This answer guide is continued from the previous page.

Question Four:

Students were provided with a 3 x 3 metre sample square wi
required to calculate the average rate of fossils per square
information provided.

Model Response:

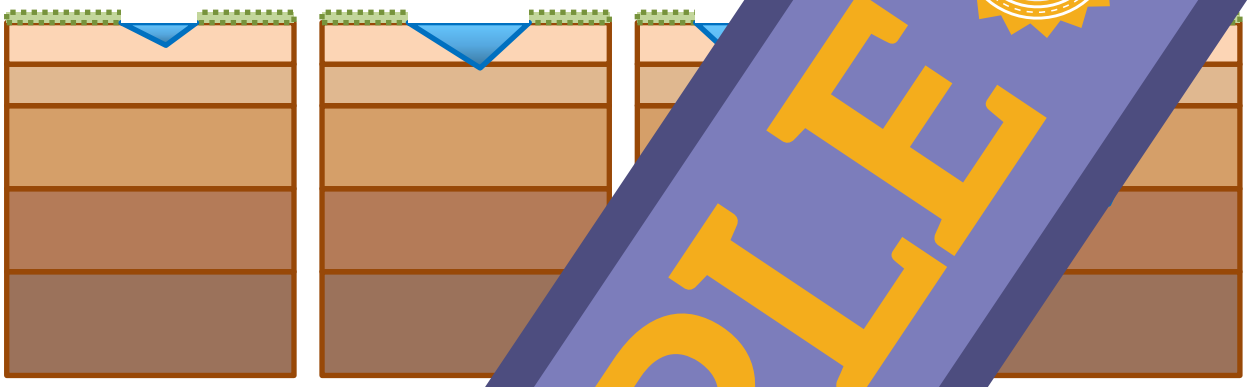
Total grid area: 3 x 3 = 9m²
Fossils in sample area: 7 fossils
Average fossils per metre: 7 fossils / 9
Estimated fossils in 100m²: 0.78 x 1
Estimated fossils in 3500m²: 0.78 x

Ridiculous Ravine

A NAP Mate ® Resource

Fast-flowing rivers can cut through solid rock to form de
called erosion and usually occurs over many years.

Q1 Below is the cross section of a river. Measure the depth
point in time. Measure the surface of the water when



1700 18 2000

Depth: 3m 24m

Width: 10m 28m

Q2 Consider the meas atterns.

The measurements sh nes deeper and 6m wider than

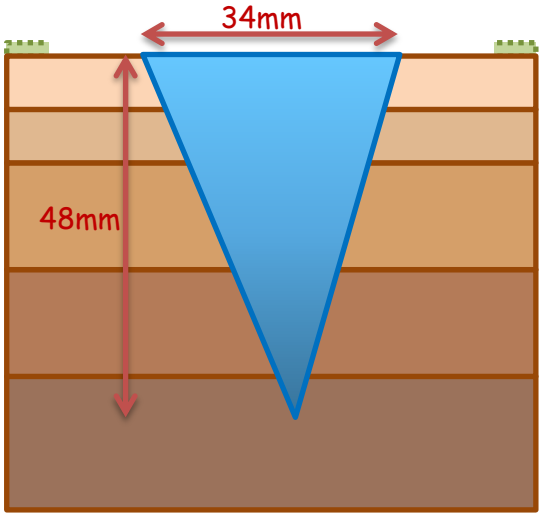
the year before.

Q3 Calculat 00, 2100 and 2200. On the cross section
below

1600 Dept

1600 W

.0m



2100

Ridiculous Ravine

A NAP Mate ® Resource

Q4 Do you think the river will continue to grow according to this

No, as the depth is doubling every 100 years. This rate is ur

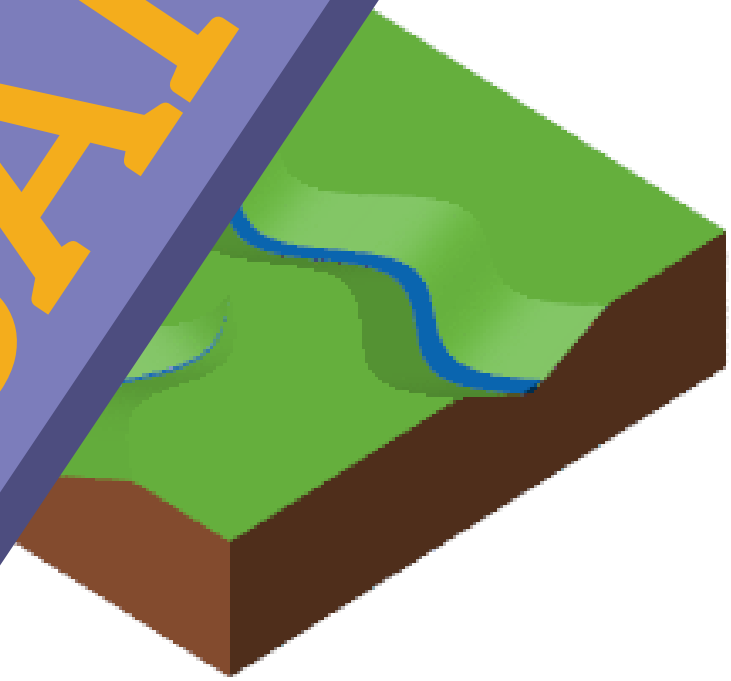
the river would become extremely deep very quickly, whi

Q5 If you were only considering river depth, wha ck in time using this pattern? Would the river dis

The river would continue to become shallower

Q6 Is it possible to use the pattern t nt past?

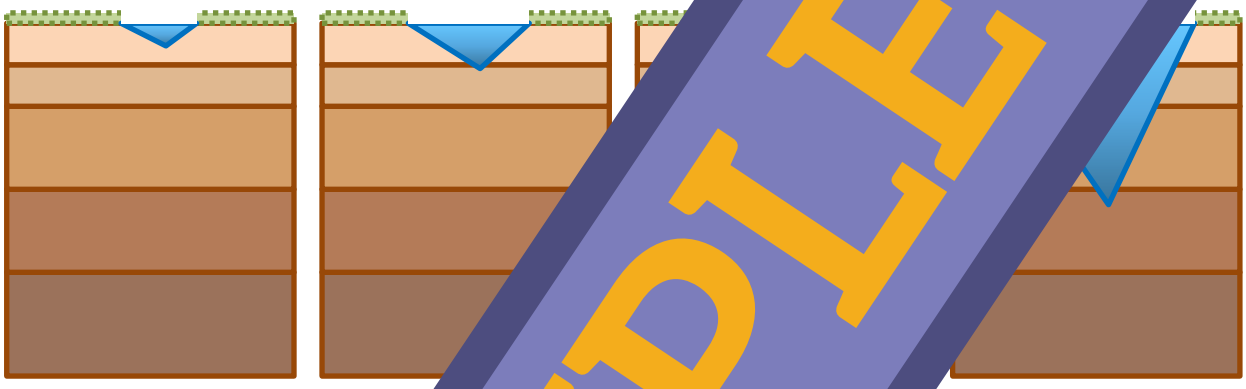
No, because the width would quick s impossible.



World Explorers

Question One:

Students were provided with the following cross sectional dia
the depth and width of the river in each.



1700 2000

Students were also provided wit

Model Response:

1700:

Depth:
Width

1800:

D

1900:

2

e observations about the data and describe the pattern.

how that each year the river is two times deeper and 6m wider than the

This answer guide is continued on the next page...

...This answer guide is continued from the previous page.

Question Three:

Students were then asked to calculate the depth and width o

Model Response with Solutions:

2100:

Depth = 24m x 2 = 48m
Width = 28m + 6m = 34m

2200:

Depth = 48m x 2 = 96m
Width = 34m + 6m = 40m

For 1600, students needed to calculat do this, students need to use the inverse operations (divisio

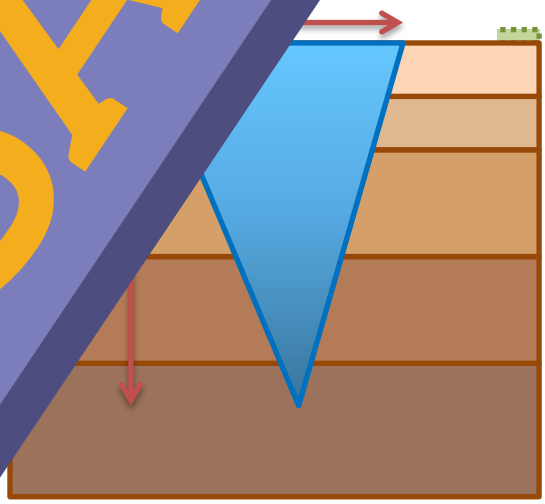
Model Response with Solutions:

1600:

Depth = 3m
Width = 1

Students were also as cross section. Students should have converted the calcul to mm.

Model Response



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...This answer guide is continued from the previous page.

Question Four:

Students were asked if the river will continue to grow accord

Model Response:

No, as the depth is doubling every 100 years *that the river would become extremely deep very qu* *l.*

Question Five:

Students were asked what would happen t* *o calculate river depths in the past.

Model Response:

The river would continue t *ach zero.*

Question Six:

Students were asked if the* *width in the past. Students might have needed to calculat* *ermine whether it can be used to predict widths in the pa* *d that these calculations will lead to a negative number, wh*

Model Response

No, b *a negative number, which is impossible.*

End of Le

Plea

If you feel there
booklet for you t
class, you may
worksheet

this
with your
ties (whole
heets) for

Alternati
to

entire worksheet
at a later date.