

# APPLIED MATH & STATISTICS

Statistics = study of uncertainty

UNCERTAINTY: state of incomplete or imperfect information about something of interest to you

Statistics helps with:

- gathering data to decrease uncertainty about something of interest
- making a valid conclusion from a given body of evidence

Statistics mainly comes up in:

- science (facts & relationships)
- decision-making (predicting the future under different conditions)

• STATS & SCIENCE (facts & relationships)

- RELATIONSHIPS

• CAUSAL → true cause & effect

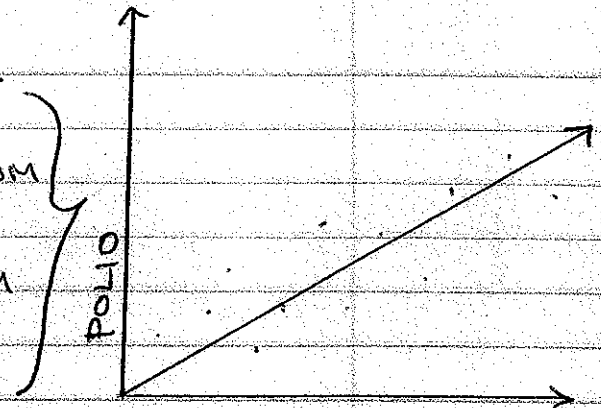
EX: smoking causes lung cancer/heart disease in humans

• ASSOCIATIONS → two things that are associated but neither causes the other

- weak word simply showing that as one thing changes, another thing changes correspondingly

EX: soft drinks cause polio (continues on next pg.)

Season	soft drinks	polio
WINTER	LOW	LOW
SPRING	MEDIUM	MEDIUM
SUMMER	HIGH	HIGH
FALL	MEDIUM	MEDIUM



- Scatter plot shows positive association SOFT DRINKS (positive slope)

- but association is not causal because soft drinks do not cause polio. Real reason for increase in polio was that nonchlorinated swimming pools allow for polio virus to spread in hotter months

SEASON	SWIMMING POOL USE	POLIO
winter	low	low
spring	medium	medium
summer	high	high
fall	medium	medium

