NUMERACY

Y5 Reasoning sample materials

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.
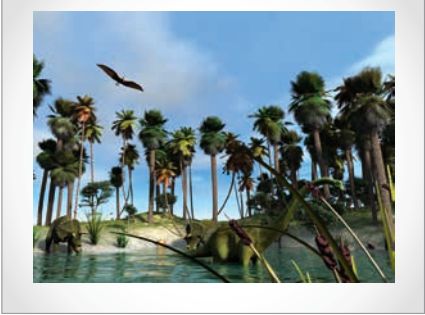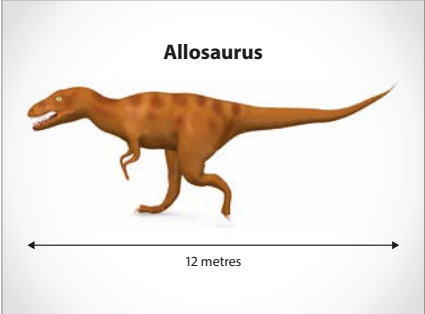
As importantly, the sample items can be used to promote understanding of good responses to open questions. For example, teachers could anonymise and photocopy a range of responses and ask learners to work in small groups to rank from 'best' to 'worst', identifying what is good about each and why.
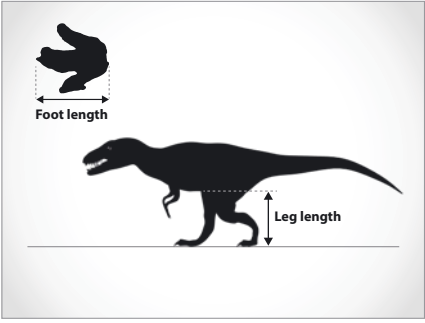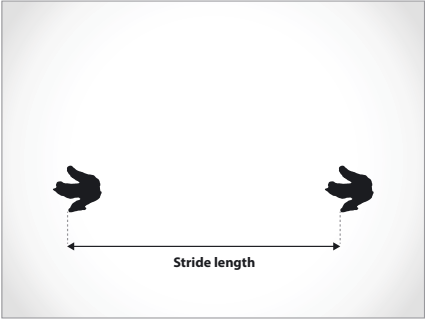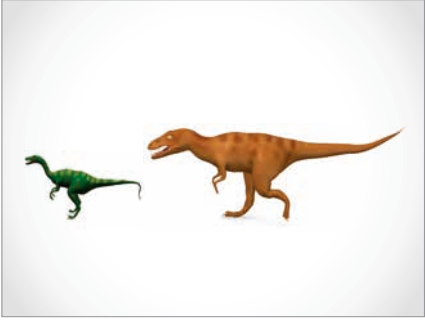
● *Marking of the sample items*

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		Although dinosaurs lived millions of years ago, scientists can work out facts about them by the clues they have left behind. One set of clues is … footprints.
Slide 2		Dinosaur footprints like these were found in the rocks near Sully in South Wales. The dinosaurs walked there when it was wet with mud and silt. When it dried out the footprints were fossilized so we can still see them today.
Slide 3		There were many different types of dinosaur. This one is called an Allosaurus. It had sharp teeth. Unlike many dinosaurs which were plant eating, an Allosaurus ate meat including other dinosaurs.
Slide 4		This is a footprint from an Allosaurus. It was found in America. *Trace the edge of the footprint with your finger.* Scientists can use the footprint to work out information about the Allosaurus.

Slide 5	 Foot length Leg length	The scientists measure foot length. Then they use mathematics to work out the leg length. *Do not give the rule.*
Slide 6	 Stride length	The scientists also measure the distance between footprints – this distance is called the stride length. Then they use more mathematics to work out how fast the dinosaur could run. *Do not give the rule.*
Slide 7		The Allosaurus is chasing a smaller dinosaur. Run, little dinosaur, run! You are going to work out whether the Allosaurus is likely to catch the smaller dinosaur. All the information you need is in your booklet. Remember that for some of the questions you will need to use your calculator, and it is very important 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.

Foot length = **0.3m**

Stride length = **2.7m**

We think leg length is four times foot length.

To find how many metres a dinosaur can run in one minute:

Multiply stride length by 84, divide the result by leg length and then subtract 16

The smaller dinosaur can run about **180 metres** in one minute.

Is the Allosaurus likely to catch it?

Show how you decide.

5m

6

2 Anna has six hats.

She wears them in turn:

1, then 2, 3, 4, 5, 6 then 1 again, and so on.

1	2	3	4	5	6

Today is **Monday**.
I am wearing hat
number **3**

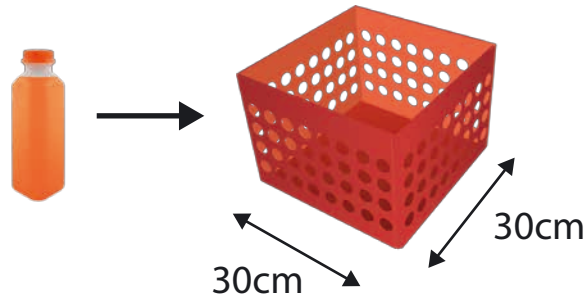How many **weeks** until she wears the same hat again on a Monday?
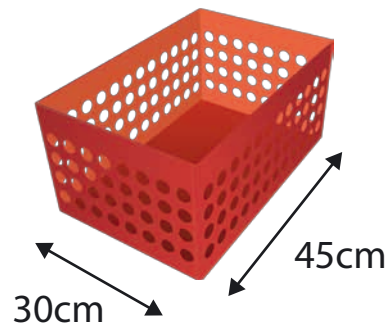
Show how you work it out.

weeks

3m

7

3 **16** of these plastic bottles just fit in the small box.

30cm

30cm

How many of the bottles will fit in the bigger box?

45cm

30cm

bottles

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 5 Reasoning sample materials: Markscheme

Q	Marks	Answer	Comments
1	4m	Shows that the dinosaur runs 173 metres in one minute	Accept units omitted Learners should use a calculator. However, if they work out calculations by hand, deduct one mark for each numerical error, e.g. there is only one error in the working below so it would gain 3 of the 4 marks **and** the 1 interpretation mark • $0.3 \times 4 = 0.12$ (error) $84 \times 2.7 = 227$ $227 \div 0.12 = 1891$ (condone rounding down) This is much faster so it would eat it up
	Or 3m	Shows the value 189 or 189 followed by any decimal, e.g. • 189.72	
	Or 2m	Shows the value 226.8 or 227	Condone rounding down, i.e. accept 226
	Or 1m	Shows the value 1.2	Allow follow through from their incorrect speed
	And 1m	Compares speed and draws a correct conclusion, e.g. • 173 < 180 so the little one will escape • 173 is slower so it will be safe unless it falls over	

Q	Marks	Answer	Comments
2	3m	Justifies their answer of 6 weeks, e.g.	

Justifies their answer of 6 weeks, e.g.

- Same week Sun, 1 is Sat, 2 is Fri, 3 is Thurs, 4 is Wed, 5 is Tues, so week 6 is Monday again

-

M	T	W	T	F	S	S
✓						✓
					✓	
				✓		
			✓			
		✓				
	✓					
✓						

-

1	2	3	4	5	6	1
2	3	4	5	6	1	2
3	4	5	6	1	2	3
4	5	6	1	2	3	4
5	6	1	2	3	4	5
6	1	2	3	4	5	6

- Each week she wears it one day earlier so 6 altogether

Q	Marks	Answer	Comments
	Or 2m	Shows correct reasoning but gives an answer of 7 weeks	
	Or 1m	Gives an answer of 6 weeks but without sufficient reasoning to show their understanding	
3	3m	24	
	Or 2m	Shows that 4 bottles fit along one side of the smaller box, and that 6 bottles fit along the 45cm side of the bigger box	
	Or 1m	Shows understanding that the bottles fit in the smaller box in a 4 by 4 array	

Acknowledgements

Hat images courtesy of happyhats.co.uk