








Activity description

Pupils decide how to schedule jobs in a fashion workshop. There are six people in the workshop and all jobs must be completed in one day.

Pupils will need to consider whether their schedule is a viable solution to the problem, both in terms of the order in which the jobs can be carried out, and the form of the working days of the employees.

Fashion Entrepreneur ◁ ◇ ◑ ○

There are a lot of things to do tomorrow. How can we get them all done in one day?
Six people work here. You have to plan who does what.

TRACK BOTTOMS

Cutting:	2 hours
Tacking:	3 hours
Machining:	2 hours

POLO SHIRTS

Cutting bodies:	2 hours
Cutting collars and sleeves:	2 hours
Tacking bodies:	2 hours
Tacking collars and sleeves and tacking shirt together:	3 hours
Machining:	3 hours

OTHER JOBS

Deliveries to retail outlets:	4 hours
Deliveries to private clients:	4 hours
Tidying stock cupboard:	2 hours
Answering letters:	3 hours

Use the job sheet to make a clear notice. It must show what everyone will do tomorrow.
Write down any decisions you made to help you plan the job.

Nuffield Applying Mathematical Processes (AMP) Practical exploration 'Fashion entrepreneur'
Supported by the Clothworkers' Foundation © Nuffield Foundation 2010.

Suitability

Pupils working at all levels; individuals or pairs

Time 1 – 2 hours

AMP resources Pupil stimulus

Equipment

Copies of job sheet for rough work and completed notice
Computer spreadsheet

Key mathematical language Scheduling, logic, decision making

Key processes

Representing Identifying factors that affect decisions. Producing a clear plan for the six people who contribute to the completion of all tasks in order, within the constraints of a working day.

Analysing Working logically towards a workable job sheet, recognising the impact of constraints and assumptions.

Interpreting and evaluating Relating findings to the original problem and adjusting solutions to improve their workability, justifying decisions made.

Communicating and reflecting Presenting solutions clearly with explanations; considering the assumptions made and the appropriateness and accuracy of the final Job Sheet.

Teacher guidance

You may like to set the scene of work in a fashion workshop. You may need to explain what cutting, tacking and machining are. You may need to discuss the need for a clear job sheet for each day's work, and the notion of people working different hours during the day.

Read through and discuss with the pupils the tasks listed in the student activity, bringing in aspects of the 'Additional Information', including decisions about various interpretations of the deliveries.

Explain to the pupils that they will need to make their own decisions to help them plan the jobs. They should write down immediately any decisions they make.

Pupils should use the 'Notes' section of the job sheet in the student activity material for notes about each worker, or to show calculations, general notes or decisions they took for their final notice.

Remind pupils that their notice should be easily understandable by all the workers, and that their solution should be workable in reality.

Each pair may need to use job sheet(s) for rough working, and will then need another blank copy on which to produce their final version. Alternatively, they could decide to use a different format if they wish. Remind them to transfer their notes about decisions, constraints and modifications onto the version to be submitted. Pupils working on extension tasks will, of course, need further copies of the job sheet.

During the activity

Look out for unhelpful assumptions 'hidden' in the Job Sheets, such as:

- everyone must start work at the same time
- people can work for eight hours without a break
- males do the driving rather than the sewing
- work must be done in one-hour blocks.

By questioning pupils about their rough answers and work in progress, you can encourage them to describe and write down all the assumptions and decisions they have made, with reasons. For example, 'there are staggered lunch hours so that the workshop is always staffed'.

Encourage pupils to check that their solution is workable before they submit their final job sheet.

Spare job sheets should be readily available.

Discussion of working hours and conditions of work provides some cross-curricular links with PSHE.

Additional information

Every item must be cut before it is tacked, and tacked before it is machined.

The working day can start and finish when pupils choose. People can work for different numbers of hours.

Any person can do any of the tasks.

People can have both short breaks and lunch breaks at different times. It is normal for them to have a short break if working for four hours and for there to be an hour for lunch for full-time workers. The four-hour delivery includes time for a short break.

Pupils may wish to assume that the deliveries are for previously completed garments and could be made at any time (this makes the activity easier) and/or that they are local and do not have to be done in one four-hour block. Decisions on this, and the number of delivery vans available, should be noted by pupils on the job sheet.

If pupils require further information about the nature of the jobs, the following data can be given.

One hundred track bottoms and one hundred polo shirts are being made, twenty each of sizes XS, S, M, L and XL.

There are four different colours of fabric, so five track bottoms and polo shirts in each size and colour are being made.

Five layers of fabric can be cut at one time (all the same size and colour).

Probing questions and feedback

AMP activities are well suited to formative assessment, enabling pupils to discuss their understanding and decide how to move forward. See www.nuffieldfoundation.org/whyAMP for related reading.

- Can you check, for the track bottoms and for the polo shirts, that you have planned all the jobs in the correct order: cutting, tacking, machining?
- Remember that all six people can do any of the jobs. How many hours does each person work? Do they all get reasonable breaks?
- People are paid for the time they are at work. Does your job sheet use their time efficiently?
- How could you adjust your job sheet so that the clothes could be made and delivered all in one day?

Extensions

- Adapt the final job sheet in the light of a notified absence of one person. The effects on each person could be considered, and the person whose absence is easiest, or hardest, to deal with could be found.
- Using the additional information, produce one or more different solutions, for example, using shorter tasks involving garments of only one size and / or colour. Dividing the tasks into smaller units in this way offers more flexibility; for instance, some tacking can take place before all cutting is finished.
- Look at genuine time sheets for various workplaces, including any from pupils' work experience placements.

Progression table

The table below can be used to:

- share with pupils the aims of their work
- facilitate self- and peer-assessment
- help pupils review their work and improve on it

Please edit it as necessary. The table supports formative assessment but does not provide a procedure for summative assessment. It also does not address the rich overlap between the processes nor the interplay of processes and activity-specific content.

Representing <i>Using the job sheet or other format to represent the problem Identifying factors that affect decisions</i>	Analysing <i>Extracting relevant information and working within constraints to find a workable solution</i>	Interpreting and evaluating <i>Interpreting the effects of decisions on possibilities available and working towards improving solutions</i>	Communicating and reflecting <i>Communicating decisions clearly, with reasons where appropriate</i>
Uses the job sheet to plan a solution	Shows minimal understanding through allocating some tasks on the job sheet		A filled job sheet is provided Pupil A
Extracts some relevant information about sensible order of tasks Pupils A, B	Several tasks shown on the job sheet in a sensible order, but may not all have the correct time allocation or may be impractical Pupils A, B	Evidence that some constraints have been interpreted and taken into account Pupil B	Communicates some of the decision making in addition to a filled job sheet Pupil B
Recognises the need for tasks to be in correct order, for appropriate times, and suitably shared Groups C, D	All tasks allocated correctly with some breaks but may have unfilled gaps Group C	Allocates all tasks in correct order with some explanations for decisions Groups C, D	Presents a clear and largely correct job sheet, highlighting and clarifying particular features Groups C, D
Gives consideration to issues of work/break balance in the working day, and translates this to meaningful task allocations	Provides a meaningful solution that meets needs for work/break balance	Provides clear rationale for task allocations and states reasons for any assumptions and choices	Presents a clear and coherent solution, including a correct job sheet, explicitly outlining assumptions, decisions and reasons
Accounts for contingencies and additional constraints	Provides alternative job sheets to accommodate additional constraints Group D	Provides explanations for adjustments to original solution	Shows evidence of reflecting on original work and communicates any modifications



Sample responses

Pupil A

Fashion entrepreneur: job sheet

	8 o'clock	9 o'clock	10 o'clock	11 o'clock	12 o'clock	1 o'clock 1:30	2 o'clock	3 o'clock	4 o'clock 4:15	5 o'clock 5:15	6 o'clock	NOTES
Jane	cutting	Boodies T facing	Print designing		Machining		design printing	Private delivery		(answering letters)		
Darren	cutting	Boodies P facing	Print designing		Machining		design printing	Private delivery		letters		
Susan	cutting	Boodies P facing	together T facing		Nursery Pick-up		detail deliveries	Private delivery		letters (answering)		
Ramesh	cutting	Boodies P facing	together T facing		Machining		detail deliveries	Private delivery		Tidy		
Karl	cutting	Print designing	together P facing		Machining		design printing	detail delivery		tidy		
Parminda	cutting	Print designing	together P facing		Machining		design printing	detail delivery		tidy		
<p>since task</p> <p>everybody working</p>												

Pupil A has used the job sheet to plan a solution which has some tasks in the correct order. The solution has been clearly presented, but the plan includes several additional tasks with no explanation, time allocations that are sometimes incorrect, and with all workers taking breaks at the same time.

Probing questions

- During break times and deliveries the office is left unmanned. Why did you choose to do this? Can you suggest an alternative solution where one or more people are always working?
- You have an afternoon tea break of 15 minutes. How could you improve your job sheet to make the length of morning break and lunch break more realistic?
- Susan does a nursery pick-up during the day. Other workers are doing their own jobs, print designing, during the day. Why have you chosen to do this?

Pupil B

Fashion entrepreneur: job sheet

	8 o'clock	9 o'clock	10 o'clock	11 o'clock	12 o'clock	1 o'clock	2 o'clock	3 o'clock	4 o'clock	5 o'clock	6 o'clock	NOTES
Jane	cut _B	cut _{crs}	tack _B	tack _{crs}	L	m						
Darren	cut _B	cut _{crs}	tack _B	tack _{crs}	L	m						
Susan	cut _T	tack _T							tidy up			
Ramesh		cut _T	tack _T									
Karl												
Parminda		answer letters						D	D	D	D	

my decisions

I have decided to split each hour into 4 15 minute sections this way people can have 15 minute breaks.

I chose to give 2 people the job of making the t-shirts

Pupil B has considered different start and finishing times. The day has been split into 15-minute slots to allocate tasks and breaks. Tasks are generally in the correct order, but there are several errors in allocation of times for some tasks. Lunch and breaks are indicated, but without a key the job sheet is unclear. There are unexplained gaps in the working day for Susan and Parminda.

Probing questions

- How could you improve your solution so that each employee is productively engaged while they are at work?
- Can you give reasons for all the decisions you made in allocating tasks?

Group C

We can afford 6 vans, and we only have 6 employees because that's all we need, though we could afford more.

We switched it round so that Karl has his break at 9 and tacking at 10 because there has to be you can't take the collars and sleeves until you have done the bodies. The bod and tracksuit bottoms are at 9 and the collar and sleeves at 10.

Jane and Parminda don't have kids they don't have to pick them up at 3 they finish at 4. They get paid overtime.

Post comes at 9 so Darren, Susan and Ramesh answer the letters at 10 to have them ready by 11.

They all get 2 hours break per days, which is fair because they start at 8.

Fashion entrepreneur: job sheet

	8 o'clock	9 o'clock	10 o'clock	11 o'clock	12 o'clock	1 o'clock	2 o'clock	3 o'clock	4 o'clock	5 o'clock	6 o'clock	NOTES
Jane	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Darren	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Susan	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Ramesh	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Karl	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Parminda	Yellow	Purple	Orange	Black	Red	Pink	Green	Blue	Diagonal	Diagonal	Diagonal	
Cutting	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
Tacking	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	
Machining	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	
		Cutting bodies	Cutting sleeves+collars	Tacking bodies	Tacking all	Machining	Delivering to retail outlets	Private clients	Tidying @	Answering letters	Lunch	Break
												Not at work

They all deliver at the same time so we have 6 vans.

Cutting is done first thing because you can't do anything until the cutting is done.

They all have lunch together at 12 because the clothes are all made, just need to be delivered.

Group C has considered different finishing times, with reasons, but not different starting times, for which the same reasons may apply. However the suggestion that working beyond 3pm is paid at overtime indicates that the working day is fixed as 8am to 3pm. Tasks are in the correct order and everyone has the same amount of time for breaks, but some breaks are just before or just after lunch. The practicality of one-hour breaks following lunch and followed by one hour tidying as the last job of the day is not considered.

Probing questions

- Have you considered workers having different start times as well as different finishing times?
- All breaks and lunch are the same, one hour. You could find out how much time you would be given for break and lunch if you worked in, say, a supermarket from 8am to 3pm, and use this to revise your job sheet.
- Would you want your break directly before or after lunch? Jane and Parminder have a one-hour break before their final one-hour task of tidying up. Can you explain why you've chosen these break time slots?
- All your tasks are performed in one-hour time slots. See if you can find another way to organise the timing of the working day.

Group D

If one persons absent

Fashion entrepreneur: job sheet

TB - Tracksuit bottoms C - Collars & leaves
 P - Polo shirts r.o - retail outlets
 b - bodices p.o - private outlets

	8 o'clock	9 o'clock	10 o'clock	11 o'clock	12 o'clock	1 o'clock	2 o'clock	3 o'clock	4 o'clock	5 o'clock	6 o'clock	NOTES
Jane												
Darren	Cutting		Tacking TB		Break	Machining TB	Delivery TB	Delivery TB				
Susan	Cutting		Tacking TB		Break	Machining TB	Delivery TB	Delivery TB				
Ramesh	Cutting		Tacking TB		Break	Machining P	Delivery P.o	Delivery P.o				
Karl	Cutting		Tacking TB		Break	Machining P	Delivery P.o	Delivery P.o				
Parminda	Letters	Break	Tacking TB		Break	Machining P	Tidying	Tidying				
	with 4 vans.											
Jane							Delivery TB	Delivery TB				
Darren							Delivery TB	Delivery TB				
Ramesh							Tidying	Break	Delivery P.o	Delivery P.o		
Karl							Tidying	Break	Delivery P.o	Delivery P.o		
Parminda							END					
	with 2 vans											

SUSAN + EMILY

Susan is absent so we have to share her jobs out.

We changed Karl's and Ramesh's times of Delivering 2 hours later, so so they tidy and have a break whilst the other two people Deliver with the 2 vans we have. Then when Jane & Darren have finished Delivering, they end for the day, then Karl and Ramesh go and deliver for 2 hours. Parminda finishes at 2 as there is nothing else for her to do.

Group D has produced a clear job sheet for one of the extension tasks, the absence of one worker. (The job sheet for the original task is unavailable.)

All tasks have been allocated in the correct order with correct time allocations. However no consideration has been given to anything other than one-hour blocks of time.

Two possible scenarios, the availability of two and of four delivery vans, are given with limited reasons.

Probing questions

- Have you considered allocating tasks in slots of less than one hour?
- Do all the break times need to be one hour long? How long would you get if you worked in a supermarket? What other options would you consider?