

In the Hair Analysis event, competitors delve into microscopic analysis and scale castings to identify the characteristics of a hair sample. Participants will scrutinize cuticle patterns, medulla patterns, and pigment distribution to make their determinations. Following this, a comparative analysis will be conducted on the same hair sample to match it to one of three known samples. Each step of the analysis will be justified through detailed written reports.

Entry Requirements

- Teams must be composed of 2 members.
- Chapters can only register 2 teams to compete.

Materials

Competitors can/should provide the following materials. Competitors are only permitted to bring in the below materials to the competition. TPSA does not provide the below materials.

- **Photo Identification Reference** [the rulebook \(https://tpsa.info/rulebook\)](https://tpsa.info/rulebook) for details
- **Slide Preparation Materials** (i.e. slides, coverslips, water, etc.)
- **Safety Equipment** (i.e. gloves, metal tweezers or forceps, scissors, etc.)
- **Writing utensil** (Blue/ Black inkpen)
- **Blank notebook paper** Used for notes and summaries
- **Permanent Marker** used to mark evidence tape and slides
- **Clear fingernail polish** Clear quick dry fingernail polish to conduct scale casting.
- **Evidence Tape** (tape may be in strips or on a roll)
- **Scissors** Any scissors necessary to cut evidence tape.
- **Station Cleaning Materials** Paper towels or wet wipes to clean up any spilled materials

Procedures and Timeline

- **Check In (10 min Time Limit)** Competitors must check in to their event at their designated **check-in time**. Competitors that arrive **ten (10) minutes** after their designated check-in time will be marked as no-shows and not be allowed to compete out of respect for the time commitment made by our judges and volunteers.
- **Pre-Event Briefing (5 min Time Limit)** After check-in, competitors will be guided to the designated event area. Once there, the moderator will provide a comprehensive briefing, detailing the event's instructions, rules, and procedures. This briefing ensures that each competitor is well-informed and prepared for the subsequent stages of the competition.
- **Part 1 (15 min Time Limit)**
 1. The competitors will have 15 minutes to complete part 1.
 2. When the moderator starts the timer and calls "start," the competitors will begin their analysis of the hair sample.
 3. Competitors will use proper technique to open the sample package containing evidence (hairs) for analysis.
 4. Competitors will conduct scale castings and microscopic analysis.
 5. When the competitors have correctly created a wet mount of the sample, they will be given a prepared slide to use to determine the characteristics of the hair.
 6. The team will use the prepared slide to determine the characteristics of the hair sample and write a summary of their findings, detailing identified characteristics, such as medulla pattern, cuticle pattern, medullary index, pigmentation color, etc.
 7. The competitors will then clean their workstations and seal evidence using proper technique.
 8. The summary of findings will be submitted to the judge's hands before the moderator calls "time" when the 15 minutes ends. The sample slide, prepared slide and cuticle cast will remain on the workbench for Judge review.
- **Moderator Part 2 (5 min Time Limit)** The room moderator will provide the materials for part 2. Instructions will be provided and a timer will be set for 15 minutes. The moderator will start the time and announce "start".
- **Part 2 (15 min Time Limit)**
 1. Competitors will compare their "suspect" sample from part 1 with 3 provided "known" samples.
 2. Competitors will open the sample packages, using proper technique, containing evidence (hairs) for analysis.
 3. Competitors will conduct scale castings and microscopic analysis for known samples.
 4. The team will determine which of the known samples is a match with the "suspect" samples from part 1.
 5. A written summary of their findings, detailing comparison characteristics, such as medulla pattern, cuticle pattern, medulla index, pigmentation color, etc. will be prepared. Summary should state which sample matches the sample from part 1 and how the competitors came to their conclusion, addressing the listed characteristics. Non matches do not need to be addressed.

6. The competitors will then clean their workstations and seal evidence using proper technique.
 7. The summary of findings will be submitted to the judge's hands before the moderator calls "time" at the end of 15 minutes. All sample slides and cuticle casts will be left on the workbench for Judge review.
- **Evaluation and Scoring (5 min Time Limit)** After the completion of the event, the judges will convene to assess each competitor's/team's performance based on a standardized rubric. This stage is conducted without the presence of the competitors. Judges will evaluate the criteria outlined in the rubric to ensure a fair and objective scoring process. Once all assessments are finalized, scores will be recorded for each competitor/team.

Safety Protocols

- **Jewelry** Rings must feature a continuous, even, and unadorned exterior surface. Necklaces must not be visible from the outside of the uniform. Bracelets may not be worn. Facial piercings must be removed or covered with a band-aid.
- **Hair** All hair must be secured out of the eyes for the duration of the event. Competitors with hair extending past the top of the shoulder shall wear their hair secured neatly in a bun or ponytail ensuring that no hair extends below the collar of the uniform. It is not an exception to the rule that a student's chosen hair style is too thick to be secured above the collar.
- **Shoes** Competitors must wear closed-toe, closed- low-heel footwear for this event.
- **Fingernail Length** Competitors fingernails shall not extend past the tip of the finger.
- **Shirt Sleeves** Long sleeve shirts shall fit closely at the wrist and not extend past the wrist.
- **Pant Length** Pants shall not extend past the sole of the shoe.

Professional Dress Guidelines

To secure professionalism points, competitors should dress in attire that accurately reflects what professionals in the respective public safety careers would wear while performing the tasks associated with the event. Competitors are also expected to consult and follow the professional dress guidelines in the rulebook to qualify for points. Additionally, participation is contingent upon meeting all prescribed safety protocols.

Judge Qualifications

- Experience with general microscopy.
- Experience with trace evidence analysis.

Criteria	Unattempted	Unsatisfactory	Satisfactory	Proficient	Exemplary	Points
Professionalism						
Dress Code	<p>0</p> <p>Does not fulfill the dress code requirements.</p>		<p>10</p> <p>Fulfills the dress code requirements.</p>			Opts
Safety						
Safety Competitor dons gloves.	<p>0</p> <p>Did not wear gloves</p>		<p>2</p> <p>Competitor donned gloves.</p>			Opts
Part I: Characteristic Determination						
Evidence Packaging/Handling Evidence should be opened using proper technique and handled without unnecessary loss or destruction.	<p>0</p> <p>Did not open correctly or wasted evidence.</p>	<p>2</p> <p>Evidence was not opened using proper technique but was handled without unnecessary loss or destruction.</p>	<p>3</p> <p>Evidence was opened using proper technique but did cause unnecessary loss or destruction.</p>	<p>4</p> <p>Evidence was opened using proper technique and handled with minimal unnecessary loss or destruction.</p>	<p>5</p> <p>Evidence was opened using proper technique and handled without unnecessary loss or destruction.</p>	Opts
Slide Preparation Slides prepared correctly using a wet mount technique. (1) The proper amount of hair is placed on the slide. (2) Tweezers/forceps are used to handle evidence. (3) Correct amount of water is used. (4) Cover slip is used. (5) Slide is labelled.	<p>0</p> <p>Slide was not prepared correctly.</p>	<p>1</p> <p>Only 1-2 requirements were met.</p>	<p>3</p> <p>Only 3 requirements were met.</p>	<p>4</p> <p>Only 4 requirements were met.</p>	<p>5</p> <p>All 5 requirements were met.</p>	Opts
Microscope Use Microscope is used correctly. (1) Slide placed on stage correctly. (2) Focusing begins on low power. (3) Stage is moved using knobs, not hands. (4) Competitor refocuses with each power increase. (5) Competitor uses appropriate knobs (fine focus/coarse focus).	<p>0</p> <p>Did not use microscope properly or at all.</p>	<p>1</p> <p>At least 2 requirements were met.</p>	<p>3</p> <p>Only 3 requirements were met.</p>	<p>4</p> <p>Only 4 requirements were met.</p>	<p>5</p> <p>All 5 requirements were met.</p>	Opts
Cuticle Cast Competitors correctly complete a cuticle scale cast. (1) Uses clean slide. (2) Paints thin layer of clear nail polish on slide. (3) Uses tweezers to correctly place hair. (4) Allows time to dry. (5) Gently removes hair from polish.	<p>0</p> <p>Did not attempt or met 0-1 requirements.</p>	<p>3</p> <p>Only 2 requirements met.</p>	<p>5</p> <p>Only 3 requirements met.</p>	<p>7</p> <p>Only 4 requirements met.</p>	<p>10</p> <p>All 5 requirements met.</p>	Opts
Summary Written summary completed containing (1) proper spelling, grammar, and complete sentences, (2) description of medulla structure, (3) medullary index, (4) color, and (5) description of cuticle scale pattern.	<p>0</p> <p>No written summary submitted or no requirements were met.</p>	<p>3</p> <p>Only 1-2 requirements were met.</p>	<p>5</p> <p>Only 3 requirements were met.</p>	<p>7</p> <p>Only 4 requirements were met.</p>	<p>10</p> <p>All 5 requirements were met.</p>	Opts
Evidence Returned to Packaging Evidence is returned to packaging and packaging is sealed using proper technique.	<p>0</p> <p>Evidence not returned to packaging or packaging not sealed properly.</p>		<p>2</p> <p>Evidence returned to packaging but packaging not sealed properly.</p>		<p>4</p> <p>Evidence returned to packaging and packaging sealed properly.</p>	Opts

Criteria	Unattempted	Unsatisfactory	Satisfactory	Proficient	Exemplary	Points
Clean Up Work area returned to pre-arrival condition, all trash thrown away.	0 No clean up attempted.		2 Some clean up attempted, but not completed.		4 Clean up completed and all trash thrown away.	Opts
Judge Reviews Cuticle Cast The slide with the cuticle cast will be left behind and the judge will view it under the microscope to determine the clarity of the cast.	0 No cuticle cast performed.	2 Cuticle cast completed, however the cuticle type was not identifiable.	4 Cuticle cast was completed and cuticle type was able to be determined in some areas, but not throughout cast.		6 Cuticle cast was completed and cuticle type was able to be determined throughout cast.	Opts
Part II: Matching						
Evidence Packaging/Handling Evidence should be opened using proper technique and handled without unnecessary loss or destruction.	0 Evidence was not opened using proper technique and was not handled without unnecessary loss or destruction.	2 Most evidence was opened using proper technique but was not handled without unnecessary loss or destruction.	3 All evidence was opened using proper technique and most was handled without unnecessary loss or destruction.	4 Most evidence was opened using proper technique and handled without unnecessary loss or destruction.	5 All evidence was opened using proper technique and handled without unnecessary loss or destruction.	Opts
Slide Preparation Slides prepared correctly using a wet mount technique. (1) The proper amount of hair is placed on the slide. (2) Tweezers/forceps are used to handle evidence. (3) Correct amount of water is used. (4) Cover slip is used. (5) Slide is labelled.	0 No slides were correctly prepared.	1 Most slides met at least 2 requirements.	3 All slides met at least 3 requirements.	4 All slides were correctly prepared, meeting at least 4 requirements.	5 All slides were correctly prepared, meeting all 5 requirements.	Opts
Microscope Use Microscope is used correctly. (1) Slide placed on stage correctly. (2) Focusing begins on low power. (3) Stage is moved using knobs, not hands. (4) Competitor refocuses with each power increase. (5) Competitor uses appropriate knobs (fine focus/coarse focus).	0 Slides were not observed under the microscope or did not meet at least 3 requirements.	1 Most slides were observed under the microscope and at least 3 requirements were met.	3 All slides were observed under the microscope and at least 3 requirements were met.	4 All slides were observed under the microscope and at least 4 requirements were met.	5 All slides were observed under the microscope and all 5 requirements were met.	Opts
Match Unknown to Known	0 Unknown sample was not matched to correct known sample.		6 Unknown sample was matched to correct known sample.			Opts
Match Summary Written summary completed containing (1) proper spelling, grammar, and complete sentences, (2) description of medulla structure, (3) medullary index (4) color, and (5) description of cuticle scale pattern.	0 No written summary submitted or no requirements met.	3 Written summary submitted, correctly addressing 1-2 requirements.	5 Written summary submitted, correctly addressing at least 3 requirements.	7 Written summary submitted, correctly addressing at least 4 requirements.	10 Written summary submitted, correctly addressing all 5 requirements.	Opts
Evidence Returned to Packaging Evidence is returned to packaging and packaging is sealed using proper technique.	0 No attempt made to return evidence to packaging or reseal.		2 Some evidence returned to packaging or all returned, but not correctly sealed.		4 All evidence returned to packaging and resealed using proper technique.	Opts

Criteria	Unattempted	Unsatisfactory	Satisfactory	Proficient	Exemplary	Points
Clean Up Work area returned to pre-arrival condition, all trash thrown away.	0 No clean up attempted		2 Attempted to clean up, but not completed		4 Clean up completed and all trash thrown away	0pts
Total Score: 0 /100 pts						