

Mathematics in the workplace: an induction activity

Introduction

Teachers say that learning Mathematics is more effective if learners can make links between Mathematics and the skills they need in their subject or vocational area.

The session outlined below is being developed for use with learners as part of their induction to help them think about the mathematical skills they need to function effectively in the workplace.

Learning objectives and outcomes

When they have completed this session, learners should be able to:

- appreciate the relevance of Mathematics in their subject or vocational area
- identify the mathematical abilities required in the subject or vocational area
- assess the Mathematics they already possess against that required to function effectively in the workplace
- relate their knowledge and skills in Mathematics to their individual learning plan (ILP).

Resources required

For each learner you will need:

- Worksheet 1: Image A and Worksheet 2: Image B
- equivalent photographs from the subject or vocational area *or* access to the internet so that learners can select their own digital image
- Worksheet 3: Skills sheet
- Worksheet 4: Prompt sheet.

Starting points

The use of digital images establishes that the discussion about Mathematics that follows is immediately relevant to the workplace. Images can be taken by the teacher or learners in real-life situations, or they may be taken from the internet.

A particularly useful approach is to allow learners to select the image of the workplace for themselves from the internet.

Learners use the images to discuss the Mathematics that they anticipate being useful in this context. This leads into an individual self-assessment exercise.

Planning in multiple environments

Clearly, the use of appropriate work-related images and photographs relates the ideas of mathematical skills and context.

The self-assessment activity undertaken by learners can be used to form an ILP with associated topics identified for development and with SMART (Specific, Measurable, Achievable, Realistic, Time-related) learning targets attached.

Suggested approach

Stage 1

Arrange learners in pairs and explain that they are going to use photographs to discuss the Mathematics they will need in the workplace. Emphasise the importance of discussion in understanding what is portrayed in an image.

Distribute copies of the photographs using Worksheets 1 and 2 as examples.

Use class discussion to establish the Mathematics that learners think is relevant to each situation in the photographs. Ask the learners for their interpretation of what is happening in the photograph: what they think the person was doing immediately before the photograph was taken and immediately after, on each occasion emphasising the mathematical content of the description.

Focus on aspects of the workplace that would not usually be described as mathematical and challenge learners to identify the Mathematics being used.

Use this discussion to gauge how easy it will be for learners to be able to identify the skills needed. If this is going to be difficult then use the prompts on Worksheet 4 and illustrate them using the sample photographs in Worksheets 1 and 2.

Stage 2

Give each pair of learners digital images related to their specific vocational context, equivalent to the ones that have just been used.

Alternatively, ask learners to select images from the internet. If learners are going to select their own images make sure that they are able to print them out. Point out that they should select ones that show a typical scene from the workplace, not necessarily images that depict Mathematics being used.

Allow learners time to discuss the images and the activities that they think are taking place in this context. Learners may use Worksheet 4 as a prompt if necessary, to focus their discussion on relevant Mathematics.

Invite the learners to annotate the images with relevant Mathematics or to make some notes.

Stage 3

Give each learner copies of Worksheets 3 and 4.

Ask each pair of learners to recall their discussions about the photographs, using Worksheet 4 if necessary. On the Skills sheet they should enter up to 10 uses of Mathematics that they identified in their discussions. This section of the Skills sheet will be the same for each pair of learners.

Stage 4

Ask each pair of learners to read out the skills that they have identified in the photograph. Note them on the whiteboard.

Ask the learners who used Worksheet 4 what problems they identified and how Mathematics helped to produce a solution.

Compare the Mathematics on the whiteboard with the list of mathematical topics on Worksheet 4. Challenge the group to find examples in their workplace of the topics from Worksheet 4 that have not yet been listed on the whiteboard.

Stage 5

Reviewing learning

Each learner should now return to their own version of Worksheet 3 and complete the other two questions, which ask for topics they are comfortable with, and ones they need to practise.

An alternative approach is to use the ‘traffic light’ system. Topics that learners are happy with are highlighted in green, ones where they are less confident are highlighted in red, and areas they are unsure about are highlighted orange. This could also be done by sticking dots of an appropriate colour next to the skill.

The red skill areas form the basis of the initial ILP.

Finally, ask learners to summarise:

- how they learned
- what went well – and why?
- what went less well and why?
- where they could use the approach again.

Differentiation to meet individual needs

Activities undertaken during the session give learners to opportunity to work at their individual level of understanding.

Challenges – what learners might do next

Learners can begin to identify specific jobs within the sector that highlight the need for a specific Mathematics skill. For example, a learner could look at fitting a radiator as a plumber may have to do. This would involve estimating, measuring, volume, use of formula with heat loss, scale, angles of pipes, torque settings, temperature and pricing.

Worksheet 1: Image A



Worksheet 2: Image B



Worksheet 3: Skills sheet

Look at the image and discuss in your group:

- what you might have to do in this job
- what Mathematics you might have to use.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Which of these skills do you think you are good at?

1.

2.

3.

Which of these skills do you think you need to improve?

1.

2.

3.

Worksheet 4: Prompt sheet

Use the questions below to identify the Mathematics that might apply to the workplace shown in the photograph.

Under normal circumstances when would the following be used?

- Tables, charts, graphs and diagrams.
- Large numbers.
- Small numbers.
- Simple fractions.
- Decimals.
- Percentages.
- Scales on measuring equipment.
- Everyday units such as:
 - minutes
 - millimetres
 - litres
 - grams
 - degrees.
- Counting the number of people or items.
- Addition, subtraction, multiplication and division using:
 - whole numbers
 - fractions
 - decimals.
- Calculations involving:
 - money
 - lengths
 - areas and volumes.
- Working to a level of accuracy and making approximations.
- Ratio and proportion.
- An average and a range.

What problems do you think you might meet in this workplace?

What Mathematics might you use to solve the problem?

If the solution is wrong what will happen?

How could you check your answer?

How will Mathematics help you to tell other people about your solution?