

Stingers

Stingers are Key Stage 3 National Curriculum test questions that are used to stimulate whole-class discussion and promote problem solving. They let both teacher and pupils focus on a learning objective and assess pupils' knowledge and understanding. The material is particularly relevant to pupils targeting level 5.

Stingers provide plenary discussion for lessons. They can be run through a computer and projector. Alternatively they can be copied onto an OHT. The content would be difficult to write on a board, but could be photocopied for small-group discussion.

It is important to allow discussion by members of the class and wherever possible allow pupils the opportunity to explain their reasoning to the whole class.

Content

1	Decimal numbers and measures	Problem solving
2	Weigh it up	Problem solving
3	Car parking	Problem solving
4	Travel passes	Money problem
5	Shortcuts with percentages	Percentages
6	Adding, ordering and equivalents	Fractions
7	Ages	Ratio
8	Huts	Sequences
9	Substitution	Substitution
10	Simplifying and solving	Equations and expressions
11	Folding rectangles	Area and perimeter
12	It's in the net	Nets and solids
13	Star pattern	Angles and symmetry
14	Favourite books	Pie charts
15	Fair games	Probability
16	Game scores	Averages

These teaching notes suggest activities to accompany most of the Stingers.

STINGER 1

Decimal numbers and measures (problem solving)**Suggested questions**

- (a) Which operation do you use?
(b) Is Misha 1.15 m or 1.42 m tall? Why?
(c) What's the connecting number between metres and centimetres?
- How many grams are in one ounce?
How many ounces are in one pound?

STINGER 2

Weigh it up (problem solving)**Suggested questions**

- What is adding up to 5 kg?
- What is the mass of 2 small tins? 1 tin?
How could you write this down?
- What if ...
the big tin weighs 1.7 kg? ... $2\frac{1}{4}$ kg?
the scale read 8 kg?

STINGER 3

Car parking (problem solving)**Suggested questions**

- How can you organise your answers so you know you haven't missed any out?
(use a list, table, order systematically, ...)
- Can you find all the ways first with one 50p coin only? ...
with only 20p and 10p coins?
- What is the minimum number of coins? ... the maximum number of coins?
- What if ...
the parking fee is £1?

STINGER 4

Travel passes (money problem)**Suggested questions**

- Discuss strategies or shortcuts, for example:
 - What is the cost of 4 weeks? 40 weeks? 5 weeks? Total?
 - How would you write this down clearly but briefly?
- $£630 \div 45$ is challenging. Try simple chunking:
 $45 \times £10 = £450$, leaving $£630 - £450 = £180$;
 $£180 \div 45$ gives a further £4.
Discuss chunking as an approach for the future.

STINGER 5

Shortcuts with percentages (percentages)**Suggested questions**

Emphasise that being able to recall 25%, 50%, 75%, 10% and 20% means that you can derive others.

- 1 What is 3 out of 4 boxes as a fraction? ($\frac{3}{4}$) As a percentage? (75%)
- 2 What is $12\frac{1}{2}\%$ half of? (25%) So what fraction is $12\frac{1}{2}\%$? ($\frac{1}{8}$)
- 3 If $12\frac{1}{2}\%$ is one square shaded, how many squares is $37\frac{1}{2}\%$?

STINGER 8

Huts (sequences)**Suggested questions**

- 1 Simple huts
The rule is $m = 4h + 1$.
How can you tell the 4 is correct? and the 1?
Can you explain this rule in words?
Use the rule to work out (a) and (b).
- 2 Elegant huts
The rule is ... what?
What is the same about this rule and the rule for simple huts?
What is different?
Predict the rule.
How can you check whether you are right?
- 3 Use rules to find h and m .
There are 10 huts. How many matches are there?
There are 101 matches. How many huts are there?

STINGER 11

Folding rectangles (area and perimeter)**Suggested questions**

- 1 In which two directions do you fold the starting rectangle to make two new rectangles?
- 2 How did I fold the 20 cm by 20 cm square to get the 10 cm by 5 cm rectangle?
- 3 How many other shapes can you get if you fold the shape three times?
Draw the one with the smallest perimeter.

STINGER 13

Star pattern (angles and symmetry)**Suggested questions**

- 1 Why does this pattern have rotation symmetry of order 6?
- 2 What does $w + 26$ equal?
- 3 What if you change 26° to 19° ?
Why can't you change 26° to 72° ?
- 4 What if another star pattern had rotation symmetry of order 8?

STINGER 14

Favourite books (pie charts)**Suggested questions**

- 1 Class A
 - How many degrees represent the 20 pupils in class A?
How many degrees represent 1 pupil?
Complete the table.
 - How can you check whether you are right? (total F = 20, total angle = 360°)
- 2 Class B
 - If 100° represents 5 pupils, how many degrees represent 1 pupil?
 - Complete the table.
 - How many pupils are in class B?
 - Which is the most popular type of book in class B?

STINGER 15

Fair games (probability)**Suggested questions**

Reinforce the language of probability in order to avoid common errors.

- 1 Game 1
There are 2 fours out of 8 possible outcomes, or 2 out of 8, giving $\frac{2}{8}$ or $\frac{1}{4}$.
- 2 Game 2 (any six numbers)
 $\frac{2}{3}$ means 2 out of 3. What is that out of 6?
What does $\frac{1}{3}$ mean for this game?

STINGER 16

Game scores (averages)**Suggested questions**

Model how to make brief jottings from a word problem, and highlight the usefulness of doing this both in exam situations and in general problem solving. For example:

Paula: Game 1 → 8
Game 2 → 8
Game 3 → 8
Game 4 → 0
Total = ...
Mean = ...

Ali: Total = 9
Possibilities are: $0 + \dots + 4 = 9$ and $1 + \dots + 5 = 9$, leading to 0, 5, 4 (impossible) and 1, 3, 5.

What if Ali's three scores have a mean of 3 and a range of 3? Or a range of 5?
Or a mean of 4 and ...?