

2025 Physical (Fracture) Match Proficiency Test FTS-25-PM Summary Report

The Submission Deadline for this test was April 4, 2025

The test was manufactured by FTS at the FTS Laboratory Facility (127 W. Grand River Avenue, Williamston, MI 48895) and all activities were coordinated by Rebecca Smith (rsmith@forsci.com), Proficiency Test Program Manager. Ms. Smith is also authorizing the release of this report. This is the summary report issued on 4/28/25. FTS considers all reports confidential and does not release information regarding participant's results without authorization from that participant.

Summary

Test results were received in 113 of 127 tests distributed (89% response rate). Of the 113 respondents:

Item 1A

104 of 113 (92%) reported 'No Fracture Match exists between Item 1A and the other items.'
6 of 113 (5%) reported 'Inconclusive' as to whether a fracture match exists between Item 1A and any questioned samples.
2 of 113 (2%) reported a fracture match between Item 1A and Item 3.
1 of 113 (1%) reported a fracture match between Item 1A and Item 5.

Item 1B

107 of 113 (95%) reported a fracture match between Item 1B and Item 2.
4 of 113 (3%) reported 'Inconclusive' as to whether a fracture match exists between Item 1B and any questioned samples.
2 of 113 (2%) reported 'No Fracture Match exists between Item 1B and the other items.'

Manufacturer's Information

Items were produced and packaged at different times in the same laboratory area. All items were produced utilizing Prestee™ wooden coffee stir sticks (5.5" x ~0.125", UPC 819796026725, Amazon.com). Three stir sticks were utilized per test and were selected to be similar in color and width.

Both ends of a wooden stir stick were broken off, resulting in a wooden fragment ~2" in length. Both ends of the fragment were labeled 'A' and 'B' and became Item 1. The broken off end that contained a physical match to side 'A' was discarded and the broken off end that contained a physical match to side 'B' became Item 2. A photomicrograph was taken of the physical match for each proficiency test. The physical matches in each set displayed minimal distortion and cracking from breaking, and showed sufficient corresponding fractured areas for physical match determination. Both fragments were packaged onto white post-it notes with the factory edge (Item 2) / 'A' end (Item 1) sticking to the adhesive to minimize any damage to the physical match. The post-it note was folded in half,

labeled, and further packaged into a cardboard sleeve. The Items was further packaged into a coin manila envelope, sealed and labeled per FTS guidelines.

Wooden stir sticks were broken, utilizing the ends for Items 3, 4, 5 and 6 to ensure no extra physical matches. The fragments were packaged onto white post-it notes with the factory edge sticking to the adhesive. The post-it note was folded in half, labeled, and further packaged into a cardboard sleeve. The Items were further packaged into a coin manila envelope, sealed and labeled per FTS guidelines.

The six items with matching UTICs were packaged together in a bubble mailer, sealed and labeled per FTS guidelines.

Assigned Value

Proficiency tests under ISO 17043:2023 are assessed via comparison of the participant result to the assigned value of a proficiency test item or items. For quantitative tests, FTS determines the assigned value based on statistical methods described in ISO 13528:2022. For qualitative tests, the FTS study coordinator determines the assigned value based on a number of factors, including product source information, internal and/or external pre-distribution laboratory analysis, and consensus of responses (consensus value).

Quality systems and laboratory reporting guidelines vary greatly from laboratory to laboratory, therefore participating laboratories and their accrediting bodies are responsible for the assessment of whether a reported result is an outlying result.

For this proficiency test, the following assigned values are based on source information:

Item 1A: No Fracture Match exists between Item 1A and the other items.

Item 1B: Fracture Match with Item 2.

Please note that all items used to prepare this test originate from the same source, so no chemical/elemental examination is required. The purpose of the test is solely to challenge the examiner in their ability to evaluate fracture matches between like materials and not the chemical and elemental characteristics of these materials.

Please examine the submitted items to determine if a fracture match exists between the broken wooden sticks.

Items Submitted

Item 1: Broken wooden stick with sides labeled 'A' and 'B'.

Item 2: Broken wooden stick.

Item 3: Broken wooden stick.

Item 4: Broken wooden stick.

Item 5: Broken wooden stick.

Item 6: Broken wooden stick.

3) **Item 1A**

Please identify any items with a fracture match to Item 1, side A.

- A) Item 2
- B) Item 3
- C) Item 4
- D) Item 5
- E) Item 6
- F) No Fracture Match exists between Item 1A and the other items.
- G) Inconclusive

4) **Item 1B**

Please identify any items with a fracture match to Item 1, side B.

- A) Item 2
- B) Item 3
- C) Item 4
- D) Item 5
- E) Item 6
- F) No Fracture Match exists between Item 1B and the other items.
- G) Inconclusive

UTIC	Webcode	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025101	W182	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025102	W266	No Fracture Match exists between Item 1A and the other items.	Item 2

<u>UTIC</u>	<u>Webcode</u>	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025103	W049	Inconclusive	Item 2
p2025104	W119	No Fracture Match exists between Item 1A and the other items.	Inconclusive
p2025105	W061	No Fracture Match exists between Item 1A and the other items.	Inconclusive
p2025106	W061	No Fracture Match exists between Item 1A and the other items.	No Fracture Match exists between Item 1B and the other items.
p2025107	W061	No Fracture Match exists between Item 1A and the other items.; Inconclusive	Item 2
p2028108		No Fracture Match exists between Item 1A and the other items.	Item 2
p2025109	W043	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025110	W043	No Fracture Match exists between Item 1A and the other items.; Inconclusive	Item 2
p2025111	W197	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025113	W179	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025114	W009	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025116	W040	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025117	W024	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025118	W144	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025119	W193	Item 3	Item 2
p2025120	W095	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025121	W095	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025122	W128	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025123	W160	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025124	W088	No Fracture Match exists between Item 1A and the other items.	Item 2

<u>UTIC</u>	<u>Webcode</u>	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025125	W088	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025126	W092	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025127	W031	Item 5	Item 2
p2025128	W079	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025129	W114	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025130	W114	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025131	W114	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025132	W187	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025133	W187	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025134	W268	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025135	W052	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025136	W052	Inconclusive	Item 2
p2025137	W052	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025138	W052	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025139	W067	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025140	W158	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025141	W158	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025142	W158	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025143	W158	Inconclusive	Item 2
p2025144	W158	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025145	W068	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025146	W080	Inconclusive	Item 2

UTIC	Webcode	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025147	W110	No Fracture Match exists between Item 1A and the other items.	No Fracture Match exists between Item 1B and the other items.
p2025148	W030	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025149	W082	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025150	W135	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025151	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025152	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025153	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025154	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025155	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025156	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025157	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025158	W151	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025159	W249	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025161	W120	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025163	W204	No Fracture Match exists between Item 1A and the other items.	Inconclusive
p2025164	W226	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025165	W226	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025166	W027	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025167	W027	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025169	W027	No Fracture Match exists between Item 1A and the other items.	Item 2

UTIC	Webcode	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025170	W027	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025174	W059	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025175	W001	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025178	W192	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025179	W014	Inconclusive	Item 2
p2025180	W015	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025181	W203	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025182	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025183	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025184	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025185	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025186	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025187	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025188	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025189	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025190	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025191	W130	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025194	W025	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025196	W084	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025197	W051	No Fracture Match exists between Item 1A and the other items.	Item 2

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<u>UTIC</u>	<u>Webcode</u>	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025199	W016	No Fracture Match exists between Item 1A and the other items.	Inconclusive
p2025200	W076	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025201	W042	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025202	W162	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025203	W098	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025204	W098	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025205	W098	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025206	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025207	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025208	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025209	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025210	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025211	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025212	W055	Inconclusive	Item 2
p2025213	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025214	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025215	W055	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025216	W004	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025217	W007	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025218	W007	Item 3	Item 2
p2025219	W007	No Fracture Match exists between Item 1A and the other items.	Item 2

<u>UTIC</u>	<u>Webcode</u>	<u>Item 1A</u>	<u>Item 1B</u>
		Please identify any items with a fracture match to Item 1, side A.	Please identify any items with a fracture match to Item 1, side B.
p2025220	W007	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025221	W007	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025222	W007	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025223	W056	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025224	W056	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025225	W056	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025226	W121	No Fracture Match exists between Item 1A and the other items.	Item 2
p2025227	W070	No Fracture Match exists between Item 1A and the other items.	Item 2

5) How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court). In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

*See table below.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025101	W182	<p>A physical match was present between end 1B of Item 1 and one end of Item 2; therefore, these two wood sticks were once one piece (Level 1 Association).</p> <p>Terminology Key for Associative Evidence: The following descriptions are meant to provide context to the levels of opinions reached in this report. Every level of conclusion may not be applicable in every case nor for every material type.</p> <p>Level I Association: A physical match; items physically fit back to one another, indicating that the items were once from the same source.</p> <p>Level II Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type.</p> <p>Level III Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. Because other items have been manufactured that would also be indistinguishable from the submitted evidence, an individual source cannot be determined.</p> <p>Level IV Association: An association in which items are consistent in observed and measured physical properties and/or chemical composition and, therefore, could have originated from the same source. As compared to a Level III association, items categorized within a Level IV share characteristics that are more common amongst these kinds of manufactured products. Alternatively, an association between items would be categorized as a Level IV if a limited analysis was performed due to the characteristics or size of the specimen(s).</p> <p>Level V Association: An association in which items are consistent in some, but not all, physical properties and/or chemical composition. Some minor variation(s) exists between the known and questioned items and could be due to factors such as sample heterogeneity, contamination of the sample(s), or having a sample of insufficient size to adequately assess the homogeneity of the entity from which it was derived.</p> <p>Inconclusive: No conclusion could be reached regarding an association/elimination between the items.</p> <p>Elimination: The items were dissimilar in physical properties and/or chemical composition, indicating that they did not originate from the same source.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025102	W266	<p>Conclusions: The Item 1 'B' and the Item 2 broken end corresponded surface grain pattern (see Figure 1) in the direction of the grain, edge contour, and fit back together (see Figures 5 - 8). This provides strong support for the proposition that Item 1 and Item 2 were at one time part of a single unit (Type 1 Association).</p> <p>The Items 3, 4, 5 and 6 had a different surface grain pattern (see Figures 2 - 4) angle of grain direction (see blue arrows) and did not have corresponding edge contour (see red arrows) (see Figures 9 -17) to Item 1 'A' or 'B'. This provides strong support for the proposition that the Item 1 and Items 3, 4, 5, and 6 pieces were not, at one time, part of a single unit (Exclusion).</p> <p>Interpretation: The following descriptions are meant to provide context for the opinions reached in this report. Not every type of conclusion may be applicable in every case or for every material type.</p> <p>Type I Association: Physical fit The highest degree of association between items. Discernible class and individual characteristics observed would not be expected to be repeated in another source. This includes items that have been broken, torn, or separated, where physical features align or correspond in a manner that is not expected to be replicated. This can also include, items where distinctive characteristics have been introduced into the item after manufacturing that would be not expected to occur in another source.</p> <p>Type II Association: Association with distinct characteristics Items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and share distinctive characteristic(s). Although the examiner would not expect to see these distinctive characteristic(s) repeated in another source, it lacked sufficient characteristics for a source identification.</p> <p>Type III Association: Association with conventional characteristics Items correspond in all measured physical properties, chemical composition and/or microscopic characteristics. However, it is possible for another sample to be indistinguishable from the submitted evidence; therefore, an individual source cannot be determined.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025102 (Cont.)	W266	<p>Type IV Association: Association with limitations An association of decreased evidential value in which items correspond in all measured physical properties, chemical composition and/or microscopic characteristics which suggests that the items originated from a common source; however, limiting factors exist. Limitation factors could include items commonly encountered in the relevant population, the inability to perform a complete analysis, or limited information.</p> <p>Inconclusive No conclusion could be reached regarding an association or an exclusion between the items.</p> <p>Exclusion with Limitations The item exhibits differences to the comparison sample that suggests that the items did not originate from the same source; however, limiting factors exist. Limiting factors could include possible natural or manufactured source variations.</p> <p>Exclusion The items exhibit differences in physical properties and/or chemical composition to the comparison sample that demonstrate they did not originate from the same source.</p> <p>I hereby certify that the above report, and these opinions and interpretations are accurate to the best of my knowledge and within the limitations of the current state and understanding of the science.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025103	W049	<p>Item 1- This item was used for comparison purposes with Items #2 through #6</p> <p>Item 2- A physical match is present between Item #1B and Item #2. These two pieces were at one time one item.</p> <p>Item #1 and Item #2 were examined visually, stereoscopically, and using a comparison microscope. The contours and microscopic details of the fractured/torn edge of Item #1B are complementary to the contours and microscopic details of the fractured/torn edge of Item #2. Physical features aligned across the traverse (wood grain, texture, color) with additional correspondence of wood fibers and pores observed in the exposed cross-section along the break.</p> <p>Item 3- No physical match was found between Item #1A and Item #3.</p> <p>Item #1A and Item #3 were examined visually, stereoscopically, and with a comparison microscope. The contours and microscopic details of the fractured/torn edge of Item #1A are not complimentary to the contours and microscopic details of the fractured/torn edge of Item #3. The width of Item #1A is greater than the width of Item #3 at the break and beyond the break. Few corresponding traversing features across the break were observed. No physical match was found between Item #1A and Item #3.</p> <p>Item 4- No physical match was found between Item #1A and Item #4; however, this examination could not exclude Item #4 as originating from the same source as Item #1A.</p> <p>Item #1A and Item #4 were examined visually, stereoscopically, and with a comparison microscope. The ends of the wood fibers on the broken edge of Item #4 are bent/curled. The contours and microscopic details of the fractured/torn edge of Item #1A are not complimentary to the contours and microscopic details of the fractured/torn edge of Item #4. There are some areas of corresponding traversing features observed in the wood grain across the break. These features are insufficient to identify a physical match between Item #1A and Item #4. This examination is inconclusive.</p> <p>Item 5- No physical match was found between Item #1A and Item #5; however, this examination could not exclude Item #5 as originating from the same source as Item #1A.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025103 (Cont.)	W049	<p>Item #1A and Item #5 were examined visually, stereoscopically, and with a comparison microscope. The contours and microscopic details of the fractured/torn edge of Item #1A have few areas of complimentary correspondence to the contours and microscopic details of the fractured/torn edge of Item #5. There are a few areas of corresponding traversing features observed in the wood grain across the break. These features are insufficient to identify a physical match between Item #1A and Item #5. This examination is inconclusive.</p> <p>Item 6-</p> <p>No physical match was found between Item #1A and Item #6.</p> <p>Item #1A and Item #6 were examined visually, stereoscopically, and with a comparison microscope. The width of Item #6 is slightly greater than the width of Item #1A at and near the break, but this may be due to damage or distortion. The contours and microscopic details of the fractured/torn edge of Item #1A are not complimentary to the contours and microscopic details of the fractured/torn edge of Item #6. No areas of corresponding traversing features were observed across the break. Texture differences just beyond the break were noted. No physical match was found between Item #1A and Item #6.</p>
p2025104	W119	Items 1A-1F were examined visually and stereoscopically for the presence of one or more fracture matches between sides A and B of Item 1A and the broken sides of Items 1B-1F. No fracture matches were observed between Item 1A (sides A and B) and Items 1C-1F. No fracture match was observed between Item 1A (side A) and Item 1B. The fracture match examination between Item 1A (side B) and Item 1B was inconclusive due to similarities in the grain of the wood and details of the fracture obscured by the fibrous nature of the sample.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025105	W061	<p>Attempts were made to physically fit both broken/fractured ends of a wooden stick, labelled A and B in Item 1 with one broken/fractured end of each wooden stick in Items 2, 3, 4, 5 and 6.</p> <p>When an item is broken, a unique and characteristic fracture of the broken edge is produced. If the item bears markings, scratches, striations or other characteristic features of any kind these will continue from one broken to the other broken piece when compared. It is extremely unlikely that another object of the same kind could, at random, be physically fitted to those pieces.</p> <p>Based on the above, it is my opinion:</p> <ul style="list-style-type: none"> • A physical fit was not achieved between the fractured end of Item 1, labelled A and the broken ends of the wooden sticks in Items 2, 3, 4, 5 and 6. • A physical fit was not achieved between the fractured end of Item 1, labelled B and the broken ends of the wooden sticks in Items 4, 5 and 6. • A physical fit between the fractured end of Item 1, labelled B and the broken ends of the wooden sticks in Items 2 and 3 was determined to be inconclusive.
p2025106	W061	On the basis of the items received and the examinations conducted, I have formed the opinion that none of the fractured ends of items 2 to 6 inclusive formed a physical fit with either of fractured ends A and B of item 1.
p2025107	W061	The items 1 – 6 all shared class characteristics with each other composed of a balsa wood like material of the same width and thickness. Item 1 had two fractured edges, and items 2 – 6 had one fractured edge. For side B of item 1, when placed into juxtaposition with item 2 there was a complimentary fit and therefore a physical fit was established. Due to item 2 having only one fractured edge that was a physical fit for side B and was not a compliment fit for side A for item 1. It was excluded as a physical fit for side A of item 1. For side A of item 1, no physical fit could be established between items 3 – 6. Due to the possibility that a physical fit cannot be achieved due to possible missing pieces, my opinion for item 3 – 6 with side A of item 1 was inconclusive.
p2025108		An identification has been made between item 1 end B and item 2. It is opinion that exhibit Item 1 end B and item 2, were once the same item before being separated.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025109	W043	<p>Exhibit 1 contained a light-colored, broken wooden stick that measured 5.3 centimeter (cm) long with a width of 4 millimeters (mm) and a thickness of 1 mm. The broken edges of Exhibit 1 were compared to the broken wooden sticks in Exhibits 2 – 6. Each of these pieces measured 2.5 cm long, 4 mm wide, and 1 mm thick.</p> <p>Edge “B” of the Exhibit 1 piece of wood and one edge of the Exhibit 2 piece of wood physically corresponded with distinctive features of the broken edges. This demonstrates that Exhibit 1 and Exhibit 2 were once part of a single object (Type I Inclusion).</p> <p>The other pieces of wood (Exhibits 3 - 6) were similar in general appearance to Exhibit 1 but did not physically fit back to the other edge of Exhibit 1. The absence of a physical fit does not imply that the compared items did not originate from the same source, and they do share sufficient class characteristics to warrant additional comparison examinations. Further examinations can be completed upon request.</p> <p>See the Appendix of this report for further context regarding the conclusions listed above.</p> <p>APPENDIX</p> <p>The following descriptions are meant to provide context to the opinions reached in this report. Not every type of conclusion may be applicable in every case or for every material type.</p> <p>Type I Inclusion: Source Identification – Source Identification is the highest degree of association between items. This association provides the strongest support that the items originated from the same source as opposed to different sources. Source Identification, which includes a physical fit, is reached when the items display physical features that correspond/re-align in a manner that is not expected to be replicated.</p> <p>Type II Inclusion: Inclusion with Highly Discriminating Characteristics – This is the highest degree of association that can be determined in the absence of a Source Identification. This type of association provides strong support that the items originated from the same source as opposed to different sources. The items correspond in all measured physical properties, chemical composition and/or microscopic characteristics and share highly discriminating characteristic(s) that would rarely be expected to occur in the relevant types of materials examined.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025109 (Cont.)	W043	<p>Type III Inclusion: Inclusion with Discriminating Characteristics – This type of association provides support that the items originated from the same source as opposed to different sources. The items correspond in all measured physical properties, chemical composition and/or microscopic characteristics; however, other items have been manufactured or could occur in nature that would also be indistinguishable from the examined materials.</p> <p>Type IV Inclusion: Inclusion with Limitations – This type of association provides limited support that the items originated from the same source as opposed to different sources. Therefore, the possibility that the items came from the same source cannot be eliminated. As compared to the categories above, this type of association has decreased evidential value due to limiting factors such as the items are more commonly encountered, a limited analytical scheme was conducted, or minor variations were observed in the data.</p> <p>Inconclusive – No conclusion could be reached regarding an inclusion or an exclusion between the items.</p> <p>Exclusion with Limitations – This conclusion provides support that the items originated from different sources as opposed to the same source due to observed differences; however, an Exclusion conclusion was not reached due to limiting factors such as possible natural or manufactured source variations, damage or contamination that cannot be removed or avoided.</p> <p>Exclusion – The items display differences that support that the two items did not originate from the same source.</p>
p2025110	W043	<p>The wooden sticks in Exhibits 2 through 6 were visually and microscopically compared to Exhibit 1. Exhibits 2 through 6 were similar in physical characteristics to the Exhibit 1 stick, including color and width.</p> <p>A physical fit was made between the stick in Exhibit 2 and the edge labeled B in Exhibit 1. The edges fit together in a manner that is not expected to be reproducible in another source. This demonstrates that Exhibit 1 and 2 were at one time joined together to form a single continuous piece (Type I Inclusion).</p> <p>No physical fit was made between the stick in Exhibit 1 and Exhibits 3, 4, 5, or 6 because the damaged edges did not align with the edge labeled A. Therefore, it could not be determined whether Exhibit 1 was once part of the same piece of wood (Inconclusive).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025111	W197	<p>The broken wooden stick (1) end 'B' physically matched the broken wooden stick (2).</p> <p>The broken wooden stick (1) end 'A' did not physically match the other broken wooden sticks (2 - 6).</p> <p>The broken wooden stick (1) end 'B' did not physically match the other broken wooden sticks (3 - 6).</p>
p2025113	W179	<p><u>Interpretation</u></p> <p>In my view, there is characteristic agreement between item 1B and item 2 such that they almost certainly formed part of the same original item.</p> <p><u>Conclusion</u></p> <p>In my opinion, the findings provide Extremely Strong support for the view that items 1B and 2 originated from a common source.</p>
p2025114	W009	<p>The physical match identified between the broken wooden stick (item 1, side labeled 'B') and the broken wooden stick (item 2) indicates that they were once part of a single object.</p> <p>When an item is broken, a distinctive fracture edge and/or surface is ordinarily formed. It is extremely unlikely that another broken object of the same type could also be, at random, physically matched to these pieces, however, it cannot be proven to be impossible.</p> <p>Since no physical match between the broken wooden stick (item 1, side labeled 'A') and the broken wooden sticks (items 3 to 6) was identified, it could not be determined that item 1 and any of items 3 to 6 were once part of a single object.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025116	W040	<p>Examined visually, with low power magnification, and with stereomicroscopy.</p> <p>The fractured end marked B on the section of wood labeled broken wooden stick with sides labeled 'A' and 'B', (item 1), is a physical match to the fractured end of the section of wood labeled broken wooden stick, (item 2). Level I Association.</p> <p>The fractured end marked A on the section of wood labeled broken wooden stick with sides labeled 'A' and 'B', (item 1), is not a physical match to the fractured end of the section of wood labeled broken wooden stick, (item 2). Elimination.</p> <p>The fractured end marked A and the fractured end marked B on the section of wood labeled broken wooden stick with sides labeled 'A' and 'B', (item 1), are not physical matches to the fractured ends of four sections of wood labeled broken wooden stick, (item 3, item 4, item 5, and item 6.) Elimination.</p>
p2025117	W024	<p>The broken wooden sticks of items #1(side B) and #2 were physically and microscopically matched to each other and determined to have originated as a single item.</p> <p>The broken wooden sticks of items #3, #4, #5, and #6 were examined and found to be of dissimilar origin from that of items #1(sides A and B) and #2 due to significant differences in wood grain direction and fracture lines.</p>
p2025118	W144	<ul style="list-style-type: none"> - The broken wooden stick named Item 1, with side labeled 'A'; has NO fracture match with the broken wooden sticks named Item 2, Item 3, Item 4, Item 5 and Item 6. - The broken wooden stick named Item 1, with side labeled 'B'; has fracture match with the broken wooden stick named Item 2; so both sides has have the same origin. - The broken wooden stick named Item 1, with side labeled 'B'; has NO fracture match with the broken wooden sticks named Item 3, Item 4, Item 5 and Item 6.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025119	W193	<p>On examination, I found:</p> <p>i) Broken wooden stick with sides labeled 'A' (Item 1) have physical match with broken wooden stick (Item 3).</p> <p>ii) Broken wooden stick with sides labeled 'B' (Item 1) have physical match with broken wooden stick (Item 2).</p> <p>iii) The broken wooden stick with labeled sides 'A' and 'B' (Item 1) does not have physical match with broken wooden stick Item 4, Item 5 and Item 6.</p> <p>Therefore, I am of the opinion that the broken wooden stick Item 1, Item 2 and Item 3 were originally a single piece of wooden stick.</p>
p2025120	W095	<p>These items were examined and compared in an attempt to determine whether or not there is evidence of an association between the broken wooden stick in Item 1 and the broken wooden sticks in Items 2 – 6.</p> <p>Initial examinations of Items 1 – 6 revealed they are like one another with respect to their color, type of material, and relative width and thickness.</p> <p>Further comparisons revealed corresponding fracture contours between Items 1 and 2. It is therefore concluded that these two broken wooden sticks at one time formed a single item.</p> <p>No direct correspondence was found between the broken wooden stick in Item 1 and the broken wooden sticks in Items 3 – 6.</p>
p2025121	W095	<p>The submitted items were examined and compared to determine whether or not the broken wooden sticks in Items 2-6 could have originated from the broken wooden stick in Item 1.</p> <p>Item 1 contains one (1) broken wooden stick which is fractured on two (2) sides. The fractured sides are labeled "A" and "B", respectively.</p> <p>Items 2-6 each contain one (1) broken wooden stick which is fractured on one (1) side.</p> <p>Macroscopical and stereomicroscopical examinations and comparisons between the broken wooden sticks in Items 2-6 and the broken wooden stick in Item 1 revealed that they are alike with respect to color and type of material. Further comparisons of the fractured edges revealed simultaneous correspondence of the Item 1 Side "B" fractured edge and the fractured edge of Item 2 with respect to the fracture contours and surface details. It is therefore concluded that the Item 2 broken wooden stick and the Item 1 broken wooden stick were at one time part of a single stick.</p> <p>Examinations and comparisons of the Item 1 Side "A" fractured edge and the fractured edges of the wooden sticks in Items 3-6 did not reveal any direct correspondence. As a result, no association was found by physical comparison of their fractured edges.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025122	W128	<p>Item 1 B and Item 2 formed a unit before the break. Item 1 B and Item 2 are from the same source (A mishap occurred during the examination, so that item 2 and 6 could have been mixed up. It is therefore possible that Item 1 B and Item 6 could have formed a unit before the break).</p>
p2025123	W160	<p>A fracture match was noted between broken wooden stick with side labelled 'B' in item 1 and the broken wooden stick in item 2. I have considered the proposition that broken wooden stick with side labelled 'B' in item 1 and the broken wooden stick in item 2 were originally a single item; the results of this examination provide conclusive support for this proposition.</p> <p>There was no fracture match between the broken wooden stick with side labelled 'A' in item 1 and any of the broken wooden sticks in items 3, 4, 5 and 6.</p>
p2025124	W088	<p>CONCLUSIONS:</p> <p>Item 2 originated from and was at one time a part of item 1.</p> <p>It cannot be concluded items 3-6 were at one time a single item with each other or the reconstruction of items 1 and 2.</p> <p>RESULTS:</p> <p>Broken wooden sticks (items 1-6) were examined for the purpose of determining whether or not they were at one time a single item.</p> <p>Examination and comparison of item 2 and item 1 "end B" revealed corresponding fracture contours and surface detail. It is therefore concluded that item 2 originated from and was at one time a part of item 1.</p> <p>Examination and comparison of items 1 "end A", 3, 4, 5, and 6 revealed no association by fracture comparison. It therefore cannot be concluded they were at one time a single item with each other.</p> <p>METHODS OF ANALYSIS:</p> <p>Examinations were performed visually and by stereo microscopy.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025125	W088	<p>CONCLUSIONS:</p> <p>Item 2 originated from and was at one time a part of item 1.</p> <p>It cannot be concluded Item 1 was at one time a single item with items 3-6.</p> <p>RESULTS:</p> <p>Item 1 and items 2-6 were examined for the purpose of determining whether or not they were at one time a single item.</p> <p>Examination and comparison of item 1 and item 2 revealed corresponding fracture contours and surface detail. It is therefore concluded that item 2 originated from and was at one time a part of item 1.</p> <p>Examination and comparison of item 1 with items 3-6 reveals no association by fracture comparison, and it cannot be concluded they were at one time a single item.</p> <p>Item 1 and items 3-6 are similar in appearance and are suitable for compositional comparison; however, wood comparisons are not currently performed by the Division of Forensic Sciences.</p> <p>METHODS OF ANALYSIS:</p> <p>Examinations were performed visually and by stereo microscopy.</p>
p2025126	W092	<p>Side B of Item 1 could be physically fitted to the broken wooden stick in item 2 by matching their characteristic broken edges, indicating that they were originally in one single piece.</p> <p>Side A of Item 1 could not be physically fitted to any of the broken wooden sticks in items 2-6.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025127	W031	<p>ITEMS:</p> <p>1 a sealed manila envelope identified as "FTS Forensic Testing Services FTS-25-PM UTIC p2025127" containing:</p> <p>1-1 one (1) wooden stick with two (2) fractured edges labeled "A" and "B" sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 1 p2025127"</p> <p>1-2 one (1) wooden stick with one (1) fractured edge sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 2 p2025127"</p> <p>1-3 one (1) wooden stick with one (1) fractured edge sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 3 p2025127"</p> <p>1-4 one (1) wooden stick with one (1) fractured edge sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 4 p2025127"</p> <p>1-5 one (1) wooden stick with one (1) fractured edge sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 5 p2025127"</p> <p>1-6 one (1) wooden stick with one (1) fractured edge sealed in a manila envelope identified as "FTS Forensic Testing Services FTS-25-PM Item 6 p2025127"</p> <p>RESULTS:</p> <p>The wooden sticks, items #1-1, #1-2, #1-3, #1-4, #1-5, and #1-6 were examined visually and by stereomicroscopy.</p> <p>The wooden stick, item #1-5, physically fit to the wooden stick side labeled "A", item #1-1.</p> <p>The wooden stick, item #1-2, physically fit to the wooden stick side labeled "B", item #1-1.</p> <p>The remaining wooden sticks, items #1-3, #1-4, and #1-6 did not physically fit to the wooden stick sides labeled "A" or "B", item #1-1. Further analysis can be performed if additional fractured pieces are submitted for comparison.</p> <p>OPINION:</p> <p>The wooden stick, item #1-5, was once a part of the wooden stick side labeled "A", item #1-1. This is a Type I Association. See Association Key below.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025127 (Cont.)	W031	<p>The wooden stick, item #1-2, was once a part of the wooden stick side labeled "B", item #1-1. This is a Type I Association. See Association Key below.</p> <p>The wooden sticks, items #1-3, #1-4, and #1-6, could not have come from the wooden stick sides labeled "A" or "B", item #1-1. This is an Elimination. See Association Key below.</p> <p>DISPOSITION OF EVIDENCE: The evidence is returned to the submitting/investigating agency upon completion of examination.</p> <p>Terminology Key for Associative Evidence:</p> <p>Type I Association: A positive identification; an association in which items share individual characteristics that show that the items were once from the same source.</p> <p>Type II Association: An association in which items are consistent in all measured physical properties and/or chemical composition and share unusual characteristic(s) that would not be expected to be found in the population of this evidence type.</p> <p>Inconclusive: No conclusion could be reached regarding an association between the items.</p> <p>Elimination: The items did not physically fit together, were dissimilar in physical properties and/or chemical composition and did not originate from the same source.</p>
p2025128	W079	<p>Item 1 on Side B was physically fit together with Item 2. It can be concluded that Item 1 and Item 2 were once joined to form a single unit.</p> <p>All of the items had consistent class characteristics; however, no other items were able to be physically fit together. Therefore, it could not be determined whether or not the items were once joined to form a single unit.</p>
p2025129	W114	<p>The broken sticks in Items 1 and 2 constitute a physical match and at one time formed a single object.</p> <p>Similarities in class characteristics were noted between the broken stick in Item 1 and the broken sticks in Items 3, 4, 5, and 6; however, these items do not constitute a physical match.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025130	W114	<p>Item 2 and the "B" end of Item 1 constitute a physical match and at one time formed a single object.</p> <p>Although Items 3, 4, 5 and 6 have the same class characteristics in terms of thickness, shape, color, composition, appearance and hardness, they do not constitute a physical match with the "A" end of Item 1 and were not at one time a single object.</p>
p2025131	W114	<p>Item# 1-2 and Item# 1-1 (side "B") constitute a physical match and at one time formed a section of a single object. No physical match was found between the damaged edge of Item# 1-2 and Item# 1-1 (side "A").</p> <p>The wooden stick in Item# 1-3 and the wooden stick in Item# 1-1 have the same class characteristics. Class characteristics are observable details such as colors, composition, texture, and dimensions; however, no physical match was found between the damaged edge of Item# 1-3 and the damaged edges of Item# 1-1.</p> <p>The wooden stick in Item# 1-4 and the wooden stick in Item# 1-1 have the same class characteristics. Class characteristics are observable details such as colors, composition, texture, and dimensions; however, no physical match was found between the damaged edge of Item# 1-4 and the damaged edges of Item# 1-1.</p> <p>The wooden stick in Item# 1-5 and the wooden stick in Item# 1-1 have the same class characteristics. Class characteristics are observable details such as colors, composition, texture, and dimensions; however, no physical match was found between the damaged edge of Item# 1-5 and the damaged edges of Item# 1-1.</p> <p>The wooden stick in Item# 1-6 and the wooden stick in Item# 1-1 have the same class characteristics. Class characteristics are observable details such as colors, composition, texture, and dimensions; however, no physical match was found between the damaged edge of Item# 1-6 and the damaged edges of Item# 1-1.</p>
p2025132	W187	<p>Item #1, side B, and Item #2 constitute a physical match and at one time formed a single object.</p> <p>Similarities in class characteristics were noted between Item #1, side A, and Item #3, Item #4, Item #5 and Item #6; however, no physical match could be found between Item #1, side A, Item #3, Item #4, Item #5 and Item #6.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025133	W187	<p>Item #1 (side B) and Item #2 constitute a physical match and at one time formed a single object.</p> <p>Item #1 (side A) and Item #3 do not constitute a physical match and did not at one time form a single object.</p> <p>Item #1 (side A) and Item #4 do not constitute a physical match and did not at one time form a single object.</p> <p>Item #1 (side A) and Item #5 do not constitute a physical match and did not at one time form a single object.</p> <p>Item #1 (side A) and Item #6 do not constitute a physical match and did not at one time form a single object.</p>
p2025134	W268	<p>ITEM # CONCLUSION</p> <p>Items 1-1 and 1-2 (End "B") constitute a physical match and at one time formed a single object.</p> <p>Items 1-1 and 1-3 do not constitute a physical match.</p> <p>Items 1-1 and 1-4 do not constitute a physical match.</p> <p>Items 1-1 and 1-5 do not constitute a physical match.</p> <p>Items 1-1 and 1-6 do not constitute a physical match.</p>
p2025135	W052	<p>The two fractured ends, labelled A and B, of the wooden stick (item 1) were compared to the fractured ends of the remaining five wooden sticks (items 2 to 6).</p> <p>No correspondence of shape was found between the two fractured ends of item 1 and four of the wooden sticks (item 3 to 6). Therefore, item 1 was not directly joined to items 3 to 6.</p> <p>A good to excellent correspondence of shape and microscopic detail was found between end B of item 1 and item 2.</p> <p>In subjectively assessing the strength of this correspondence I have considered the probability of finding this correspondence if end B of item 1 and item 2 were once joined, as opposed to finding this correspondence if items 1 and 2 were not joined.</p> <p>In my opinion, the correspondence observed between end B of item 1 and item 2 provides extremely strong support for the suggestion that items 1 and 2 were once joined, as opposed to not being joined.</p> <p>I have chosen the term 'extremely strong support' from the following scale: neutral, slight support, moderate support, strong support, very strong support and extremely strong support. This scale can be used to indicate the level of support for either proposition.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025136	W052	<p>I received 6 pieces of wooden sticks, items 1 to 6 inclusive. All the sticks were of a similar colour and shape. Item 1 had two broken sides with one labelled A and the other B. Items 2 to 6, inclusive, have one broken side and one manufactured side.</p> <p>When two or more items are suspected of originally being joined or to have formed part of a larger item, the broken or torn edges of these items can be examined to see if they fit together. Due to the random nature of breakages or tears, if the edges of two items fit together, then a conclusion can be formed as to the strength of the correspondence observed between the two items.</p> <p>Each of the broken sides of the sticks were compared to each other. I compared the broken sides of item 1 side B and item 2. I observed a correspondence of profile features and fractured edges and in my opinion these two items physically fit together. In subjectively assessing the strength of this correspondence I have considered: the probability of finding this correspondence if the two items were once joined, and the probability of finding the correspondence if two items were not joined and have come from different sources.</p> <p>In my opinion, the scientific significance of the correspondence observed between item 1 side B and item 2 provides extremely strong support for the proposition that the items were once joined as opposed to having come from different sources.</p> <p>I compared the broken sides of item 1 side A and item 3. I observed some correspondence of profile features and fractured edges however there was not enough detail in these features, and I was unable determine whether or not item 3 could have been joined to item 1 side A. In subjectively assessing the strength of this correspondence I have considered: the probability of finding this correspondence if the two items were once joined, and the probability of finding the correspondence if two items were not joined and have come from different sources. In my opinion, the scientific significance of the correspondence observed between item 1 side A and item 3 is neutral.</p> <p>The statement of opinion as to the scientific significance of the correspondence is selected from the following scale: is neutral, provides slight support, provides moderate support, provides strong support, provides very strong support, and provides extremely strong support.</p> <p>No correspondence was found between the broken sides of items 4, 5 or 6 and no correspondence was found between them and item 1. In my opinion, these items were not previously joined.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025137	W052	<p>When two or more items are suspected of originally being joined or to have formed part of a larger item, the broken or torn edges of these items can be examined to see if they fit together. Due to the random nature of breakages or tears, if the edges of two items fit together, then a conclusion can be formed as to the strength of the correspondence observed between the two items.</p> <p>I have compared the broken edges of end B of item 1 to the broken edge of item 2. I observed a correspondence of edge characteristics, wood thickness and width, and grain between end B of item 1 and the broken edge of item 2, and in my opinion these two items physically fit together. In subjectively assessing the strength of this correspondence I have considered: the probability of finding this correspondence if the two items were once joined, and the probability of finding the correspondence if these two items were not joined and have come from different sources.</p> <p>In my opinion, the nature of the correspondence observed between item 1 and item 2 provides extremely strong support for the proposition that item 1 and item 2 were once joined as opposed to having come from different sources.</p> <p>The statement of opinion as to the scientific significance of the correspondence is selected from the following scale: is neutral, provides slight support, provides moderate support, provides strong support, provides very strong support, and provides extremely strong support.</p> <p>I could not obtain a correspondence of edge characteristics between end A of item 1 and any of items 3, 4, 5 or 6. Therefore, in my opinion, end A of item 1 was not originally joined to the broken ends of item 3, 4, 5 or 6.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025138	W052	<p>Laboratory records show that on 22 January 2025, an envelope containing six sections of broken sticks in sealed smaller envelopes, was submitted to the laboratory. One stick, marked as stick 1 had two broken ends, while the remaining sticks marked as 2 to 6 respectively, had only one broken end. I was asked to determine whether or not a fracture match exists between the broken wooden stick 1 to any of the broken sticks 2 to 6.</p> <p>When two or more items are suspected of originally being joined or to have formed part of a larger item, the broken or torn edges of these items can be examined to see if they fit together. Due to the random nature of breakages or tears, if the edges of two items fit together, then a conclusion can be formed as to the strength of the correspondence observed between the two items.</p> <p>I have compared the broken edges of stick 1 to stick 2. I observed a correspondence of pattern in the breakages between end B of stick 1 and stick 2 and in my opinion. In subjectively assessing the strength of this correspondence I have considered: the probability of finding this correspondence if the two items were once joined, and the probability of finding the correspondence if two items were not joined and have come from different sources.</p> <p>In my opinion, the nature of the correspondence observed between end B of stick 1 and stick 2 provides extremely strong support for the proposition that stick 1 and stick 2 were once joined as opposed to having come from different sources.</p> <p>The statement of opinion as to the scientific significance of the correspondence is selected from the following scale: is neutral, provides slight support, provides moderate support, provides strong support, provides very strong support, and provides extremely strong support.</p> <p>I also compared the broken edges of sticks 3 to 6 with the broken end A of stick 1. The shape of the broken edges of each of these items were different from each other, therefore no fracture match exists between stick 1 and the sticks 3 to 6..</p>
p2025139	W067	<p>Through physical and comparative examination it was determined that pieces P1-B (Item #1 side B) and P-2 (Item #2) share class and individual characteristics. A physical match was found between the fracture edges of the wood pieces of P1-B and P-2. Therefore, pieces P1-B and P-2 present a common origin and at one time formed a single object.</p> <p>Pieces P1-A, P-3, P-4, P-5 and P-6 only share similar physical and class characteristics.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025140	W158	<p>The two pieces of wood, Lab Items 1 and 2, were physically and microscopically compared, and based on the presence of complimentary detail were determined to have been directly connected and part of a single unit at one time.</p> <p>The pieces of wood, Lab Items 3, 4, 5, and 6, were physically and microscopically compared to the piece of wood, Lab Item 1, and based on the lack of complimentary detail were eliminated as having been directly connected to Lab Item 1.</p>
p2025141	W158	<p>The wooden sticks, Laboratory Items 1 and 2, were physically and microscopically compared and based on the presence of corresponding complimentary detail were determined to have been part of a single unit at one time.</p> <p>The wooden sticks, Laboratory Items 3-6, were physically and microscopically compared to the wooden stick, Laboratory Item 1, and based on the lack of corresponding detail were eliminated as having been directly connected to Laboratory Item 1.</p>
p2025142	W158	<p>The broken wooden sticks, Lab Items 1 and 2, were physically and microscopically compared and based on the presence of corresponding complimentary details were determined to have been part of a single unit at one time.</p> <p>The broken wooden sticks, Lab Items 3, 4, 5, and 6, were physically and microscopically compared to the broken wooden stick, Lab Item 1, and were found to have corresponding discernible class characteristics. However, due to the lack of corresponding individual characteristics, Lab Items 3, 4, 5, and 6 have been eliminated from having been directly connected to Lab Item 1.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025143	W158	<p>The broken wooden sticks, Lab Item 1B and Lab Item 2, were physically and microscopically compared, and based on the presence of corresponding complimentary detail were determined to have been part of a single unit at one time.</p> <p>The broken wooden sticks, Lab Item 1A and Lab Item 4, were physically and microscopically compared and found to have corresponding complimentary detail, but because these items could not physically fit together, Lab Item 1A and Lab Item 4 could neither be identified nor eliminated as having been part of a single unit at one time.</p> <p>The broken wooden sticks, Lab Items 3, 5, and 6, were physically and microscopically compared to the broken wooden stick Lab Item 1, and based on the lack of corresponding detail were eliminated as having been directly connected to Lab Item 1.</p>
p2025144	W158	<p>The small wooden pieces, Lab Items 1 and 2, were physically and microscopically compared and based on the presence of corresponding complimentary detail were determined to have been part of a single unit at one time.</p> <p>The small wooden pieces, Lab Items 3-6, were physically and microscopically compared to the small wooden piece, Lab Item 1, and based on the lack of corresponding detail were eliminated as having been directly connected to Lab Item 1.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025145	W068	<p>Opinions and Interpretation:</p> <p>The broken wooden stick (Item 2) physically fits side B of the broken wooden stick of Item 1. The wooden stick of Item 2 was once joined with the wooden stick of Item 1 (Level I Association).</p> <p>The broken wooden sticks of Item 3, Item 4, Item 5, and Item 6 do not physically fit side A or B of the broken wooden stick of Item 1.</p> <p>Results:</p> <p>Item 1 (Broken wooden stick with sides labeled "A" and "B"). T1, T29 This item consisted of one wooden stick broken on both ends. One end labeled A and the other end labeled B.</p> <p>Item 2 (Broken wooden stick). T1, T29 This item consisted of a wooden stick with one manufactured edge and one broken edge.</p> <p>Item 3 (Broken wooden stick). T1, T29 This item consisted of a wooden stick with one manufactured edge and one broken edge.</p> <p>Item 4 (Broken wooden stick). T1, T29 This item consisted of a wooden stick with one manufactured edge and one broken edge.</p> <p>Item 5 (Broken wooden stick). T1, T29 This item consisted of a wooden stick with one manufactured edge and one broken edge.</p> <p>Item 6 (Broken wooden stick). T1, T29 This item consisted of a wooden stick with one manufactured edge and one broken edge.</p> <p>Methodology:</p> <p>T1 - Stereomicroscopy is utilized in the general examination of evidence. T29 - A Keyence VHX-600 digital microscope was utilized to visualize evidence and capture images. Images are stored within the laboratory.</p> <p>Disposition:</p> <p>All submitted items not otherwise addressed will be returned to the submitting agency.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025145 (Cont.)	W068	<p>Level of Association:</p> <p>Level I Association: A physical fit; items physically fit and/or align one another by way of corresponding surface characteristics. The associated items were once joined together to form a single item.</p> <p>Level II Association: Items correspond in all tested properties and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type. No exclusionary differences are detected.</p> <p>Level III Association: Items correspond in all tested properties and, therefore, could have originated from the same source. Other items have been manufactured and/or are naturally occurring that would also correspond to the submitted evidence. No exclusionary differences are detected.</p> <p>Level IV Association: Items correspond in tested properties and, therefore, could have originated from the same source. The items share typical characteristics expected to be readily available in the population of this evidence type. No exclusionary differences are detected. Alternatively, an association between items could be categorized as a Level IV Association if a limited analysis is performed. The extent of limited analysis varies and is specified in the report.</p> <p>Definitions:</p> <p>Physical Fit: Associated items physically fit and/or align one another by way of corresponding surface characteristics. The associated items were once joined together to form a single item.</p> <p>Associated: The questioned sample is the same distinct type of material as the known standard based upon detected properties. In other words, one could not discern a questioned sample if it were to be mixed with an associated known standard. No exclusionary differences are detected.</p> <p>Disassociated: Exclusionary differences are detected upon comparison.</p> <p>Inconclusive: No conclusion could be reached regarding an association or an elimination.</p> <p>Elimination: The sample did not originate from the source represented by the known standard. Samples are disassociated from the standard due to detecting exclusionary differences upon comparison.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025146	W080	<p>In the opinion of this examiner, Laboratory Item 001.A (Item 1) broken wooden stick, Side A could not be physically fitted together with any of the other submitted broken wooden sticks, Laboratory Items 001.B through 001.F (Items 2 through 6). The absence of a physical fit does not imply that the compared items did not originate from the same source because they share class characteristics such as material, thickness, and texture. Therefore, it is inconclusive as to whether they were once part of a single object.</p> <p>In the opinion of this examiner, Laboratory Item 001.A (Item 1) broken wooden stick, Side B and Laboratory Item 001.B (Item 2) broken wooden stick, physically corresponded with distinctive features of the broken edge contours as well as surface features in the woodgrain. This serves as the basis for the opinion that 001.A and 001.B were once part of a single object.</p>
p2025147	W110	No fracture match/physical fit was identified between Items 1 (sides A and B) and Items 2,3,4,5 and 6.
p2025148	W030	<p>It was determined utilizing stereomicroscopic examination that item 1 side B and item 2 are a physical match. Therefore, it is the opinion of the examiner that those two pieces of wood were one piece prior to the damage occurring.</p> <p>It was determined utilizing stereomicroscopic examination that item 1 side A was not a physical match to the remaining pieces item 3, item 4, item 5 and item 6.</p>
p2025149	W082	<p>Physical fit analysis is based on the direct comparison of class and incidental characteristics including distinct and random fracture edge contours. Corresponding fracture edge contours support the conclusion that the items once formed one object. The possibility that another broken object having the same fracture edge contour cannot be statistically calculated.</p> <p>Item 2 forms a physical fit with item 1, side B.</p> <p>Items 3 through 6 do not form physical fits with item 1.</p>
p2025150	W135	<p>The above items were examined macroscopically and using digital microscopy.</p> <p>Lab item 1 was compared to Lab items 3, 4, 5, and 6. These items could not be associated due to differences in the fractured edges.</p> <p>Lab items 1 and 2 were physically fitted together and were at one time a single unit.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025151	W151	<p>The pieces of broken wooden sticks from the scene (Items 2-6) were visually, microscopically, and three-dimensionally compared to the piece of broken wooden stick from the suspect vehicle (Item 1, sides A and B). The wooden stick (Item 2) was physically matched along fracture lines to Side B of Item 1. Items 1 and 2 bear the same class characteristics and sufficient individual characteristics to determine they were once parts of the same item.</p> <p>Items 3 and 4 differ in class characteristics (width) from Item 1, and were eliminated as having come from the same source as Item 1.</p> <p>Items 5 and 6 bear the same class characteristics as Item 1, but there is disagreement in the three-dimensional characteristics along the fractured edges. These items, as received, were eliminated as having come from the same source as Item 1.</p>
p2025152	W151	<p>The broken wooden stick with sides labeled A and B (Exhibit 1) was visually and microscopically examined and three-dimensionally compared to the other five broken wooden sticks (Exhibits 2-6).</p> <p>Exhibit 2 was physically matched along fracture lines, bears the same class characteristics, and has sufficient individual characteristics to determined it was once a part of Exhibit 1- side B.</p> <p>Exhibits 3-4 bears similar class characteristics, including color, material, texture, width, and luster as Exhibit 1; however, they lack sufficient individual characteristics to determine they were once a part of Exhibit 1.</p> <p>Exhibits 5-6 are similar in color, material, texture, and luster as Exhibits 5-6; however, the width is different, and thus Exhibits 5-6 can be excluded as having originated from Exhibit 1.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025153	W151	<p>The broken wooden sticks (Exhibits 1B-1F) were visually, physically, and microscopically compared to the broken sides labeled "A" and "B" of the wooden stick (Exhibit 1A).</p> <p>The broken stick (Exhibit 1B) was examined and three-dimensionally matched along fracture lines, and bears the same class characteristics and sufficient individual characteristics to determine it was once a part of the broken stick (Exhibit 1A) at side B.</p> <p>The broken sticks (Exhibits 1C-1F) were examined and bear some similar class characteristics, including color, composition, and thickness, as the broken wooden stick (Exhibit 1A). However, the broken sticks (Exhibits 1C-1F) have differences in width/height, grain pattern, and fracture lines than the broken stick (Exhibit 1A).</p> <p>Therefore, the broken sticks (Exhibits 1C-1F) were EXCLUDED as once being a part of the broken stick (Exhibit 1A) at side A.</p>
p2025154	W151	<p>The pieces of broken wooden sticks (Exhibits 01.2-01.6) were visually and three-dimensionally compared to the piece of broken wooden stick (Exhibit 01.1). The piece of broken wooden stick (Exhibit 01.2) was physically matched along fracture lines and bears the same class characteristics, as well as, sufficient individual characteristics to determine it was once a part of the broken wooden stick (Exhibit 01.1 side labeled B).</p> <p>The pieces of broken wooden sticks (Exhibits 01.3-01.6) were documented and photographed; however, no further analysis was performed.</p>
p2025155	W151	<p>Six pieces of broken wooden sticks (Exhibits 1A, 1B, 1C, 1D, 1E, and 1F) were submitted for Fracture Comparison Analysis.</p> <p>Five pieces of broken wooden sticks (Exhibits 1B, 1C, 1D, 1E, and 1F) were compared to the piece of broken wooden stick (Exhibit 1A) with ends labeled "A" and "B". One piece of broken wooden stick (Exhibit 1B) was visually and three-dimensionally compared to Side "B" of the piece of broken wooden stick (Exhibit 1A), was physically matched along fracture lines, and bears the same class characteristics and sufficient individual characteristics to determine it was once a part of Side "B" of the wooden stick (Exhibit 1A).</p> <p>The remaining four pieces of broken wooden sticks (Exhibits 1C, 1D, 1E, and 1F) share some class characteristics with Exhibit 1A, however, they can all be eliminated as once being a part of the wooden stick (Exhibit 1A).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025156	W151	<p>Several broken pieces of wood (Exhibits 1A-1F) were collected and submitted to [redacted] personnel for Fracture Comparison Analysis. The pieces of wood (Exhibits 1B-1F) from the scene were visually examined and physically compared to another broken piece of wood (Exhibit 1A-sides labeled A and B) from the suspect's residence.</p> <p>The broken piece of wood (Exhibit 1B) collected from the scene was visually examined and three dimensionally matched along fracture lines to the broken piece of wood (Exhibit 1A-side labeled B). They bear sufficient class and individual characteristics to determine they were once a part of the wooden stick as a whole.</p> <p>The remaining broken pieces of wood (Exhibits 1C-1F) were eliminated as to having once belonged to Exhibit 1A-side A.</p>
p2025157	W151	<p>The agency submitted one wooden stick (Item 1) with both ends broken. The agency denoted one broken end as "A" and the other as "B." Additionally, the agency submitted five wooden sticks (Items 2-6) each with one unlabeled broken end. Fracture Comparison Analysis was performed comparing the broken ends "A" and "B" on Item 1 to the unlabeled broken ends on Items 2-6.</p> <p>Items 1 and 2-6 bear similar class characteristics such as material, color, texture/wood grain, and relative size/dimensions.</p> <p>Identification: The wooden stick (Item 1) broken end "B" was visually examined and three-dimensionally matched along fracture lines to the broken wooden stick (Item 2). Item 1 side "B" and Item 2 bear the same class characteristics and sufficient individual characteristics to determine they were once a part of a wooden stick as a whole.</p> <p>Elimination: The wooden stick (Item 1) broken end "A" was visually and physically examined to the remainder of the broken wooden sticks (Items 3-6). There was significant disagreement of the three-dimensional shape of the broken ends. No fracture match exists between Item 1 side "A" and Items 3-6. However, because of the consistency of class characteristics between Items 1 and 3-6, it is inconclusive as coming from the same source item, as additional broken pieces of wooden stick may have been positioned between the breaks of Item 1 side "A" and the broken ends of Items 3-6.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025158	W151	<p>Five pieces of broken wooden sticks (Exhibits 1.2-1.6) and one piece of a broken wooden stick with sides labeled 'A' and 'B' (Exhibit 1.1) were submitted to the lab by Forensic Testing Services for Fracture Comparison Analysis. The five pieces of broken wooden sticks (Exhibits 1.2-1.6) were visually and physically compared to sides 'A' and 'B' of the one piece of a broken wooden stick (Exhibit 1.1).</p> <p>One piece of broken wooden stick (Exhibit 1.2) was visually and three-dimensionally compared to side 'B' of Exhibit 1.1. Exhibit 1.2 was physically matched along fracture lines and bears the same class characteristics and sufficient individual characteristics to determine it was once a part of Exhibit 1.1 side 'B'.</p> <p>Exhibit 1.1 side 'A' and all other Exhibits could not be matched along fracture lines and there were not sufficient individual characteristics. Therefore, no fracture match exists between Exhibit 1.1 side 'A' and Exhibits 1.3-1.6.</p>
p2025159	W249	<p>Items 1-6 each contained one (1) broken wooden stick. They were visually and microscopically examined, and physically compared with each other.</p> <p>Item 1, Side A, was not, at one time, physically connected to Items 2-6. The fractured edges did not physically align, and therefore, no fracture match exists between these items.</p> <p>Item 1, Side B, physically fit together with Item 2, and were, at one time, connected. The construction, material, and design features were similar. The fractured edges physically aligned with each other.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025161	W120	<p>When the Questioned Item 2; Exhibit 2 (broken wooden stick) was compared to the Known Item 1; Exhibit 1 (broken wooden stick with sides labeled "A" and "B") it was determined that Item 2; Exhibit 2 Side A and Item 1; Exhibit 1 Side B shared similar gross characteristics, surface configurations and significant fracture contours (microscopic, fracture, color, surface striations and surface markings).</p> <p>When the Questioned Items 3-6; Exhibits 3-6 (broken wooden sticks), were compared to the Known Item 1; Exhibit 1 (broken wooden stick with sides labeled "A" and "B") it was determined that the evidence had similar gross characteristics, but failed to reveal significant corresponding fracture contours or surface configurations (microscopic, fracture and surface striations). When the Questioned Item 2; Exhibit 2 (broken wooden sticks), was compared to the Known Item 1; Exhibit 1 Side A (broken wooden stick with sides labeled "A" and "B") it was determined that the evidence had similar gross characteristics, but failed to reveal significant corresponding fracture contours or surface configurations (microscopic, fracture and surface striations).</p> <p>Conclusions:</p> <p>When the Questioned Item 2; Exhibit 2 (broken wooden stick) was compared to the Known Item 1; Exhibit 1 Side B (broken wooden stick with sides labeled "A" and "B") physically fit and match together and it was determined that Exhibit 2 originated from the same source as Exhibit 1 and were once one and the same.</p> <p>When the Questioned Items 3-6; Exhibits 3-6 (broken wooden sticks) was compared to the Known Item 1; Exhibit 1 (broken wooden stick with sides labeled "A" and "B") it could not be determined if the evidence items were once one and the same item, however they could have come from a similar source.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025163	W204	<p><u>Item 1 End B and Item 2</u> There were distinctive features along the broken edges such as splintered projections of wood which, in my opinion, appeared to align. Due to this it is reasonable to consider that they might once have been part of the same object. However, due to the complex nature of the fractured surfaces and the multiple splinters and distortions of the wood it was not possible to entirely fit the broken edges of Item 1 End B and Item 2 together, therefore it was not possible to make a meaningful determination for physical fit and the results must be considered inconclusive.</p> <p><u>Item 1 end A to Items 2, 3 ,4, 5, 6</u> <u>Item 1 end B to Items 3,4,5,6</u> In my opinion, a physical fit has not been established between these items as there was no apparent alignment of the damaged ends. However, there were comparable but not distinctive similar features between the items such as the colour, nature of the wood and dimensions of it. Therefore if it is considered that due to the nature of the wood there may be potential for loss of material and distortion during breakage, then, in my opinion, it cannot be reliably determined whether or not the items may once been part of the same object.</p>
p2025164	W226	<p>A class characteristic analysis of exhibits 1 through 6 determined that all exhibits share similar class characteristics of thin wood. Exhibits 2 through 6 cannot be excluded as coming from exhibit 1 based on these class characteristics.</p> <p>A fracture match analysis of exhibits 1 and 2 revealed that exhibit 2 was successfully realigned with exhibit 1 side B, demonstrating they were once joined to form a single object and share a common origin.</p> <p>A fracture match analysis of exhibit 1 side A with exhibits 3 through 6 revealed differences in the fractured edges and did not realign.</p>
p2025165	W226	<p>A class characteristic analysis of exhibits 1 through 6 (items 1 through 6) determined all exhibits share similar class characteristics of a light colored, wooden stick.</p> <p>Exhibit 2 (item 2) was realigned to exhibit 1, side B (item 1B), indicating they were once joined to form one object.</p> <p>Exhibits 2 through 6 (items 2 through 6) were not realigned to exhibit 1, side A (item 1A).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025166	W027	<p>The submitted broken wooden sticks were visually and microscopically compared for a physical fit. Item 1 had two broken ends and was labeled A and B by the submitting agency.</p> <p>Item 1 Side B and Item 2 corresponded in class characteristics (light-colored wooden sticks). Item 2 physically fit along the fractured edge of Item 1 Side B. The alignment included correspondence of multiple changes in direction along the fractured edge and wood grain correspondence across the fractured edges. In the opinion of the examiner, Item 2 originated from the wood stick represented in Item 1 Side B (Physical Fit). The alignment of the fractured edges between the wooden sticks would not be expected except by pieces that were once connected (Physical Fit).</p> <p>Items 3, 4, 5 and 6 and Item 1 Side A and Side B had similarities in general class characteristics (light-colored wooden sticks); however, the fractured edges of Items 3, 4, 5, and 6 and the fractured edges of Item 1 Side A and Side B did not correspond (No Physical Fit).</p> <p>Conclusion Scale for Physical Fit Examinations</p> <p>The following descriptions are meant to provide context to the levels of opinions reached in this report.</p> <p>Physical Fit (Physical Match): The physical fit and/or alignment of features supports the opinion that the items were once a single object or from the same object. While this opinion cannot specifically exclude all other possible sources, the quality and extent of corresponding detail would only be expected by items that were once part of the same object.</p> <p>High Degree of Alignment: No physical fit was found; however, the items had apparent similarities of general physical properties in addition to sharing atypical characteristic(s) and/or having possible alignment. There were limiting factors that prevented a more definitive conclusion.</p> <p>No Physical Fit: The items had apparent similarities of general physical properties; however, no fit or alignment of fractured edges was found.</p> <p>Unsuitable for Physical Fit Examination: The items had apparent dissimilarities of general physical properties or some other limiting factor(s) which prevented a physical fit examination.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025167	W027	<p>Information:</p> <p>Items 1 - 6 were examined visually and microscopically. Item 1 had two fractured ends that were labeled as A and B. Items 2 - 6 had one fractured end and one manufactured end. The fractured ends of Item 1 were examined and compared to the fractured ends of Items 2 - 6 for a physical fit.</p> <p>Results:</p> <p>The fractured end labeled 'B' on Item 1 was found to physically align with the fractured end of Item 2. In addition to the fractured ends aligning, the wood grain direction aligned across the two items. In the opinion of the examiner, Items 1 and 2 were at one time connected and part of a single wood piece (Physical Fit / Physical Match).</p> <p>No alignment of fractured edges between the remaining items and Item 1 were found (No Physical Fit).</p>
p2025169	W027	<p>Information:</p> <p>The submitted broken wooden sticks (Items 1-6) were to be compared for possible physical fits. Because Item 1 had two fractured edges (labeled ends A and B) and Items 2-6 each only had one fractured edge, Items 2-6 were visually and stereoscopically compared to each end of Item 1 for possible physical fits.</p> <p>Results:</p> <p>The fractured end of Item 2 fit with end B of Item 1. The alignment included correspondence of multiple changes in direction along the fractured edges and alignment of the wood grain. In the opinion of the examiner, Item 2 originated from end B of Item 1 (Physical Fit). The alignment of the fractured edges between the wooden sticks would not be expected except by pieces that were once connected.</p> <p>The fractured ends of Items 2, 3, 4, 5, and 6 did not fit with end A of Item 1. In the opinion of the examiner, no physical fits exist between end A of Item 1 and the remaining evidence (No Physical Fit).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025170	W027	<p>Examinations: Visual examination, stereomicroscopy</p> <p>Information: Broken wooden sticks (Items 1 through 6) were examined and compared to one another for potential physical fits. All of the submitted items were similar in gross physical characteristics (color, material type, relative thickness) and had at least one fractured edge.</p> <p>Results: Item 1 physically aligned along its fractured end labeled B with the fractured end of Item 2. The physical alignment of these items included corresponding changes of directions in the fractured edges and corresponding topography of the internal wood structure of the fractured edges. In the opinion of the examiner, Items 1 and 2 form a portion of a single wooden stick. The alignment displayed between the items would not be expected except by pieces that were formerly connected (Physical Fit; see Conclusion Scale below).</p> <p>The fractured ends of the remaining submitted items (Items 3 through 6) did not physically align with the fractured end of Item 1 labeled A or with one another (No Physical Fit).</p> <p>If additional broken wooden sticks relevant to the investigation are located, please contact the undersigned regarding possible future analyses.</p> <p>Conclusion Scale for Physical Fit Examinations:</p> <p><i>The following descriptions are meant to provide context to the levels of opinions reached in this report.</i></p> <p>Physical Fit (Physical Match): The physical fit and/or alignment of features supports the opinion that the items were once a single object or from the same object. While this opinion cannot specifically exclude all other possible sources, the quality and extent of corresponding detail would only be expected by items that were once part of the same object.</p> <p>High Degree of Alignment: No physical fit was found; however, the items had apparent similarities of general physical properties in addition to sharing atypical characteristic(s) and/or having possible alignment. There were limiting factors that prevented a more definitive conclusion.</p> <p>No Physical Fit: The items had apparent similarities of general physical properties; however, no fit or alignment of fractured edges was found.</p> <p>Unsuitable for Physical Fit Examination: The items had apparent dissimilarities of general physical properties or some other limiting factor(s) which prevented a physical fit examination.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025174	W059	<p>The questioned broken stick in Item 2 could be positively fracture matched back to the the broken side "B" of the known stick in Item 1. Therefore, the broken stick in Item 1 and Item 2 were originally part of the same piece.</p> <p>No fracture match could be made between any of the questioned broken sticks in Items 3, 4, 5,or 6 with the broken side "A" of the known broken stick in Item 1.</p>
p2025175	W001	<p>Examination and comparison of Items 1 broken wooden stick (end "B") and 2 broken wooden stick revealed that they share corresponding fracture contours and physically fit together. Therefore, Items 1 and 2 wooden sticks are parts of the same object. This is a Type 1 Association as described in the Association Scale included in this report.</p> <p>Differences in gross characteristics confirm Items 3, 4, 5, and 6 broken sticks did not originate from the Item 1 broken stick (ends "A" and "B"). These are eliminations as described in the Association Scale included in this report.</p>
p2025178	W192	<p>The broken ends on Item 1 were physically and microscopically compared with the broken ends on Items 2 thru 6 with the following results:</p> <p>The broken end of Item 2 corresponds with the broken end "B" of Item 1 indicating they are of common origin (same item).</p> <p>The broken ends on Items 3 thru 6 did not correspond the broken end "A" of Item 1. Items 3 thru 6 are not of common origin to Item 1.</p>
p2025179	W014	<p>Comparative analysis between the Item 1 (B) fractured end and the fractured end of Item 2 revealed a correspondence of thickness, color, composition, wood grain morphology/carryover and fracture planes. It was concluded that Item 1 (B) and Item 2 were once joined together as a single unit/item.</p> <p>Comparative analysis between the Item 1 (A) fractured end and the fractured end of Item 3 revealed correspondence in thickness, color and composition. There was limited similarity in wood grain morphology/carryover and limited congruency of fracture plan features. It could not be determined whether Item 1 (A) and Item 3 were once joined as a single unit/item. Analysis was limited by the fragile composition and potential loss of sample material as well as the inability to apply some methods utilized in physical fit analysis.</p> <p>Comparative analysis between the Item 1 (A and B) fractured ends and the fractured ends of Items 4-6 revealed differences in wood grain morphology and fracture planes. It was concluded that Items 4-6 did not share a fracture plane with Item 1 (A and B).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025180	W015	<p>Examination of the surface patterns and edge contours on Item 2 and Item 1, side B, found that these items were once joined as a single section of wood. This identification is based on agreement of both class and individual characteristics.</p> <p>Examination of the surface patterns and edge contours on item 1, side A, and items 3 through 6 were compared without effecting a physical match. These exclusions were based on differences in class characteristics.</p>
p2025181	W203	<p>Item 1, side B, and Item 2 at one time formed a single continuous object. This constitutes a fracture match.</p> <p>No fracture match exists between Item 1, side A, and the other items.</p>
p2025182	W130	<p>RESULTS OF EXAMINATION / ANALYSIS</p> <p>1. Comparison of K1 to Q1 through Q5</p> <p>a. A physical match was found to exist between a fractured edge of K1 (Side B) and the fractured edge of Q1.</p> <p>b. K1 and Q2, Q3, Q4, and Q5 are all consistent with respect to their material and color. However, a physical match was not found to exist between the remaining fractured edge of K1 (Side A) and Q2, Q3, Q4, or Q5.</p> <p>INTERPRETATION OF RESULTS</p> <p>1. It is the opinion of the undersigned that K1 and Q1 were previously joined together to be one partial wooden coffee stirrer.</p> <p>2. It is the opinion of the undersigned that K1 was not previously joined to Q2, Q3, Q4, or Q5, as represented by the samples submitted.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025183	W130	<p>Results of examination/analysis</p> <p>1. Physical Match Comparison</p> <p>a. A physical match was found to exist between broken edge "B" of Laboratory item #1 and the broken edge of Laboratory item #2.</p> <p>b. Laboratory items #3-6 and Laboratory item #1 are consistent with respect to color, material, width, and thickness. However, the examinations conducted did not disclose the presence of a physical match between broken edge "B" of Laboratory item #1 and the broken edges of Laboratory items #3-6.</p> <p>c. Laboratory items #2-6 and Laboratory item #1 are consistent with respect to color, material, width, and thickness. However, the examinations conducted did not disclose the presence of a physical match between broken edge "A" of Laboratory item #1 and the broken edges of Laboratory items #2-6.</p> <p>Interpretation of results</p> <p>1. It is the opinion of the undersigned that Laboratory item #1 and Laboratory item #2 were at one time joined together to be one partial "wooden" tan stick.</p> <p>2. It is the opinion of the undersigned that Laboratory item #1 and Laboratory items #3-6 were not previously joined together as represented by the samples submitted. Additional comparative analysis may be able to be conducted, but is not currently performed at the [redacted] Laboratory.</p>
p2025184	W130	<p>Results of Examination/Opinion</p> <p>1. The wood fiber pattern of broken edge B of Laboratory item #1 inter-locks and corresponds with the irregular fractured pattern of the broken edge of Laboratory item #2.</p> <p>A physical match was found to exist between the broken edge B of Laboratory item #1 and the broken edge of the Laboratory item #2. It is the opinion of the undersigned that Laboratory item #2 and laboratory item #1 were at one time joined together (at edge B) to be one wooden stick.</p> <p>2. The wood fiber pattern of broken edge A of Laboratory item #1 does not inter-lock and does not correspond with the irregular fractured edge pattern of Laboratory items #2-6.</p> <p>No physical match was found to exist between the broken edge A of Laboratory item #1 and the broken edges of Laboratory items #2-6. It is the opinion of the undersigned that Laboratory item #1 edge A and Laboratory items #2-6 were not joined together as represented by the samples submitted.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025185	W130	<p>Laboratory Item #2 and Laboratory Item #1 are consistent with respect to color, material, width, and thickness. However, a physical match was not found to exist between the fractured edges of Laboratory Item #2 and Laboratory Item #1 (edge A).</p> <p>A physical match was found to exist between the fractured edges of Laboratory Item #2 and Laboratory Item #1 (edge B).</p> <p>Laboratory Items #3 through #6 and Laboratory Item #1 (edges A and B) are consistent with respect to color, material, width, and thickness. However, a physical match was not found to exist between the fractured edges of Laboratory Items #3 through #6 and Laboratory Item #1 (edges A and B).</p> <p>It is the opinion of the undersigned that Laboratory Item #1 and Laboratory Item #2 were at one time joined together to be one partial wooden stick.</p> <p>It is the opinion of the undersigned that Laboratory Items #3 through #6 and Laboratory Item #1 were not previously joined together</p>
p2025186	W130	<p>Comparison Results:</p> <p>a. A physical match was found to exist between the fractured edges of Q1 and the K1 (Side "B").</p> <p>b. Q1 and K1 are consistent with respect to color and material. However, a physical match was not found to exist between the fractured edges of Q1 and K1 (Side "A").</p> <p>c. Q2-Q5 and K1 are consistent with respect to color and material. However, a physical match was not found to exist between the fractured edges of Q2-Q5 and K1 (Side "A" and Side "B").</p> <p>Interpretation of Results:</p> <ol style="list-style-type: none"> 1. It is the opinion of the undersigned that Q1 and K1 were at one time joined together to be one larger piece of a wooden stick. 2. It is the opinion of the undersigned that Q2-Q5 and K1 were not previously joined together.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025187	W130	<p>Results of examination/analysis</p> <p>1. A physical match was found to exist between the fractured edge of Laboratory item #1 labeled "B" and the fractured edge of Laboratory item #2. However, a physical match was not found to exist between the fractured edge of Laboratory item #1 labeled "A" and the fractured edge of Laboratory item #2.</p> <p>2. Laboratory item #1 and Laboratory items #3 through #6 are consistent with respect to color, material, and shape. However, a physical match was not found to exist between the fractured edges on the ends labeled "A" or "B" of Laboratory item #1 and Laboratory items #3 through #6.</p> <p>Interpretation of results</p> <p>1. It is the opinion of the undersigned that Laboratory item #1 and Laboratory item #2 were at one time joined together to be one longer wooden stick with a fractured edge on one end labeled "A".</p> <p>2. It is the opinion of the undersigned that Laboratory item #1 and Laboratory items #3 through #6 were not previously joined together as represented by the samples submitted.</p>
p2025188	W130	<p>RESULTS</p> <ol style="list-style-type: none"> 1. Comparison <ul style="list-style-type: none"> • A physical match was found to exist between the fractured edges of Laboratory item #2 and Laboratory item #1 (side B). • A physical match was not found to exist between the fractured edges of Laboratory item #2 and Laboratory item #1 (side A). • Laboratory items #3, 4, 5, 6 and Laboratory item #1 are consistent with respect to class characteristics (color, approximate size). However, a physical match was not found to exist between the fractured edges of Laboratory items #3, 4, 5, 6 and Laboratory item #1. <p>INTERPRETATION</p> <ol style="list-style-type: none"> 1. It is the opinion of the undersigned that the questioned item (Laboratory item #2) and known item (Laboratory item #1) were at one time joined together to be one wooden stick. 2. It is the opinion of the undersigned that the questioned items (Laboratory items #3, 4, 5, 6) and the known item (Laboratory item #1) were not previously joined together.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025189	W130	<p>Results:</p> <ol style="list-style-type: none"> 1. A physical match was found to exist between the fractured edge marked "B" of Laboratory item #1 and the fractured edge of Laboratory item #2. 2. Laboratory item #1 and Laboratory items #2, 3, 4, 5, and 6 are consistent with respect to color, apparent material, and construction. However, a physical match was not found to exist between the fractured edges of: <ol style="list-style-type: none"> a. Side "A" of Laboratory item #1 with any of the fractured edges of Laboratory items #2 through #6 b. Side "B" of Laboratory item #1 with any of the fractured edges of Laboratory items #3 through #6 <p>Interpretations:</p> <ol style="list-style-type: none"> 1. It is the opinion of the undersigned that Laboratory item #1 and Laboratory item #2 were at one time joined together to be one longer flat partial wooden stick. 2. It is the opinion of the undersigned that Laboratory item #1 was not previously joined together with Laboratory items #3, 4, 5, or 6.
p2025190	W130	<p>Results of examination/analysis</p> <p>1. Comparison:</p> <p>a. Laboratory Item #1 Side A and Laboratory Items #2-6 are consistent with respect to sample material and color. However, a physical match was not found to exist between the fractured edges of Laboratory Item #1 Side A and Laboratory Items #2-6.</p> <p>b. A physical match was found to exist between the fractured edges of Laboratory Item #1 Side B and Laboratory Item #2.</p> <p>Interpretation of results</p> <ol style="list-style-type: none"> 1. It is the opinion of the undersigned that Laboratory Item #1 Side A and Laboratory Items #2-6 were not previously joined together. 2. It is the opinion of the undersigned that Laboratory Item #1 Side B and Laboratory Item #2 were at one time joined together to be one partial wooden piece. 3. It is the opinion of the undersigned that Laboratory Item #1 Side B and Laboratory Items #3-6 were not previously joined together based on the presence of a physical match between Laboratory Item #1 Side B and Laboratory Item #2.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025191	W130	<p>Comparison:</p> <p>1. A physical match was not found to exist between the fractured edge of Q1 (Item #2) and fractured edge "A" of K1 (Item #1). However, a physical match was found to exist between the fractured edge of Q1 and fractured edge "B" of K1.</p> <p>2. Q2-Q5 (Items #3-6 respectively) and K1 are consistent with respect to color and material. However, a physical match was not found to exist between the fractured edges of the Q2-Q5 and fractured edge "A" of K1.</p> <p>3. Due to the findings above, a physical match was not found to exist between the fractured edges of Q2-Q5 and fractured edge "B" of K1.</p> <p>Interpretation of Results:</p> <p>1. It is the opinion of the undersigned that Q1 and K1 were at one time joined together to be one partial brown wooden stick.</p> <p>2. It is the opinion of the undersigned that Q2-Q5 and K1 were not previously joined together.</p>
p2025194	W025	<p>A physical match was established between the wooden stick fragment in item 2 and side B of the wooden stick in item 1. This indicates that items 1 and 2 were once a single piece. While this opinion cannot specifically exclude all other possible sources, the quality and extent of corresponding features would only be expected by items that were once part of the same object.</p> <p>No physical match was established between side A of the wooden stick in item 1 and the wooden stick fragments in items 2, 3, 4, 5 and 6.</p> <p>No physical match was established between side B of the wooden stick in item 1 and the wooden stick fragments in items 3, 4, 5 and 6.</p>
p2025196	W084	<p>Items 1A, 3, 4, 5, 6</p> <p>No fracture match was established between Item 1 Side-A and the broken sticks Items 3, 4, 5, and 6.</p> <p>Items 1B, 2</p> <p>Item 1 Side-B was microscopically identified as previously having been a single unit with the broken stick Item 2.</p>
p2025197	W051	<ul style="list-style-type: none"> Item 2 was at one time part of Item 1. <p><i>Qualifier: The possibility of these items having such correspondence if they were not a single object is exceedingly small.</i></p> <ul style="list-style-type: none"> Item 3 to Item 6 did not physically fit to Item 1.

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025199	W016	<p>Item 1: One broken wooden stick with two broken ends labeled "A" and "B" was analyzed for comparison to Items 2 - 6.</p> <p>Item 2: One broken wooden stick with one broken end. The broken end could not be physically fitted to Item 1 end "A". The result of the physical fit examination to Item 1 end "B" is inconclusive. The broken end from Item 2 and the broken end from Item 1 end "B" exhibit areas that partially fit together; however, the fragility of the broken wood fibers that compose the wooden sticks prohibit the ability to determine the presence or absence of a physical fit.</p> <p>Item 3: One broken wooden stick with one broken end. The broken end could not be physically fitted to Item 1 end "A" or end "B".</p> <p>Item 4: One broken wooden stick with one broken end. The broken end could not be physically fitted to Item 1 end "A" or end "B".</p> <p>Item 5: One broken wooden stick with one broken end. The broken end could not be physically fitted to Item 1 end "A" or end "B".</p> <p>Item 6: One broken wooden stick with one broken end. The broken end could not be physically fitted to Item 1 end "A" or end "B".</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025200	W076	<p>Item: 1-1-1 (FTS item 1) Brand: Unknown Type: Piece of a flat wooden stick with two broken edges. Suitability: Suitable</p> <p>Item: 1-2-1 (FTS item 2) Brand: Unknown Type: Piece of flat wooden stick with one straight edge and one broken edge. Suitability: Suitable</p> <p>Item: 1-3-1 (FTS item 3) Brand: Unknown Type: Piece of flat wooden stick with one straight edge and one broken edge. Suitability: Suitable</p> <p>Item: 1-4-1 (FTS item 4) Brand: Unknown Type: Piece of flat wooden stick with one straight edge and one broken edge. Suitability: Suitable</p> <p>Item: 1-5-1 (FTS item 5) Brand: Unknown Type: Piece of flat wooden stick with one straight edge and one broken edge. Suitability: Suitable</p> <p>Item: 1-6-1 (FTS item 6) Brand: Unknown Type: Piece of flat wooden stick with one straight edge and one broken edge. Suitability: Suitable</p> <p>Based on microscopic comparisons, in the opinion of the laboratory:</p> <p>A physical match was observed to exist between the broken edge (splintered end) of item 1-2-1 (FTS item 2) wooden stick and the Edge B broken edge (splintered end) of item 1-1-1 (FTS item 1) wooden stick. This means that item 1-2-1 (FTS item 2) was identified as having been joined at one time as an integral unit to item 1-1-1 (FTS item 1) at Edge B broken edge (splintered end) and eliminated as having been joined at one time as an integral unit to item 1-1-1 (FTS item 1) at Edge A broken edge (splintered end).</p> <p>Physical matches were not observed to exist between the broken edges (splintered ends) of items 1-3-1 (FTS item 3), 1-4-1 (FTS item 4), 1-5-1 (FTS item 5), and 1-6-1 (FTS item 6) to Edge A or to Edge B broken edges (splintered ends) of item 1-1-1 (FTS item 1) wooden stick. This means that items 1-3-1 (FTS item 3), 1-4-1 (FTS item 4), 1-5-1 (FTS item 5), and 1-6-1 (FTS item 6) were not joined at one time as an integral unit to item 1-1-1 (FTS item 1).</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025201	W042	<p>Physical comparison (visual and microscopic) of the broken ends of wooden sticks Items 1 - 6 revealed the following:</p> <p>A physical match exists between the broken end of Item 2 and the 'B' broken end of Item 1. Therefore, Item 1 and Item 2 was previously joined together and once a single segment.</p> <p>There was no physical match between the broken end of Item 2 and the 'A' broken end of Item 1.</p> <p>There were no physical matches between the broken ends of Item 3 - 6 to the broken end 'A' and the broken end 'B' of Item 1. Therefore, Item 1 was not previously joined together to any of Items 3-6.</p>
p2025202	W162	<p>The results of the examination extremely strongly support that there is a fracture match between Item 1B and Item 2.</p>
p2025203	W098	<p>Item 1 The broken wooden stick with side labeled 'B' is visually similar in physical characteristics to the broken wooden stick (Item 2). Additionally, the broken wooden stick with side labeled 'B' forms a physical fit to the broken wooden stick (Item 2). It is our opinion that the broken wooden stick with side labeled 'B' and the broken wooden stick (Item 2) were once joined and subsequently separated.</p> <p>The broken wooden stick with side labeled 'A' is visually similar in physical characteristics to the broken wooden sticks (Item 2 through Item 6). However, no physical fits were observed. Please note this is a limited comparison.</p> <p>No trace evidence was detected.</p> <p>Item 2 This item was used for comparison purposes.</p> <p>Item 3 This item was used for comparison purposes.</p> <p>Item 4 This item was used for comparison purposes.</p> <p>Item 5 This item was used for comparison purposes.</p> <p>Item 6 This item was used for comparison purposes.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025204	W098	<p>Item 1 was used for comparison purposes. A physical fit comparison was made to the broken ends labeled in part 'A' and 'B' of this known wooden stick. Item 2 is similar in physical characteristics to the known broken stick (Item 1). A physical fit was observed between the broken end of this wooden stick and the end marked 'B' of the known broken wooden stick (Item 1). It is my opinion that these two pieces were once joined and subsequently broken.</p> <p>Item 3 through Item 6 are similar in physical characteristics to the known broken stick (Item 1). No physical fit was observed between these broken wooden sticks and the known broken wooden stick.</p>
p2025205	W098	<p>01 : 6x9 padded yellow envelope 01-01-AA-01 : Broken wooden stick with sides A and B (Item 1) This item was used for comparison purposes.</p> <p>01-02-AA-01 : Broken wooden stick (Item 2) A physical fit was observed between this item and the submitted broken wooden stick with sides A and B (01-01-AA-01). It is my opinion, that at one time, these items were once joined together [Category 1]. No further analysis was performed.</p> <p>01-03-AA-01 : Broken wooden stick (Item 3) This item is similar in visual color and physical characteristics to the submitted broken wooden stick with sides A and B (01-01-AA-01). However, no physical fits were observed. No further analysis was performed.</p> <p>01-04-AA-01 : Broken wooden stick (Item 4) This item is similar in visual color and physical characteristics to the submitted broken wooden stick with sides A and B (01-01-AA-01). However, no physical fits were observed. No further analysis was performed.</p> <p>01-05-AA-01 : Broken wooden stick (Item 5) This item is similar in visual color and physical characteristics to the submitted broken wooden stick with sides A and B (01-01-AA-01). However, no physical fits were observed. No further analysis was performed.</p> <p>01-06-AA-01 : Broken wooden stick (Item 6) This item is similar in visual color and physical characteristics to the submitted broken wooden stick with sides A and B (01-01-AA-01). However, no physical fits were observed. No further analysis was performed.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025206	W055	<p>1. Exhibit 1 (broken wooden stick with sides labeled "A" and "B") was examined to determine if it could have been physically connected to any of Exhibits 2 through 6 (broken wooden sticks).</p> <p>2. Sufficient individual characteristics were observed between Exhibit 1 (side "B") and Exhibit 2 to serve as the basis for the conclusion that Exhibit 1 (side "B") and Exhibit 2 were once physically connected.</p> <p>3. Sufficient individual characteristics were not observed between Exhibit 1 (side "A") and Exhibits 3, 4, 5, or 6 to serve as the basis for the conclusion that Exhibit 1 (side "A") was not physically connected to Exhibits 3, 4, 5, or 6. This does not imply whether the compared items originated from the same source or from different sources.</p>
p2025207	W055	<p>1. Exhibits 1 through 6 (broken wooden sticks) were evaluated for the presence or absence of a physical fit.</p> <p>2. Exhibit 1 Side "B" and Exhibit 2 were once physically connected at the broken ends.</p> <p>3. Exhibit 1 Side "A" and Exhibits 2 through 6 were not once physically connected at the broken ends based on disagreement of individual characteristics. This does not imply whether the compared items originated from the same source or from different sources.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025208	W055	<p>1. Visual and stereoscopic examinations were performed on Exhibit 1 (broken wooden stick with sides labeled 'A' and 'B') and Exhibits 2 through 6 (broken wooden sticks) to determine if Exhibit 1 was at one time physically connected to any of Exhibits 2 through 6.</p> <p>2. Physical fit examinations between Exhibit 1 (side B) and Exhibit 2 disclosed an agreement of class characteristics and individual characteristics along the fractured edges. Exhibit 1 (side B) and Exhibit 2 were once physically connected.</p> <p>3. Physical fit examinations between Exhibit 1 (side A) and Exhibit 2 disclosed a disagreement of individual characteristics along the fractured edges. Exhibit 1 (side A) was not once physically connected to Exhibit 2 at the fractured edges. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>4. Physical fit examinations conducted between Exhibit 1 (sides A and B) and Exhibits 3 through 6 disclosed an agreement of class characteristics and a disagreement of individual characteristics along the fractured edges. Exhibit 1 was not once physically connected to any of Exhibits 3, 4, 5, or 6 at the fractured edges. This does not imply whether the compared items originated from the same source or from different sources.</p>
p2025209	W055	<p>1. Physical fit examinations were performed on Exhibits 1 (item 1, broken wooden stick with sides labeled 'A' and 'B'), 2 (item 2, broken wooden stick), 3 (item 3, broken wooden stick), 4 (item 4, broken wooden stick), 5 (item 5, broken wooden stick), and 6 (item 6, broken wooden stick).</p> <p>2. Exhibit 1, side B, and Exhibit 2 were once physically connected at their fractured edges.</p> <p>3. Exhibit 1, side A, and Exhibits 2-6 were not once physically connected at their fractured edges, based on a lack of realignment of the individual features between each compared pair. This does not imply whether the compared items originated from the same source or from different sources .</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025210	W055	<p>1. Exhibit 1 (item 1) is a wooden like stick with two broken ends. One end was marked "A" and one end was marked "B". Exhibits 2 through 6 (items 2 through 6) are wooden like sticks, each with one broken end.</p> <p>2. Physical fit examinations were performed on the two broken ends of Exhibit 1 and on the one broken end of Exhibits 2 through 6.</p> <p>3. Exhibit 1 "B" and Exhibit 2 were once physically connected at the broken ends.</p> <p>4. Exhibit 1 "B" and Exhibits 3 through 6 were not once physically connected at the broken ends based on a disagreement of individual characteristics. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>5. Exhibit 1 "A" and Exhibits 2 through 6 were not once physically connected at the broken ends based on a disagreement of individual characteristics. This does not imply whether the compared items originated from the same source or from different sources.</p>
p2025211	W055	<p>1. Exhibits 1 (wooden stick), 2 (wooden stick), 3 (wooden stick), 4 (wooden stick), 5 (wooden stick), and 6 (wooden stick) were evaluated for the presence or absence of a physical fit.</p> <p>2. Side B of Exhibit 1 and Exhibit 2 were once physically connected at their corresponding fracture edge.</p> <p>3. Exhibit 1 was not once physically connected to Exhibits 3, 4, 5, or 6 at their fracture edges based on fracture edge features. This does not imply whether the compared items originated from the same source or from different sources.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025212	W055	<p>1. Physical fit examinations were performed on Exhibits 001, 002, 003, 004, 005, and 006 (wooden sticks).</p> <p style="margin-left: 2em;">a. Exhibits 001 and 002 were once physically connected at the fractured edge of Exhibit 001 marked as "B".</p> <p style="margin-left: 2em;">b. It could not be determined if Exhibits 001 and 003 were once physically connected at the fractured edge of Exhibit 001 marked as "A" based on the physical features displaying simultaneous similarities and differences.</p> <p>2. Exhibits 004, 005, and 006 were not once physically connected to Exhibit 001 based on disagreement of individual characteristics. This does not imply whether the compared items originated from the same source or from different sources.</p>
p2025213	W055	<p>1. Exhibits 2 through 6 (broken wooden sticks) were examined to determine if they were at one time physically connected to Exhibit 1 (broken wooden stick with sides labeled 'A' and 'B').</p> <p>2. Physical fit examinations between Exhibit 1 End B and Exhibit 2 disclosed an agreement of class characteristics and individual characteristics along the fractured edges. Exhibit 1 End B and Exhibit 2 were once physically connected.</p> <p>3. Physical fit examinations between Exhibit 1 End B and Exhibits 3 through 6 disclosed an agreement of class characteristics and a disagreement of individual characteristics along the fractured edges. Exhibits 3 through 6 were not once physically connected to Exhibit 1 End B. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>4. Physical fit examinations between Exhibit 1 End A and Exhibits 2 through 6 disclosed an agreement of class characteristics and a disagreement of individual characteristics along the fractured edges. Exhibits 2 through 6 were not once physically connected to Exhibit 1 End A. This does not imply whether the compared items originated from the same source or from different sources.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025214	W055	<p>1. Physical fit examinations were performed on Exhibits 1 (piece of wood), 2 (piece of wood), 3 (piece of wood), 4 (piece of wood), 5 (piece of wood), and 6 (piece of wood).</p> <p>2. Exhibit 1 and Exhibit 2 were once physically connected.</p> <p>3. Exhibit 1 and Exhibit 3 were not once physically connected. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>4. Exhibit 1 and Exhibit 4 were not once physically connected. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>5. Exhibit 1 and Exhibit 5 were not once physically connected. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>6. Exhibit 1 and Exhibit 6 were not once physically connected. This does not imply whether the compared items originated from the same source or from different sources.</p>
p2025215	W055	<p>Physical fit examinations were performed on Exhibits 1 through 6 (broken sticks).</p> <p>Side B of Exhibit 1 and Exhibit 2 were once physically connected at the damaged ends.</p> <p>Side A of Exhibit 1 and Exhibit 3 were not once physically connected at the damaged ends. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>Side A of Exhibit 1 and Exhibit 4 were not once physically connected at the damaged ends. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>Side A of Exhibit 1 and Exhibit 5 were not once physically connected at the damaged ends. This does not imply whether the compared items originated from the same source or from different sources.</p> <p>Side A of Exhibit 1 and Exhibit 6 were not once physically connected at the damaged ends. This does not imply whether the compared items originated from the same source or from different sources.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025216	W004	<p>Examination and comparison of side B of Item 1 and Item 2 revealed corresponding edges and features. These Items physically fit to form one continuous piece when corresponding edges and/or features are re-aligned in a specific sequence. It is therefore concluded that Items 1 and 2 were, at one time, a portion of a single unit (Level I - Physical/Fracture Match).</p> <p>Side A of Item 1 could not be physically fitted together with Item 3, 4, 5, or 6. Side A of Item 1 and Items 3, 4, 5, and 6 each show areas of discrepancy; therefore, no meaningful conclusion could be reached as to the possibility of shared sources (Inconclusive).</p> <p>Side A of Item 1 and Items 3, 4, 5, and 6 each share sufficient class characteristics to warrant additional comparison examinations, however, the physical and chemical comparison of this material is not performed by [agency name].</p>
p2025217	W007	<p>There is a physical fit between end B of item 1 and the broken end of item 2. No other physical fits with item 1 were found.</p> <p>The stick from item 1 and the stick from item 2 were at one time a single object. The wooden sticks from items 3-6 differ in width from the wooden stick in item 1; therefore, items 3-6 originated from different sources than item 1.</p>
p2025218	W007	<p>Item 2 was found to physically fit Item 1 at the B end and Item 3 was found to physically fit Item 1 at the A end. These three items were at one time a single object. Items 4, 5, and 6 do not physically fit Item 1 at either A or B end.</p>
p2025219	W007	<p>No physical fits exist between 1A and 2, 3, 4, 5, and 6.</p> <p>No physical fits exist between 1B and 3, 4, 5, and 6.</p> <p>A physical fit exists between 1B and 2.</p>
p2025220	W007	<p>There was a physical fit present between Item 1 end B and the broken end of Item 2. These items were at one point a single object.</p> <p>There was no physical fit between either of the broken ends of Item 1 and the broken ends of Items 3 through 6. However, due to shared similar class characteristics, Items 3 through 6 could not be excluded from having originated from the same source as Item 1.</p>
p2025221	W007	<p>A physical fit was present between item 1 (end B) and item 2. Items 1 and 2 were at one time a single item.</p> <p>Items 3-6 did not exhibit a physical fit with item 1 (end A). However, the items are all wooden sticks of similar cross-sectional dimensions. Therefore, items 3-6 cannot be excluded as originating from the same source as item 1.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025222	W007	<p>A physical fit was present between item 1 and item 2. These items were at one time a single object.</p> <p>No other physical fits were found.</p>
p2025223	W056	<p>The broken edge marked B of item 1.1 and the broken edge of item 1.2 have distinctive features that physically match together. The alignment of these features serves as the basis for the opinion that the items were at one time joined together. The determination of a physical match is based solely on a visual/microscopic comparison, not upon a statistical evaluation of data or an exhaustive comparison to all potential sources.</p> <p>No physical match was established with the broken edge marked A of item 1.1. The absence of a physical match does not preclude the possibility that the compared items originated from the same source. Additional comparison examinations would be required to evaluate the possibility of an association or an exclusion based on class characteristics.</p>
p2025224	W056	<p>Item 1 (1.1) is a wooden stick fragment that has broken ends on both sides. Items 2-6 (1.2-1.6) are wooden stick fragments that are each broken on one end.</p> <p>The broken ends of Items 2-6 were examined for possible physical matches to both ends of Item 1. In addition, Items 2-6 were compared amongst themselves for physical matches.</p> <p>A physical match was established between the broken end of Item 2 (1.2) and broken end "B" on Item 1 (1.1).</p> <p>The broken edges of Items 1 and 2 have distinctive features that physically match together. The alignment of these features serve as the basis for the opinion that Items 1 and 2 were at one time joined together.</p> <p>The determination of the physical match was based solely on visual and stereomicroscopic examinations, not upon a statistical evaluation of data or an exhaustive comparison to all potential sources.</p> <p>No other physical matches were established.</p> <p>The absence of a physical match does not preclude the possibility that the compared items originated from the same source. Additional comparison examinations would be required to evaluate the possibility of an association or an exclusion based on class characteristics.</p> <p>At the present time, the Laboratory does not conduct wood comparisons. Upon request, the samples may be made available to other laboratories for further testing.</p>

UTIC	Webcode	How would you state your findings in a report? (Use the same wording as you would to submit a report to the lead investigator and/or court).
p2025225	W056	<p>The broken edges of items 1 (end B), and 2 have distinctive features that physically match. The alignment of these features serves as the basis for the opinion that items 1 and 2 were at one time joined together to form one continuous piece of wood. The determination of a physical match is based solely on a visual/microscopic comparison, not upon a statistical evaluation of data or an exhaustive comparison to all potential sources.</p> <p>No physical match was established between end A of item 1 with the broken ends of items 3 through 6, or the broken ends of 3 through 6 with one another. Items 1 and 3 through 6 were not previously joined to one another as represented by the samples submitted. The absence of a physical match does not preclude the possibility that the compared items originated from the same source. Additional comparison examinations would be required to evaluate the possibility of an association or an exclusion based on class characteristics.</p>
p2025226	W121	<p>Items 1 through 6 were visually and microscopically examined. Item 1 was observed to have two broken ends, marked "A" and "B."</p> <p>The "B" end from item 1 was found to physically fit to the broken end of item 2, to show that at one time item 2 and item 1 side B were joined together.</p> <p>No physical fit was observed between item 1 (sides A and B) and items 3, 4, 5, or 6.</p> <p>No physical fit was observed between item 2 and items 1 (side A), 3, 4, 5 or 6.</p>
p2025227	W070	<p>Physical and microscopic comparison of Item 1 side "B" with Item 2 revealed matching characteristics along the fracture line to conclude that the sticks had been joined at one time.</p> <p>Items 3, 4, 5, and 6 did not fracture match to either side of Item 1.</p>

- 6) How long did it take to complete this test (in hours)? Please report actual analytical hours only.

- 7) Did you find this test to be a fair test of the process of the examination of materials with a potential physical match?
 - A) Yes
 - B) No

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination of materials with a potential physical match?
p2025101	W182	1	Yes
p2025102	W266	3	Yes
p2025103	W049	6	Yes
p2025104	W119	4	No
p2025105	W061	13	No
p2025106	W061	2	Yes
p2025107	W061	20	Yes
p2028108		1 hour	Yes
p2025109	W043	2 for exam; 6 for documentation	Yes
p2025110	W043	25	Yes
p2025111	W197	16	Yes
p2025113	W179	3	Yes
p2025114	W009	2	No
p2025116	W040	2	Yes
p2025117	W024	3	No
p2025118	W144	7.5	No
p2025119	W193	6 hours	Yes
p2025120	W095	32	Yes
p2025121	W095	6	Yes
p2025122	W128	2 h	Yes
p2025123	W160	8	Yes
p2025124	W088	2	Yes
p2025125	W088	8 hours	Yes
p2025126	W092	10 hours	Yes
p2025127	W031	8	Yes
p2025128	W079	4	Yes
p2025129	W114	8	Yes
p2025130	W114	6	Yes
p2025131	W114	1	Yes
p2025132	W187	8	Yes
p2025133	W187	3	Yes
p2025134	W268	16	Yes
p2025135	W052	4	Yes
p2025136	W052	1	No
p2025137	W052	3	Yes
p2025138	W052	2	Yes
p2025139	W067	32 hours	Yes
p2025140	W158	6 hours	Yes
p2025141	W158	8	Yes

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination of materials with a potential physical match?
p2025142	W158	3	Yes
p2025143	W158	4	Yes
p2025144	W158	3 hr	Yes
p2025145	W068	15	Yes
p2025146	W080	7	Yes
p2025147	W110	12 hours	No
p2025148	W030	2	Yes
p2025149	W082	8	Yes
p2025150	W135	10	Yes
p2025151	W151	2	Yes
p2025152	W151	6+	No
p2025153	W151	2	Yes
p2025154	W151	1	Yes
p2025155	W151	4	No
p2025156	W151	1	Yes
p2025157	W151	2	Yes
p2025158	W151	3	Yes
p2025159	W249	2	Yes
p2025161	W120	8	Yes
p2025163	W204	5	Yes
p2025164	W226	6	Yes
p2025165	W226	4	Yes
p2025166	W027	8 hrs	Yes
p2025167	W027	6	No
p2025169	W027	3	Yes
p2025170	W027	8	Yes
p2025174	W059	2 hours	Yes
p2025175	W001	1.5	Yes
p2025178	W192	3	Yes
p2025179	W014	20	No
p2025180	W015	2	Yes
p2025181	W203	1	Yes
p2025182	W130	4	Yes
p2025183	W130	14	Yes
p2025184	W130	35	Yes
p2025185	W130	10	Yes
p2025186	W130	3 hours	Yes
p2025187	W130	8	Yes
p2025188	W130	8	Yes

UTIC	Webcode	How long did it take to complete this test (in hours)? Please report actual analytical hours only.	Did you find this test to be a fair test of the process of the examination of materials with a potential physical match?
p2025189	W130	4	Yes
p2025190	W130	14	Yes
p2025191	W130	10	Yes
p2025194	W025	6	Yes
p2025196	W084	12	Yes
p2025197	W051	8	Yes
p2025199	W016	18	No
p2025200	W076	5	Yes
p2025201	W042	21 hours	Yes
p2025202	W162	16	Yes
p2025203	W098	14	Yes
p2025204	W098	8	No
p2025205	W098	3	No
p2025206	W055	20	No
p2025207	W055	8	Yes
p2025208	W055	8	Yes
p2025209	W055	24	No
p2025210	W055	12	No
p2025211	W055	6	Yes
p2025212	W055	30	No
p2025213	W055	4	Yes
p2025214	W055	5	No
p2025215	W055	8	No
p2025216	W004	4	Yes
p2025217	W007	3	Yes
p2025218	W007	3	Yes
p2025219	W007	12	Yes
p2025220	W007	8.5	Yes
p2025221	W007	3.5	Yes
p2025222	W007	2	Yes
p2025223	W056	2	Yes
p2025224	W056	4	Yes
p2025225	W056	2	Yes
p2025226	W121	10	Yes
p2025227	W070	4	Yes



8) How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.

Additionally, this question is a means to provide you with an opportunity to explain or include information about your findings or interpretation, as needed. In order to maintain confidentiality, please refrain from including identifying information specific to your laboratory.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025101	W182	It was challenging because of the softness of the material, but overall a good test.	

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025103	W049	<p>This test used thin wooden sticks which would not typically represent the types of evidence seen in the forensic firearm lab. Some types of evidence which are seen include knife tips/blades, tool tips/tools, keys which have been shorn, vehicle parts such as mirrors, parts of cars/vehicles, thick wooden handles of brooms or yard tools etc. This test did not allow for effective use of reverse lighting techniques due to the frayed/fibrous nature of the material. The material may also be subject to breaking off easily during transport or handling.</p> <p>Additionally, the answers that are allowed for this test do not reflect all the answers available to the examiner. The test only allows "Inconclusive" or "No Fracture Match Exists between Item # and all other items" as a group selection rather than being able to select specific items. For example, one item may show significant differences allowing for "No Fracture Match Exists" while another item may share all discernable class characteristics and some individual features but not enough to say a fracture match exists or doesn't exist (Inconclusive). The test taker is forced to choose only one option that would include both those items.</p>	<p>Thank you for the suggestions on substrates and question wording. FTS offers different Physical (Fracture) Match substrates year to year that may or may not reflect the items typically encountered within your agency.</p> <p>When selecting test samples, FTS generally considers samples we have received in our laboratory casework. While we have not seen stir sticks in our casework, the intention was to test participants in assessing physical fit of small wood fragments, which we do encounter in cases. The use of stir sticks provided a relatively uniform material to utilize for this purpose.</p> <p>The stir sticks were a challenging substrate for analysts to assess a physical match due to the size and softness of the material but in our view these physical characteristics are not outside the realm that a physical fit expert may encounter in casework and results of this test were overwhelmingly within consensus. While we stand by the validity of the test, given the negative comments from participants, we will not utilize this substrate in the future.</p> <p>Due to the fragility of the samples, additional packaging was utilized to protect the broken ends from additional damage in transit.</p> <p>Each year FTS offers a custom Physical (Fracture) Match PT (FTS-XX-PM2) with a metal substrate that may be more applicable to your needs.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025104	W119	<p>Due to the small surface area and fibrous and fragile nature of the stirring sticks, I do not find them to be suitable as test samples. In the minimal handling of the samples, splinters were observed shedding from the samples.</p> <p>Clarification for question 4, the inconclusive result only applies to Item 2. There were no fracture matches between Item 1 side B and Items 3-6.</p>	<p>Thank you for clarifying your response.</p> <p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p>
p2025105	W061	<p>Re: Inconclusive result for Item 1, end B.</p> <p>Strong consideration was given to the possibility of the fractured end of Item 2 being a physical match for the fractured end of Item 1 end B. However, based on our laboratory's guidelines, these items for comparison were lacking in unique, surface characteristic features continuing from one item to the other and cannot be considered to be a conclusive physical match.</p> <p>Due to the laboratory's current limitations with the instrumentation (i.e. photographic equipment and related software), no such layering of images/superimposition could be performed to view any potential physical fits.</p> <p>As per laboratory's procedure, this examination was technically and independently reviewed. However, additional assistance was sought from colleagues for their independent examination of the items to determine if the same conclusion was reached.</p> <p>A suggestion for the Physical Fit Test Result Form would be to include a section relating to techniques/instrumentation used to perform the examination. (This could be either a free text comment space/box or to select from a list of techniques, with an "Other" category.)</p>	<p>Thank you for clarifying your responses and for your question suggestions.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025107	W061	This material will be easily damaged, future participants may be at a disadvantage due to the damage after use.	Please see FTS Response for p2025103.
p2025111	W197	The broken edges of the wooden sticks were very fragile, and the splintered wood could break off easily. Some of the splintered wood was barely/loosely attached. If the splintered wood was accidentally broken off, it could make a physical (fracture) match more difficult. It had to be assumed that no wood was lost/missing when the items were broken.	FTS chose a substrate this year that was more challenging due to the fragile nature of the wooden stir sticks. However, all physical matches were photographed microscopically and packaged properly to damage or avoid loss of material.
p2025114	W009	Wooden stir sticks are not a typical type of material that we encounter in casework. The material was fragile and difficult to work with as the wood splinters and breaks. Casework samples are usually harder more robust materials.	Please see FTS Response for p2025103.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025117	W024	<p>Our Firearm and Toolmark (FATM) unit generally only accepts fracture/physical match cases where the questioned items are composed of a rigid surface, which provide a defined fracture to examine under the microscope. The broken ends of these wooden sticks were splintered, preventing the use of the reverse lighting method that is regularly utilized in our fracture/physical examinations. If these items were submitted as an actual laboratory request, it is likely they would have been assigned to the trace unit instead, based on the item and fracture type.</p> <p>It would be helpful to know the material/item types of the test prior to ordering, because then our QA unit ordering the test would know whether to assign the test to our trace unit vs the FATM unit.</p>	Please see FTS Response for p2025103.
p2025118	W144	The worst material (wooden stick) you could use to do a fracture match test	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025120	W095	<ul style="list-style-type: none"> - Provide a case type of scenario that makes it clear which items are knowns and which items are unknowns. - This test requires comparing all of the items. In our lab, once you have a positive fracture match the other items do not need to be examined. - While this test was a fair test of the process of the examination, perhaps using a material that is not as prone to material loss as wood is. With wood you have splintered ends and increased potential for material loss due to the initial fracture as well as during packaging, handling, examination, and photographic documentation. 	<p>FTS will no longer provide case scenarios as they are entirely contrived. FTS does not evaluate an agency's evidence interpretation or significance determination.</p> <p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p>
p2025121	W095	I thought the test could have been improved upon by providing a scenario or, at the very least, specify which items are to be considered questioned/known samples. Our SOPs state that questioned samples be opened prior to the known standards, so having a scenario would help to clarify the order in which to open the items.	<p>Thank you for the suggestion.</p> <p>Please see FTS Response for p2025120.</p>
p2025122	W128	<p>The packaging of the sticks is somewhat unfortunate.</p> <p>For this reason, there was a possible mix-up.</p> <p>Otherwise everything is okay</p>	Thank you for the comment.
p2025125	W088	Including a scenario would be beneficial.	Please see FTS Response for p2025120.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025127	W031	<p>Wood is a difficult substrate to work with due to its brittleness. You had to be very delicate when working with these samples in order to not break pieces off that would be necessary for a positive fracture match.</p> <p>While conducting examinations, I observed that in the case of fracture matching the items, due to the substrate, one side may fracture better than the reverse side. I created samples in house to mimic this test using flat wooden coffee stir sticks in order to observe if this was a phenomenon of how the substrate breaks in order to determine if a fracture match truly existed or not.</p>	<p>Please see FTS Response for p2025103.</p> <p>Thank you for clarifying your response.</p>
p2025130	W114	Test seems pretty good.	
p2025131	W114	I am required to include a Conclusion statement for each Q-Item submitted, which explains the extended conclusions	Thank you for clarifying your response.
p2025132	W187	The test represented the field of fracture match well and it was an accurate representation of case work. No suggestions for improvement.	
p2025134	W268	No aspects would be changed.	
p2025136	W052	Items were too fragile and easily damaged during examination or any handling. This made the test extremely challenging and did not accurately test the interpretation of a physical fit due to limits on what could be done	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025137	W052	The ends of the pieces of wood are very fragile and easily broken. This made this a very difficult examination, albeit a fair test of abilities.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025138	W052	Laboratory does not report a conclusive fracture match.	
p2025141	W158	A more 3 dimensional sample that is not as fragile.	Thank you for the suggestion.
p2025143	W158	There was a lot of corresponding complimentary detail between Lab Items 1A and 4, but they did not physically fit together. There may have been warping or weathering of the Items due to how they were packaged, so a determination between identification and elimination could not be made. I have photos supporting my findings and am happy to also submit them if requested.	Thank you for clarifying your response.
p2025147	W110	The test material is problematic, being both extremely fragile in nature and not always producing sufficiently distinct features. In-house test samples were prepared using comparable material, and some of the broken ends produced features with sufficient identifiable characteristics to constitute a physical fit finding, while others did not. In addition, no scenario was given, and no information was provided as to which items were the questioned or known samples.	Please see FTS Response for p2025103 and p2025120.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025149	W082	Prior FTS physical fit test scenarios described where the items originated from. This test did not include that information which made it difficult to determine which item(s) were questioned and which were known. To minimize bias, the questioned item(s) should be examined prior to the known item(s).	Thank you for the suggestion. Please see FTS Response for p2025120.
p2025152	W151	I feel that these items were a poor representation of a true fracture match. It is impossible to truly align the broken edges without damaging the items. The fibers of each broken edge is damaged/manipulated as they come together when attempting to align. These items would be more suited for a materials analysis type test, which we don't perform at our lab. Next time please choose items that aren't too fragile to try to actually physically fit to one another.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025153	W151	I did not personally think the substrate given was the best option, as it is fibrous and brittle and could easily have very small pieces that could break or flake off during examination.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025154	W151	These pieces are fragile and the broken ends while trying to fracture compare I was worried about breaking pieces off, which would prevent an identification. May be just more sturdy objects.	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025155	W151	I felt the test samples could have been made from a slightly stronger wood product. The ends of the soft wood that was used could have been compromised during shipping, and could easily be damaged during the analysis phase.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025156	W151	The wood was very difficult to fracture. Also, after trying to match multiple times pieces started to break off.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025158	W151	Give a scenario or location of where the items were collected from (crash scene v. vehicle). This would make more sense when writing the report.	Please see FTS Response for p2025120.
p2025159	W249	The substrate (wooden stick) for this test was very brittle. At the present time, technical review requires transport across state lines. Although effort was made while packaging to ensure the integrity of the items, changes were noted along the broken ends by the external reviewer. These items were initially shipped to the laboratory, it is possible they could have already undergone structural changes since preparation. This has the possibility of interfering with the test results.	Please see FTS Response for p2025103 and p2025111.
p2025163	W204	Material chosen was not suitable for us to be able to permit our reporting of a physical fit Item 1 to Item 2 due to the splintered and fragile ends of the break points which continued to fracture during handling/analysis.	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025165	W226	It is difficult to assess the significance of some of the differences, such as width, seen between samples. It would help if at least one full reference stick was provided. It would also have helped to make test breaks to see the extent of warping near the fractured ends.	Thank you for the suggestion. It will be considered for future PT designs.
p2025167	W027	6 Items were too many, it comes out to a lot of comparisons with each item having 2 sides and Item 1 having 2 ends and 2 sides. As scientists who also do casework and multiple other PTs, it is excessive.	Thank you for the comment.
p2025169	W027	A Conclusion Scale would be included in the report to define Physical Fit and No Physical Fit.	Thank you for clarifying.
p2025170	W027	<p>A statement and associated images would also be included in the report: "Images depicting the physical fit are included in this report for reference."</p> <p>The test lacked a scenario, which felt odd in the reporting stage. In addition, the instructions imply a physical fit examination amongst all items as opposed to Item 1 being compared to Items 2 through 6. While this may make sense with some materials, it did not make sense with what I perceived to be broken coffee stir sticks. Physically alignment of Items 2 through 6 with one another would produce ~2-inch wooden sticks, which doesn't seem like something that would exist (though I could absolutely be wrong).</p>	Please see FTS Response for p2025120.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025175	W001	The instructions for this test could have been clearer. All items in this test were broken wooden sticks, so the instructions stating "Please examine the submitted items to determine if a fracture match exists between the broken wooden sticks" is a little vague. It did not prevent completing the exam, but "Please examine the labeled ends of Item 1 to Items 2-6 to determine if a fracture match exists between the broken wooden sticks," or something similar, would have been a more clear instruction.	Thank you for the suggestion.
p2025178	W192	No recommendations.	

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025179	W014	<p>There were numerous limitations/problems with this test design:</p> <p>a) As received, my test sample for Item 1 contained loose fragments of wood in the packaging that appear to have broken off during sample packaging and/or shipping/handling. Due to extremely fragile nature of the material especially on the fractured ends, there was unavoidable damage and loss of fibers from the fractured ends even with careful handling, manipulation of the samples during microscopy, and during the physical verification process. This loss of information limits analysis and the verification process greatly and can affect analytical conclusions.</p> <p>b) The sample material would not be a commonly encountered (if ever) type of material submitted in real casework. The type of material and the nature by which it fractures also took away the ability to utilize a common method used for physical fit analysis - reverse lighting of the fracture plane. Therefore one of the major tools in the toolbox for this type of analysis was not available to fully evaluate the samples. The analysis was limited to only comparing the external fracture planes (which were losing material, damaged, and changing even with careful handling/analysis).</p> <p>c) Sample pieces of the wood used for the test samples would have been extremely beneficial to provide with the test sets. Since this is not a common type of test material, the sample piece of wood could have been used by analysts to make test breaks/fractures in order to see how the material behaves when broken, how much material is potentially lost during the fracturing process, and to evaluate known matches to known non-matches to evaluate material behavior.</p>	<p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p> <p>We appreciate the insightful comments regarding test instructions. These will be considered in future versions of the test.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025179 (Cont.)	W014	<p>d) The test questions (3 and 4) were worded very poorly and can cause confusion. For example, there is the ability to "identify" a sample item to the questioned Item 1 (A), eliminate all of the items, or a basic inconclusive. To be properly designed and avoid erroneous conclusions due to confusion, the test questions <u>should</u> allow for the ability to identify a specific sample item to the questioned item, eliminate specific samples to the questioned item, and designate a specific sample item as being inconclusive to the questioned item. For example, my conclusion for Item 3 is <u>inconclusive to Item 1 (side A)</u> but I was unable to express that specific sample inconclusive for the test question. I was also unable to express the specific samples that I <u>eliminated</u> from Item 1 (side A). In a real case example, I would have the ability to express specific identifications, inconclusives, and eliminations.</p>	
p2025180	W015	No suggested changes. This test was interesting, of good quality, and fair.	
p2025181	W203	Use materials closer to crime evidence.	

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025189	W130	Because of accreditation requirements, we must analyze unknown samples prior to known samples for comparison tests. For clarity, I recommend the wording of the requested examination use the terms "unknown" and "known" for the items so that we may approach it appropriately. For casework, we would call the customer to determine this information.	Thank you for the suggestion.
p2025190	W130	The scenario could stand to be clearer in the future about which items are known vs. unknown.	Thank you for the suggestion.
p2025191	W130	One suggestion I have is to make clear in the question sections of the exam whether test items are meant to be treated as a known or questioned item.	Thank you for the suggestion.
p2025194	W025	Recommendation to avoid storing test samples in any packaging medium containing an adhesive layer (i.e., sticky notes), as this could result in portions of test samples becoming lodged/embedded in a manner that could negatively alter the separated edges to be evaluated for a potential physical match - especially if the material is flexible or otherwise fragile (ex. fibrous ends of small wooden sticks).	Thank you for the suggestion.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025199	W016	<p>Explanation about my findings:</p> <p>The material (wood) in this test proved to be very fragile and therefore difficult for a blind secondary verification. The nature of these samples did not allow for a complete "lock" of two individual pieces. During analysis, a piece of the broken end of Item 2 broke off and had to be set aside. This broken piece from Item 2 did physically fit to a section of Item 1 End "B", however, since the Item 2 piece could not physically fit in its entirety, an inconclusive result was reported.</p> <p>Item 1 End B exhibited physical features that generally aligned with the broken end of Item 2. When viewed side by side, there were several areas within each item that appeared to fit (i.e. "overhang splinters" from one item and loss of wood material in the other item) and roughly measured to fit. Due to the interior of the broken wood, no fitting alignment was possible, preventing any "overhang splinters" to physically fit with the loss of wood material in the respective areas.</p> <p>Although confident that Item 1 End B and Item 2 broken end generally align with each other, there were too many insufficient individual characteristics to determine the presence or absence of a physical fit.</p> <p>To improve on this test, I would suggest that, in addition to being photo verified, all physical fit samples be physically verified by a qualified analyst prior to distribution. Had this step been taken, the test provider would have realized that the substrate utilized for this test was inappropriate.</p>	<p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p> <p>Two qualified analysts took this PT as a pre-distribution test and did not comment on the inappropriateness of the substrate.</p>

FTS

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UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025199 (Cont.)	W016	Samples that are fragile and easily altered during the analysis process are not viable samples for a physical fit proficiency test. The broken ends of the test samples exhibited excessive distortion during analysis, thus eliminating sufficient corresponding fractured areas for a physical match determination. These types of samples prohibit a blind secondary examination from being performed, a step that is required in many laboratories. Had this evidence been received in casework, the results would have been reported as inconclusive due to the multitude of issues that were encountered, mainly the destruction of the fracture points due to the fragile nature of the evidence. Physical fit proficiency tests should be made with evidence in which the results can be verified by another analyst, in addition to being photo verified prior to distribution. Fragile samples, though encountered in casework, should not be used to evaluate a participant's ability to perform a physical fit analysis.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025202	W162	Good test.	
p2025203	W098	To have an actual case scenario.	Please see FTS Comment for p2025120.
p2025204	W098	The submitted broken wooden sticks had a fragile nature that made a comparison back to the known complicated. Most of the wooden items submitted to this laboratory are much larger, with a less fragile nature.	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025205	W098	The material used for this test was incredibly fragile and small. I felt there was a high chance for a misinterpretation of the exam. With my handling of the material alone some of the edges from the fractured areas broke off or bent out of shape thus creating the potential for false positives/negatives.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025206	W055	<p>This was not a representative physical fit test due to the material that was chosen - wood. These wooden sticks were extremely fragile and difficult to work on without destroying the individual characteristics that are required to be examined and independently verified by a second examiner. I expect more inconclusives due to alterations of the evidence just by performing the routine tasks of removing them from the packaging, positioning them, and photographing them, not to mention that when you attempt to fit these wooden pieces together, you have likely permanently altered the evidence.</p> <p>Bad choice of materials. Yearly proficiency tests are not meant to be novel or tricky, and yours consistently are.</p>	<p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p> <p>We certainly do not attempt to be novel or tricky in the selection of test materials but rather choose samples that provide a challenge to the examiner and in the case of physical match, use varying substrates.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025207	W055	<p>-The answer sheet does not allow for the possibility of different answers for items 2-6 compared to Item 1. For example, if Item 3 could be excluded as a match to one of the sides but Item 4 was inconclusive as a match to that side, there is not a way to convey that in the multiple choice answer on the answer sheet.</p> <p>-For a proficiency test, this was a difficult material to work with due to the fact that the material is easily manipulated through the process of examination and verification. Since there is expected to be a ground truth answer, but the material could be manipulated/damaged further, an examiner might not have sufficient characteristics to come to the consensus conclusion.</p>	<p>Thank you for the suggestion.</p> <p>Please see our response for UTIC p2025103 regarding suitability of the test samples.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025209	W055	<p>1. The softness of the wood substrate used to create this PT means that the fractured edges are extremely easy to damage or alter, to the point where even if the items are received intact after shipping, the actual act of physical fit comparison (and/or verification) could result in permanent alteration/loss of the material. I understand that challenging substrates could be encountered in casework. However, a proficiency test should be designed around evaluating baseline competency through the establishment of a consensus result. It is therefore risky and unnecessary to employ such a delicate material in a proficiency test. It feels as though this proficiency test was not designed to evaluate competency. It feels as though this PT was designed to "stress test" the field at large by using an extremely challenging substrate that is fraught with variability and the potential for error. In other words, this test felt more like a research project meant to determine the outer limits of Physical Fit examiners' abilities. The results of proficiency tests have a huge impact on a forensic laboratory's accreditation and on the authorizations of individual examiners to perform casework.</p>	<p>Please see our response for UTIC p2025103 regarding suitability of the test samples. While we are not making an effort to "stress test" the field, we do try to utilize different materials year to year as this provides varied challenges for the examiner. The results of this test overwhelmingly met consensus.</p> <p>The phrase "baseline competency" is an interesting one to try to put into practice. We generally consider samples we have seen in our laboratory or have heard other encounter. While we have not seen stir sticks in casework, our intention was to test participants in assessing physical fit in small wood fragments which we have seen in several cases and the use of stir sticks provided a relatively uniform material to utilize for this purpose.</p> <p>We will consider your comments in the phrasing of the test questions for future versions of this test.</p> <p>We will consider updating the name of this PT to Physical (Fracture) Fit in future rounds to align with current ASTM terminology.</p>

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025209 (Cont.)	W055	<p>In the future, please consider the materials used and make a better effort to reduce external variables that could unnecessarily lead to the lack of a consensus.</p> <p>2. The test result form is heavily flawed. Questions 3 and 4 bias the examiner toward the presence of a Physical Fit. There need to be questions for each pairwise comparison, providing "Physical Fit Present", "Physical Fit Absent", "Inconclusive", and "N/A" options for all possible comparisons. For example, an examiner could be extremely confident that there is NOT a Physical Fit between item 1, side B and items 3, 5, and 6. But what if they are inconclusive about the comparison of item 1, side B to items 2 <i>and</i> 4? There is no way to indicate such a result on the current form.</p> <p>3. ASTM E3392-24, Standard Guide for Forensic Physical Fit Examination, section 3.2.4.1, states, "The term match (for example, physical match, fracture match) is not recommended to be used as it can be misleading to the layperson." Recommend adoption of terminology in ASTM guide.</p>	

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025210	W055	<p>I answered "no" to the fair test question because the substrate in the test samples is very fragile and the fibrils at the ends of the fractured edges can be easily be damaged when conducting examinations. I understand there can be challenges in casework samples due to the fragile nature of the material encountered, but those challenges do not have to be included as part of the proficiency testing process.</p> <p>Current terminology is physical "fit", NOT physical fracture "match".</p>	Please see FTS response for p2025103 and p2025209.
p2025211	W055	While my test appeared to be fine, using a material that is so fragile and easily changed gives the chance for a lot of issues to occur.	Please see FTS response for p2025103.
p2025212	W055	<p>1. Horrible substrate for a physical fit proficiency test. Easily altered during shipment and examinations. Porous material has inherent "voids" with very limited surface area for comparison. A small wooden stir stick is not commonly encountered in routine casework.</p> <p>2. Answer sheet is not suitable to capture the information that is reported. if you are going to provide multipule items to compare (which is not realistic to casework), the answer sheet should allow a conclusion for each comparison.</p>	Please see our response for UTIC p2025103 regarding suitability of the test samples.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025213	W055	-poor substrate choice; small wood fibers had broken off of some samples during shipping; too fragile of a material for a proficiency test. Sample handling has high likelihood of being destructive.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025214	W055	Material is too fragile and easily altered by function of performing the examination.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025215	W055	This was not consistent with casework. This type of physical evidence would not typically get submitted to our laboratory for criminal investigations. The porous, brittle material was a poor choice to test this type of examination and should be reconsidered for future use.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025220	W007	I believe the samples were a good test of an analyst's abilities since the wood made things a little harder but still possible to find a match.	Thank you.
p2025224	W056	Suggest more secure inner packaging for the wooden sticks. A small envelope would have been better. The sticks easily slid off the post-it notes despite the tacky surface. Once the outer packaging was cut open, the sticks could easily slide out of the paper and cardboard and then out of the evidence envelope.	Thank you for the suggestion.

UTIC	Webcode	How would you change the aspects of the test (i.e. scenario, test samples, question sections, report format) to improve a future version of this test? Comments and suggestions are welcome.	FTS Response
p2025225	W056	It would be beneficial to clarify the description of the items to indicate "questioned" and "known" samples. In this case, the generic question asked to examine the submitted items to determine if a fracture match exists, where the official questionnaire only asks about whether any of the items match with item 1.	Thank you for the suggestion.
p2025226	W121	Due to the fragile nature of the wooden sticks and how they were broken, the substrate chosen for this test was unrealistic for casework. While this substrate is similar to items received in the past for PTs (I remember a year where broken pencils were used), I would not recommend using something this fragile for a PT in the future.	Please see our response for UTIC p2025103 regarding suitability of the test samples.
p2025227	W070	Good quality proficiency test!	