

Trace Evidence

Summary

- Microscopic Analysis
- Types of Trace Evidence
 - Glass
 - Hair (fur)
 - Fibers
 - Paint
 - Soil
 - Gunshot Residue

Glass

- What is glass?
- What crimes are glass involved in?
- How is glass collected?
- How is glass analyzed in the lab?

Trace > Glass

What is glass?

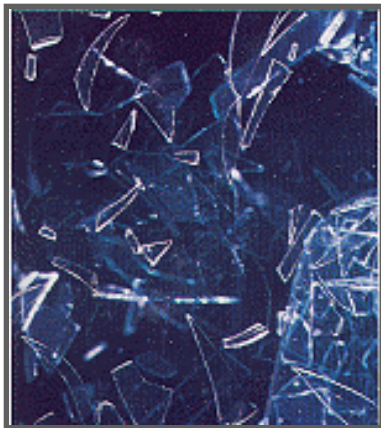
- Made from fused inorganic materials
- Amorphous; not crystalline (molecules not arranged)
- Varies in elemental formula
- Many shapes and colors



Trace > Glass

How is glass involved in crime?

- Small fragments can be used as **trace evidence** (link objects/people)
- Crime scene reconstruction



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How is glass collected?

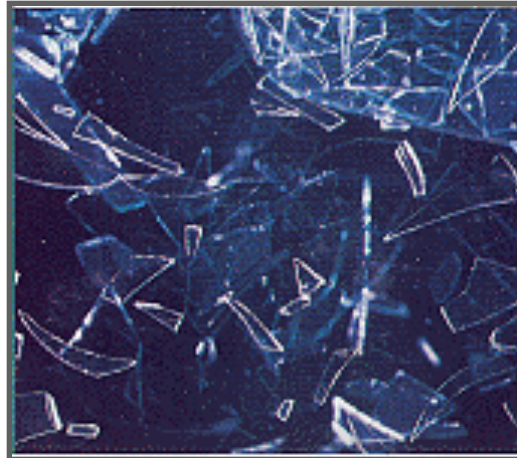
For **reconstruction**, detailed photographs can be taken or the entire pane of glass is collected.



Trace > Glass

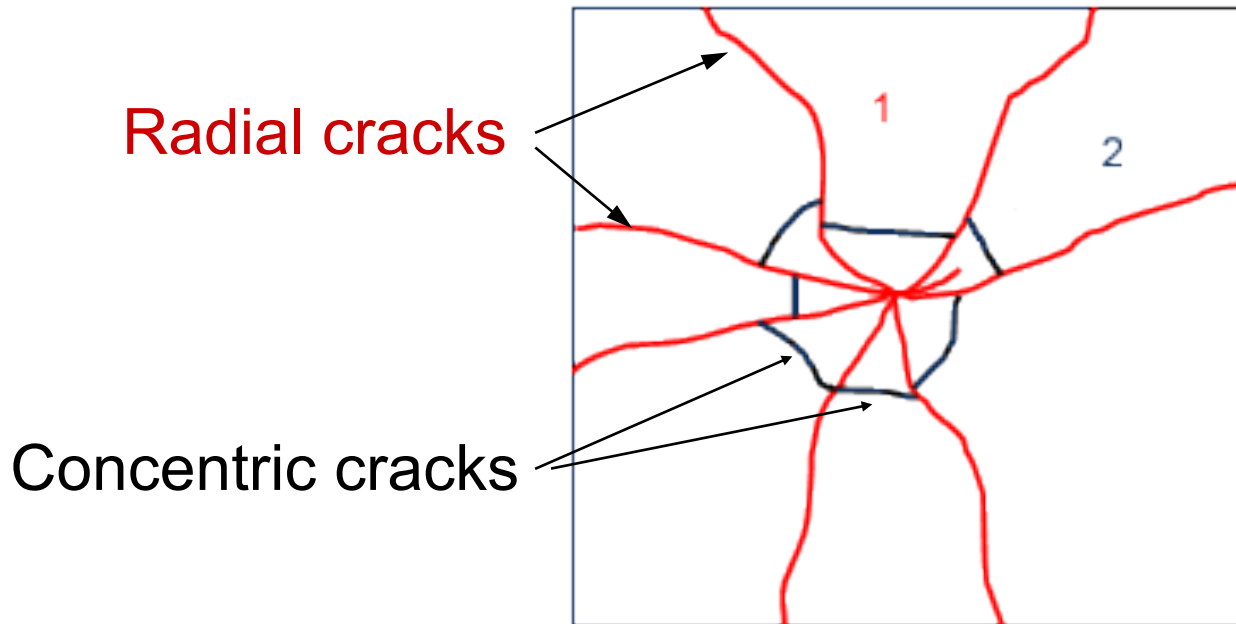
How is glass collected?

For **trace evidence**, usually visually collected with forceps and packaged in plastic bags.



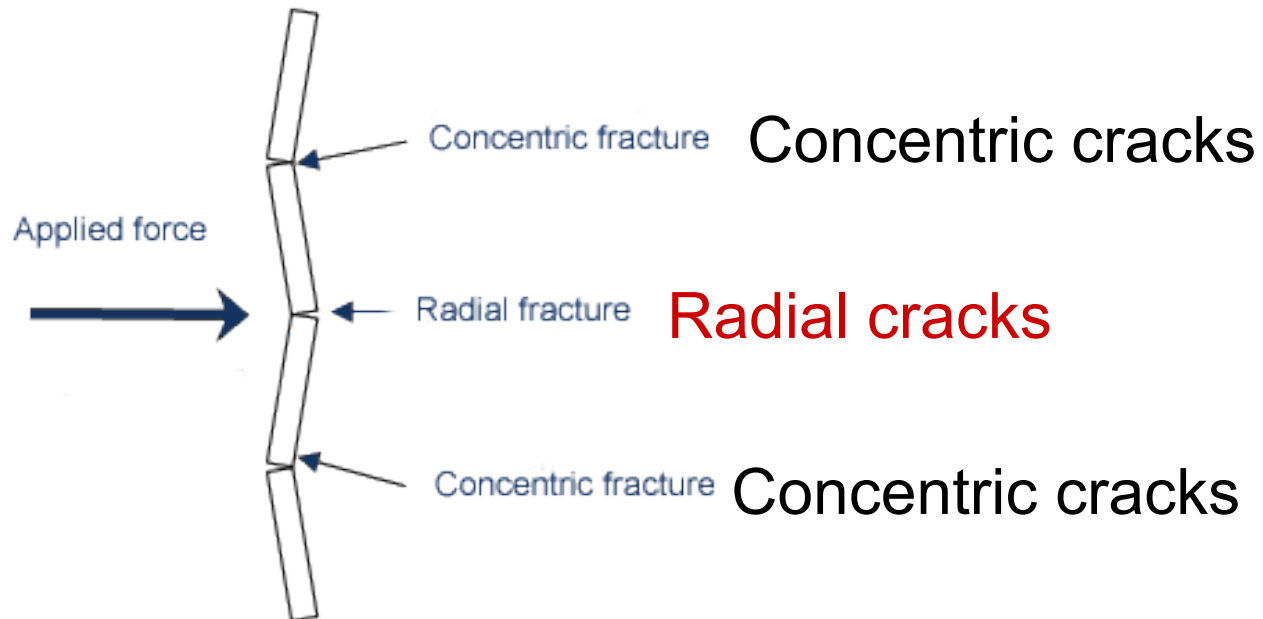
Trace > Glass

For reconstruction:



Trace > Glass

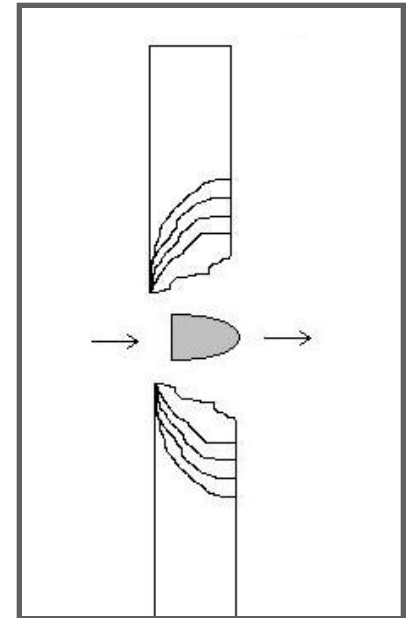
For reconstruction:



Trace > Glass

For **reconstruction**:

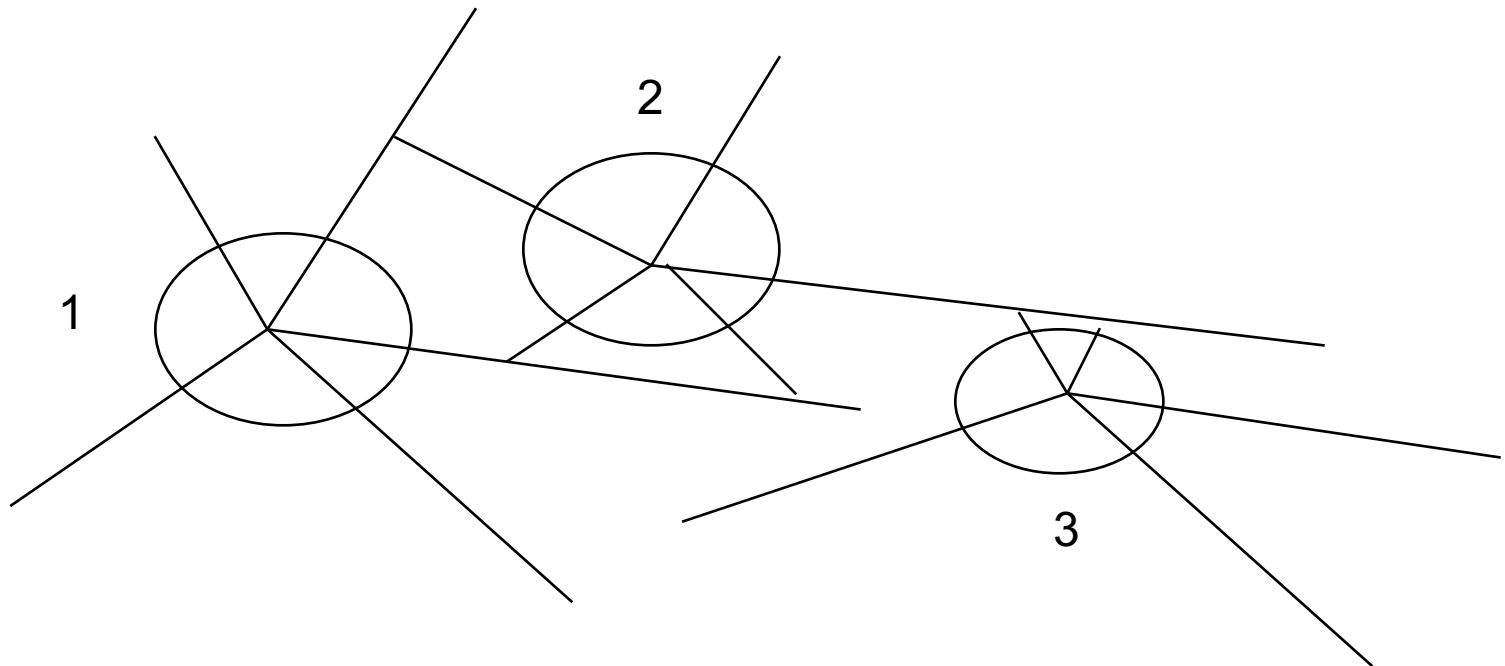
1. Determine the direction of projectile.
 - When looking at a radial section, **conchoidal fractures** point back to the origin of the break
 - Core usually on opposite side of the origin



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For reconstruction:

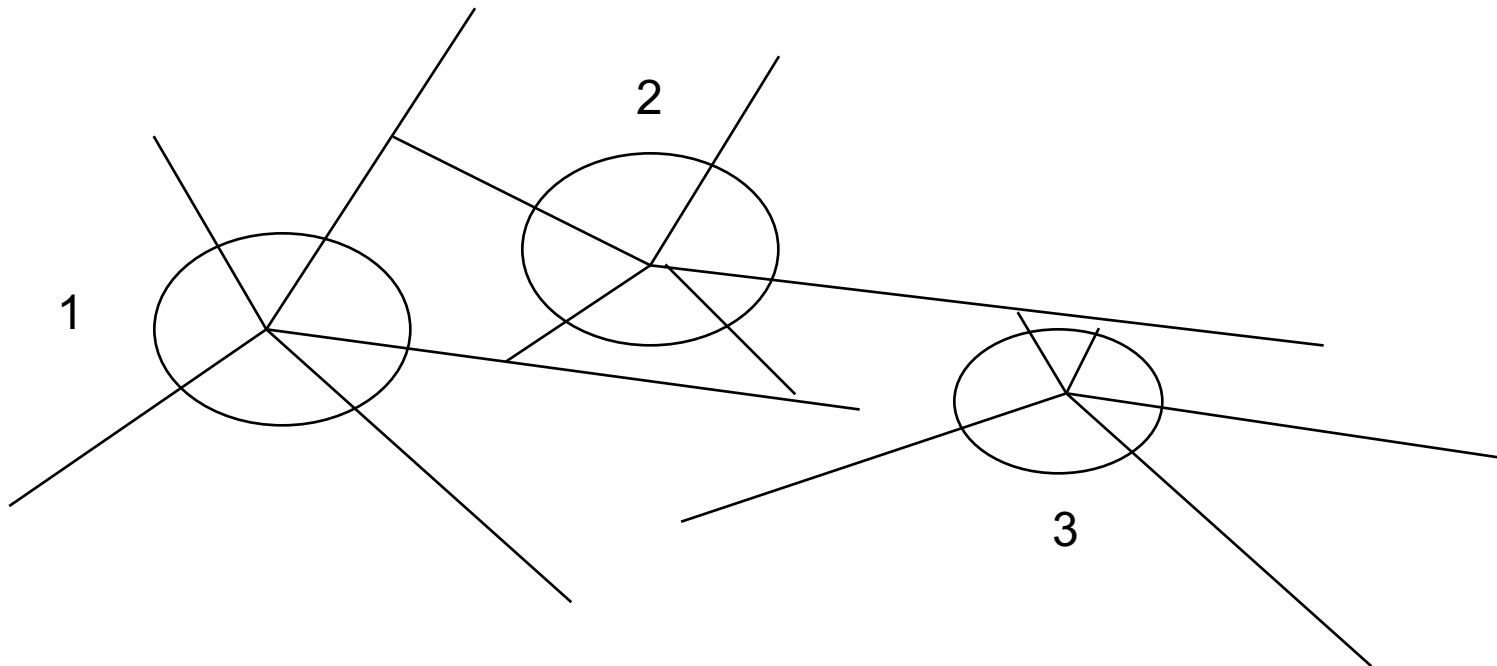
2. Determine the order of projectiles when dealing with more than one.



Trace > Glass

For reconstruction:

2. Determine the order of projectiles when dealing with more than one.



Trace > Glass

For **trace analysis**:

Associate unknown glass found at the crime scene with known samples to determine the source.

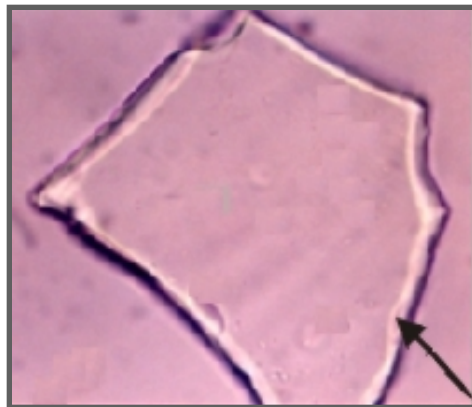
Done with microscopic analysis

- Color, curve, thickness, etc.
- **Refractive index**: Determined by placing glass in oils of different refractive indexes

Trace > Glass

Refractive index:

- Low relief = no outside line
R.I. of glass and oil are similar
- High relief = thick outside line (**Becke line**)
R.I. of glass and oil are different



Soil

- What is soil?
- What crimes involve soil?
- How is soil collected?
- How is soil analyzed in the lab?

What is soil?

- Mixture of animal and vegetable materials, and minerals
- In many ways, soil has a unique composition in a given area.

Trace > Soil

What crimes involve soil?

Due to the widespread location of soil (earth), it can be used to associate people, objects, and scenes in numerous cases.



Trace > Soil

How is soil collected & analyzed?

Collected in jars or vials.

Materials in soil are identified and quantified.

Analysis relies on soil composition being:

- Consistent over time in one location
- Different in different locations