Survival:

This description should be used at a process step which will not adequately remove the hazard. For example:
Survival of Clostridium botulinum spores
Survival of spoilage spore-forming bacteria

Risk Assessment

So far you have identified a "long list" of hazards and briefly described how they are likely to have arisen in the food. The next task is one of the most important of the HACCP process: the identification of those hazards which are significant and the rejection of those which pose no significant risk to the consumer and can be controlled by your prerequisite programme.

The purpose is to produce a "short list" of significant hazards which must be considered further by the HACCP study. This will be achieved by you scoring each of the identified hazards in terms of "Severity" and "Likelihood" to obtain a "Significance" score.

2. Provide a severity score for each hazard

In this example we will uses a 1-3 scoring system to specify the severity of each identified hazard, in terms of the potential harm that could be caused to the consumer. A score of 1 indicates low severity of the hazard, and 3 is high severity. You should base your severity score purely on the potential outcome of the hazard remaining in the food at the time it is consumed. Do not consider the likelihood of this happening, as this is covered in the next stage.

Hazard	Low 1	Medium 2	High 3

Score 1: Low severity

Here there is little risk of serious harm to the consumer although there might be some concerns regarding the quality of the product. Some examples of low severity issues which may score a "1" here include:

- Taints in food where there is no actual chemical contamination; for example, exposure to diesel exhaust fumes or taints from packaging
- Discolouration of food
- Use of wrong ingredient (except if this introduces an undeclared allergen)

Conduct a hazard analysis

What does this mean?

For a HACCP plan to be effective, control measures need to be targeted at those hazards which are more likely to occur in practice and which if they occur may lead to actual harm. The process of identifying such significant hazards is known as "Hazard Analysis" and requires you to work through each process step in turn, describing the identified hazards and then ranking them in terms of their likelihood of occurrence and severity. At the end of this process, you will be required to identify suitable control measures for those hazards ranked as significant, any hazards which you have ranked as insignificant will be covered by the prerequisites.

1. Write a hazard description for each hazard

The description should refer to the source or cause of the hazard and whilst brief, should contain sufficient detail to properly characterise the hazard. When writing the hazard description you should include one of the following terms which provide an explanation of the nature of the hazards at each process step. Using the same terminology throughout the HACCP plan will help you to produce a coherent plan.

Presence:

Use this description when the hazard is likely to be already present in the food at the process step. For example:
Presence of Salmonella in raw chicken pieces
Presence of E.coli o157 in raw beef mince
Presence of stones in sacks of chick peas
Presence of bones in fish

Introduction:

This description should be used where the hazard is potentially introduced at the process step itself. For example:
Introduction of E.coli o157 by cross-contamination from utensils
Introduction of glass from broken light fittings
Introduction of Listeria from condensate dripping into open food

Growth:

This description should be used where there is potential for growth of microorganisms at a process step. For example:
Growth of Salmonella during ageing process
Growth of Clostridium perfringens during cooling
Growth of moulds during maturing process

Score 2: Medium severity

This type of hazard could cause serious harm to the consumer, for example short term illness or perhaps slight cuts or abrasions. Typical examples of this type of hazard might include:

- Foreign objects which are unlikely to be ingested or to present a choking hazard
- Residual detergent in process equipment
- Pesticide or heavy metal residues in food

Score 3: High severity

This type of hazard could cause actual significant illness such as food poisoning or actual bodily harm such as choking or internal bleeding.
Typical examples might include:

- Pathogenic bacteria or their toxins which cause serious illness or may kill such as E.coli o157 and Salmonella, Clostridium botulinum.
- Sharp glass or metal fragments which might be ingested
- Food allergens

3. Provide a likelihood score for each hazard

This is an assessment of the likelihood that the hazard will actually occur. When considering this score you should take into account:

- The product description as set out in Preparatory Stage 2 and in particular any chemical or physical properties of your food which might encourage or inhibit microbial growth
- Any published guidance on the likelihood of the hazard, such as food poisoning statistics or information produced by the Food Standards Agency
- The history of such hazards associated with your food

You should score the likelihood of the hazard actually occurring on a scale of 1 to 3.

- **Score 1** indicates "Low" likelihood. Here it is unlikely, although still possible, that the event will occur. In other words, it is possible but not probable that the hazard will occur in practice.
- **Score 2** indicates 'Medium' likelihood. Here it is reasonably foreseeable that the hazard will occur. It could happen although there may not be any evidence of it having happened before.
- **Score 3** indicates "High" likelihood. It is very likely that the hazard will occur.

4. Determine your significant score

Once you have entered values for the 'Severity' and 'Likelihood' for a given hazard at a process step, a 'Significance' rating score (9 is the maximum score) will automatically be generated.

You should now identify a significance score above which you are going to consider the hazard to be significant and take it forward to the next stage.

For example:

If you specify that a score of 3 is significant all those hazards scoring 3 or above will be taken through to the next stage all those hazards scoring 2 and below will be controlled and managed through effective prerequisite programmes.

If you specify that a score of 4 is significant all those hazards scoring 4 or above will be taken through to the next stage, all those hazards scoring 3 and below will be controlled and managed through effective prerequisite programmes.

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HANDBOOK

Specify the control measures for each hazard

What does this mean?
Control measures are actions and/or activities that are taken to prevent, eliminate or reduce the occurrence of a hazard that you have identified.

How is this stage achieved?
Only significant hazards (those above your predetermined significance score trigger point) will be carried forward to this stage.

For each significant hazard record what actions and/or activities are to be taken to prevent, eliminate or reduce the hazard to an acceptable level. Control measures are often confused with monitoring. Monitoring is carried out to check that the control measure put in place to control the hazard is working. Here are the definitions of "control measure" and "monitoring" to help you understand the difference:

Control measure
Any action and/or activity that can be used to prevent or eliminate a food safety hazard or reduce it to an acceptable level.

Monitoring
Conducting planned observations or measurements to assess whether a CCP is under control.

You should remember that:
More than one control measure may be necessary to effectively manage a specific hazard.

- For example, use of a metal detection system, maintenance of the detection system, and training on using it might all be needed to avoid the hazard of metal pieces in food.
- One control measure may manage more than one hazard. For instance, oil temperature and fry time can be an effective control for reducing both numbers of Salmonella and Campylobacter in fried food.
- Control measures are not always carried out at the same Process Step where the hazard arises. For example a hazard at Process Step 1 may be 'presence of metal in raw material from supplier'; this may have several controls including the use of only pre-approved suppliers, or supply to an agreed specification. These controls will appear at Process Step 1, however a control measure at Process Step 15 'effective working metal detector and rejection system' is also a control for this hazard.

A table to show examples of an identified hazard at a process step, its likely cause, the control measures for the hazard and how these are monitored

Step number	Process step description	Hazard and possible cause	Control measure	Monitoring
10	Deep Frying	Survival of bacteria due to undercooking: low oil temperature or short exposure time	Stated oil temperature and fry time	Checks on the continual measurement of oil temperature to be taken on the first product at the start of the shift, every 30 minutes thereafter and on the last product of the shift. Timer with alarm to be activated as each batch is placed in the fryer
15	Metal detection	Introduction of metal from broken machinery used in other process steps	Effective working metal detector and rejection system	Metal detector checks taken at the start of a run, end of a run and every 20 minutes. The checks are carried out using 1.5mm Ferrous, 2.0mm Non-Ferrous and 3.0mm Stainless Steel, all are to be detected and rejected by the metal detector
15	Metal detection	Introduction of metal from broken machinery used in other process steps	Prerequisite requirement of Planned preventative maintenance	Routine maintenance will be carried out as outlined in the Planned preventative maintenance procedure PPM01
15	Metal detection	Introduction of metal from broken machinery used in other process steps	Prerequisite requirement of Training	All staff in must be trained in operation and checking of the metal detector