

Standardized Work: Lesson Worksheet - Teacher Key

This is a document of how we expect the students should generally be answering the questions on the worksheet provided.

The purpose of the worksheet given to the students is to be an evaluation tool to see if they know what the main points of Standardized Work are, there are also questions requiring deeper understanding of these main points.

For runs 1 & 2 the student are simply writing down information about the runs: time, which instructions were used, and if their 'finished plane' matches the end of the instructions (we are considering this a quality control using visual inspection). For some it will be hard to tell because of the color, orientation, etc. and they should be recording these reasons.

Question 1

- Between instruction sets 1 and 4 expect a larger time difference than the other groups.
- Between instruction sets 2 and 3 expect a smaller time difference if any (these instruction sets are more similar but should still show the conceptual differences that will be noticed between set 1 and 4).
- Their reasoning should be focused on the instruction clarity (grayscale vs. color) and the sequencing/order having a better 'flow' in one compared to the other.

Note: the students resulting time may not come out in the expected gradient between bad-bad and good-good instructions. You may want to explain that the reason for this skewed data can be due to the fact that in the second run each person is familiar with the final product, and some people are better at using Legos or visual based instructions.

Question 2

$$takt\ time = \frac{total\ time\ available\ daily}{daily\ customer\ demand}$$

$$total\ time\ available\ daily = \left[2\ hour/day * 60\ min/hour \right] = 120\ min/day$$

$$daily\ customer\ demand = \frac{50\ planes/week}{5\ days/week} = 10\ planes/day$$

$$takt\ time = \frac{120\ min/day}{10\ planes/day} = 12\ min/plane$$

Question 3

The idea here is that if the recorded cycle time is above 12 minutes then you won't be able to meet production demand on time (considering takt time definition), and this is obviously not good. So the students should be saying that they want to reduce their production cycle time to at or below the takt time so that they can make the production deadline.

Question 4

The first part of this question is to have the students notice that differing instructions cause quality differences. (Again this can be skewed on the second run). The second part is for the students to identify that the quality of the instructions can cause color defects, while sequencing can result in positioning defects, and then a combination of the two can result in a completely wrong piece being used.

Question 5

This is just to make sure that the students can identify a simple case of WIP. So, when the students actually finish the product they should be answering that there is no WIP in the system, then no when they don't finish.

Question 6

This is more of a critical thinking question on WIP, bottlenecking, and other concepts that are not covered in this lesson but will be covered in other lessons. Here we want the student to understand that even when you have a majority of the product in the system, that due to the factors present, including the high amounts of WIP, that the products might not get finished on time. Possible answer could involve these factors: the WIP for the other order is acting like a 'wall' towards the new order if you consider a 'first-in first-out' system; with an assembly type of production you have to finish the other order first even though the smaller order may take a shorter time (line balancing and planning), the workstation with the WIP is slower than the rest (bottlenecking occurs), workstation will have waiting time (caused by bottlenecking), order was placed on one line instead of multiple (planning), and also would be inventory/WIP space, with so much product at workstation 3 there might not be any more room between station 2 and 3, causing 2 to stop production until space is available.

Question 7

The students should have answers pertaining to clear, detailed, and properly ordered instructions for the first part of the question such as: include clearly worded, written instructions with each step, add more different views of each step (to see other side), all pages should be colored to distinguish pieces, have the parts list on each page, etc. For the second part of the question, the best answers would be that you would want to balance the amount of work between each station, and/or you would give each workstation the entire set of instructions to each worker so they can see the entire process, but would only do their part.