

### **What is critical path analysis?**

This technique is used to plan all sorts of projects. It works really well in construction and the built environment, because it helps make sure things happen in the right order, and makes sure projects fit into the shortest possible time.

The best way for critical path analysis (CPA) to work is to keep it simple. There are many methods used, but we're suggesting an adapted version which will work for you, and give you an idea of the principles without getting too complicated. So here's how to do it:

### **You will need:**

- Some squared paper, with squares 1cm x 1cm or smaller
- A second site plan sheet, which has 25 x 40 1cm x 1cm boxes on it
- Scissors
- Blu Tack or small Post-it / sticky notes

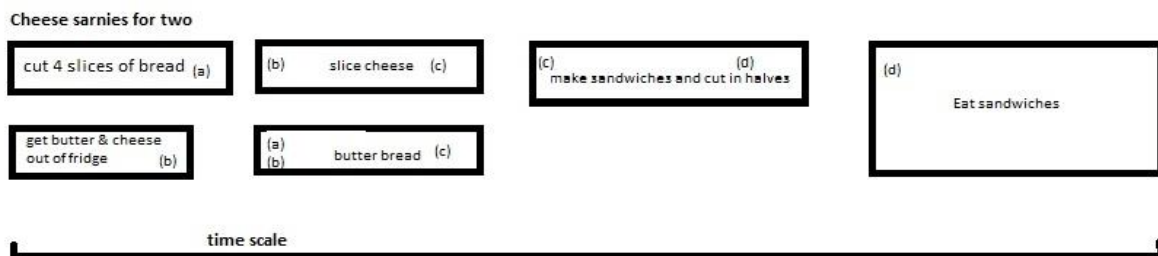
### **Tasks:**

1. Decide a list of the key tasks you need to do to complete your project.
2. Work out how long each task will take, for how many members of the team. When you do this, try to ensure that:
  - a) The task will be completed in one session (ask your teacher how long each session will be)
  - b) If you think it will take longer, divide it between two people, or more, so it can be done in one session
3. Cut out strips of the squared paper. If the task will take 45 minutes, cut it out so it's three centimetres long. If it will take two people that time to do the job, cut it out so it's two centimetres high. So for each strip, the length of the task in quarters of an hour should be the length of the strip, and the number of people it'll take should be the height of the strip.
4. On a full A3 planning sheet of squared paper, you can fit 10 hours (as 40 boxes) along the longest edge, so put a scale for this along the top edge, dividing the time into the sessions you will have to work on the project.
5. For each task, decide which other tasks have to be completed before it starts (these are called 'dependencies'). So, if you're building a house you can't put the walls up until the foundations are laid and dried.
6. When you start laying out your critical path, you start with the tasks which don't depend on any others being done before they start.
7. Fit enough of these into the first session so everyone has something to do for the whole session. Lay them out evenly spread down the page.
8. Then work out which tasks depend on each of those tasks being done. Lay these out in the second session, so everyone in the team has something to do for the whole session.
9. If you have a task which needs others to be complete before it starts, you need to make sure you put it in your schedule to start after all the required tasks are finished.
10. Check it all over and then stick each task to the plan with Blu Tack or sticky notes, so your teacher can photocopy your plan for each team member, but you can still move tasks if required as the project goes on.



Here's an example of a critical path analysis for making a cheese sandwich. Two people were involved, so you can see that there are never tasks allocated for more than two people. At one point the two people are on the same task (eating!) but mostly they work on separate tasks. If one person had to do all the tasks shared out between two, it would take twice as much time, and the order would be different.

You can see that you can't slice cheese until it's out of the fridge, and you can't butter bread until you've (a) cut the bread and (b) got the butter and cheese out of the fridge. If you separate the two things you have to get out of the fridge, it will take longer, as you'll have to open and close the door twice. Critical path analysis can help spot inefficiencies like this, where time is wasted, so it's important to follow your plan through when you've written it.



When you start to develop your critical path analysis, using a table like this to order your tasks will really help you. We've also provided a table you might choose to use for your final version.

| Number | Task title | Time required | People required | Dependencies |
|--------|------------|---------------|-----------------|--------------|
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1. Number each task (this is easier than using letters, as in the example, when you have lots of tasks)
2. Give it a title
3. Work out how long it will take, and how many people (amend these as you go through)
4. Work out the 'dependencies' (tasks which have to be done before the task in question starts)
5. Make your plan

**REMEMBER TO CHECK PROGRESS AGAINST THE PLAN AT THE END OF EACH SESSION**

