Fingerprints have been used to identify individuals for years. "In 2000 B. C. E., the Babylonians used fingerprints made in clay to accompany documents to prevent forgery. Handprints as signatures are mentioned in the Book of Job; they were used in ancient India to prevent supplication of the payment of wages. The Native Americans of North America recognized the individuality of fingerprints long before the arrival of Europeans."[1]

Fingerprints are treated as routine evidence in criminal cases, most often to identify a criminal. "In 1993, an 8-year-old girl in Knoxville, Tennessee, was kidnapped and then luckily escaped. She was able to describe and later identify the car in which she was held captive. When the car was recovered four days later, police were unable to find any of her fingerprints anywhere in the car…"

Question Could she have ever been in the car? How?

Data/Fact Gathering: Some facts about fingerprints:

Fingerprints are classified as visible or latent. Visible fingerprints are made in blood, paint, ink, etc. while latent fingerprints are invisible to the naked eye.

Fingerprints are deposits of perspiration and other molecules from the body, often the result of our hands touching our face. Fingerprints contain oils, fatty acids, esters, salts, urea, and amino acids. Most methods of detecting fingerprints come from amino acids.

Children's fingerprints are different from adults. The oils in finger extractions of adults contain larger concentrations of long-chain alkyl esters ($C_{15}H_{31}COOC_{16}H_{33}$) while children contain smaller fatty acids ($C_{12}H_{25}COOH$). (The change in fingerprint composition accompanies puberty when the oils our faces produce change.)

Evaluation

1) What kind of intermolecular forces would you find in adult and/or child' s fingerprints?

2) Would you expect a child's or an adult's fingerprints to last longer in a hot car? Why?

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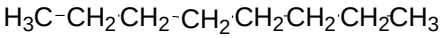
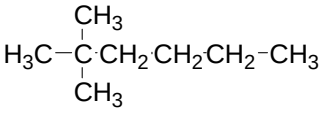
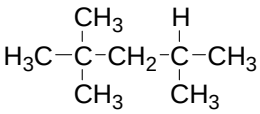
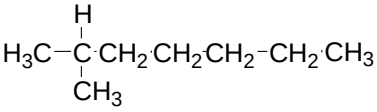
[1] From: Kimbrough, D. R.; DeLorenzo, R. J. Chem. Ed. 1998, 75, 1300-1301.

3) Match the isomers of octane show in Table 1 with the boiling points in the following list: 99.2°C, 107 °C, 117.7 °C, 125.6°C

Table 1: Isomers of octane

	Structure
octane	
2,2-dimethylhexane	
2,2,4-trimethylpentane	
2-methylheptane	

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Chapter 9: 49, 55, 59, 63, 99, 103
Chapter 11: 11, 15, 25,