

NUMERACY

Y7

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*

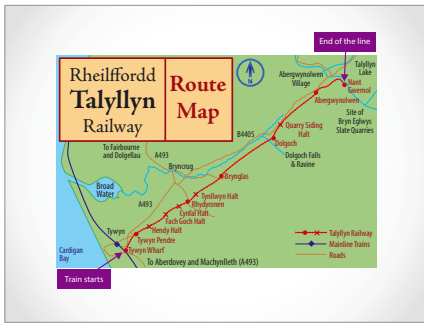
A markscheme is provided which is typical of those to be used alongside the live tests. It includes a range of likely responses with clear guidance on when and how partial credit should be applied. General marking guidance provides principles of marking to facilitate consistency across schools.

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 |  | <p>Talylyn Railway is in Mid-Wales. It was opened in 1865 to carry slate from the mountains. Some years later it began taking passengers but then the quarry closed, and the railway became in very poor condition.</p> |
| Slide 2 |  | <p>In 1951, however, the Railway was saved. A group of people got together to restore the railway back to how it had been. Talylyn became the first railway in the world to be preserved in this way.</p> |
| Slide 3 |  | <p>Today, Talylyn is a successful tourist attraction. People come from all over the country to travel on the old trains through the beautiful countryside.</p> |

Slide 4



This is the route the trains take. The trains start here at Tywyn Wharf (*point*) then they travel about 12km to the end of the line at Nant Gwernol. (*Trace the route.*)

Then people return the same way from Nant Gwernol to Tywyn Wharf. (*Again, trace the route.*)

There are several stops on the way. People can get on and off, so they can spend time exploring. Then they continue their journey, catching a later train.

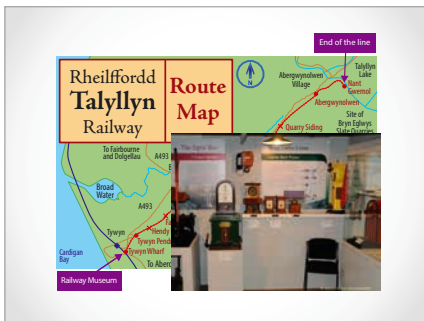
Slide 5



One of the places that people like to get off the train to see is Dolgoch Falls. There are three sets of waterfalls, in the beautiful mountains.

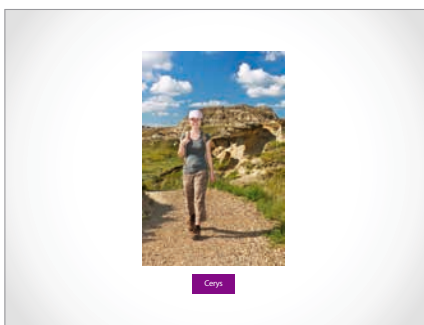
Many passengers enjoy walking through this area. They can choose to visit on their way from Tywyn Wharf to Nant Gwernol or they can visit on the way back.

Slide 6



Another popular attraction is the Railway Museum. This is by the main entrance at Tywyn Wharf (*point*).

Slide 7



This is Cerys. She is organising a trip to Talyllyn with her friends.

You are going to help her plan their day, making sure that they make the most of their day.

I will leave the map of the Railway on the screen so you can see where the different places are.

Slide 8



All the information you need is in your booklet. When you have finished there are other questions to answer.

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.

1 Cerys is organising the trip on the railway.

Her friends e-mail to say what they want to do.

Hi Cerys

I can't leave home until 10am.

It will take me 40 minutes to get to Tywyn Wharf.

I want to travel to Nant Gwernol and back.

Rhys

Let's spend as much time as possible at Dolgoch Falls.

Tara

I want at least 30 minutes at the Railway Museum.

I must be home by 5.30.

It takes me about 30 minutes to get home from Tywyn Wharf.

From Mark

Cerys uses this timetable to plan the day.

Trains from Tywyn Wharf to Nant Gwernol

| | | | | | |
|---------------|-------|-------|------|------|------|
| Tywyn Wharf | 10.30 | 11.40 | 1.20 | 2.30 | 4.10 |
| Dolgoch Falls | 11.01 | 12.11 | 1.53 | 3.01 | 4.43 |
| Nant Gwernol | 11.23 | 12.33 | 2.13 | 3.23 | 5.18 |

Trains from Nant Gwernol to Tywyn Wharf

| | | | | | |
|---------------|-------|-------|------|------|------|
| Nant Gwernol | 11.35 | 12.45 | 2.25 | 3.35 | 5.27 |
| Dolgoch Falls | 12.24 | 1.29 | 3.00 | 4.19 | 5.49 |
| Tywyn Wharf | 12.55 | 2.00 | 3.45 | 4.50 | 6.20 |



The museum is open from 10am to 5pm so we should visit it before we catch the train.

Use the timetable to explain **why** they should visit the museum first.



Now work out a plan for the rest of the day.



- 2 There are **3** colours of sweets in this machine:
yellow, red and blue.



The twins both want a sweet
but they must be the **same** colour.



Each sweet is **10p**.

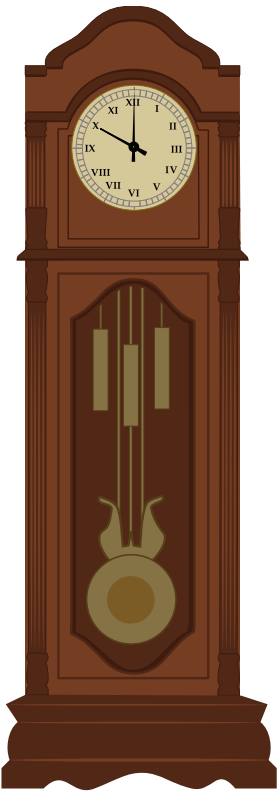
What is the most money they will need to spend?

A large rectangular area with a red border, intended for writing the answer. In the top-left corner, there is a small icon of a notepad with a pencil. In the bottom-right corner, there is a smaller red-bordered box containing the letter 'p'.

2m

3

It's August 31st.
My clock is showing the correct time.
That doesn't happen very often!



Every day his clock loses the same amount of time.

| | When the real time is 10am, his clock shows |
|---------------|---|
| August 31st | 10:00 |
| September 1st | 9:45 |
| September 2nd | 9:30 |
| September 3rd | 9:15 |

When the real time is 10am, his clock will show 10:00 again.

On what **date** will that next happen?

Area for writing the answer, containing a notepad icon and a red rectangular box for the date.

4m

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 7 Reasoning sample materials: Markscheme

| Q | Marks | Answer | Comments |
|-----|--|--|---|
| 1i | 1m | <p>Uses the timetable to justify why the museum should be visited first, e.g.</p> <ul style="list-style-type: none"> • Rhys can't arrive before 10.40 so they have an hour before the train at 11.40 • They can't get the 10.30 so they have lots of time to wait • He can't get there till 10.40 so they catch the 11.40 instead | <p>Accept unambiguous identification of the relevant trains, e.g. for the 11.40 train from Tywyn Wharf, accept 'second train'</p> <p>Do not accept answers that do not use the railway timetable, e.g.</p> <ul style="list-style-type: none"> • It will be shut • Get it out of the way |
| 1ii | Option A: Straight to Nant Gwernol, stopping at Dolgoch Falls on the return journey | | |
| | 1m | Leave Tywyn Wharf at 11.40 (accept if clearly shown in their first answer) | |
| | 1m | Get off the train at Nant Gwernol at 12.33 and get back on for the return journey at 12.45 | Accept 12.33 not identified, but 12.45 must be clearly shown |
| | 1m | Get off the train at Dolgoch Falls at 1.29 | |
| | 1m | Get back on to continue the journey at 4.19 | |
| | 1m | Arrive back at Tywyn Wharf at 4.50 | |
| 1ii | Option B: Stopping at Dolgoch Falls on the outward journey | | |
| | 1m | Leave Tywyn Wharf at 11.40 (accept if clearly shown in their first answer) | |
| | 1m | Get off the train at Dolgoch Falls at 12.11 | |
| | 1m | Get back on to continue the journey at 3.01 | |
| | 1m | Get off the train at Nant Gwernol at 3.23 and get back on for the return journey at 3.35 | Accept 3.23 not identified, but 3.35 must be clearly shown |
| | 1m | Arrive back at Tywyn Wharf at 4.50 | |

| Q | Marks | Answer | Comments |
|---|--------------|--|---|
| 2 | 2m | 40p | |
| | Or 1m | Shows that four sweets are needed, e.g. <ul style="list-style-type: none"> • If the first three are different colours, then the fourth one must be one of those colours so they have a pair • YRB then one of those again | |
| 3 | 4m | 18th October | |
| | Or 3m | Shows or implies 48 (the number of days) Or Gives an answer of 5th December (has doubled the number of days) | Accept an answer of 17th or 19th October as implying 48 |
| | Or 2m | Shows a correct method to find the number of days, e.g. <ul style="list-style-type: none"> • Loses 1 hour in 4 days: 4×12 Or Shows or implies 96 (double the number of days) | Accept an answer of 4th or 6th December as implying 96 |
| | Or 1m | Groups 15 minutes per day, e.g. <ul style="list-style-type: none"> • Loses 1 hour in 4 days Or Shows a correct method to find double the number of days, e.g. <ul style="list-style-type: none"> • 4×24 | |

Acknowledgements

Images of Talyllyn used with the kind permission of the Talyllyn Railway.
Further information can be found at www.talyllyn.co.uk

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