

Mathematics Departmental Workshops

Topic: Effective day to day provision for able, gifted and talented students

Overview

This unit addresses the effective day to day provision for able, gifted and talented mathematicians in our schools. The unit starts by looking at the definitions of able, gifted and talented. It then looks at different types of mathematical understanding - as identified in an article by Richard Skemp - and their place in the classroom. Teachers are then invited to consider their existing provision for able, gifted and talented students and categorise this provision into actions that support instrumental and relational understandings. Finally teachers are invited to tackle a rich task and consider how this task supports day to day provision for able, gifted and talented students.

Where are you now?

Within your team it is important to understand the definitions of able, gifted and talented. Using the definitions on 'Resource sheet 1: Definitions' ask your team to work in pairs to decide which definition matches 'able', 'gifted' and 'talented'.

Gifted students are those who have evident high attainment in academic subjects. Talented students have evident high attainment or latent high ability in a creative or expressive art or a sport. 'Able' students may be either gifted or talented, or indeed both.

Now ask your team to brainstorm the characteristics they see in able, gifted and talented learners of mathematics in your school. Record the characteristics on a flip chart or whiteboard and leave this list displayed for the rest of the session.

Ensure that all members of your team know how gifted students are identified in your school and department.

Activity 1: What is understanding?

Give out 'Resource sheet 2: Relational Understanding and Instrumental Understanding' taken from *Relational Understanding and Instrumental Understanding* by Richard R Skemp (first published in *Mathematics Teaching* 77, 1976) and ask your team to read the text.

In pairs or small groups, give examples of relational and instrumental understanding in your classroom.

Use 'Resource sheet 3: instrumental & relational card sort'. Cut out the cards and ask your team, in pairs, to sort the cards to illustrate instrumental and relational understanding in different topics. You may want teachers to write their own set of cards demonstrating instrumental and relational understanding in a topic of their choice; e.g. fractions, or percentages.

Activity 2: Evaluating provision

On a flip chart (or whiteboard) display a copy of 'Resource sheet 4: Instrumental and relational chart'. Ask your team to write down, on post-its, the things that are currently done to support able, gifted and talented students in your school then stick them on the chart under the headings of 'instrumental' or 'relational'. Check that members of the team agree that the activities are placed in the correct column.

Activity 3: A rising tide raises all boats

Look at the chart from Activity 3 above and see if it includes the statements on 'Resource Sheet 5: Instrumental and relational statements'. If not then ask your team in which column would they place the statements from Resource Sheet 5 (you may like to have written these on post-its yourself before the meeting).

J.F.Kennedy is attributed with the phrase 'a rising tide raises all boats' when considering the US economy but this phrase can also be applied to able, gifted and talented provision, so although we are considering these activities in the context of working with able, gifted and talented students, they should also be seen as part of good mathematics teaching.

Activity 4: nrichment

In this activity you will explore a rich task with your team. You will then ask them to think about how this activity supports the actions you wrote down in the 'relational' column in tasks 2 & 3 (above). The nrich website <http://nrich.maths.org/public/> is a source of rich tasks (which are also linked to the objectives of the renewed secondary framework followed by many departments <http://nrich.maths.org/curriculum>).

Ask your team to work in pairs to discuss the 'Magic Potting Sheds' (<http://nrich.maths.org/4926>) problem.

Introduce the problem and allow time for the pairs of teachers to become familiar with it. Then ask them to consider how students may think about the problem, possibly using the suggestions on the solutions page <http://nrich.maths.org/4926&part=solution>. As pairs 'finish' the task, ask them to think how they might extend the problem (see the problem More Magic Potting Sheds <http://nrich.maths.org/4927>).

Now go back to the statements on the flip chart from Activity 2 & 3. Ask your team to spend some time thinking about the statements in the 'relational' column on the flip chart. Tell them that after 5 minutes you will ask them to feedback on how the 'Magic Potting Sheds' problem exemplifies some of the statements that they included in the 'relational' column on the flip chart.

Take feedback from pairs of teachers

Reflection

Consider the following questions as a team:

- Do we all know the gifted mathematicians in our classes?
- Does the day-to-day provision challenge these students on a regular basis?
- Have we learnt anything in this session which will change how we teach these students?

Implementing and continuing to learn

Ask members of your team to consider what they might aim to do :

- Tomorrow
- Next Week
- Next Year

Members of your team can use 'Resource Sheet 6: Implementing and continuing to learn' to record this if it is helpful to do so

Further reading

Improving learning in mathematics: challenges and strategies, Malcolm Swan
(https://www.ncetm.org.uk/files/224/improving_learning_in_mathematicsi.pdf)

This is the accompanying text in the 'standards box' which provides a rationale for the strategies researched and used.

Working mathematically with able, gifted and talented learners – South West GaTE and NCETM publication (shortly to be featured on NCETM portal)

Institution Quality Standards (IQS) self evaluation tool in gifted and talented education.

http://nationalstrategies.standards.dcsf.gov.uk/node/195324?uc=force_uj

This self evaluation tool helps an institution to drive forward improvements in its provision for teaching and learning gifted and talented pupils within the school.

Mathematics for gifted pupils

http://nationalstrategies.standards.dcsf.gov.uk/node/96377?uc=force_uj. This document is for mathematics departments considering their provision for gifted and talented pupils and takes the form of a collaborative workshop

Bowland mathematics – PD module ‘tackling unstructured problems’

<http://www.bowlandmaths.org.uk/pdmodule.htm>.