NUMERACY

Y4

Reasoning sample materials

National Numeracy Tests

Llywodraeth Cymru
Welsh Government

Reasoning sample materials: Guidance for teachers

The reasoning tests will be first introduced in schools in 2014. It is therefore important that teachers and learners become increasingly familiar with the requirements in the framework to identify processes and connections, to represent and communicate, and to review.

Sample items have been produced for each year group to illustrate different question types and formats for response. Each year group contains one stimulus item, presented through PowerPoint, which requires information to be shown by the teacher immediately before the test begins.

The purpose of the stimulus material is to allow learners to engage with unfamiliar contexts. A teacher script is provided but teachers may use their own words provided no help is given with the numeracy that is to be assessed.

The sample items are representative of the anticipated level of demand. However, they are not complete papers: the number of marks within the live tests will be about 20 for each year group, with one stimulus item followed by between four and eight additional questions. In 2014 each reasoning test will last 30 minutes. The time taken to deliver the stimulus is in addition to this assessment time.

● *How to use the sample items*

The sample items can be printed and used for practice before the tests. Strengths and areas for improvement can then be identified and used to provide additional classroom learning and teaching activities, where appropriate.

The reasoning sample items can also be used as a basis for classroom discussion, to illustrate good test techniques. These include the importance of reading the question carefully, where to write the answers, the importance of showing working to enable others to understand the reasoning applied, good time management and the benefits of checking answers.
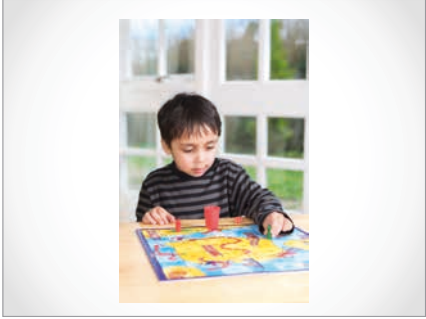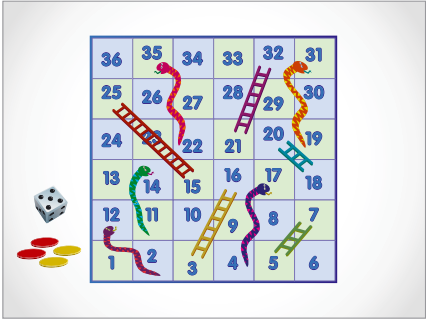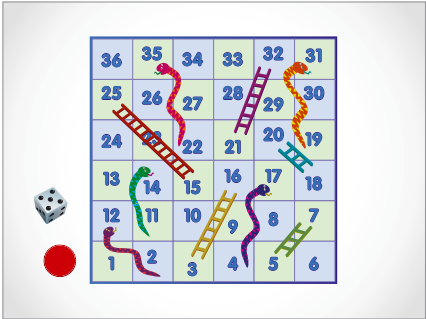
As importantly, the sample items can be used to promote understanding of good responses to open questions. For example, teachers could anonymise and photocopy a range of responses and ask learners to work in small groups to rank from 'best' to 'worst', identifying what is good about each and why.
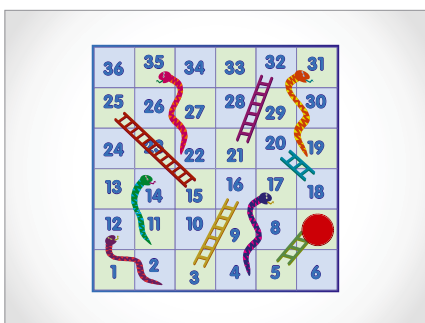
● *Marking of the sample items*

A markscheme is provided which is typical of those to be used alongside the live tests. It includes a range of likely responses with clear guidance on when and how partial credit should be applied. General marking guidance provides principles of marking to facilitate consistency across schools.

Presentation to be shown to learners before doing question 1

The text in the right-hand boxes should be read to learners. Teachers can use their own words, or provide additional explanation of contexts, if necessary. However, no help must be given with the numeracy that is to be assessed.

Slide 1		How many of you know the game Snakes and Ladders? It is a game played by children all over the world.
Slide 2		There is one six-sided dice, numbered one to six. Each player takes it in turn to throw the dice. They move their counter along the board or up at the ends of the rows. *(Show the 'zig-zag' way of moving along the board.)* If you are lucky enough to land on the bottom of a ladder you climb right up to the square at the top of the ladder.
Slide 3		Laura starts a game. She throws the dice and gets a five. When she moves her red counter forward five squares what will happen?

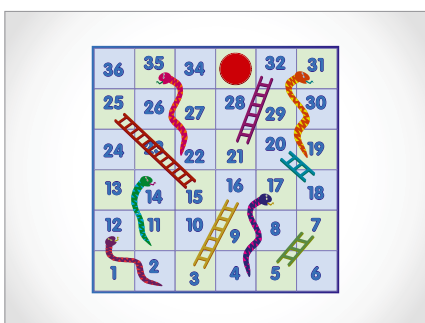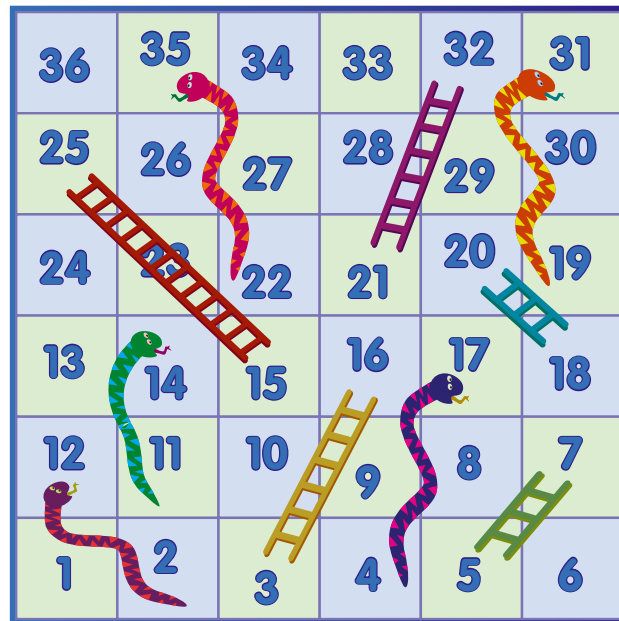|		
Slide 4		That's right, she goes up the ladder to square number 7. *(Make sure learners understand how 'ladders' work.)* So now Laura is on square 7. When she throws the dice again, what number does she not want? Why? That's right, another throw of five would take her to square 12 and she would slide down the snake to square 2. *(Make sure learners understand how 'snakes' work.)* Would anything happen if she were on square 7 and threw a one, two or four? No, you can only slide down snakes from the top of the snake. Would anything happen if she were on square 7 and threw a two or three? No, you can only climb ladders from the square at the bottom.
Slide 5		Now it's later in the game and Laura is on square 33. What number does she **not** want to throw? Why? *(A throw of two would take her to square 35 and she would slide all the way down to square 22.)* What numbers would she have to throw to finish the game? Yes, a three, four, five or six. As soon as she reaches or passes the final square – number 36 – she has finished the game. *(This is important for learners to understand.)* Now you are going to answer some questions about Snakes and Ladders. Remember to show your working so that someone else can understand what you are doing and why. When you have finished there are other questions to answer.

1

Start here

I hope I land on square **15** as it has the longest ladder.

15 is good but the ladder on **3** is better!

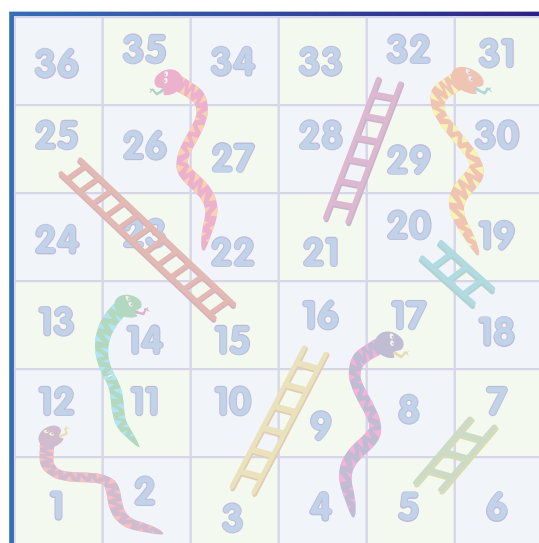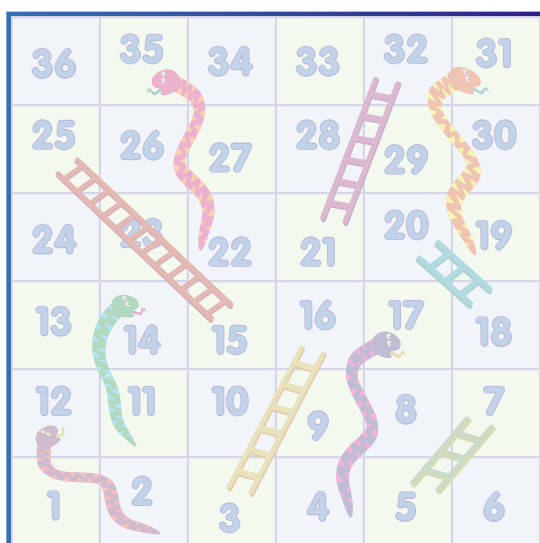Why does Matt say the ladder on square 3 is better?

1m

I played the game.

It took me **3** throws of the dice to win.

Show how you can win with 3 throws of the dice.

There are two boards in case you need to start again.

What numbers were thrown?

What numbers were thrown?

3m

1m

2 **12** balloons to share.

Which groups below can have **equal** shares?

Yes, **3** each		

1m

- -
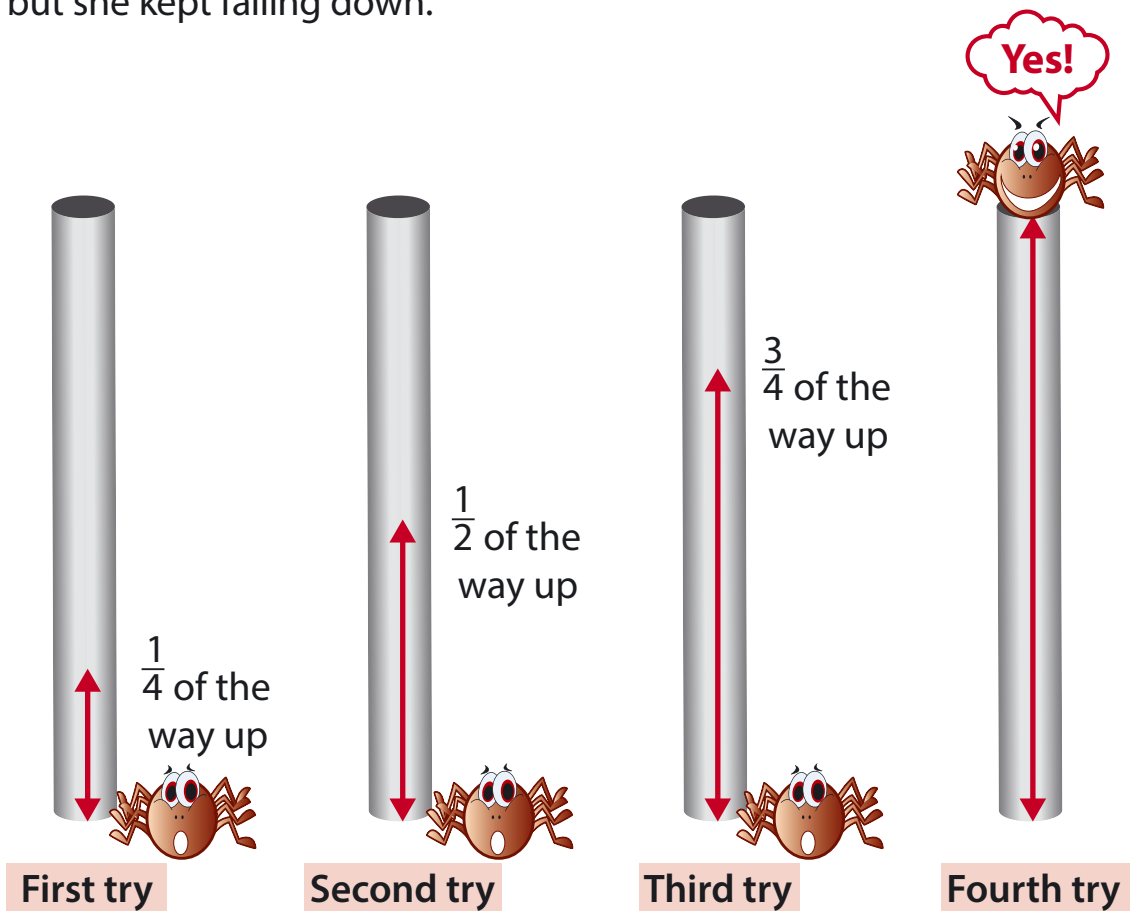
Toy cars to share.

Each of these groups **can** have equal shares.

How many cars could there be?

cars

3m

7

3 Incy Wincy Spider climbed up the water spout …

but she kept falling down.

Yes!

$\frac{3}{4}$ of the way up

$\frac{1}{2}$ of the way up

$\frac{1}{4}$ of the way up

First try   **Second try**   **Third try**   **Fourth try**

The spout is **8** metres high.

How many metres did the spider climb **up** altogether?

metres

3m

Reasoning sample materials: Marking guidance

It is important that the tests are marked accurately. The questions and answers below help to develop a common understanding of how to mark fairly and consistently.

- *Must learners use the answer boxes?*

Provided there is no ambiguity, learners can respond anywhere on the page. If there is more than one answer the one in the answer box must be marked, even if incorrect. However, if the incorrect answer is clearly because of a transcription error (e.g. 65 has been copied as 56), mark the answer shown in the working.

- *What if learners use a method that is not shown within the markscheme?*

The markschemes show the most common methods, but alternative approaches may deserve credit – use your professional judgement. Any correct method, however idiosyncratic, is acceptable.

- *Does it matter if the learner writes the answer differently from that shown in the markscheme?*

Numerically equivalent answers (e.g. eight for 8, or two quarters or 0.5 for half) should be marked as correct unless the markscheme states otherwise.

- *How should I mark answers involving money?*

Money can be shown in pounds or pence, but a missing zero, e.g. £4.7, should be marked as incorrect.

- *How should I mark answers involving time?*

In the real world, specific times are shown in a multiplicity of ways so accept, for example, 02:30, 2.30, half past 2, etc. Do not accept 2.3 as this is ambiguous. The same principle should be used for marking time intervals, e.g. for two and a half hours accept 2.5 but not 2.5pm.

- *What if the method is wrong but the answer is correct?*

Unless the markscheme states otherwise, correct responses should be marked as correct even if the working is incorrect as learners may have started again without showing their revised approach.

- *What if the learner has shown understanding but has misread information in the question?*

For a two (or more) mark item, if an incorrect answer arises from misreading information given in the question and the question has not become easier as a result then deduct one mark only. For example, if the 2 mark question is 86×67 and the learner records 96×67 then gives the answer 6432, one mark only should be given. In a one mark question, no marks can be given.
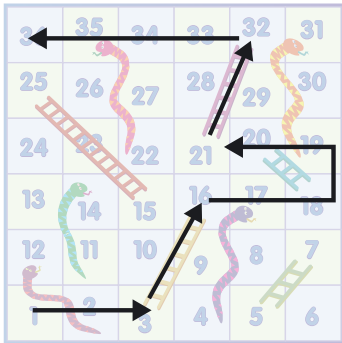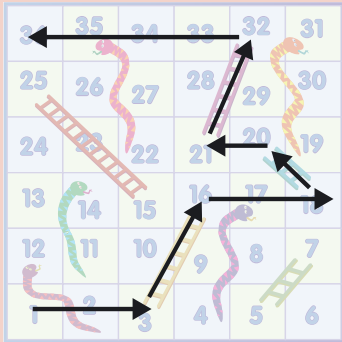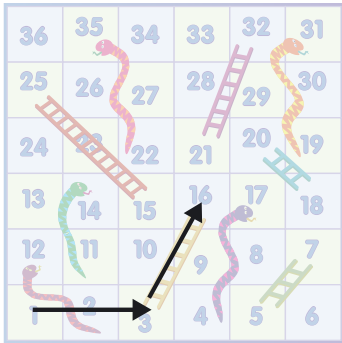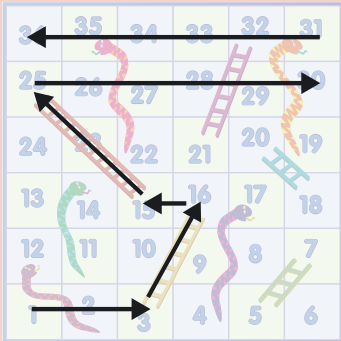
- *What should I do about crossed out work?*

Working which has been crossed out and not replaced can be marked if it is still legible.

- *What is the difference between a numerical error and a conceptual error?*

A numerical error is one in which a slip is made, e.g. within 86×67 the learner works out $6 \times 7 = 54$ within an otherwise correct response. A conceptual error is a more serious misunderstanding for which no method marks are available, for example if 86×60 is recorded as 516 rather than 5160

Year 4 Reasoning sample materials: Markscheme

Q	Marks	Answer	Comments
1i	1m	Justifies why the ladder on 3 is better, e.g. • It goes up 13 but the other goes up 10 • It goes up more	
1ii	3m	Shows the correct route, e.g. 	Accept any unambiguous means of showing the route *This forms a useful discussion item after the assessment*
	Or 2m	Shows the second fastest route, i.e. 	
	Or 1m	Shows a correct first step, i.e. going up the ladder at 3 	

Q	Marks	Answer	Comments
1iii	1m	Identifies the correct numbers thrown for their route, e.g. for the correct answer scoring 3 marks above • 3, 5, then 4 or 5 or 6 e.g. for the second fastest route • 3, 2, 1 then 4 or 5 or 6 e.g., for the common error of going backwards from 16 to 15 (see below) • 3, 1, then 5 or 6, then 6 or 5 	
2i	1m	Gives correct answers for both groups, i.e. 'No' for the group of 5 **and** 'Yes, 2 each' for the group of 6	Accept any unambiguous means of indicating 'No', e.g. a cross
2ii	3m	Gives 30 or any multiple of 30, e.g. 60	
	Or 2m	Shows a clear method by working with at least 3 multiples of one of the numbers, e.g. • (multiples of 5) 10 won't ÷ 3, 15 won't ÷ 2, 20 won't ÷ 3 • (multiples of 3) 12 no, 15 no, 18 no … • (multiples of 2) 10 x, 12 x, 14 x	
	Or 1m	Gives an answer greater than 14 that uses two of the groups, e.g. • (groups of 2 and 3) 18 or a multiple of 6 greater than 18 • (groups of 2 and 5) 20 or any multiple of 10 > 20 • (groups of 3 and 5) 15 or any multiple of 15	

Q	Marks	Answer	Comments
3	3m	20 metres	
	Or 2m	Gives the answer 32 metres (has included the downs) Or Gives the answer 12 metres (has omitted the final 8m) Or Shows that half is 4 **and** either one quarter is 2 or three-quarters is 6 Or Shows the value $1\frac{1}{2}$ or $2\frac{1}{2}$	
	Or 1m	Shows that half is 4 Or Shows that one quarter is 2 Or Shows that three-quarters is 6 Or Shows that $\frac{1}{4}$ and $\frac{3}{4}$ is 1	