

Fostering and managing collaborative work

'How can I get pupils to stop talking and start discussing?'

Module overview

There is overwhelming evidence that mathematical discussion is beneficial for learning when pupils engage with each others' reasoning. This module is intended to help you:

- consider the characteristics of an effective pupil-pupil discussion;
- explore techniques for promoting pupil-pupil discussion;
- discuss the teacher's role in managing pupil-pupil discussion.

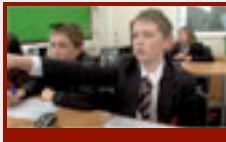
This guide is intended for use alongside the *Bowland Maths DVD* or website, which include a short introductory video for each of the activities; longer videos of lessons and teacher discussions and links to all the handouts and ICT-based problems. Due to the nature of this particular module, it is helpful to work through it with a group of colleagues.

Introductory session

1 hour

- Experience a mathematical discussion
- Reflect on your discussion
- Observe a discussion lesson
- Discussing implications for teaching
- Plan a lesson using one of the problems.

Into the classroom

1 hour

- Introduce the problem and pupils think on their own
- Pupils share their ideas in pairs
- Discuss some helpful ways of working
- Pupils have another go at the problem
- Pupils share solution strategies

Follow-up session

1 hour

- Report and reflect on the lesson
- Consider your own role during collaborative work
- Devise strategies for pupils who struggle to communicate
- Plan some strategies to use in future lessons

Resources Needed

Handout 1	Problems for discussion
Software	Treasure hunt (optional)
Handout 2	Recognising helpful and unhelpful talk
Handout 3	Ten ground rules for pupil-pupil discussion
Handout 4	Planning for pupil-pupil discussion
Handout 5	What is the teacher's role during discussion?
Handout 6	Notes on the problems
Handout 7	Further activities to promote speaking and listening
Handout 8	Suggested further reading

BOWLAND MATHS

Professional development

Introductory session

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Introduction

The importance of discussion



We know from research that mathematical discussion is an **essential** component of thinking and reasoning. Yet, as many OfSTED reports confirm, collaborative discussion is rare among pupils in most mathematics classrooms.

This module is intended to help you:

- consider the characteristics of an effective pupil-pupil discussion;
- explore techniques for promoting pupil-pupil discussion;
- discuss the teacher's role in managing pupil-pupil discussion.

Activity 1

Experience a mathematical discussion

10 minutes



What are the characteristics of helpful and unhelpful classroom talk? Before discussing this question in detail, we suggest that you experience a mathematical discussion for yourself with a small group of colleagues.

Discuss the following problem together:

How many people can stand comfortably on a football pitch?

Alternatively, you may prefer to tackle one of the problems on [Handout 1](#). These problems are similar to those found in the Bowland Case Studies.



You may like to compare your discussion with that held by three teachers: Marc, Eve and Angela.

Activity 2**Reflect on your discussion****10 minutes**

Take some time to reflect on the experience you have just had.

- What roles did you and your colleagues play in the discussion?

Not all kinds of classroom talk are helpful for learning. Refer to characteristics of helpful and unhelpful talk on [Handout 2](#).

- Which of these characteristics do you recognise in your own discussion?
- Was your discussion:
 - Collective**? How far did you really think together, or did you tend to follow independent lines of thought? Did someone 'take over'? Was someone a 'passenger'?
 - Reciprocal**? Did you listen to, share ideas with and consider the alternative views of everyone in the group?
 - Cumulative**? Did you build on each others' ideas to construct chains of coherent reasoning?
 - Supportive**? Did you feel able to share your ideas without fear of embarrassment of being wrong? Did anyone feel uncomfortable or threatened? If so, why?
 - Purposeful**? Did your discussion stay 'on task' or were you 'wandering'?
- Would you describe your talk as **Disputational, Cumulative or Exploratory**?
- What did you learn mathematically from this experience?
- What concepts, skills and problem solving strategies were being developed?

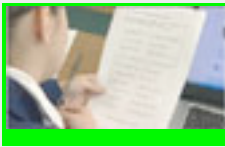
Activity 3**Observe a discussion lesson****20 minutes**

The video clips show three teachers; Eve, Angela and Marc teaching with the three problems shown on [Handout 1](#). We suggest that you watch Eve's lesson (*How many school teachers are there in the UK?*) first. Later, you may wish to come back and watch Angela and Marc's lessons.



Watch the video clip, and then consider the following issues, referring again to [Handout 2](#):

- How does the teacher introduce the problem?
- What different approaches are being used by pupils?
- How does the teacher help pupils to discuss productively?
- Can you characterise the types of talk they are using?

Activity 4**Discuss implications for teaching****10 minutes**

Pupils (and adults!) do not always discuss in helpful ways. Some are reluctant to talk at all, while others take over and dominate. Pupils may therefore need to be *taught how* to discuss. Some teachers have found it helpful to introduce a list of 'ground rules for discussion' into their classes. These ground rules should, in appropriate language, give explicit guidance to pupils on how to talk together profitably.

- Together in your group, prepare your own list of "Ground rules for discussion".
- Compare your list with that offered on [Handout 3](#).
- How could you encourage your pupils to follow these rules?
- Could you involve your pupils in drawing up such a list?

Activity 5**Plan a lesson using one of the problems (10 minutes)****10 minutes**

Choose one problem from [Handout 1](#) that would be appropriate for your class and plan a lesson.

- How will you organise the classroom and the resources needed?
- How will you group pupils? For example, will you deliberately pair pupils who will discuss well together? Will you need to keep some apart?
- How will you introduce the problem?
- How will you explain *how* you want pupils to discuss; which ground rules will you introduce?
- How will you manage the discussion? For example, will you give the pupils a chance to work on the problem individually, before moving them into pairs or groups?
- Will you hold a plenary discussion towards the end of the lesson?

You may like to watch the video of Eve planning her lesson using *Schoolteachers and dentists*.

[Handout 4](#) contains some general advice on planning for pupil-pupil discussion.

[Handout 6](#) gives some background notes on the problems and their relevance to the Bowland Case Studies.

This is the end of the *Introductory session*. After you have tried out your lesson with your own pupils, return for the *Follow-up session*.

Resources to support the lessons, and suggested lesson plans, can be found in the *Into the classroom* session.

Resources you will need:

Schoolteachers and dentists: Mini whiteboards and felt pens.

Sharing office space: 1cm squared paper, mini whiteboards.

Treasure hunt: Software, 1 computer per pair of pupils, 1 mm graph paper.