

## Enlargements Interactive Introduction

A definition of enlargement like ‘one shape is an enlargement of another if the ratios of corresponding sides are equal’ is important, but hard for students to make sense of at the beginning. This introduction aims to help them see informally what enlargement is all about.

*Copy a headshot of the head teacher from the school website and paste it onto a squared background (the “head’s head”!). Crop the image so that it is not square and align it with the squared background.*

T: I want an ‘enlarged’ version of this picture to go on my wall at home.

What does it mean to ‘enlarge’ a shape?

*You can absolutely guarantee that students will say:*

S: Make it bigger.

*The approach here is to sharpen up this understanding by being deliberately awkward. So, click on the right-hand edge of the image and pull it sideways one square. You probably don’t need to say anything – just wait.*

S: No, you have to make it bigger *both* ways.

*So now you drag the top edge upwards quite a lot.*

*A student will say:*

S: You have to make it bigger the same amount both ways.

*Click undo. Now, instead, you drag the top edge of the photo one square upwards, to match the one square wider that you made it in the first step. Now pause – the image kind of looks a bit wrong, but less so than before. It’s more subtle, and students may need to compare with the original image to see the difference. Using a photo of a familiar figure (teacher or celebrity) makes this easier than with a cartoon image like the one used here.*

T: What’s the matter?

*Avoid explaining it yourself, and give time for the students to articulate what’s gone wrong. When they complain about the image, you can remind them: “But I made it the same amount bigger both ways!”*

*Eventually the students’ language will shift to multiplicative:*

S: It got a half bigger horizontally but only a third bigger vertically. (*Students may say ‘half as big’ instead of ‘a half bigger’.*)

*If they don’t get to that yet, change the image to a less ‘square’ one – e.g., an image that has a  $1 \times 4$  aspect ratio (e.g., a full-length photo of the head teacher) – and do the same thing again. This time, a  $1 \times 4$  image could become a  $2 \times 5$  image, and that looks spectacularly wrong!*

T: What should I do?

*Students will realise that it should be  $2 \times 8$ , and if they don’t then you could experiment by dragging to discover this.*

*Occasionally students will answer this question in terms of the technology, by saying that you need to hold down SHIFT or something. If they say that, I would say, “Yes, but I’m not going to do that today, because I want to think about how much bigger the image needs to get in each direction”.*

I’ve included a PowerPoint file to illustrate the idea, but I wouldn’t just click through these slides with the students. It’s much more powerful to actually do the stretching live, by dragging with the mouse, so that students can suggest different amounts of stretch and you can do whatever they say, there and then, moving the sides of the picture back and forth as they comment on how it looks.

