**Pictures**

**How many pictures could I get on the wall?**

The aim of this activity is to give learners practise in problem solving using a range of measuring skills and possibly area calculations in a very practical way.

It will also be an opportunity to incorporate assumptions and planning skills.

**Level:** Entry 2 – level 2 depending on support

**Resources needed:**

* Calculators
* Range of suitable (and non-suitable) measuring equipment
* 25cm x 35cm template (or whichever size you choose)
* Squared or graph paper
* Blue-tack may be useful to position template on wall

**How is it used?**

Being in no particular context it should be applicable to all learners but could be contextualised quite readily if needs be. This also means that once completed the skills and processes practised within the task can be identified and discussed to see where they might be used in other, more practical situations.

I have used this task with care and sports students and found I was able to justify the relevance by relating it to sports achievement certificates or health and safety certificates.

The numeracy skills in this task could be kept to using one or two significant figures without taking into account the odd shapes of the wall such as light switches or doors and windows and hence the task could possibly be adaptable for entry level learners. Alternatively, you could set some conditions like the pictures must be higher that 1 metre, lower than 2.5 metres and no closer than 30cm to the wall. The gap could be half a picture with or state a measurement.

In the room I use, there is a door on one wall that learners have to work up to. Another wall is clear so I had rules as above, but two groups used it with different orientation of the pictures. A group of level 2 learners tackled the task with the condition that there must be an allowance for approximately 25% of the pictures to be landscape.

**Some of the useful functional skills** that this can be used to highlight and practise are:

* Making a plan of a task – Representing
* Deciding on levels of accuracy required and affect of rounding on the outcome – Analysis of the data
* Assumptions – e.g. the numbers don’t divide exactly so round up or down and get more pictures in or spread them out more – Interpretation of the answer
* Symmetry from the centre or measure from one wall? Decision making

To make sure you are practising the functionality of the learners’ maths skills, the numeracy skills required should be checked before hand to make sure a weakness here is not a barrier to tackling the problem.

**Misconceptions and common errors:**

Some learners may not see the process of planning the task as important

Visualisation of spatial problems – this will become clear when planning.

Confusion between switching from units – cm to m

Reading measuring tool accurately / correctly

Barry Gear

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| **Time** | **Content** |
| 5 - 10 minutes  | * **Review understanding of measurement** – confirm learners are comfortable using a range of measuring tools such as rulers, tapes and tape measures. Also that they are able to measure in millimetres, centimetres and metres and convert between the three units.
* **Review understanding of area and measurement** – including the importance of using the correct units and level of accuracy required for the task.
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| 10 - 15 minutes | 1. **Hand out a few A4 pictures** mounted on card measuring 25cm x 35cm.

*If you are in a classroom it is a good idea to split the group so that each group has a different wall to work on, or uses the pictures in a different orientation*.*I always suggest that the pictures should be no lower than 1 metre and no higher than 2 metres but this could be changed depending on the situation.**You could mark out areas on the wall with masking tape to start them off*1. **Introduce the task** (see notes) and get an estimate of how many pictures they think may fit on the wall before any maths has been done – record these for comparison at the end.
2. **Discuss what information might be needed to complete the task** and how this data can be collected and what maths might be needed to complete the task.
3. **Decide on what equipment will be needed** to obtain the measurements.
4. **Discuss and agree a plan** of how to complete task.

*This stage may be done as a group discussion or could be done in small groups or pairs with the groups feeding back. This then elicits comparisons, promotes constructive criticism and may highlight a variation in methods and accuracy.* *Depending on the level of the learners, you may need to give guidance on where to start ie leave a 30cm gap from the wall and a 20cm gap between each picture.**For Level 2 learners you may want to introduce a higher level of difficulty by saying the middle row must be portrait while the others should be landscape, or that every third picture should be landscape.**Measuring a centre line and working outwards is a useful technique as is dividing one picture width plus gap into the wall length.* |
| 25 - 30 minutes | * **In their groups, the learners can now start to follow their plan**, measuring the wall and trying to fit the pictures accurately.

*There may be opportunity for some to work practically from the start and some to start with a plan. Lower level learners may need to use the templates and use trial and improvement.* |
| 10 minutes | **Draw the class together and compare results and methods:*** Who was closest to their estimate?
* Which display would be the most interesting?
* What assumptions have been made?
* How would this be used in the ‘real world’ and what skills could be used in other tasks
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These extensions are optional.

They could well be used as another session to follow on or at a later date

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| **Time** | **Content** |
|  | Only 30% of the wall should be covered with pictures |
|  | Use different sized pictures |
|  | Where should the nails be placed? |