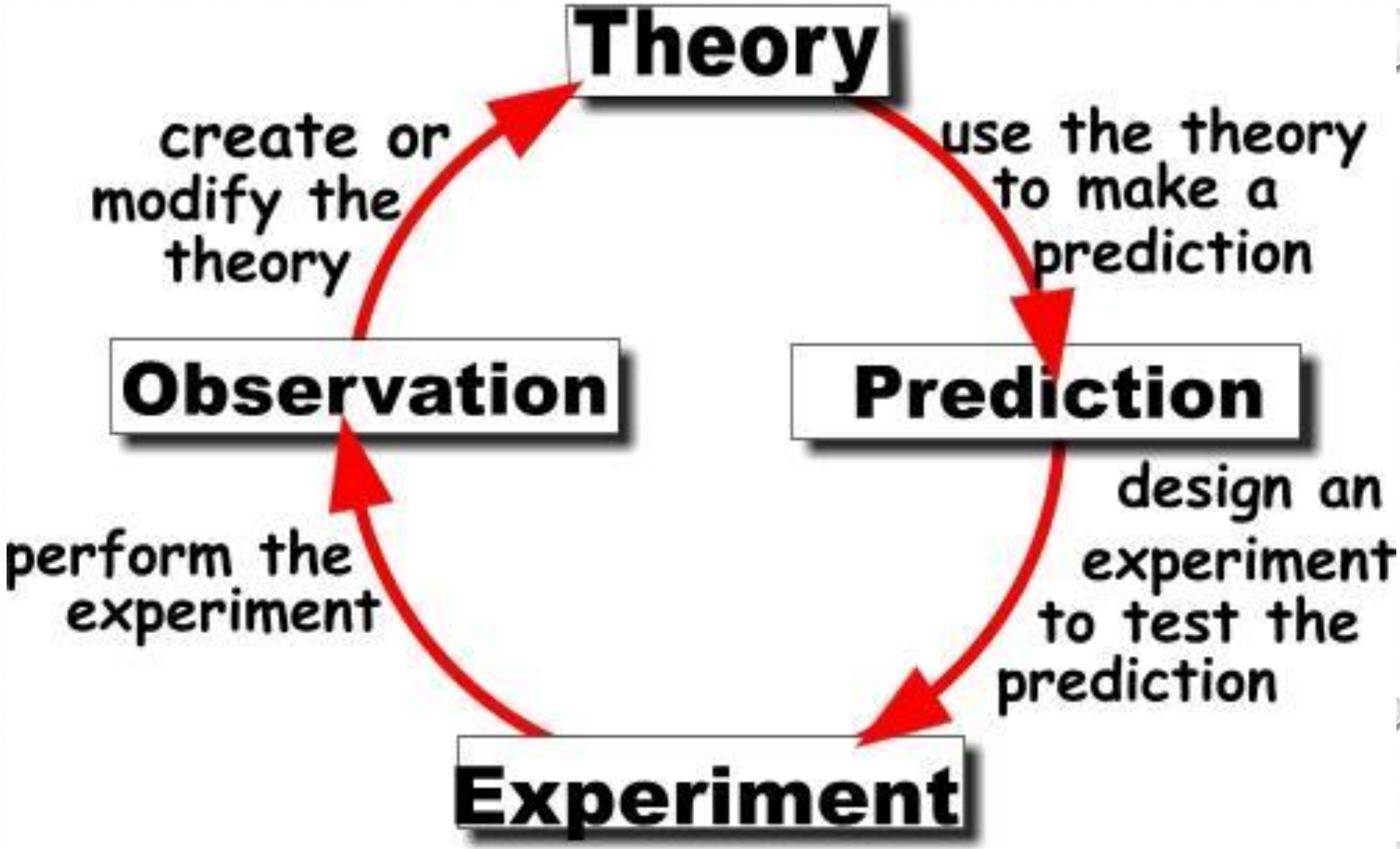
THE SCIENTIFIC METHOD

THE INVESTIGATIVE PROCESS


Theory
use the theory to make a prediction
Prediction
design an experiment to test the prediction
Experiment
perform the experiment
Observation
create or modify the theory

HYPOTHESIS

A hypothesis is an idea, a guess, a study or research that has not been tested yet.

X: I think Johnny killed Bobby
Y: How do you know?
X: I don't know yet, I haven't tested my theories yet
Y: Prove It.
X: I will try. I just have to gather data, evidence and interview witness and test all of the evidence to see if It makes any sense and others agree with my theory.

THEORY

A theory is formed by substantiated evidence. It is a principle that explains how an event may have occurred that has been analyzed with gathered data and tested evidence to prove it.

Establishing and utilizing a methodology to reach the most accurate, tested and unbiased conclusion should be of the utmost importance to investigative work.

This can be achieved by applying the scientific method to police investigations.

Organize- gathering, collecting data that is specific and relevant. (objective)

Analyze- identify individual evidence and find correlations among data.

Generalize- hypothesis formation, extend the relationship of the data beyond the given information.

Experimentation- test outcomes, collect supporting and questioned samples/data.

Conclusions

Statements made by suspects, victims, and witnesses should not automatically be treated as facts, but rather as theories that should be tested against the physical evidence.

Establish a timeline for each witness and test them individually.

Create an “Inclusive Timeline” with all witness statements and evidence that’s provides a time frame and test it.

Step 1: Organize - gathering,
collecting data that is specific and relevant (objective). This information should be observable and measurable.

- Medical Examiner
- EMT – Firefighters
- Notes, Sketches, Photographs
- Observing and identifying areas of blood and other physical evidence.

Step 2: Analyze the Data: Identify individual (Unique) patterns or of Classification and find correlations among data in evidence.

Note those pieces of evidence that make a pattern (Blood)

Do the patterns have a relationship to those around them?

Identify potential blood patterns, note the size, shape, distribution and appearance and all of the other of evidence.

Step 3: Generalize: hypothesis formation, extend the relationship of the data beyond the given information

What is a hypothesis?
An educated guess. It form ideas of potential mechanisms causing the incident.

- DO NOT GO INTO A SCENE WITH A PRECONCEIVED NOTION OF WHAT HAPPENED AND ALLOW BIAS TO OCCUR.

- DO NOT MAKE THE SCENE FIT THE THEORY, MAKE THE THEORY FIT THE SCENE.

- MULTIPLE SCENARIOS OR THEORIES SHOULD BE FORMED AND TESTED TO PREVENT BIAS FROM OCCURRING.

Step 4: Experimentation: test outcomes, collect supporting and questioned samples/data

Evaluation of data collected at the crime scene
Based on physical characteristics of patterns

Further forensic testing and autopsy outcomes
Experimentation
Based on past experience and experiments
Based on an attempt to recreate patterns
Research and other specific references

Step 4 Cont. : Experimentation

Experimentation and testing of the theory should also include acquiring appropriate reports, such as autopsy reports, medical reports, lab reports, and so forth.

- Test this theory against the evidence to see if it validates or contradicts the theory

- If it contradicts the theory, you must reformulate or consider additional events

Step 5: Conclusions

- Taking all of the information and data, as well as the results of the experimentation, and making the most probable conclusion or opinion. The most probable conclusion is usually not the only conclusion.

- Your conclusions MUST be supported by *PHYSICAL* evidence.

- Information such as forensic reports, medical and autopsy reports can all apply when reaching a conclusion.

Step 5: Conclusions cont.

- Conclusions should only be written when all of the facts are gathered and is generally the last step in the analysis.

- If Investigators correctly apply the scientific method, they will have an awareness of other possibilities and will be able to explain why their conclusion is the best explanation or why other opinions may be flawed.

Reproducibility(can you recreate it?

Validation (does it correlate with other statements and evidence found

Peer/Technical Review (Do other Investigators objectively agree?

Problems and limitations

1. Other assumptions
Assume data was true and correct

Building upon prior research, but
open to changes.

Do not ignore alternative theories
All must be analyzed

2. Alternative hypothesis

- simplest

  > Ockham's razor – pick the hypothesis with the least assumptions

  > least complex – doesn't require complex instances or situation to be true

- fits the most facts

  > Cohesiveness – ties fact together in a meaningful way

  > Comprehensive – accounts for more facts than another.

3. Confirmation

In science nothing is conclusively proven but rather tested to the point that it can’t be disproved.