Shoe and Tire Impressions
Student Worksheet Day One

Objectives:
Students will be able to:
   A) Demonstrate the correct way to make and process a shoe print cast.

Instructions:
   - You will be assigned to a group of four and will be rotating through two different lab stations.
   - Do not rotate lab stations until the teacher tells you to move.

Materials List:
Shoe Impression Castings: Styrofoam plate, sand, hair spray, baby shoe, Plaster of Paris, paper cup, Popsicle stick, water, and a toothpick.

Part A: Shoe Impression Castings

Instructions:

1. Complete one casting per group.
2. Pour your bag of sand onto the Styrofoam plate and smooth it out.
3. Place the baby shoe on the sand and press down hard; do not wiggle the shoe.
4. Carefully remove the shoe from the Styrofoam plate without causing damage to the impression.
5. Spray the impression with 5 pumps of hair spray.
6. Mix the Plaster of Paris mixture in the following proportions:
   a. In a paper cup place 3/4 cup of Plaster of Paris
   b. Mix in 1/4 cup of water from the sink
   c. Mix the Plaster of Paris with a popsicle stick until the mixture is free from lumps; your mixture should resemble pancake batter
7. Gently pour the mixture onto the shoe print over the Popsicle stick.
8. After two minutes take a toothpick and write your group initials and class period on the back of the casting.
9. Let the casting dry until tomorrow without disturbing it.

Questions:

A. What information can shoeprints provide about a crime? List at least four examples.

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Shoe and Tire Impressions
Student Worksheet Day 2

Objectives:
Students will be able to:
A) Demonstrate the ability to calculate wheelbase and stance measurements and use tread patterns to match tire tracks.
B) Describe unique characteristics found in their shoe prints.

Instructions for the lab:
- There will be two stations that you must rotate through today.
- Do not rotate stations until the teacher tells you to do so.

Materials List:
Shoe print activity: your group’s shoe casting, toothbrush, ink pad
Tire track matching activity: 5 toy cars, ink pad, extra computer paper, ruler, track reference sheet

Part A: Cleaning and using your shoe print casting
Instructions:
1. Carefully remove your shoe print from the sand.
2. Brush off as much sand as you can using your hands; be sure you are careful with your casting.
3. Using a toothbrush carefully remove the remaining soil on your casting.
4. If this does not work run your casting under cool water until all the sand is removed and dry your casting using paper towels.
5. Compare your shoe print impression to the shoes that are on the lab bench. Pick the shoe that you feel best matches your shoe impression.

Questions:
A) Which print on the lab bench best matches the print that you made using your shoe casting? Explain your choice in at least two complete sentences.

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B) Do you think that shoe prints or shoe impressions are more helpful to investigators? Explain your choice in at least two complete sentences.

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Part B: Tire Track Evaluation

Instructions:

6. On the bench top are 5 different cars and a tire track reference sheet with the matching tire tracks of these cars. Your task is to match the car labeled 1-5 with the tire tracks labeled A-E.

7. Take each car and run the wheels on the ink pad and then make a tire track on the provided paper. Allow the tire to complete one rotation; do not overlap tracks. You only have one piece of paper to make all tire tracks so use your space wisely.

8. Match the tire track you made on your piece of paper with one of the tire tracks on the index cards labeled A-E. Record your answer in column two of Table B below.

9. Measure the wheelbase and stance of each tire track that you made and record the answer below in column 3 and 4 respectively.

10. Attach your piece of paper with the tire tracks that you made to the end of your answer sheet at the end of the lab period.
   a. Allow your sheet to dry before you attach it to your lab
   b. Record the names of your group members on the track sheet

<table>
<thead>
<tr>
<th>Car Number</th>
<th>Track Match Letter (A-E)</th>
<th>Wheelbase Measurement (cm)</th>
<th>Stance Measurement (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>5</td>
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</tbody>
</table>

Questions:

C) Are tire tracks alone enough evidence to prove if someone committed a crime? Why or Why not? Write at least two complete sentences.
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D) What unique characteristics did you see in some of the tire prints that you made? Write about at least two characteristics in complete sentences.
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