The background features a dark teal base with various abstract patterns and shapes. On the left, there are green and blue organic shapes. On the right, there are white wavy lines on a green background. At the bottom, there are white plus signs on a blue background and white dots on a dark teal background. A white hand-drawn rectangular border frames the central text.

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**Chapter 4: Glass and Soil**





# Introduction

- Crime scenes often involve the force of violent events.
- Hit-and-run, forced entry, and burglary can all involve damage and breakage of glass.
- Glass breakage may also leave behind small fragments of shattered glass.
- Many times this evidence is considered trace evidence.



# Introduction Continued

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- Tiny glass fragments may also be embedded in shoes and clothing of a suspect.
- When glass fragments are found on a suspect, and are large enough, to be matched to their original site, the link between the suspect and the crime scene is enhanced.
- Glass breakage may indicate the direction and velocity of a projectile and the crime scene.







# Glass As Evidence

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- Glass will only provide *circumstantial evidence*.
- Files of color, chemical composition and physical characteristics are kept on all automobile headlight glass.
- Often, paint chips found with broken glass help to provide the clues which will link an object with a crime scene.

# More On Glass 😊

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- Burglary may involve window glass breakage.
- Glass objects are sometimes used in assaults and homicide cases.
- Broken glass is often present at the scene of the crime and its careful recovery and analysis can be a valuable tool to the crime scene investigator (CSI).





# Why Is The Glass Broken?

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- The direction of breakage is an important clue at a crime scene.
- Was the glass broken from the inside or the outside of the residence?
- What object was used to break the glass?
- Answers to these questions provide a valuable piece of the puzzle.





# When Glass Is Broken....

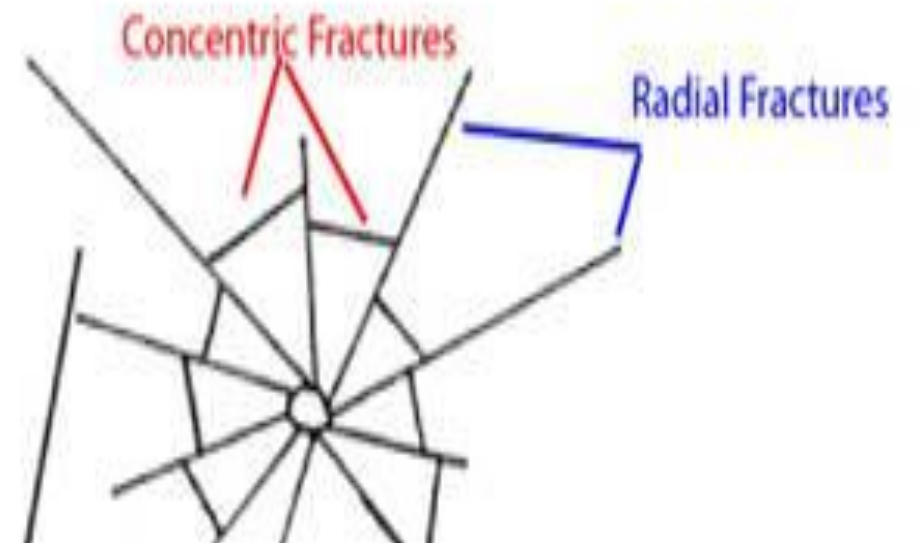
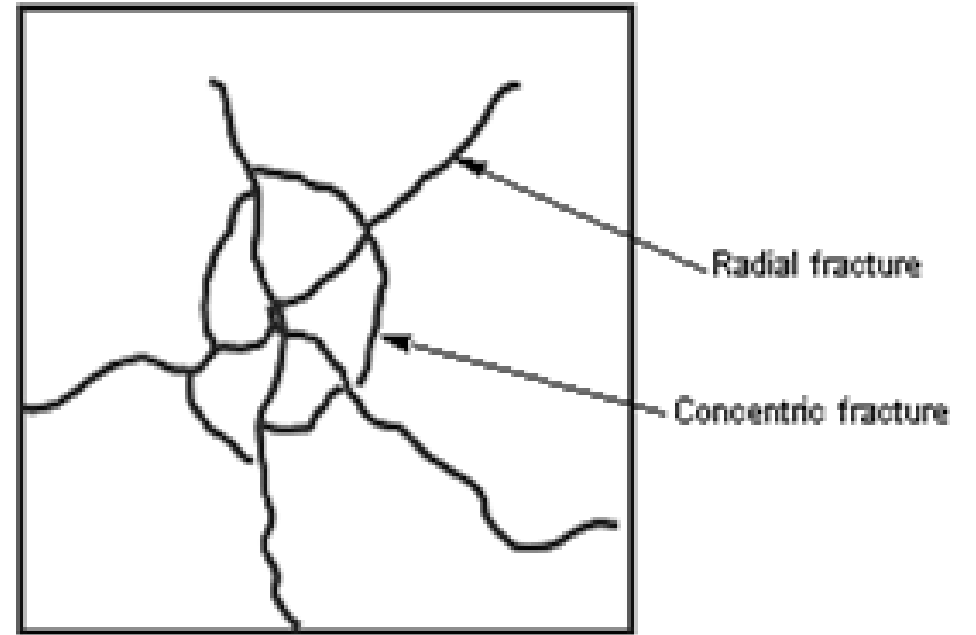
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- Conchoidal Fracture lines appear along the broken edges.
- These fracture lines form a series of curved lines. They begin @ right angles to the fracture (the side the force in acted upon).
- These fracture lines help the investigator to determine the direction of the force applied to break the glass.



# When An Object Passes Through A Pane Of Glass....

- Two types of breakage patterns occur.
- **1<sup>st</sup> : Radial Fractures** which appear as fracture lines which radiate outwards (Like the spokes on a bicycle wheel) from the center of the break.
- **2<sup>nd</sup>: Concentric Fractures** which are circular cracks which occur from one radial fracture to another.





# When The Projectile Is A Bullet HIGH VELOCITY PROJECTILE

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- There is a hole produced with a crater formed at the rear of the glass.
- The strength of Glass is on its **surface**.
- When the surface is damaged, the inner portion of the glass is easily fragmented.
- Glass is slightly flexible and will bend away from a point of impact.
- This is observed with any high velocity projectile that passes through the glass.



#81433775

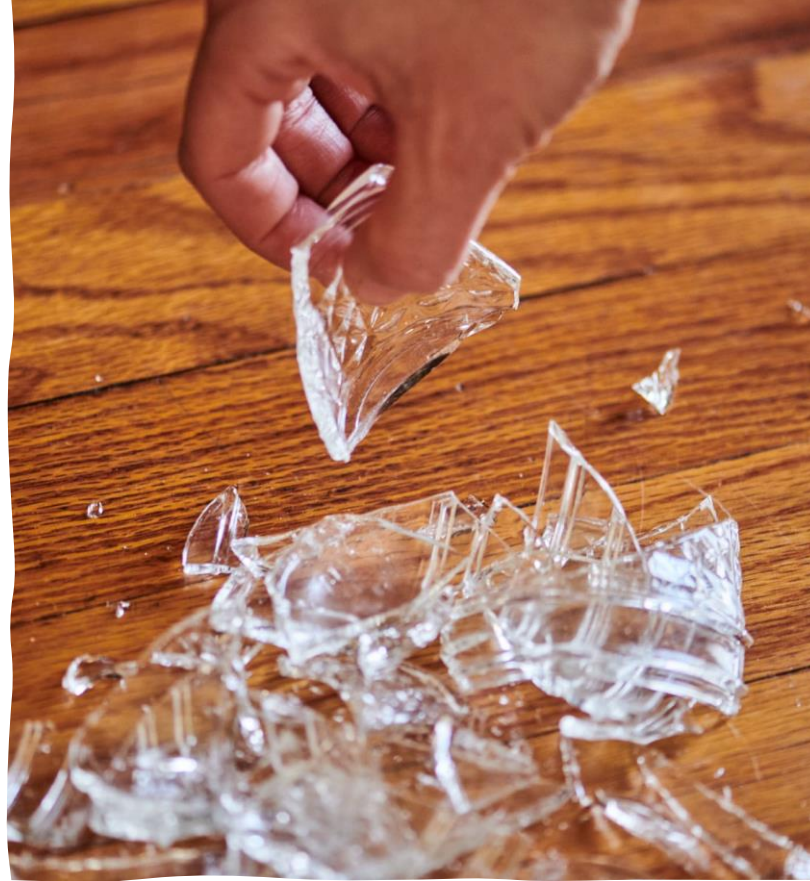


# Low Velocity Projectiles

- If the impact is caused by a non-penetrating projectile (such as a rock or BB) a cone shape plug is ejected in a forward direction, while tiny glass fragments are projected in the backward direction.
- Got it?...good...let's move on!







# Glass Is Unpredictable

- The majority of glass will fall in the direction of the applied force.
- However, tiny particles do fly back, opposite the applied force.
- Small shards of glass might land on the suspect's clothing.
- Tiny metal fragments and GSR may be discovered on the glass fragments closest to the entry point of the bullet
- Holes produced by small stones (thrown from a car tire, or propelled by a sling shot) produce very similar breakage patterns to those produced by bullets.





# Collection Of Evidence

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- Photographs and sketches should be accomplished at the beginning of the recovery of glass fragments.
- Glass analysis consists of shape and edge match of the fragment with the source.
- Smaller glass fragments are tested for color, density, thickness, chemical composition, refractive index and light dispersion in order to identify the type of glass and provide a comparative identification.



# At The Crime Scene

- When glass is broken at the crime scene, the suspect and the suspects clothing are thoroughly searched for fragments of glass.
- Glass is packaged in sheets of paper (to prevent breakage in transit) and packed in a box.
- Each piece should be marked and labeled, on the crime scene sketch.
- This is very important when a large number of pieces of glass are collected and the investigator is asking the technician to reconstruct the original glass object.



# Thanks For Your Attention!

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Please be sure to  
turn in all your  
assignments  
as soon as possible!



**WARNING:**  
**DUE DATES**  
**ARE CLOSER**  
**THAN THEY**  
**APPEAR**