Getting your bearings

Maths students at key stage 3 often find it difficult to work out the bearing of one position from another, whether by measuring or calculating the angles. **Colin Foster** offers some ideas

EVEN WHEN students have been told many times that they should always measure bearings clockwise from north, it is still easy to go wrong, and endless routine practice can be counterproductive and boring.

Here are some possible tasks you might offer to learners. Those who are already okay at finding bearings might explore links with trigonometry, Pythagoras' theorem, coordinates and transformations, depending on what they are already familiar with.

Bearings around the room

However learners are seated in the room, their positions can be exploited in the following way. Decide which direction is going to be our "north" for today (you can, of course, use the actual direction of north, but the direction of the front of the classroom might be simpler, or you could choose by voting).

- What is the bearing of Anupe from Ben? (Learners estimate an appropriate angle).
- What is the bearing of Ben from Anupe? (Asking the question both ways round highlights the relationship of a bearing and a back-bearing).

Questions along these lines involve learners in putting themselves in another person's position – which may be easier to do in real life, with people you know, than on a piece of paper.

Learners can make up their own questions

Who is on a bearing of 270° from Harnam? (There may be more than one answer).

I am thinking of a person. They are on a bearing of 045° from Alana and a bearing of 300° from Pamelbir. Who is it? (If another pupil cannot decide from this between two pupils, say, then they could ask the questioner something like: "Is the person you're thinking of on a bearing of 180° from George?" to resolve their ambiguity).

Bearings and coordinates

On a coordinate grid there are lots of opportunities for learners to work on bearings without the need for pre-prepared photocopied sheets of drawn-out questions. It is generally sensible to take the positive y-axis direction as north.

What is the bearing of (3, 5) from (4, 7)? Can you come up with any general rules for finding the bearing of one point from another?

Draw axes from 0 to 10 in both directions on centimetre-squared (or dotty) paper. Make up a route from the origin to (10, 10) that doesn't go through any lattice points (i.e. dots). (You could think of these dots as 'mines'.) Learners need to say a distance and a bearing for each leg of the route. You could specify a minimum/maximum number of legs for the journey.

Draw axes from 0 to 10 in both directions on centimetre-squared paper. In your head, 'bury treasure' at a particular pair of coordinates, but don't tell anyone. Make up instructions (distance, bearing for each step) for a roundabout route (not too easy, not too hard) that takes you there. See if someone else can follow it and find the treasure!

Draw axes from 0 to 6 in both directions on centimetre-squared paper and place letters at the lattice points.

Then use distance and bearings to spell out a message, starting from the origin. For example, the word MATHS would be:

- 037°, 5.0 cm (origin to M)
- 315°, 2.8 cm (M to A)
- 127°, 5.0 cm (A to T)
- 315°, 2.8 cm (T to H – note the same vector as M to A)
- 153°, 2.2 cm (H to S)

Learners will need to be quite accurate for it to work, and once you go wrong, you find you get gibberish from then on, and repeated letters can be awkward, so just say "stay" if you want the same letter again.

Without a protractor, you can still work out angles for routes based on 45°, 90°, 180° etc. So what words can you do without a protractor? For example, "COOL GAME".

Bearings on blank paper

Describe instructions (distance, bearing for each step) that draw a picture or a regular polygon or a capital letter.

If someone else is going to try to follow these instructions, it is kind to indicate roughly where on the page they should start – and give a recommended orientation of the paper – so that they do not end up going off the edge of the paper after they have done a lot of work!

How accurately can you predict the shape by visualising in your head before drawing anything out?

Bearings on maps

Google Earth is excellent for this and provides obvious cross-curricular links with geography.

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Further information

Google Earth: http://earth.google.com/

Union address: NASUWT

Creating community spirit

Schools will need support when it comes to fulfilling their new duty to promote community cohesion. **Chris Keates** explains

THE EDUCATION and Inspections Act 2006 introduced a duty on governing bodies to promote community cohesion. This duty came into effect in September this year.

From September 2008 the contribution schools make to community cohesion will be inspected by Ofsted. Schools, therefore, have 12 months to develop their understanding of what the duty means in practice.

The Department for Children Schools and Families guidance defines community cohesion as: "Working towards a society in which there is a common vision and sense of belonging by all communities; a society in which the diversity of people's backgrounds and circumstances is appreciated and valued; a society in which similar life opportunities are available to all; and a society in which strong and positive relationships exist and continue to be developed in the workplace, in schools and in the wider community".

The duty rightly puts schools at the heart of the community and recognises the unique and important contribution they can make to creating a cohesive and integrated society which opposes prejudice, oppression and inequality, and promotes tolerance, diversity and social justice. But, schools will also need support in responding to the new duty and to act in an appropriate and measured way.

Schools are part of a number of interlinked and mutually dependent communities. These include the whole school community itself, from pupils, parents, school workforce, governing body and the community users of the school's facilities and services, to the collaborative networks formed by schools, the local community, including the local authority area within which a school is located, the UK community which all schools are a part of, and the global community.

Whenever a new duty is imposed on schools, particularly when that duty is to be inspected by Ofsted, the response often is a flurry of activity which generates increased workload and bureaucracy. Yet more often than not the first response needed is an audit of existing practice, taking a whole school approach to determine what further action may be required.

The first thing schools should recognise is that this new duty sits alongside the existing statutory requirements for equality on grounds of race, gender and disability which are already subject to inspection.

Where schools are addressing these legislative requirements for their staff and pupils and where, also, they have recognised the need to tackle problems of homophobia and age discrimination – which are also critical barriers to truly cohesive and integrated communities – then they will be well on the way to satisfying their new responsibilities.

It will of course be important to avoid unrealistic objectives and suggestions and to recognise that there are structural and societal conditions that lie outwith the sphere of control of schools. Let's hope that Ofsted recognises this too.

Schools will also want the reassurance that Ofsted properly understands the implications of the community cohesion duty and does not have unreasonable expectations of schools. Regrettably, some of the evidence suggests that, on the ground, Ofsted is yet to demonstrate its ability to address some of the important underpinning issues around community cohesion, namely, on race and gender equality.

Over the next few months, while schools are asked to review their own policies and practices, bodies like Ofsted would also do well to use this time to consult on and develop their own practice in this area and to ensure that their inspection teams are fully trained, prepared and committed to delivering the information, support and guidance that schools and communities deserve.

• *Chris Keates is the general secretary of the National Association of Schoolmasters union of Women Teachers. Visit www.nasuwt.org.uk*