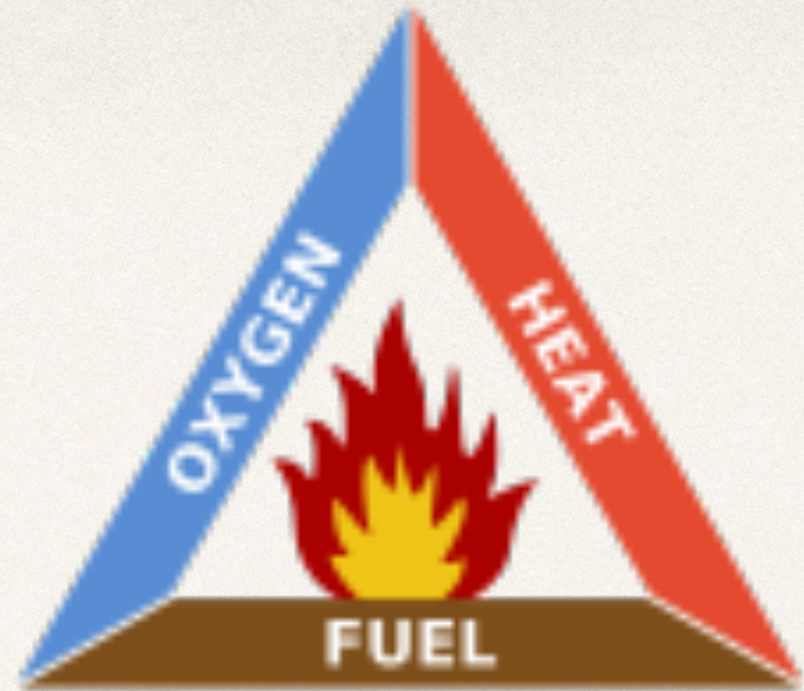


*Necessary conditions
versus
Sufficient conditions*



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PHI 169



(1) What Is the Difference?

The baby grows *only if* it eats

Eating food is a *necessary condition* for the baby to grow

But eating food is **not sufficient** for the baby to grow.
The baby needs other things (e.g. healthy environment, protection) in order to grow.

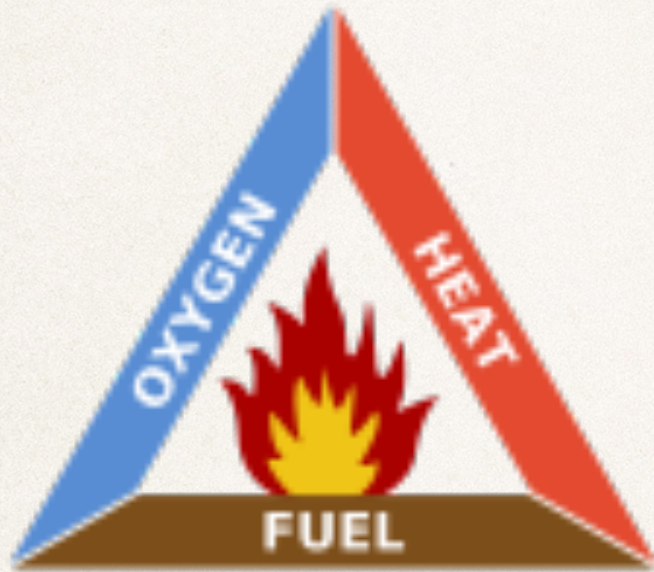
(2) What Is the Difference?

The sidewalk gets wet *if* it rains.

Raining is a *sufficient condition* for the sidewalk to get wet.

But the rain is **not necessary** for the sidewalk to get wet. The sidewalk can get wet in other ways, for example, by pouring water on it.

(1) What Is Necessary for What?



Oxygen is a *necessary condition* for fire.

Fuel is a *necessary condition* for fire.

If a fire burns, then there is oxygen.

Fire burns *only if* there is oxygen.

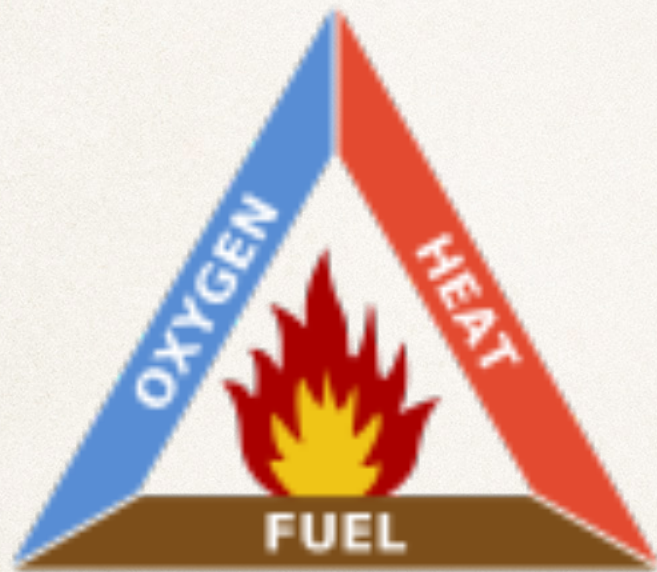
If there is no oxygen, then fire does not burn.

If a fire burns, then there is fuel (burning).

Fire burns *only if* there is fuel (burning).

If there is no fuel (burning), then fire does not burn.

(2) What Is Sufficient for What?



Oxygen is a necessary condition, but not sufficient for fire.

Fuel is a necessary condition, but not sufficient for fire.

Are oxygen and
fuel, together,
sufficient for fire?

Is fire sufficient
for heat?
Is it necessary?

A Video About the Distinction

Necessary condition

Sufficient condition

You Tube Video on the distinction

https://www.youtube.com/watch?v=5LqNm9d2_I

Necessary v. Sufficient Conditions Within Arguments

(1) Does the Conclusion Follow (Deductively) from the Premises?

Premise: If money supply increases, prices will go up.

Premise: The money supply in the US is increasing.

Conclusion: Prices in the US will go up.

*YES! According to the premises, an increase in the money supply is **sufficient** for an increase in prices.*

(2) Does the Conclusion Follow (Deductively) from the Premises?

Premise: If money supply increases, prices will go up.

Premise: The money supply in the US is not increasing.

Conclusion: Prices in the US will not go up.

NO! According to the premises, an increase in money supply is sufficient for an increase in prices, but it **need not be a necessary condition**.

Necessary or Sufficient Condition?

If one kills by accident,
one is not guilty of
premeditated
homicide.

“killing by accident” is
a *sufficient condition* for “not
being guilty of premeditated
homicide”

“being guilty of
premeditated homicide” is a
sufficient condition for “not
killing by accident”

From the LSAT Test

*Everyone who is
compassionate is kind, and
someone who has
experienced life's challenges
is invariably
compassionate. Jeremy is
kind, so he has experienced
life's challenges.*

(a) If x is compassionate,
then x is kind.

(b) If x has experienced
challenges, then x is
compassionate.

Hence, if Jeremy is kind, then
Jeremy has experienced
challenges.

What's wrong with
this reasoning?

Given premises (a) and (b), *being
kind* is a necessary condition for
having experienced challenges, not a
sufficient condition.

Two Equivalent Formulations

If A, then B.

A is a sufficient condition for B.

B is a necessary condition for A.

A only if B.

A is a sufficient condition for B.

B is a necessary condition for A.