

USING TESTBASE IN ASSESSMENT FOR LEARNING

CONTENTS

What is Assessment for Learning (AfL)?	2
What is TAfL?	3
AfL range of activities	4
How to generate ideas for a TAfL item	5
How to create a TAfL item	6
An example of a TAfL item	8
Evaluating TAfL	13

WHAT IS ASSESSMENT FOR LEARNING (AFL)?

AfL is formative assessment and it has the following characteristics. When using formative assessment you can use some or all of the following approaches as appropriate for the age group and subject.

- Teachers should avoid numerical marks or letter grades when evaluating pupils' work but they can still set targets, eg use of comment sheets to enter into dialogue with pupils.
- Teachers should comment in writing or orally on the quality of pupils' work.
- Teacher questioning becomes more open and may include wait time; no hands; passing of questions from one pupil to another.
- Teachers may discuss what makes a good answer and the assessment criteria that are to be used.
- Teachers may focus on particular criteria rather than all possible criteria.
- Pupils could write their own assessment items (with a mark scheme) or questions so they can develop an understanding of the subject and assessment criteria.
- Pupils' written work should become deeper, eg involve extended prose, keeping in mind the aims of the activity.
- Pupils may do self and/or peer assessment – again with no marks or letter grades.
- Pupils may be asked to discuss what would make a good answer so they internalise assessment criteria.
- Pupils may be asked to read and interpret a mark scheme so they learn assessment criteria.

Some of this may go against school discipline and marking policies, eg no marks, no hands up, but you might persuade colleagues and senior management teams to explore the possibilities of this worthwhile curriculum development.

The theory is based on the work of the assessment team at King's College London. You can find out much more from their website: <http://www.kcl.ac.uk/depsta/education/research/kal.html>,
<http://www.kcl.ac.uk/depsta/education/publications/blackbox.html>

In addition, QCA provides a variety of links to Assessment for Learning resources at: www.qca.org.uk/ages3-14/66.htm

Below is a selection of recent and relevant articles in *School Science Review* (SSR)

- Daws, N. and Singh, B. (1999) Formative assessment strategies in secondary science SSR, 80(293) pp 71-78
- Black, P.J. (1998) Formative assessment: raising standards inside the classroom SSR, 80(291) pp 39-46
- Black, P.J. & Harrison, C. (2001) Feedback in questioning and marking: the science teacher's role in formative assessment. SSR, 82(301), pp 55-61
- Black, P.J. & Harrison, C. (2001) Self- and peer-assessment and taking responsibility: the science student's role in formative assessment. SSR, 83(302), pp 43-49

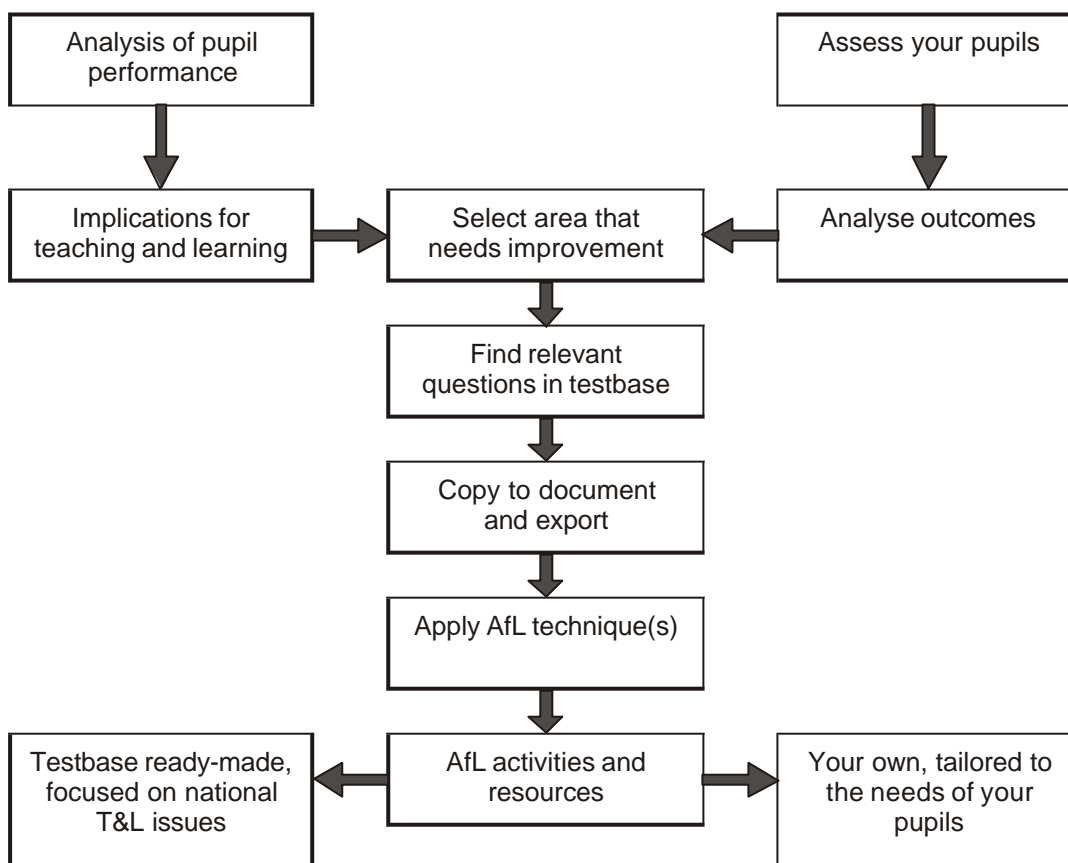
The last two are downloadable at the KCL website via the assessment team's homepage.

The most recent (and very useful and readable) book is:

Black, P., Harrison, C., Lee, C., Marshall, B. & Dylan, W. (2003) **Assessment for learning: putting it into practice** Maidenhead, Open University Press.

WHAT IS TAFL?

Testbase: Assessment for Learning (TAfL) is the use of the Testbase CD to create Assessment for Learning items. Testbase provides teachers with a database of national test questions, their mark schemes and QCA's analysis of pupil performance for each question. This analysis forms the basis of the QCA Standards reports and the implications for teaching and learning. All this information provides the resources for creating a TAfL item that can be used as part of teaching and learning. The process is summarised below and expanded on page 5.



The Testbase team has created AfL materials for key stage 3 science and will be extending to other subject areas and key stages in the coming year.

More on the development and testing of the TAfL items can be found in *School Science Review*: Nott, M. and Suckling, S. (2003) Using Testbase for assessment for learning – the TAfL project 85(311) pp 57–67.

© 2004, Doublestruck Limited, Suite 2, 63-67 Athenaeum Place, London N10 3HL

Reproduction, storage, adaptation or translation, in any form or by any means, of this document is prohibited without prior written permission of the producer, or within the terms of the licence issued by the Copyright Licensing Agency. Excerpts may be reproduced for the purposes of research, private study, criticism or review, or by educational institutions solely for educational purposes, without permission provided full acknowledgement is given.

Tel: 020 8444 1661

Fax: 020 8444 5665

info@testbase.co.uk

www.testbase.co.uk

Example national test questions Copyright © 1995-2003 Qualifications and Curriculum Authority

AFL RANGE OF ACTIVITIES

NO MARKS

Try 'Traffic Lights'

Pupils use red, yellow or green to indicate whether they "don't know", "not sure" or "certain" of an answer. This can be done with cards that pupils hold up for teacher's oral questions or indicated in the margins of an exercise book for written questions.

Try comments only

Be open about evaluative criteria with pupils, eg 'I am looking for diagrams that are accurate', and then write a comment about the accuracy and set a target for next time or corrections. Use comments sheets in the back of the exercise book where you write a comment and then the pupil has to write a comment on what they have done to correct or remedy mistakes.

Try letting pupils use the mark scheme

Let pupils self- or peer-assess then compare and contrast their answers with the mark scheme.

NO HANDS

Ask a pupil a question by name

If they don't know, pass the question on to another named pupil or let them pass it on to another named pupil OR ask 'Can anybody help them out?' and take an answer from somebody with their hand up or with a green traffic light.

Don't evaluate immediately

When listening to answers ask pupils by name to give answers and then don't evaluate immediately; ask the class to compare and contrast pupils' answers in groups eg 'what would you say', 'which is a good answer?' and so on.

'Show and tell'

Borrow from the national literacy strategy and use small whiteboards and get all pupils to write an answer down and show their answers at the same time so you can get a feel for the range of understandings in the class.

QUESTIONS

Make questions more open and allow for a range of responses

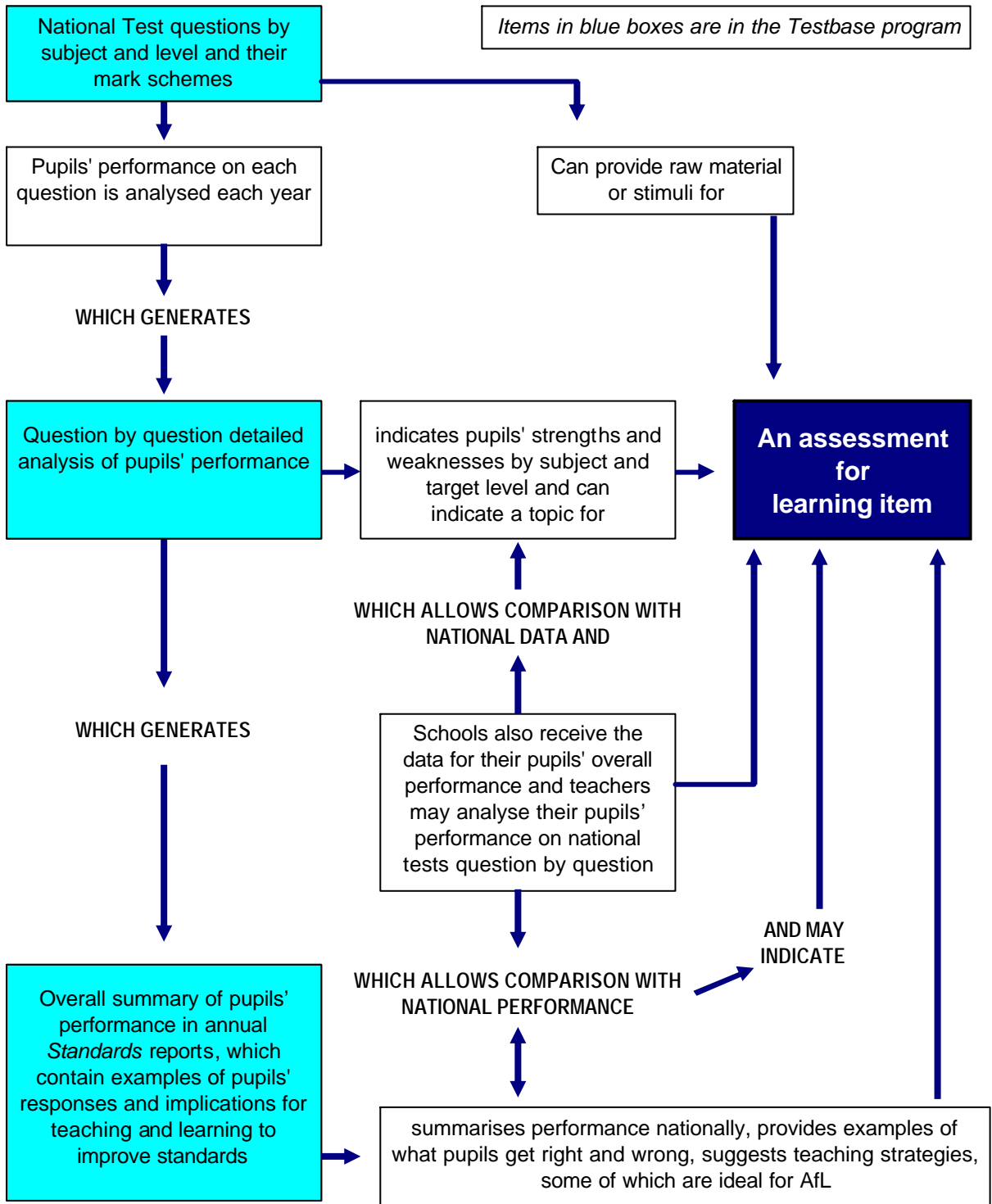
Teachers should be non-committal; let pupils evaluate each others responses in pairs or small groups - for no more than a minute at a time.

'Wait time'

Most teachers wait a split second for pupils to respond before passing the question on or answering it her/himself. If a teacher waits for 3 seconds it is far more likely that a pupil will answer - then use the tactics above. Try it (count 1, 2, 3 in your head) - it works. This conveys the message that it is okay *to think* about a question and its answer.

HOW TO GENERATE IDEAS FOR A TAFL ITEM

This flowchart indicates how the resources in the Testbase program and other information about pupils can be used to generate a TAFL item.



HOW TO CREATE A TAFL ITEM

In Testbase you will find every question from the national tests (SATs), their accompanying mark schemes, and, for 2000-2004, a detailed analysis of how pupils performed for each question.

Note: The facility value is percentage of pupils that gave a creditworthy answer, eg facility rating of 0.33 at a given level means that 33% of pupils attaining that overall level got it right. From this you can judge the difficulty of a question and the comparative achievement of your own pupils. The omission rate is the percentage of pupils that chose not to answer that part of the question.

On the 2003 version of Testbase key stage 3 science you will find Assessment for Learning items developed by teachers and advisers. This is being extended to other areas.

To write your own items is straight forward. At the core of each item are the following elements:

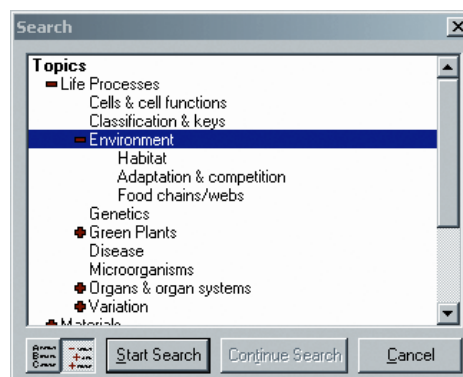
- Teachers' notes that include some or all of the following components
 - rationale for the item, eg knowledge and understanding objectives; stimuli from QCA analysis
 - preparation for item
 - teaching and learning activities/lesson plan for using the item eg resources, teacher activity, pupil activity, times for each part of the lesson..
 - possible post item activities
- Resources for pupils and teachers, eg worksheets, OHTs, interactive whiteboard materials
- Original national test question
- Original national test mark scheme
- Original QCA commentary on pupil performance

STEP-BY-STEP GUIDE TO CREATING YOUR OWN TAFL ITEM

Step A - Identify a topic for development

Use the QCA *Implications for Teaching and Learning* or use knowledge and understanding of your pupils' difficulties to select a topic.

Search for questions by Topic in Testbase by clicking on the **Topic** search button.






Step B – Select original questions

Browse through the questions and copy selected ones to the untitled document in Testbase.

Select a question from the viewer → copy to document 

→ view mark scheme  → copy to document 

→ view report  → copy to document 

Export to word processor  with a recognisable file name, ready to edit.

Step C - Opening and editing your document

Go to Start\Documents and select your file.

Double-click on the document and you are ready to edit the material using the techniques for AfL to use in your teaching and for your pupils. Remember to save the document from time to time to make sure you do not lose your work.

Step D - Help in writing the teacher notes and pupil activities

Use the guide below to help in structuring a TAfL item for pupils and other teachers.

Activities will need to be tailored to the subject and the age of the class. These ideas began with key stage 3 science but may be applicable elsewhere.

Teacher preparation	Pupil activity
Print out original questions Ask pupils to look at the question on their own or in a pair/group Tell them <u>NOT</u> to find an answer straight away!	With a partner, spend some time discussing what you think the question is asking. Make sure you: <ul style="list-style-type: none"> ▪ understand the language used ▪ check out anything unfamiliar to you both with other pairs ▪ don't hurry to 'find the answer'
Print out exemplars from Testbase if available Collate answers that your pupils have previously given	Check your answers with another pupil. <ul style="list-style-type: none"> ▪ Swap your paper with somebody else and check their answers. ▪ Discuss together the kind of answers to each part of the question and how many marks each part is worth. ▪ Discuss together how a question worth more than one mark is allocated marks. ▪ Read some answers that pupils previously gave and compare and contrast your own.
Print out copies of the mark scheme Rewrite mark scheme in more accessible language if necessary Ask pupils to share examples of answers that satisfy the mark scheme or which show misunderstanding Ask pupils to rate the question and the mark scheme	Read and discuss the mark scheme for the question and, working in pairs, identify which parts of your partner's answers: <ol style="list-style-type: none"> a) are worth a mark b) show understanding but are neither clear nor accurate enough to be worth a mark c) have misunderstood the answer required. Check your marking with your partner and agree on what the marks should be. Rework any answers so they are worth full marks. Do you think the questions are fair?
Recap the knowledge and understanding developed and/or the procedural knowledge of answering questions.	

Write a brief set of teachers' notes before trying an item you have created and revise them after you have tried it - then pass the item on to your colleagues and include in your departmental Scheme of Work!

Practical activities can be developed from questions providing an opportunity to test ideas, for pupils to demonstrate their thinking or make suggestions and for them to role play situations.

AN EXAMPLE OF A TAFL ITEM

This item illustrates a question being adapted through role play to develop better understanding of the science and the demands of the question. The activity is based on the following national test question: **KS3 Science Tests 2002 Paper 2 Tier 3-6 Q 10 Tier 5-7 Q 1** and can be found in Testbase **Q02.A2.10**

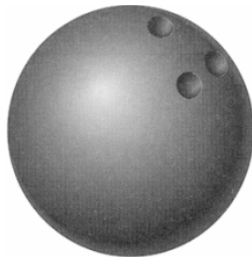
Topic: Ideas and evidence, Obtaining and presenting evidence Forces and motion

ORIGINAL QUESTION

The picture shows a man called Aristotle. He lived in Greece over 2000 years ago.



Aristotle said that the heavier an object is, the faster it will fall to the ground. The drawings below show a bowling ball, a cricket ball and a ping-pong ball. Lila dropped them all at the same time from the same height.



bowling ball
mass=5 000 g



cricket ball
mass=160 g

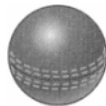


ping-pong ball
mass=2.5 g

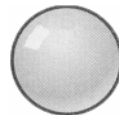
- (a) If Aristotle was correct, which of the three balls would you expect to reach the ground first? Give the reason for your answer.

..... **1 mark**

- (b) Joe said that it would be a fairer test if Lila had only used a cricket ball and a hollow plastic ball as shown below.



cricket ball
mass = 160 g



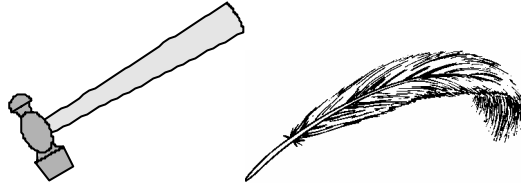
hollow plastic ball
mass=56 g

Why was Joe correct?

..... **1 mark**

(c) About 400 years ago in Italy, a man called Galileo had a different idea. He said that all objects dropped from the same height would reach the ground at the same time.

(i) Lila dropped a hammer and a feather at the same time from the same height.



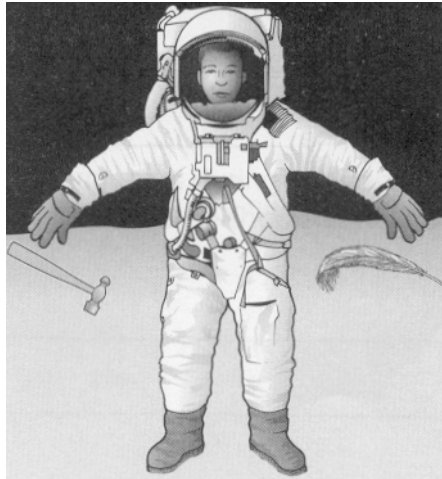
If Galileo was correct, which, if either, would reach the ground first?

..... **1 mark**

(ii) Gravity acts on both the hammer and the feather as they fall. Give the name of **one** other force which acts on them as they fall.

..... **1 mark**

(iii) An astronaut on the moon dropped a hammer and a feather at the same time from the same height.



How would the results of the astronaut's experiment on the Moon be different from Lila's experiment on the Earth?

Explain your answer.

.....

.....

2 marks
(Maximum 6 marks)

PUPILS' ACTIVITIES

1. Read the questions (a), (b), and (c). Then, in pairs, discuss and decide your answers to the questions.
2. Whose theory do you believe: Aristotle's or Galileo's?
3. One of you argue as if you believed Aristotle's theory and the other argue as if you believed Galileo's theory – compare your answers to the questions.
4. Swap roles, and compare your answers.
5. Imagine that one of you is Aristotle and the other is Galileo. On your own, predict what you think would happen in the situations below, **if you were that person**.
 - Drop 2 sheets of identical paper, one screwed up, and the other flat.
 - Drop two identical plastic bottles, one is empty one, is full of water.
 - Drop a football and pea.
6. Discuss together what **you** believe will happen in each situation and then as if you were Aristotle and then as if you were Galileo.
7. Try the experiments yourself and record your results and how you controlled your experiments. Decide, in each case, whether Aristotle or Galileo was right.
8. Go and sit with another pair of pupils, and give and listen to each other's answers, then check your answers with the mark scheme.
9. Aristotle was concerned with what happened on the Earth, Galileo was concerned about what happened in the Universe.

Imagine you could write a fax to Aristotle - could you explain to him what factors he may not have considered when trying to work out the laws of falling objects

FURTHER DISCUSSION OR HOMEWORK

Galileo used thought experiments. These are situations where you try to answer the question "What if...?"

Here is one of Galileo's thought experiments. Galileo asked students to imagine a heavy iron ball falling and then predict what would happen, if somehow, as it was falling the ball spilt into two identical halves.

Would the two halves of the ball fall at a slower, or the same, or a faster rate than the whole ball?

- (a) What do you think Aristotle would predict would happen?
- (b) What do you think Galileo would predict would happen?
- (c) What do you think would happen?
- (d) Galileo said.

"Would the two halves suddenly slow down and fall at half the rate of the whole ball?"

- (i) With whose theories was he making his students think?
- (ii) And what was he trying to show about these theories?

MARK SCHEME FOR THE QUESTION

- (a) Both the correct ball and the correct reason are required for the mark.
- the bowling ball because it has the greatest mass **or** it is the heaviest 1 mark
do not accept 'because it is bigger'
the bowling ball because it is bigger' insufficient
- (b) Any **one** from 1 mark
- they are the same diameter *accept 'they are the same size'*
 - they produce the same air resistance **or** friction
- (c) (i) They would both reach the ground at the same time 1 mark
- (ii) air resistance *accept 'friction'* 1 mark
- (iii) Either
- the feather and the hammer landed at the same time 1 mark
 - there is no atmosphere **or** air resistance **or** air on the moon 1 mark
- or**
- they would take longer to fall on the moon 1 mark
 - because there is lower gravity than on the Earth 1 mark
- Do not accept 'there is no gravity on the moon'*

[6 marks in total]

QCA ANALYSIS OF PUPIL PERFORMANCE

Parts (a) and (b) were answered well by a large majority of pupils. Part (c)(i) was less well done by pupils achieving below level 6. Over half the pupils taking the lower tier, and a quarter of those taking the upper tier paper gave an answer to this part which was consistent with Aristotle's hypothesis, that heavier objects fall faster, rather than with Galileo's hypothesis, that they would reach the ground at the same time. In part (c)(iii), almost half of all pupils lost a mark by stating that there is no gravity on the moon.

Facility values

	Tier 3 – 6		Tier 5 – 7	
	Omit %	Facility	Omit %	Facility
(a)	1	0.73	0	0.89
(b)	4	0.50	0	0.74
(c)(i)	1	0.40	0	0.74
(c)(ii)	10	0.53	3	0.71
(c)(iii) 1	7	0.15	1	0.41
(c) (iii) 2	10	0.20	0	0.41

TEACHERS NOTES

The item could be used as a diagnostic or introductory item in a scheme of work or as a revision item.

Background to this question

The QCA analysis of pupils' performance with this question showed that pupils even when asked to think like Galileo may still think like Aristotelians. An important part of being like a scientist is to be able to think and reason with somebody else's ideas – qualities of both sympathy and empathy, which are not easy to show overtly.

The activities depend on discussion, arguing and reasoning - allowing pupils to work with ideas and test those ideas against experimental evidence. It is in essence role-play and allows the important activity of playing with ideas that you may not believe but can work with, and can test their consequences – an important part of arguing and deciding in science.

Preparation

In trials the whole set of activities took 35 - 45 minutes.

It is advised that you read these notes. It is advised that pupils have pp 1 & 2 of the Pupil's Resources. Handing out p3 of the pupils' resources is an option but a teacher may wish to use these as a prompt/lesson plan for her/himself.

If you have an interactive whiteboard you could use it to display the questions and ask pupils to write their answers on the board. To save on photocopying an OHT or computer projector could be used to display the mark scheme and the item for further discussion/homework.

There are lots of opportunities to use different AfL activities and it is advised that you may want to set targets, eg in 5 minutes we will all have finished up to activity 3, and then take reports back but it is advised to keep teacher evaluation to a minimum until after the practical activity.

The practical activity can be a teacher demonstration or pupils' practical.

Dropping plastic bottles. It is advised that you use small plastic pop bottles (eg Panda pops). Make sure the full one is full with tap water and make sure all tops are tightly screwed on. Don't drop the bottles more than a metre.

Teacher information

It is important to realise that Galileo was able to imagine a world where there was no air resistance – a level of abstraction that Aristotle may have been able to engage in but still would have thought of as totally inappropriate in describing the behaviour of objects on the earth. So Aristotle wasn't less intelligent than Galileo; he just thought the abstract view was not appropriate, whereas Galileo did and set off the study of kinematics (the study of the motion of bodies) and dynamics (the study of the forces that make bodies move) that we still use today.

In the trials teachers adapted this activity in the following ways

- Pupils had to write answers down 'in rough' in pencil as they went through the questions so they had a record of what they had responded before they did the question again at the end of the activity.
- The role play was adapted so that the class sat in two concentric circles and pupils in the inner circle faced out and argued as Galileo and the outer circle faced their peers inwards and argued as Aristotle and then the pupils in the outer circle were moved around two places and this time the circles had to change roles so that all pupils had to argue the case for both roles.
- The practical activities were done as a teacher demonstration for the whole class rather than as pupil group activities.
- The class were split into two halves and one half had to state what Galileo would predict and the other half had to state what Aristotle would predict before each part of the practical was demonstrated by the teacher.
- A clip of an astronaut dropping a hammer and a feather on the moon was downloaded from the NASA website and used to provide visual stimulus for part (d).
- The fax was dropped and instead pupils answered the question again in writing on their own and then checked their answers with the mark scheme.

Possible post item question for pupil/class discussion or homework

Thought experiments are often used in physics to imagine and anticipate physical situations that may or may not be possible to realise. They usually end up with an 'obvious' answer or in this case a possible 'absurd' answer. We think part (d) is very hard; it is Galileo arguing Aristotle's position to show that it is highly unlikely. This is a well known form of argument in logic called 'reductio ad absurdum'. You may wish to leave this out.

EVALUATING TAFL

If you are trialling or developing TAFL items in your school you may find it useful to evaluate how it goes and how the pupils perceived the items and activities.

We offer the following examples of simple questionnaires and we suggest that the teacher's questionnaire may be a worthwhile way for teachers to feedback into planning a Scheme of Work. The pupils' questionnaire may provide evidence about their attitudes and values towards the TAFL items and help you develop them even further.

We recognise that we have no hard data to show that the use of TAFL items improves National test scores – that would need a proper experimental design, samples which are statistically sound and a long time. We can say that when we trialled these items the responses of the children were not just indifferent but positive and all the teachers said that they would incorporate them into their schemes of work.

We also recognise that not all lessons can contain TAFL items but we think that if a department incorporates a TAFL item into each unit that they teach then that would be a good hit rate.

The conclusions from the research we undertook in 2003 in key stage 3 science identified the variety of approaches, objectives and outcomes provided in the TAFL pilot items were valid and useful in supporting teachers planning and delivering their lessons.

The effects were notable in terms of teachers reporting creativity and innovation in their teaching and learning practice with positive achievement and motivation observed and reported by their pupils.

The teachers felt that items would be easily integrated into their school's schemes of work and that it would be desirable to do so. We hope you find the same results!

TEACHER FEEDBACK

Name		School	
Name of TAfL item used			
Year group taught:			
No. of pupils in class:			
Teaching assistant present Yes <input type="checkbox"/> No <input type="checkbox"/>		If yes, please provide brief note of their function	
If you used ICT when teaching with the TAfL item then give brief details.			

1. What did you plan to do?
Where did the TAfL item fit into your SoW? What did you plan for your students to learn?

2. What did you actually do?
*What did you say to the pupils as instructions or guidance?
How did you judge that the pupils were doing the TAfL item satisfactorily?
What did you have to do to keep the pupils on task? How did you finish the TAfL item off?*

3. What did the pupils actually do?

What were the pupils' tasks, discussing, writing, reading etc?

What was your impression of the pupils' responses to the TAfL item and its teaching activities, eg motivating, difficult but satisfying, bored, confusing, strange and so on?

Any verbatim pupils' comments - if possible?

4. Would you pass this TAfL item on to a colleague and, if yes, with what advice?

What do you think the pupils learned?

How would you adopt/adapt/reject it for use next time?

What advice would you pass onto a colleague about using the TAfL item?

Roughly how much time did the TAfL item take in the classroom?	<input type="checkbox"/> 5 - 15 mins	<input type="checkbox"/> 15 - 25 mins	<input type="checkbox"/> 25-35 mins	<input type="checkbox"/> 35-45 mins
--	---	--	--	--

PUPIL FEEDBACK

Write in your answers *or* tick the boxes like this: to tell us what you think of the lesson today.

Gender	Boy <input type="checkbox"/>	Girl <input type="checkbox"/>
Class		
Please tell us what you thought of the activity you had to do.	Helped me learn <input type="checkbox"/>	
	Same as usual <input type="checkbox"/>	
	Found it confusing <input type="checkbox"/>	
Was the activity different from a normal lesson?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
If Yes, please tell us how?		
Did you enjoy the lesson?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
Please tell us why?		
Name of TAFL item (Check with your teacher)		