STOP! *There are some terms you need to know first …*

    Premise: a statement that assumes something to be true

    Conditional Premise: a statement where "if" is a hypothesis and "then" is a conclusion

    Logic: the relationship between ideas, intended to produce truthful conclusions

Inductive Logic: Specific to General

Inductive reasoning allows for the possibility that a conclusion is false, even if all of the premises are true. Instead of being valid or invalid, inductive arguments are either *strong* or *weak*, which describes how *probable* it is that the conclusion is true. Inductive reasoning is inherently uncertain. It only deals in degrees to which, given the premises, the conclusion is *credible* according to some theory of evidence. For example:

100% of biological life forms that we know of depend on liquid water to exist.   (Premise)
If we discover a new biological life form it will likely depend on liquid water to exist.   (Strong)

All the swans I have ever seen are white.   (Premise)
All swans are probably white.   (Weak)

Generalization: proceed from a premise about a sample to a conclusion about a population

The majority of college students at Montgomery College don't get enough sleep.   (Premise)
Therefore, the majority of all college students probably don't get enough sleep.   (Conclusion)

Prediction: draws a conclusion about a future individual from a past sample

Most cats panic when placed in a moving vehicle.   (Premise)
My cat will probably hate riding in the car too   (Conclusion)

Argument from Analogy: noting the shared properties of two or more things, and from this premise inferring that they also share some further property

Humans can move about, solve mathematical equations, win chess games, and feel pain. (Prem.)
Androids can also move about, solve math equations, and win chess games.   (Premise)
Thus, it's probable that Androids, too, can feel pain.   (Conclusion)

Deductive Logic: General to Specific

In deductive reasoning, if something is true of a class, or group, of things in general, it is also true for all members of that class. For example:

All human beings will, one day, die. (Premise)
Anastasia is a human being. (Premise)
$\rightarrow$ *Anastasia will die.* (Logical Truth)

Assuming that both of the first statements are true, the final statement must also be true. This type of reasoning is only *sound*, however, if the generalization premise is true. Otherwise, a statement can be "logical" according to deduction and still be untrue. For example:

All grandfathers are bald men. (Faulty Premise)
Harold is a bald man. (Premise)
$\nrightarrow$ *Harold is a grandfather.* (Logical Untruth)

Law of Detachment:

The law of detachment takes two premises, a conditional premise and a premise about a member of a class. Based on the truth of both premises, a conclusion can be deduced.

If an angle is between 90° and 180°, then it is an obtuse angle. (Conditional Premise)
Angle A is 120°. (Premise about a Member of a Class)
$\rightarrow$ *Angle A is an obtuse angle.* (Logical Truth)

Law of Syllogism:

The law of syllogism takes two conditional premises and forms a conclusion by combining the hypothetical *(if)* aspect of one statement with the conclusion *(then)* of another.

If Larry is sick, then he will be absent. (Conditional Premise)
If Larry is absent, he will miss his classwork. (Conditional Premise)
$\rightarrow$ *Therefore, if Larry is sick, he will miss his classwork.* (Logical Truth)

Law of Contrapositive:

The law of contrapositive states that, in a conditional premise, if the conclusion is false, then the hypothesis must be false also.

If it is raining, then there are clouds in the sky. (Conditional Premise)
There are no clouds in the sky. (Premise Proving the Prior Conclusion False)
$\rightarrow$ *Thus, it is not raining.* (Logical Truth)