

Tool Mark Challenge

Teacher Information

Materials Needed:

12 tool (2-4 different types) - Choose a variety of styles and sizes

NOTE: You will want at least 3 of the same tool, but with different characteristics. For example, choose 3 flat head screwdrivers in various thicknesses and head widths. I happened to have enough spare screwdrivers and pliers to make up a set with 6 of each one for this activity.

Copies of Tool Mark Challenge worksheet

Rulers

Molding Clay (Dark blue or green works well)

Small plastic plates

Preparation:

1 – Label the tools with numbers and use clay to make impressions for your challenge. If you are going to use the clay impressions for the challenge, place each one in a plastic bag and label with a letter.

NOTE: I used a digital microscope camera (Dino Lite) to photograph the impressions made by each of the tools and choose the best ones for the challenge. I printed several copies of the challenge on card stock and laminated them to keep them in good condition. My "Tool Marks Challenge" is available on the Forensic Science page of my website in the Impression Evidence section.

2 - For the student groups, I set up 6 stations in my room with 2 tools at each station along with rulers, a slab of clay, and a plastic plate. The students work in groups and have approximately 5 minutes to document the 2 tools before they rotate to a new station. They also have an extra time at the end of class to take another look at the tools as well as a little time at the start of the next class period.

3 - Make copies of the Tool Marks worksheet (one per group.)

Activity:

Day 1:

1 - Give each group a copy of the worksheet and show the first part of the Tool Marks Challenge presentation The presentation is available on the Forensic Science page of my website in the Impression Evidence section.

2 - Allow time for the groups to visit each of the 6 stations to examine and document each of the tools and its impression. I tell my students that they may write anything on their worksheet that might help them identify the tool during the challenge - this includes sketches and traced outlines of the tools.

Day 2:

1 - Pass out the challenge pages - one for each group.

2 - Have the groups use their notes from the previous day to match the tools to the tool mark impressions. You may want to have the tools and clay available as some groups may want to recheck a few of them.

3 – Allow time for the students to identify the impressions and then check their answers.

NOTE: I have several identification labs that are races – the first group done receives a prize and bragging rights. I require the groups to have an answer for each item before they can check their answers the first time. I mark the ones that are incorrect and the students keep working until they get them all correct (or until at least half of the groups are finished.)

4 - Discuss how tool marks can be used to solve crimes.



Tool Mark Challenge

Group Members: _____

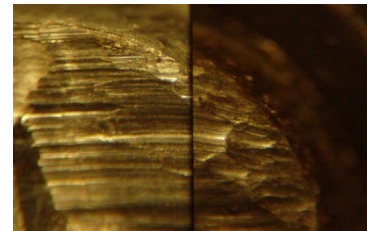
Goal: Your group will need to examine and document the tool marks made by each of the 12 tools.

At each station, you will need to:

- 1 – To prepare for the lab, roll the modeling clay into a flat circle that fits inside the plastic plate. Make several impressions of each tool in your slab of modeling clay.
- 2 – Use the ruler to record the measurements for each tool and its impression surfaces.
- 3 – Document any unique characteristics you notice on each tool or its impression. Write your observations on your worksheet.
- 4 – After you have documents both of the tools at that station, roll the clay into another ball to prepare for the next group and wait until it's time to rotate to the next station.

Features to analyze:

- Dimensions of the impression
- Ridges or striation patterns
- Defects, such as nicks and chips
- Paint chips or metal shards left on a tool



Type of Tool: _____

| Tool # | Width of Tip (mm) | Length of Tip (mm) | Unique Characteristics (Defects, surface marks, etc.) |
|--------|-------------------|--------------------|-------------------------------------------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |

Type of Tool: _____

| Tool # | Width of Tip (mm) | Length of Tip (mm) | Unique Characteristics (Defects, teeth, marks, etc.) |
|--------|-------------------|--------------------|------------------------------------------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |

Tool Mark Challenge

- | | |
|---------|---------|
| A _____ | H _____ |
| B _____ | I _____ |
| C _____ | J _____ |
| D _____ | K _____ |
| E _____ | L _____ |
| F _____ | |
| G _____ | |

of
Guesses:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

