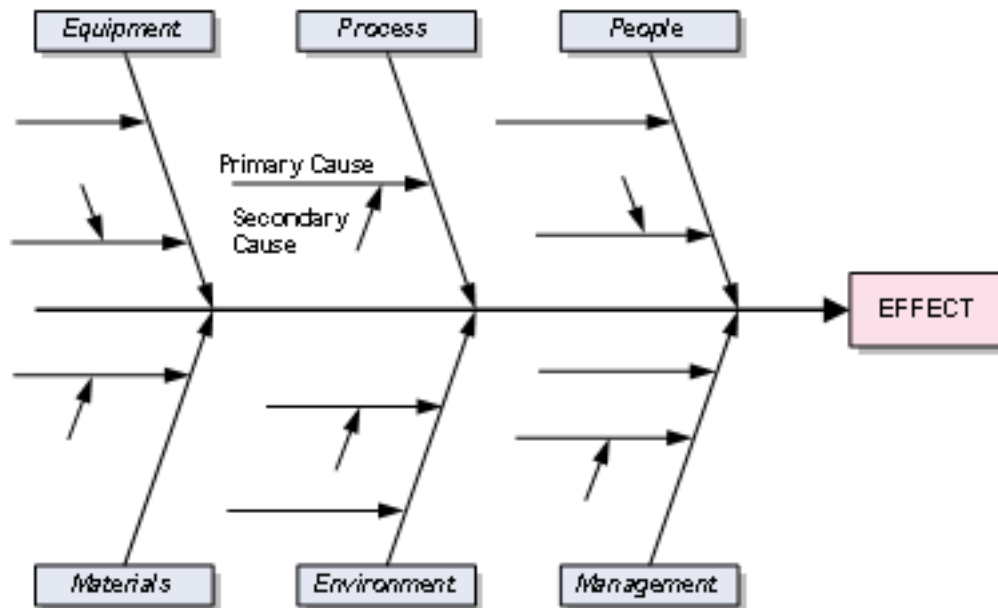


## How to Use a Cause and Effect Diagram

The Fishbone Diagram is another name for the Ishikawa Diagram or Cause and Effect Diagram. It gets its name from the fact that the shape looks like a fish skeleton with the head as the effect, or outcome. A fish bone diagram is a commonly used tool for identify possible causes for a certain problem or event.

Use the fishbone diagram to identify the causes, factors, or sources of variation that lead to a specific event, result, or defect in a process. Also use the fishbone tool along with Brainstorming and the 5 Whys as a way to dig deeper.

In a fishbone diagram, the various causes are grouped into categories and the arrows in the image below indicate how the causes flow toward the end effect.



## Steps to Using a Cause and Effect Diagram

1. **Define the Effect:** Be specific.
2. **Choose Categories:** The fishbone diagram template is set up with the most common set of categories, but add or remove categories based on your specific case. See the example categories below.
3. **Brainstorm Possible Causes:** Using the fishbone diagram while brainstorming can both broaden and focus your thinking as you consider the various categories in turn.
4. **Ask 'Why?':** You really want to find the root causes, and one way to help do that is to

use the **5 Whys** technique: asking "Why?" or "Why else?" over and over until you come up with possible root causes. "Improper handling" is not a root cause, while "Failing to wear Latex gloves" might be closer to a root cause. But, you could still ask "Why was he/she not wearing gloves?" with the possible response "There were none available." It is a lot easier to take action against the inventory problem than just the generic "improper handling". Although 'improper handling' could fall under education and training.

5. **Investigate:** Now that you've come up with possible causes, it is time to go gather data to confirm which causes are real or not.

### Common Categories in a Fishbone Diagram

<b>The M's</b>	<b>The P's (Service Industry)</b>	<b>The S's (Service Industry)</b>
Machine (Equipment)	Plant/Place	Surroundings
Method (Process)	Process	Supplies
Man Power (People / physical labor)	People	Systems
Material	Policies	Skills
Mother Nature (Environment)	Procedures	
Management (Policies)	Price	
Measurement (Inspection)	Promotion	
Maintenance	Product	
Marketing (Promotion)		

During a brainstorm session, a fishbone diagram is usually used very loosely, meaning that sometimes branches (labeled as primary and secondary causes in the fishbone diagram below) may actually represent sub-categories of causes rather than actual causality.

When a cause and effect diagram is used to represent *causality*, then the primary and secondary branches take on very specific meanings:

A **Primary Cause** is one that could lead directly to the effect. For example, a light bulb that burns out pre-maturely (the effect) might be caused by a sudden jarring motion such as *dropping*, which might be listed under the category *People* if it was associated with handling by a person (as opposed to machine handling).

A **Secondary Cause** is a cause that could lead to a Primary Cause, but does not directly cause the end effect. For example, the cause *slippery hands* doesn't make the bulb burn out, but it could lead to the light bulb being dropped. So *slippery hands* would be listed as a secondary cause under *dropping*.

When a fishbone diagram is used for simply categorizing possible causes, then instead of listing *Dropping* in the place of a primary cause, it might be listed under the sub-category

*Improper Handling*, with *Dropping* and *Throwing* as different causes that fit under that sub-category. The following example shows the sub-categories highlighted.

**Effect:** Light Bulb Burning Out Prematurely

<b>Causality Approach</b>	<b>Categorization Approach</b>	<b>Combination</b>
People	People	People
> Dropping	> Improper Handling	> Improper Handling
>> Slippery Hands	>> Dropping	>> Dropping
>> Rolling off a Table	>> Throwing	>>> Slippery Hands
> Throwing		>>> Rolling off a Table
		>> Throwing