

Critical Path Diagrams

What is it?	How to use it?
A Technique for analyzing the work to be done on a project into identifiable tasks at an early stage.	<ul style="list-style-type: none"> Decide on the tasks needed to complete the project. Decide in which order they should be carried out by way of a simple Critical Path Diagram Note any activity which has to begin before another in order for the activity to progress. Draw a Critical Path Diagram Add time estimates for activities Calculate where spare time exists Map the Critical Path. Decide accurately the longest path through the Critical Path Diagram which will dictate the overall time required to complete the project – this is known as the Critical Path
What does it achieve?	
Improves communication. During the project it allows: <ul style="list-style-type: none"> Courses of action to be fully examined both at the beginning and during the project. The Critical Path Diagram forms a basic language which can record information concisely without the need for lengthy written explanations. 	
When to use it?	
On any project – large or small which has: <ul style="list-style-type: none"> A definite beginning and end. Tasks which need to run in conjunction with each other. A series of events which must start or finish before another event can be completed 	

When it is essential that a project finishes on a particular date, a Critical Path Method will help you to decide:

- How long the project will take
- Which parts of the project need to start when
- How long each section will take
- If any 'float' or leeway is possible for the start or finish of a particular section
- If the project is running to time

How to Drawing a Critical Path Diagram

In this example: Children will be displaying artwork they have produced at a venue large enough to hold about 150 people on 1st July.

Step 1. The first consideration is to draw up a list of **Activities**. The activities you need to consider for this are:

<ul style="list-style-type: none"> Producing the artwork 	(1)	<ul style="list-style-type: none"> Arranging publicity Including: - 	(9)	<ul style="list-style-type: none"> Invite parents and local Dignitaries 	(4)
<ul style="list-style-type: none"> Labeling with Children's names 	(10)	<ul style="list-style-type: none"> Photographer 	(14)	<ul style="list-style-type: none"> Confirm numbers attending 	(11)
<ul style="list-style-type: none"> Displaying on the wall 	(13)	<ul style="list-style-type: none"> Producing own flyers 	(15)	<ul style="list-style-type: none"> Arranging food 	(8)
<ul style="list-style-type: none"> Booking a Venue 	(2)	<ul style="list-style-type: none"> door to door advertising 	(5)	<ul style="list-style-type: none"> Confirm catering numbers 	(12)
<ul style="list-style-type: none"> Inviting a celebrity to open the event 	(3)	<ul style="list-style-type: none"> Arrange invite printing 	(6)	<ul style="list-style-type: none"> Collecting and displaying food 	(16)
		<ul style="list-style-type: none"> Sending invites 	(7)		

Step 2. When the list is drawn up you need to take into consideration any jobs which cannot be started or finished until another job is completed. For example, you cannot send invites to the printers before you have decided on a venue, because this information has to be printed on the invites. Then, assign a number to them (bracketed numbers above) roughly in order of importance.

Step 3. Draw a Critical Path Diagram.

Ground Rules

- You will need a large piece of landscape paper or a roll of wallpaper on which to draw your Critical Path Diagram.
- It is recommended that your initial plan is drawn in pencil – thus allowing for alterations as the Critical Path Diagram progress.
- It has been found helpful to draw a time-line along the bottom of your Critical Path Diagram incrementing in the unit of time in which you will be working (i.e. weeks or days) mixing the two can sometimes lead to confusion but can be accommodated (see example).
- Having previously decided on your list of activities now start placing them on the time line for example:
- It is best to separate activities starting at the same time, to different areas of the Critical Path Diagram to avoid confusion (see example).
- Mark in the box what Activity it is and its Duration. Mark the Event number above the box and the “Who is responsible” box underneath.

Activities

Activity 1: Producing the exhibits will take 12 weeks. Place the start of the box at 0 and extend to 12 weeks. Labeling the exhibits will take 1 week – place a box between weeks 12 – 13 lasting 1 week. Fill in boxes as above.

Activity 2: Booking the venue is assigned a 1 week slot starting at week 0. Place its Activity box at week 0 and extend over 1 week. Fill in boxes as above.

Activities 3,4 and 6: All run one after the other therefore are placed next to each other in separate 1 week boxes. Fill in boxes as above.

Activity 5: Needs to be ready for week 4, and needs to be completed before activity 6 can take place. This is shown by the bold down arrow from activity 5 to 6. Fill in boxes as above.

Activity 6,7: The invites are at the printers between activity 6 and 7, mark this in the box. Fill in boxes as above.

Activity 8 and 9: Can start at the same time as activity 7. These can have separate lines to avoid confusion. Fill in boxes as above.

Activity 11: When RSVP's are returned numbers attending can be calculated leading to:(Fill in boxes as above).

Activity 12: Confirming food numbers. Fill in boxes as above.

Activity 13 and 14: Are carried out 24 hours before the Exhibition and are indicated as a small box with a bold down arrow. Fill in boxes as above.

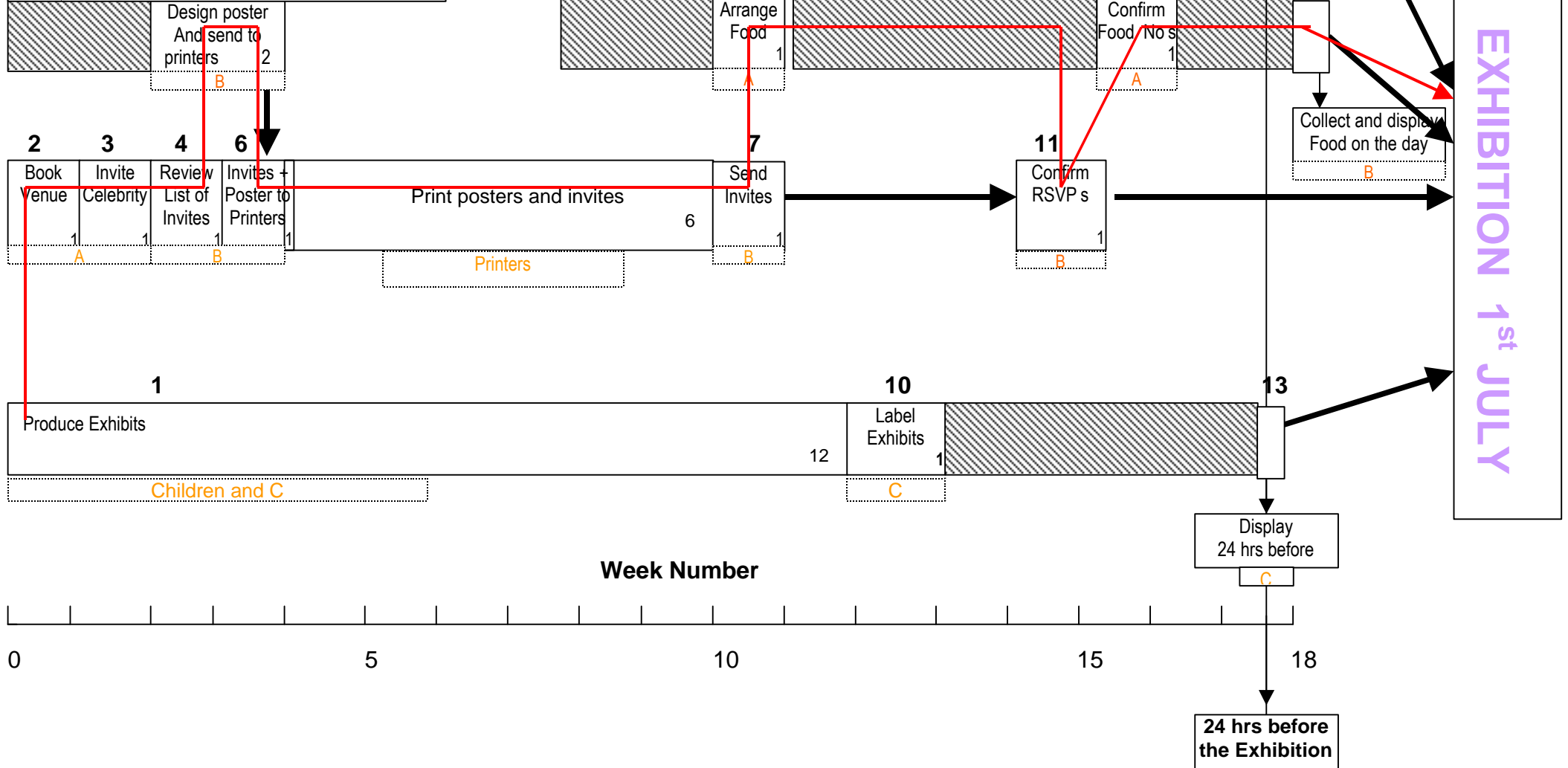
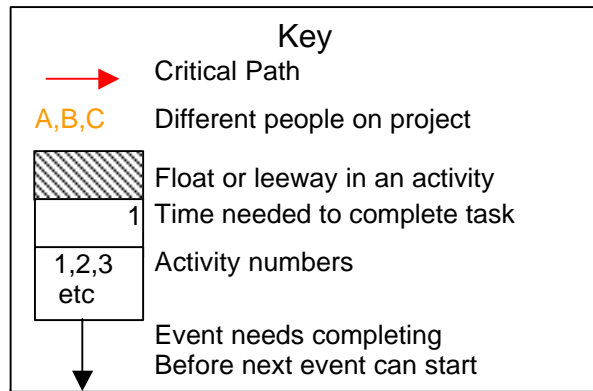
Activities 15 and 16: Are carried out on the day. Fill in boxes as above.

The Critical Path Diagram Representing these activities is shown overleaf:

Diagram Notes:

- Projects are made up of a number of individual jobs, known as **Activities**. In the example given later each activity is clearly labeled within its own box, the box spanning the duration (in weeks) of the activity. This duration is also indicated by a number in the bottom right hand corner known as the **Duration**.
- The shaded area is known as the **Float** this is the amount of leeway you have within an **Activity** and is explained fully later.
- The dotted box under the **Activity** box is the “**Who**” box – the person responsible for each particular activity.
- The bold numbers above each **Activity** box are known as the **Event** and indicates in which order the activities will progress.
- The sequence of tasks which forms the longest time path through the Critical Path Diagram and therefore dictates the overall time required to complete the project is known as the **Critical Path** and is marked in red.

CRITICAL PATH DIAGRAM



Calculating Spare Time or Leeway in the Project

Once the Critical Path Diagram is drawn it is important to look at each activity to establish whether they have a **Float** or leeway time within it. **Float** time allows for efficient handling of man-power and resources. It can be useful to identify if the same person is being used for several simultaneous jobs. For example: Activities 4, 5 and 6 have all been assigned to person B which means a very hectic 2 weeks for that person (see example). It would be sensible and within best practice policy to move the start date of activity 5 earlier therefore alleviating the mad rush in weeks 3 and 4.

Using Tabular Chart

A tabular chart is another method which can help you calculate **Float** time. Set up a table, as below establishing how long each activity will take, the earliest date (on which week number) it must start, the latest date it can finish, then by calculating: The **latest finish date**, minus **earliest start date**, minus **duration** of activity will = the amount of float on that activity. For example: Activity 5, designing the posters to send to the printers, must be completed by week number 4 (latest finishing date) so that it ties up with activity 6, invites going to the printers, they will take 2 weeks to produce **duration** the **earliest start** therefore would be week 0. By calculating **earliest start date** (0) minus **latest finish date** (4) Minus **duration** (2) = 2 weeks **float**.

Tabular Chart - You will see that only a few activities have Float available.

Activity Number	Description	Duration (in wks)	Earliest start date	Latest finish date	Float
1	Produce exhibits	12	0	12	0
2	Book venue	1	0	1	0
3	Invite Celebrity	1	1	2	0
4	Review List	1	2	3	0
5	Design Poster	2	0	4	2
6	Invites/poster to print	1	3	4	0
7	Sent Invites	1	10	11	0
8	Arrange Food	1	8	11	2
9	Arrange publicity	1	10	14	3
10	Label Artwork	1	12	18	5
11	Confirm RSVP's	1	14	15	0
12	Confirm food no's	1	15	16	0
13	Display Art	12hrs	12hrs	24hrs	0
14	Meet photographer	On the day			
15	Interview local TV				
16	Collect /display food				

Step 5 Draw on the Critical Path

The **Critical Path** is the longest time path through the Critical Path Diagram. It also represents the shortest duration in which the project can be completed. The **Activities** with zero **Float** must start and Finish on time. These **Activities** are said to be critical because any delay in their completion will delay the project. They form a continuous path or chain of **Activities** through the Critical Path Diagram which is the **Critical Path** and is indicated by the red line in the example.

To maintain the overall project, time critical **Activities** must start and finish on the due dates. If the Critical Path Diagram is modified or individual **Activities** are delayed, the **Critical Path** may change and the Critical Path Diagram should be amended.