
Welcome to Vice City
GTA: Vice City. Out now for PS2
POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS
POLICE LINE DO NOT CROSS POLICE LINE DO NOT CROSS

Forensic Science

Distance Learning Presentation
For
King Drew Magnet High School of Medicine and Science
March 14, 2007

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Agenda

Presentation in 3 parts

1. Overview of Forensic Science and how it is being taught in the high school
2. Forensic Anthropology
3. Forensic Odontology

Outcomes
Part 1

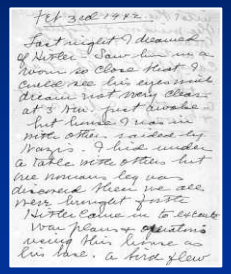
- Participants will:
  - Define forensic science and the role of the forensic scientist
  - Name various services provided by crime labs.
  - Review an overview of the syllabus for a forensic science class in Montgomery County
  - Observe student artifacts

Forensic Science - is the application of various sciences to those criminal and civil laws that are enforced by police agencies in a criminal justice system

Role of the Forensic Scientist

- Analyze physical evidence and to provide expert witness testimony
  - Know the laws that decide admissibility of scientific evidence
  - Cannot give 100% correct answer, only an opinion based on reasonable scientific certainty based on training and experience

Early Forensic Scientists

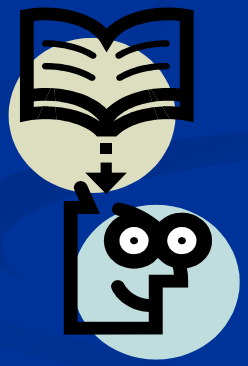


Albert S. Osborn

- Developed fundamental principles of document examination
- Responsible for acceptance of documents as scientific evidence

Hans Gross

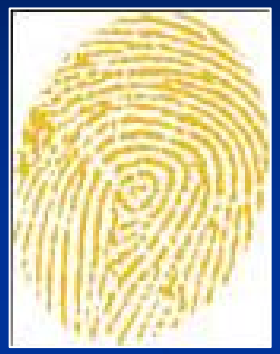
- First work to describe application of scientific disciplines to criminal investigation



Edmund Locard

- Locard's Exchange Principle: trace evidence is transferred when people come in contact

Early Forensic Scientists



Francis Galton

- Formed the basis of today's fingerprint identification

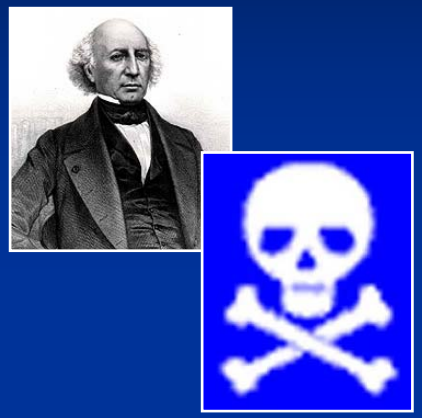
Leone Lattes

- Recognized that blood can be grouped and devised procedure for determining blood type

Calvin Goddard

- Established the comparison microscope as the tool for firearms comparison

Early Forensic Scientists

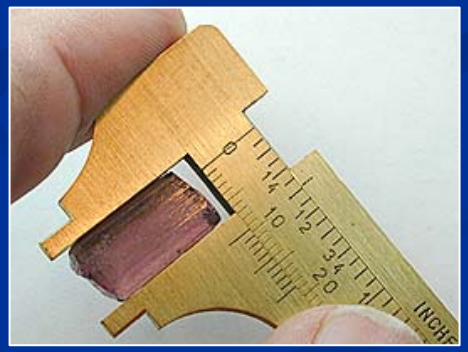


Mathieu Orfila

- First paper on detection of poisons
- Father of toxicology

Alphonse Bertillon

- First system of personal identification
- Established *anthropometry*
- Father of criminal identification



U.S. Crime Labs

- More than 300 public crime labs in the U.S.
  - Why are there so many?
    - Supreme Court decisions in 1960's placed greater emphasis on ***scientifically evaluated evidence***
    - ***?***
    - ***?***
  - In 1923 the oldest crime lab was established – do you know where?

Some of the Provided Crime Laboratory Services

- Audio, Video, & Image Analysis
- Chemistry

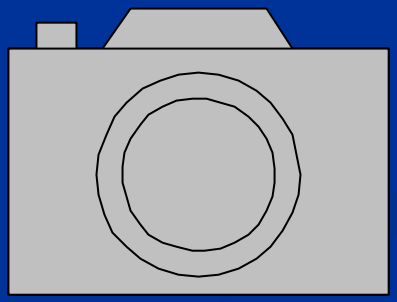
- Combined DNA Index System
- Computer Analysis and Response

Services continued…

- DNA Analysis
- Evidence Response
- Explosives
- Firearms & Toolmarks

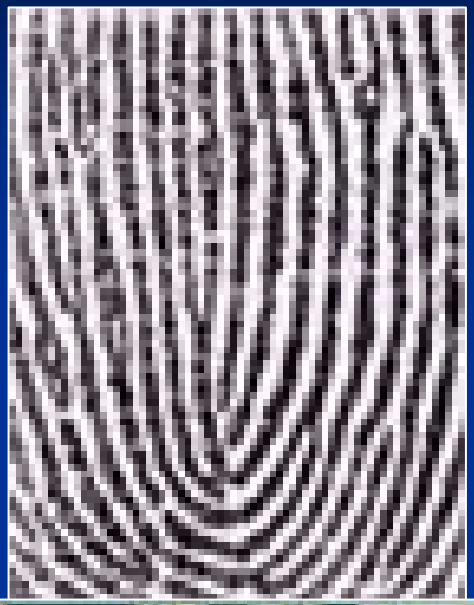
Services continued…

- Hazardous Materials Response
- Investigative and Prosecutive Graphics
- Photography



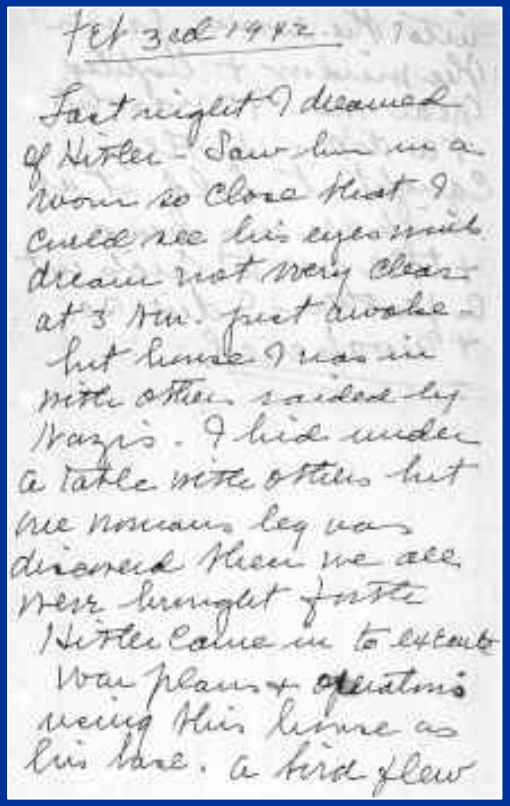
Services continued…

- Research
- Ridge Pattern experts / Latent prints
- Impressions



Services continued…

- **Questioned documents**


Feb 3rd 1942

Last night I dreamed
of Hitler - Saw him in a
room so close that I
could see his eyes mich
dream not very clear
at 3 AM. just awoke -
but have I was in
with other soldiers by
Nazis. I hid under
a table with others but
one woman's leg was
discovered then we all
were brought forth
Hitler came in to execute
War plans + operations
using this house as
his base. a bird flew

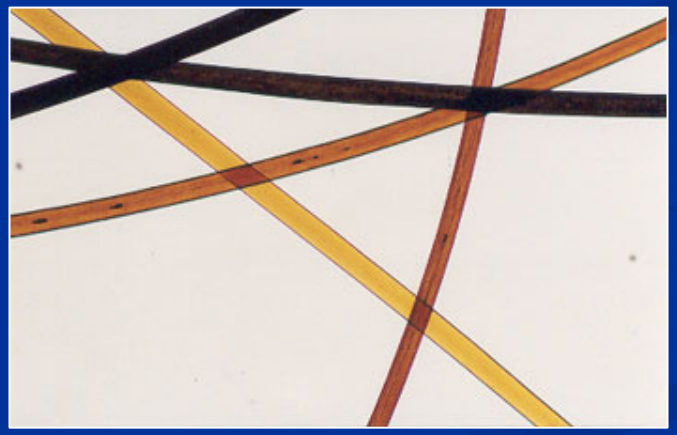
- Dan Rather

Services Continued.

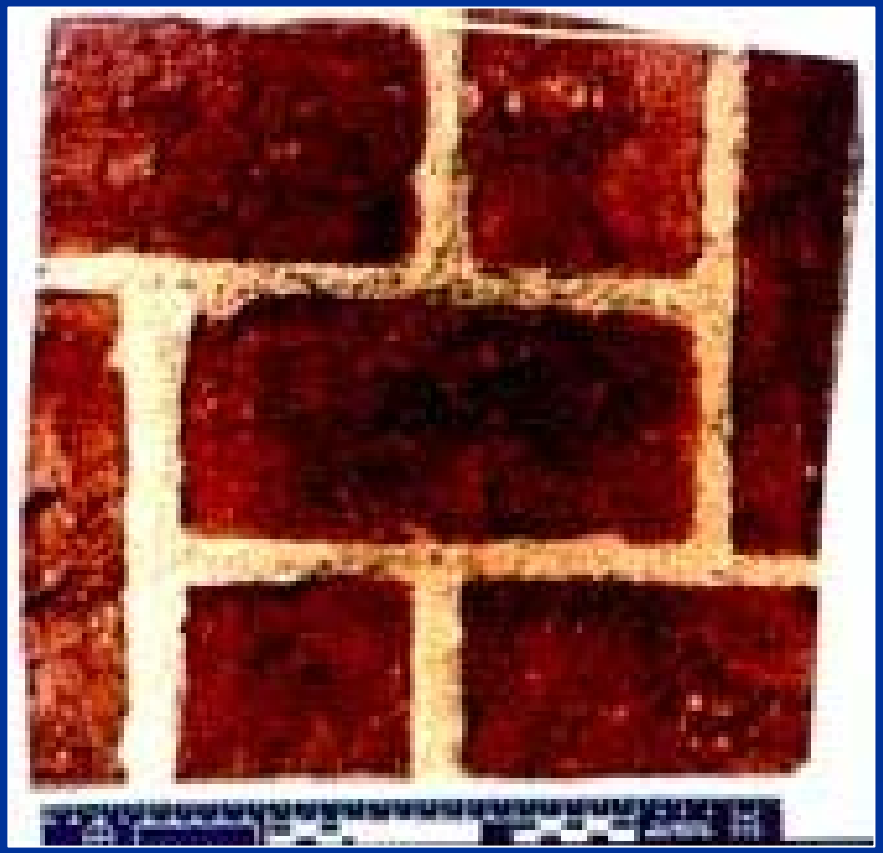
- **Structural Design**

Scale models of Unabomber's cabin used during trial

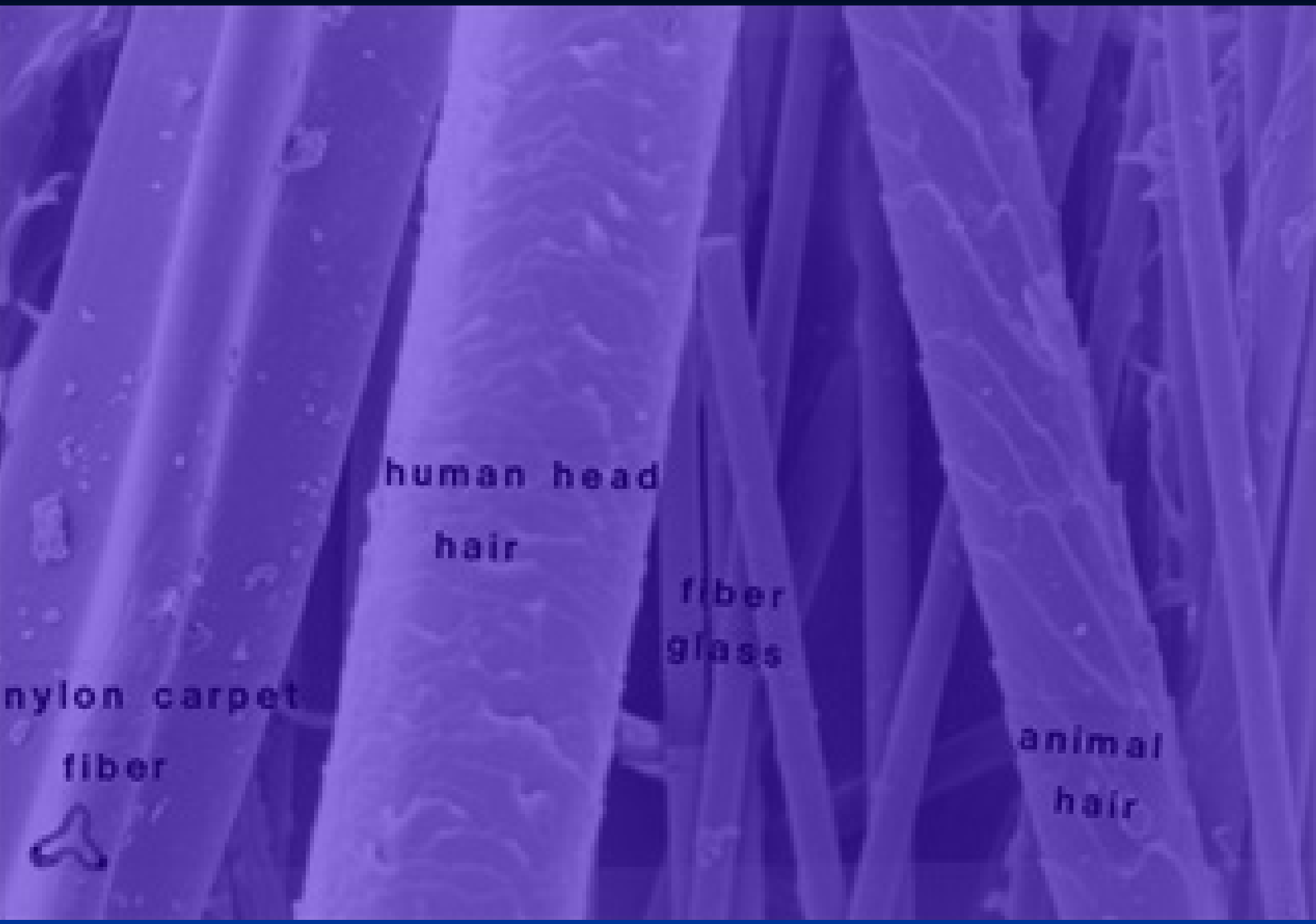
- **Trace Evidence**



Overlap is common



Bloody shoeprints left on brick floor


human head
hair
fiber
glass
nylon carpet
fiber
animal
hair

So what is forensic science class all about?

Goal/purpose

- In Forensic Science, students apply cross-disciplinary scientific knowledge and techniques to investigate crime scenes, evaluate various types of evidence, solve scenario-based “crimes,” while exploring career opportunities.

Content

- Society's trend has made the scientist, an active participant in the crime laboratory, a useful part of the criminal justice system.
- Students are exposed to analysis involving human remains, glass and soils, trace evidence, firearms and tool marks, documents, and entomological specimens. Cutting-edge biotechnological techniques are also explored.
- Writing and verbal communication skills are essential tools with which students both analyze and present their findings.

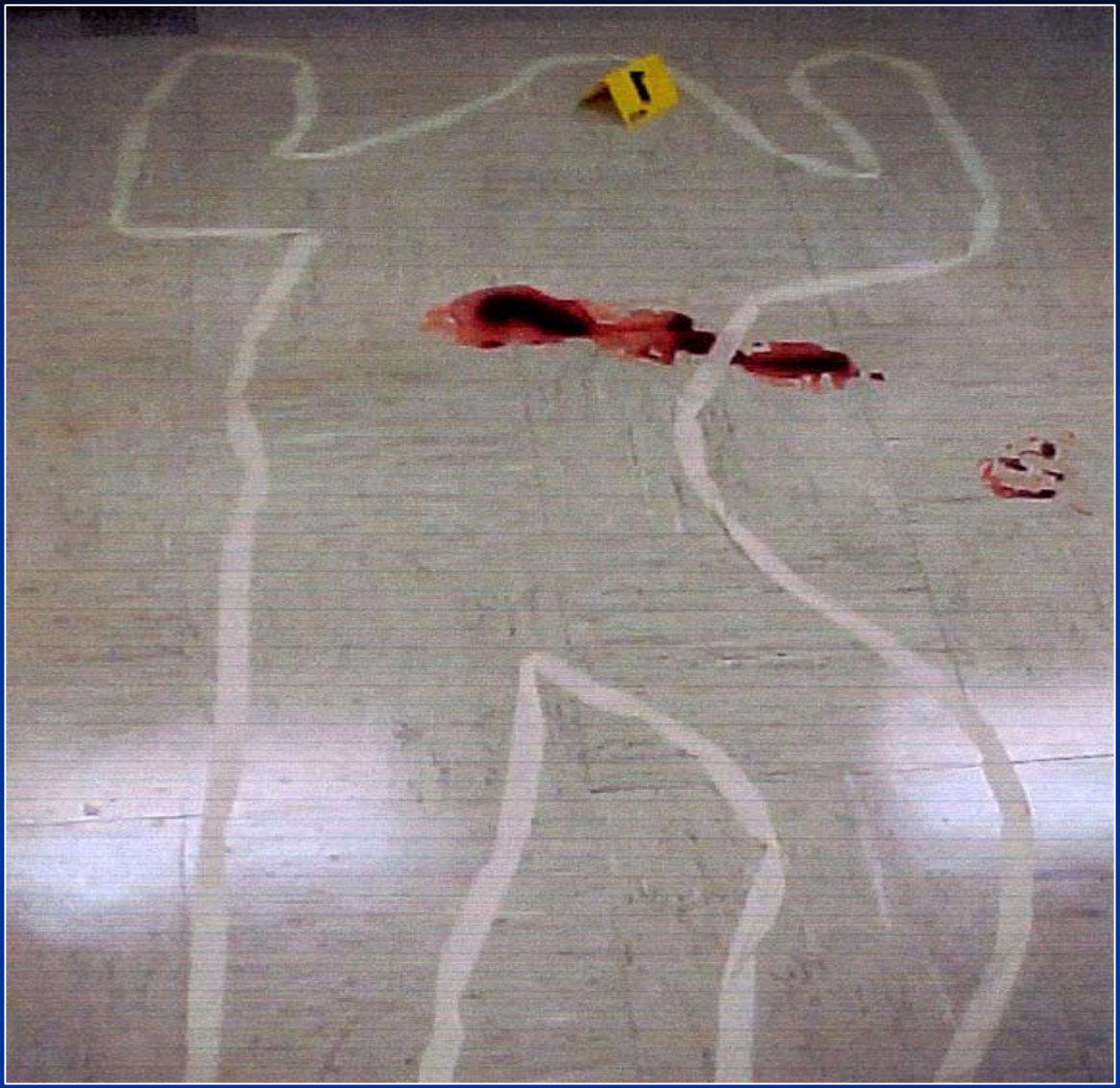
4 Main Categories

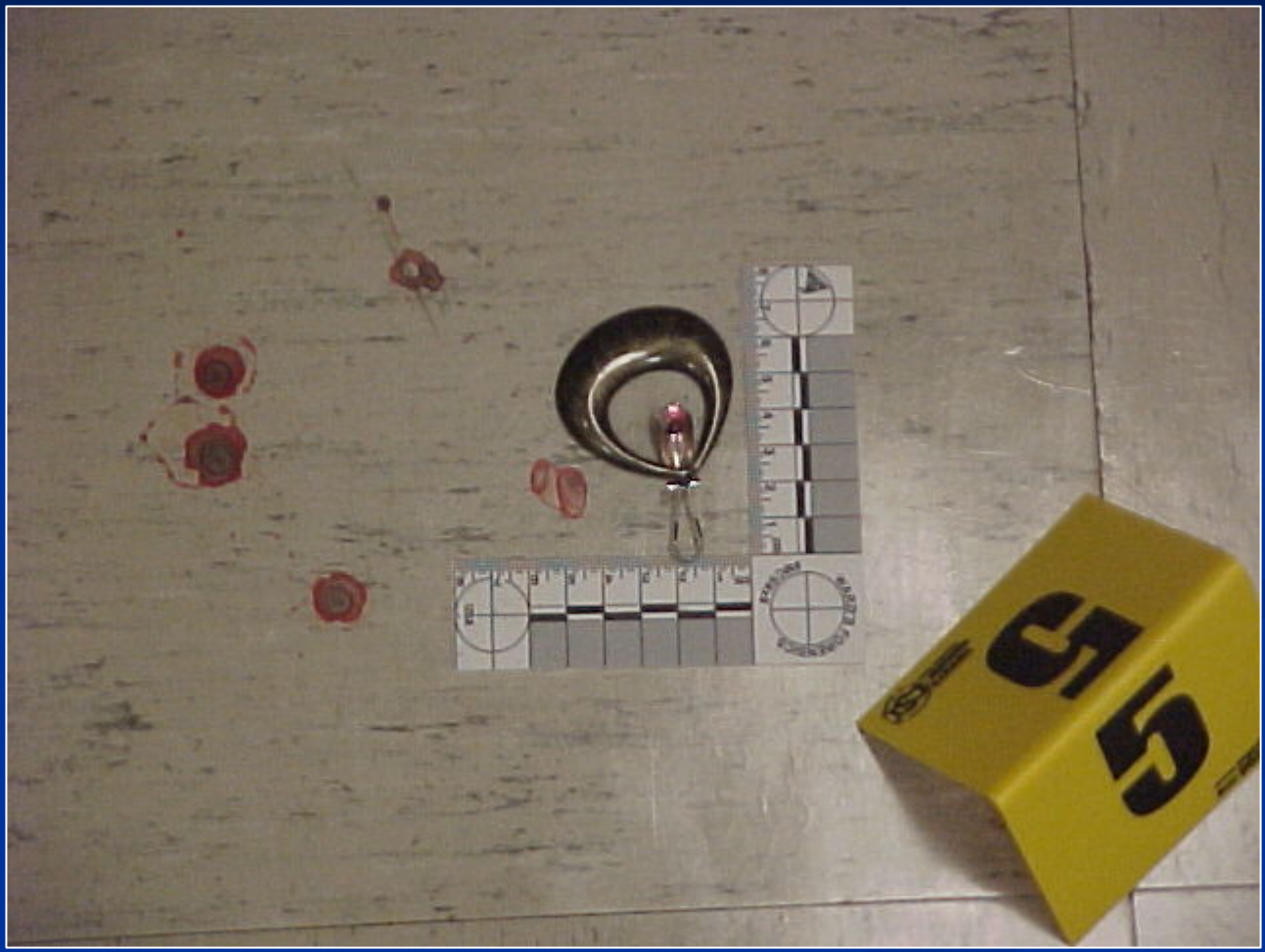
- Forensic Science and the Law
- Biological Science
- Chemical Science
- Physical Science

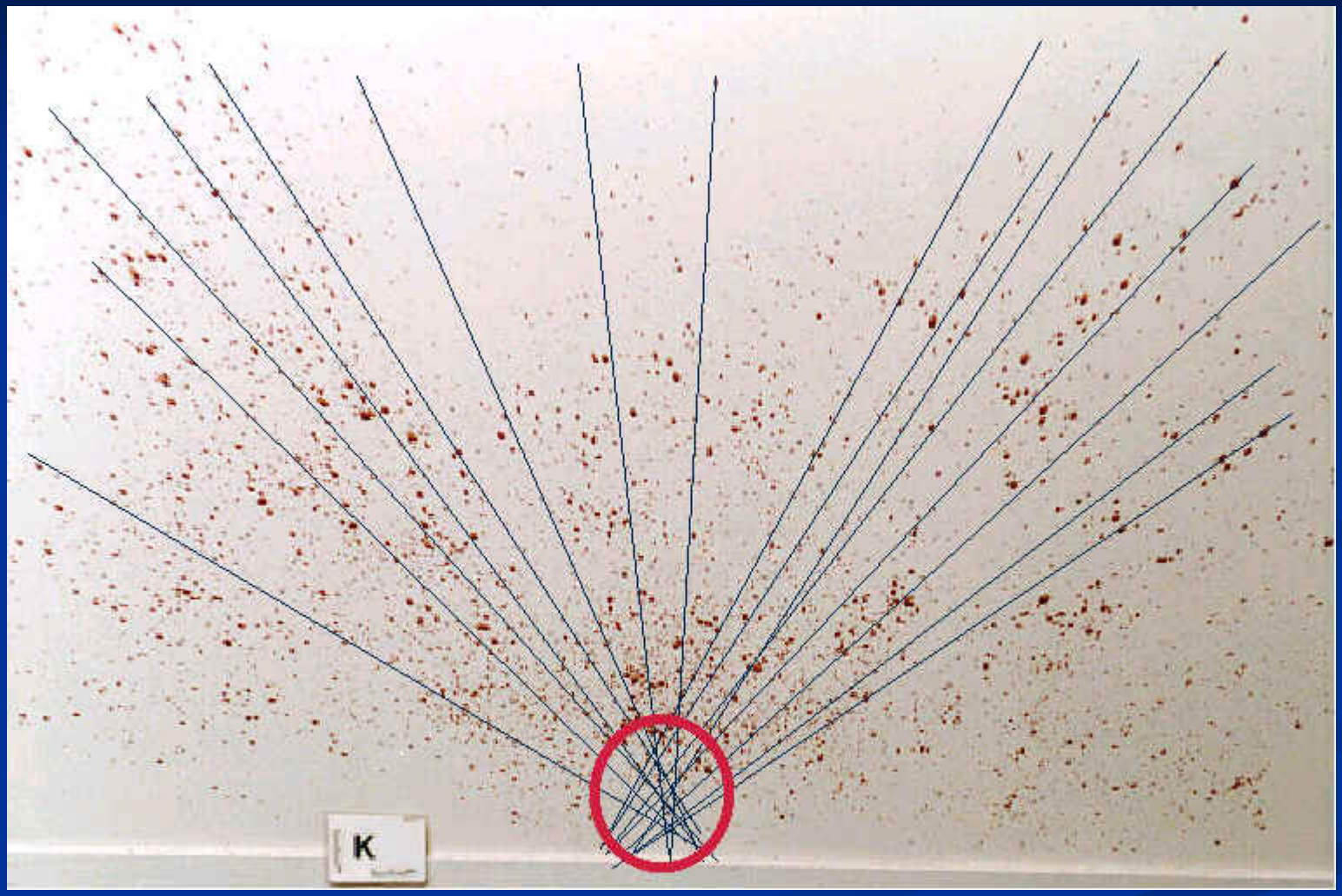
Semester 1

- **1. Forensic Science and the Law**
- * Introduction to Forensic Science
- * Evidence Analysis
- * Law
- *Crime Scene
- Careers in Forensic Science
- Mass Fatalities

- **2. Biological Science - Is it human?**
- *Anthropology
- *DNA
- *Hair
- Serology and Blood Patterns
- *Time of Death
- a. Entomology
- b. Pathology
- Odontology




5
5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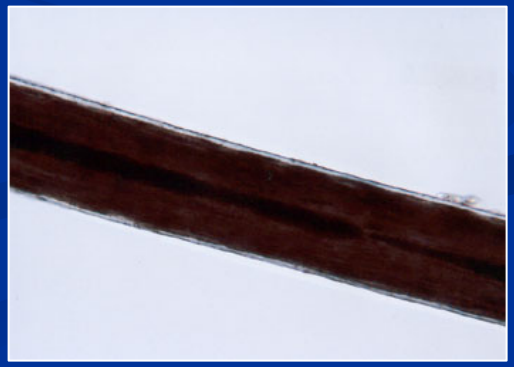
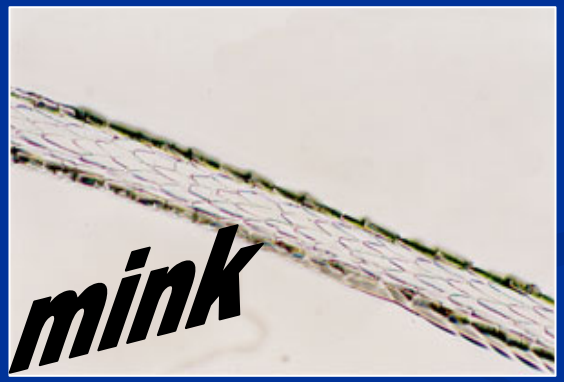



cat


cow


deer

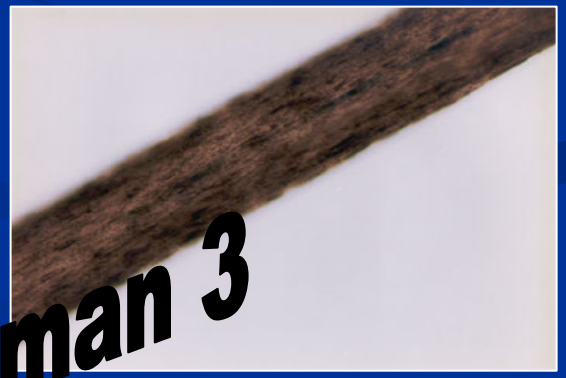

dog


mink


rabbit


human 1


human 2


human 3

Human Hair

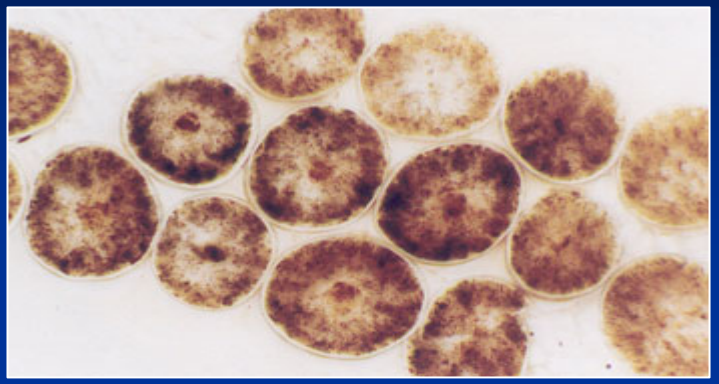
- Mongloid

- Negroid

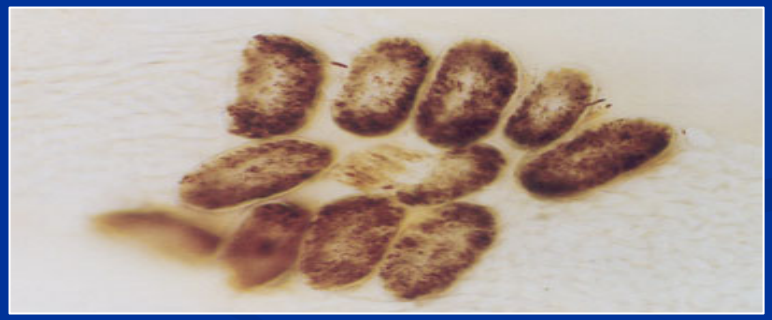
- Caucasian

Human Hair

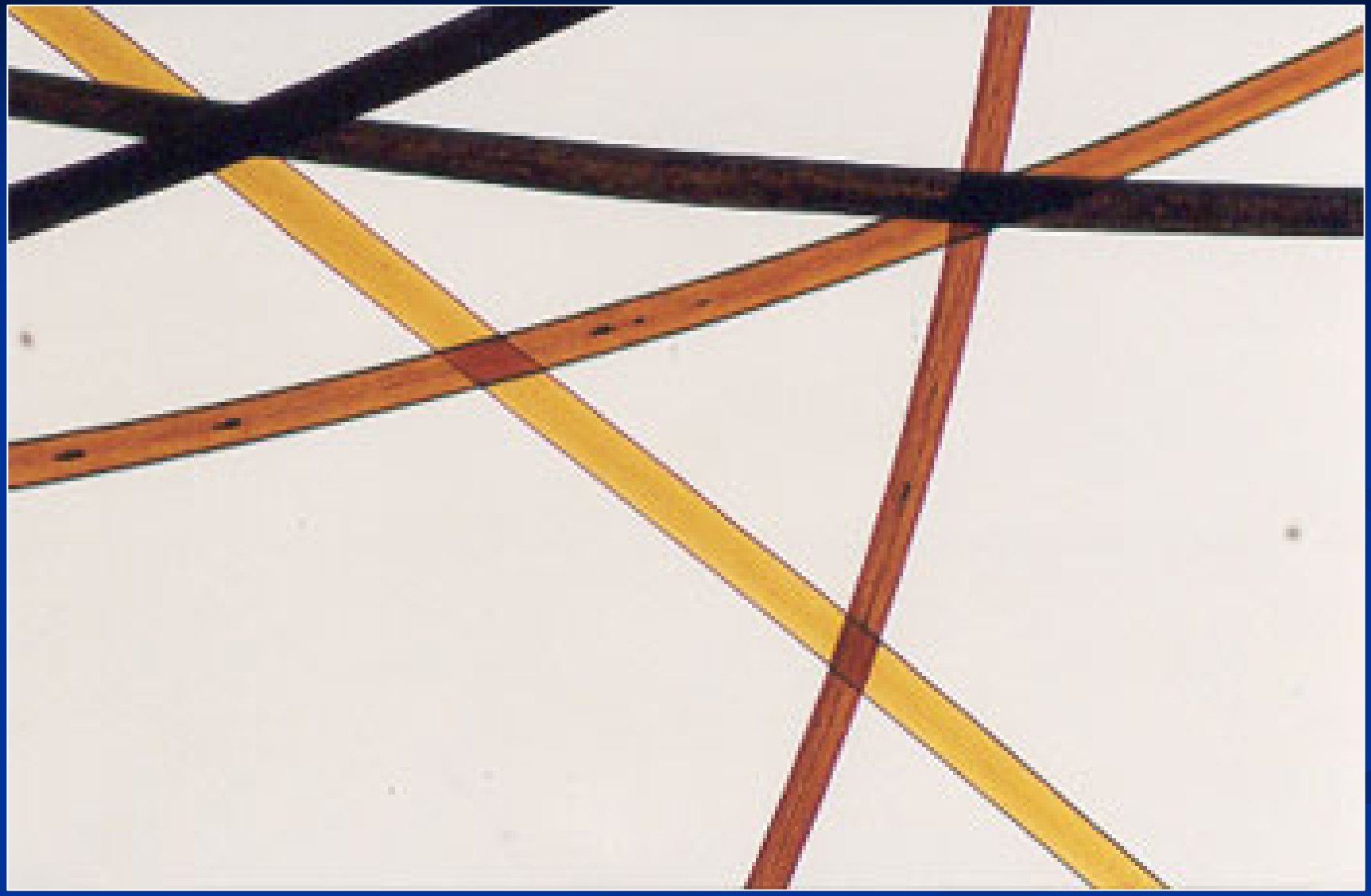
- Mongloid



- Negroid



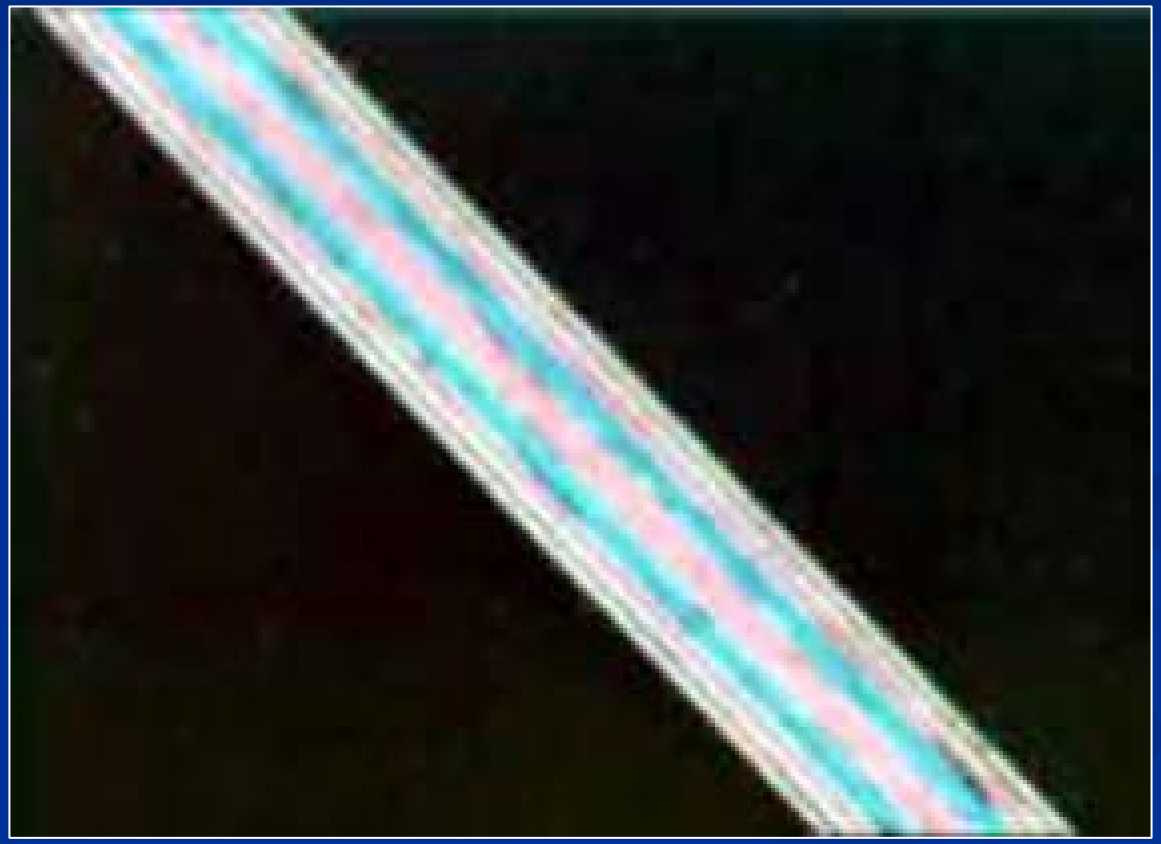
- Caucasian



Semester 2

- **3. Chemical Science**
- *Fiber
- Glass, Soil, Paint
- Fire
- Explosives
- Toxicology

- **4. Physical Science**
- Criminal Profiling
- *Fingerprint
- Firearms/Ballistics
- Internet
- Questioned Documents
- Tool marks and Impressions



Nylon Carpet

Different cross-sectional patterns
can be patented


A
B
C

concentric fractures from secondary bullets terminate at fractures from first bullet

radial cracks from first bullet


WEST PIER

With scientific knowledge, and critical thinking skills

acquired through forensic science;

students are poised to pursue further studies

in biology, chemistry,

physics, anatomy, anthropology, law, and medicine.

Enduring Understandings

1 - 4

Forensic Science is the application of various sciences to those criminal and civil laws that are enforced by police agencies in a criminal justice system

Forensic evidence is evaluated using controlled scientific techniques.

Various court cases throughout the years have set guidelines created specifically designed to set parameters around the type of evidence and how it is collected, processed, tested and presented in a court of law.

Forensic scientists come from many different fields of specialization.

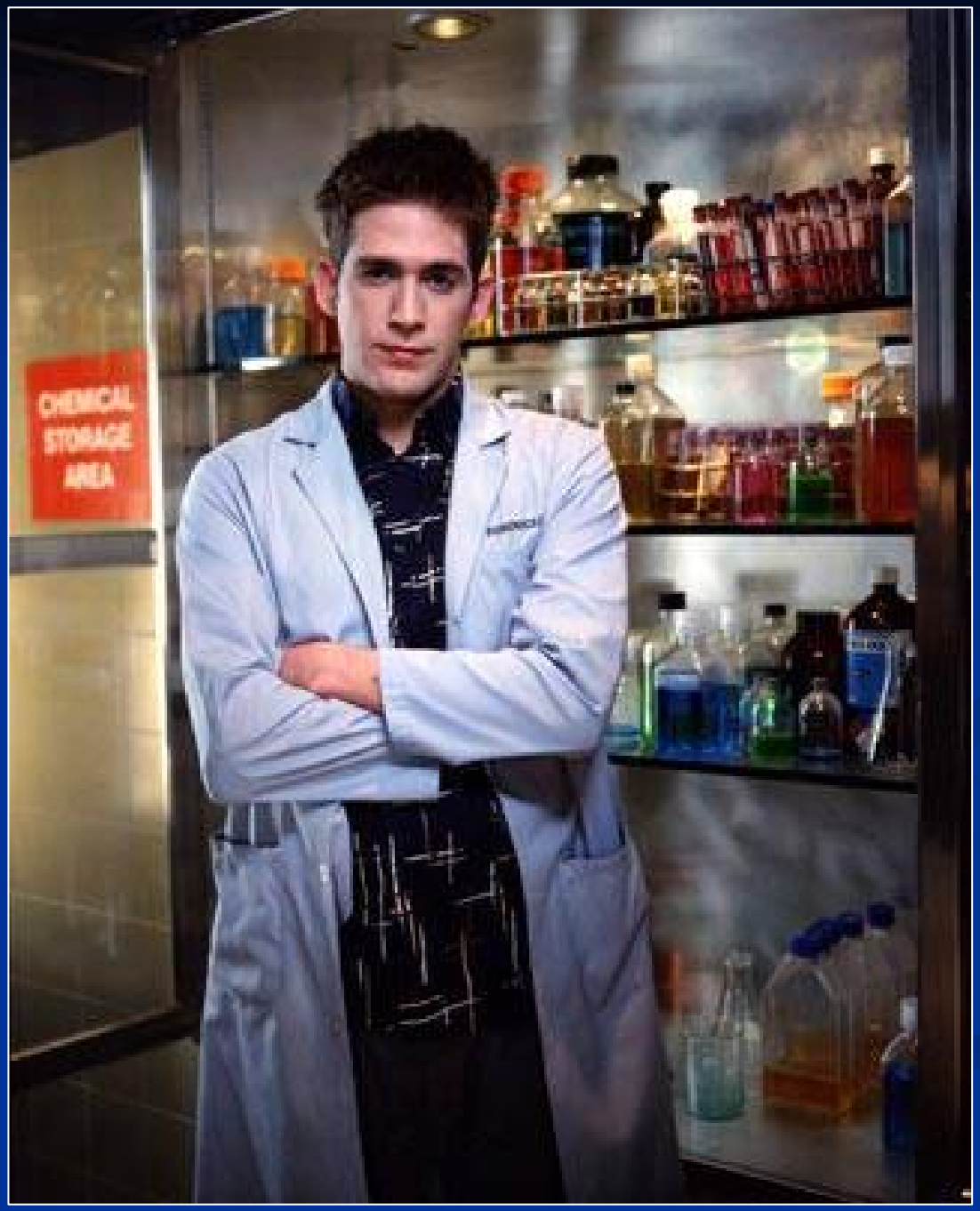
Anthropologists	Odontologists	Ridge pattern specialists
Entomologists	Footware/Toolmark	X-Ray specialists
Toxicologists	Pathologists	Hair/Fiber
Serologists	Biology	Glass and Paint
Soil/Glass/Paint	Questioned Documents	Geologists
Photographers	Computer specialists	Explosives

Forensic science begins at the crime scene.

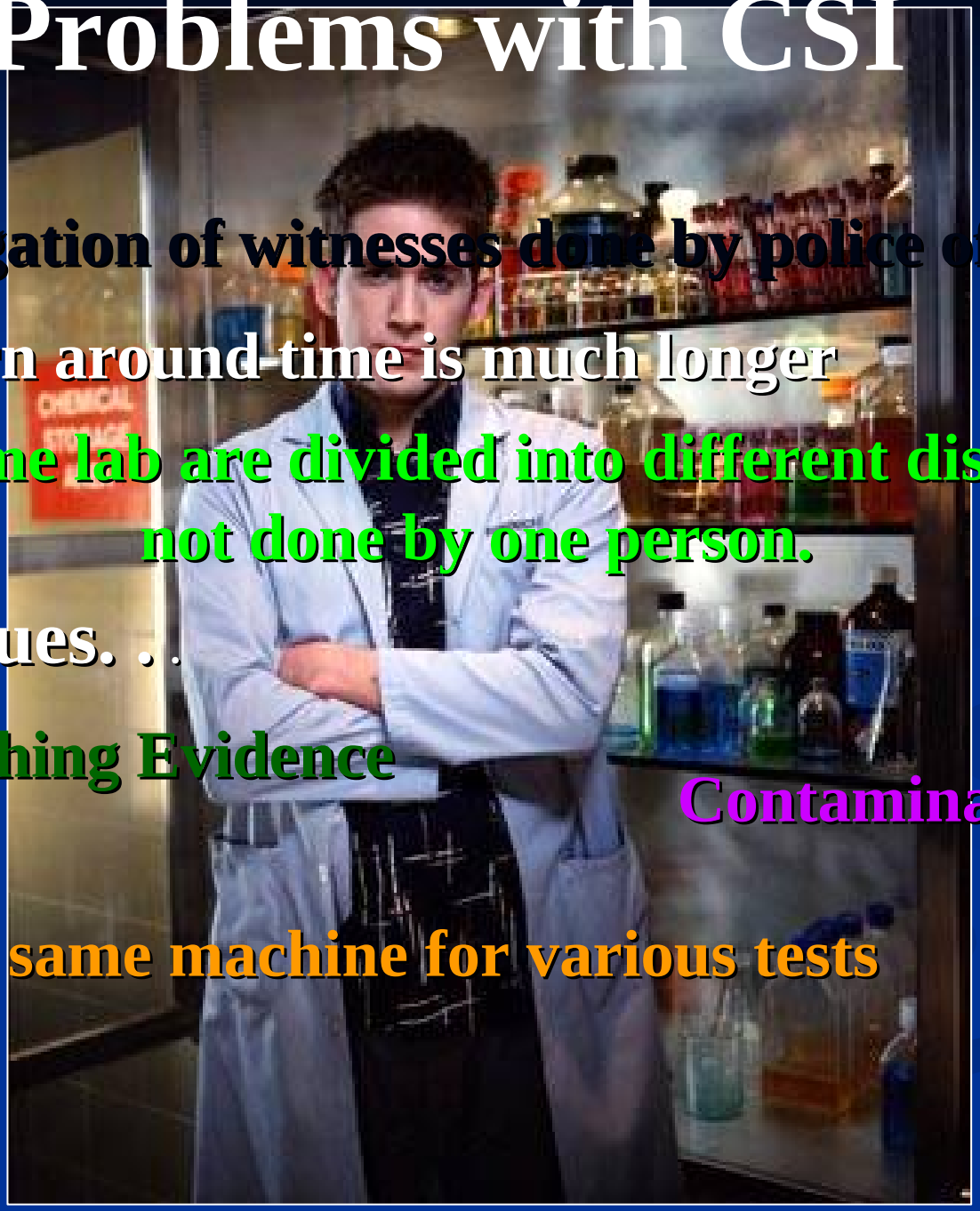
- First Responder - Securing the scene
- Scene documentation – Crime scene sketches, photography
- Collection of evidence - Chain of Custody begins

TV

- Court TV
  - Forensic Files
  - Body of Evidence
  - Cold Case Files


CHEMICAL
STORAGE
AREA

Problems with CSI



Interrogation of witnesses done by police officers

Lab turn around time is much longer

Jobs in a crime lab are divided into different disciplines. . . not done by one person.

Other issues. . .

Photographing Evidence

Contamination

Using the same machine for various tests

Opportunities

http://www.aafs.org

Check out the site – lots of great information!

Student Artifacts

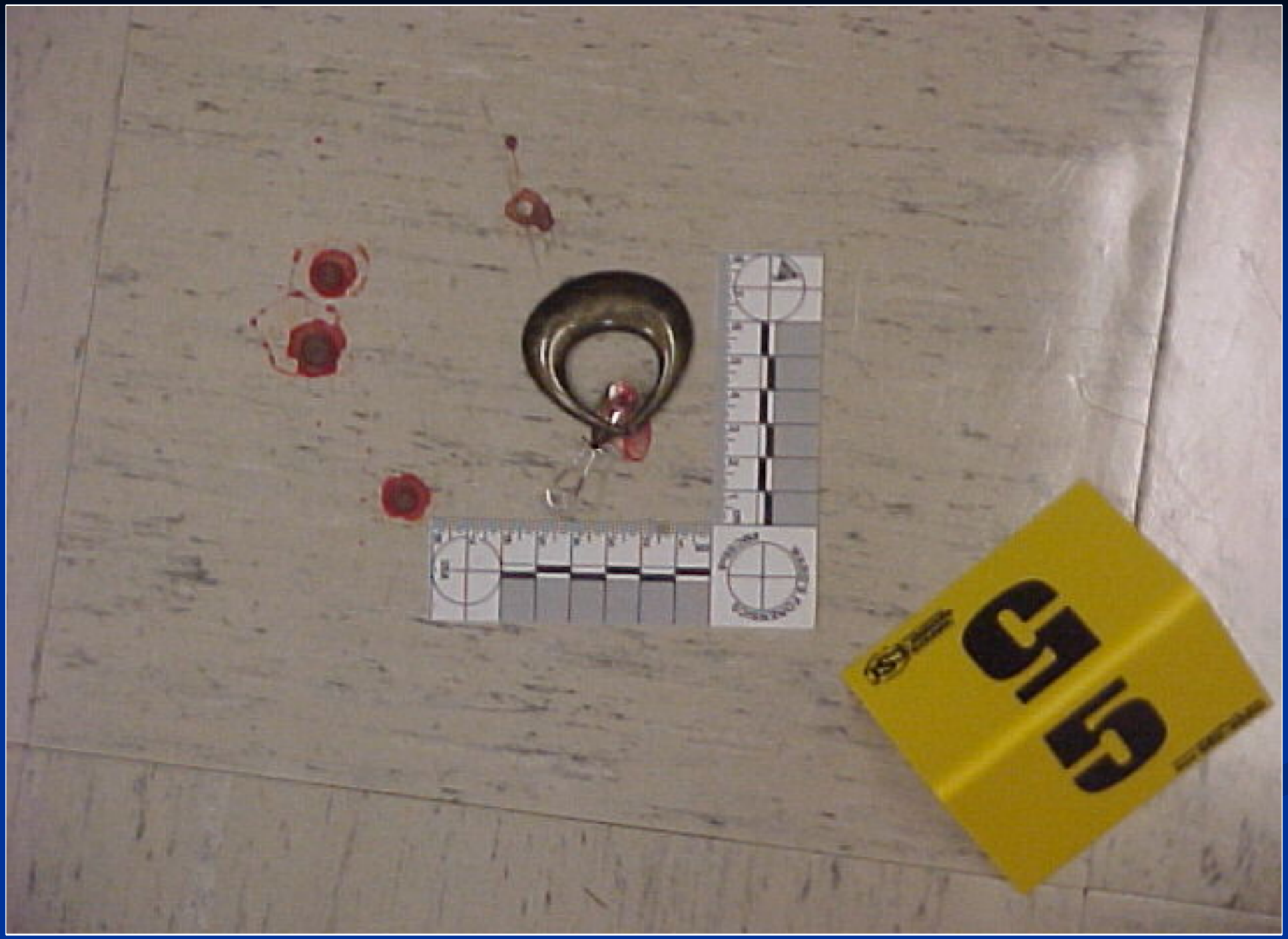
Student Artifacts

Lets get jazzed

It is all about you, the *active* learner

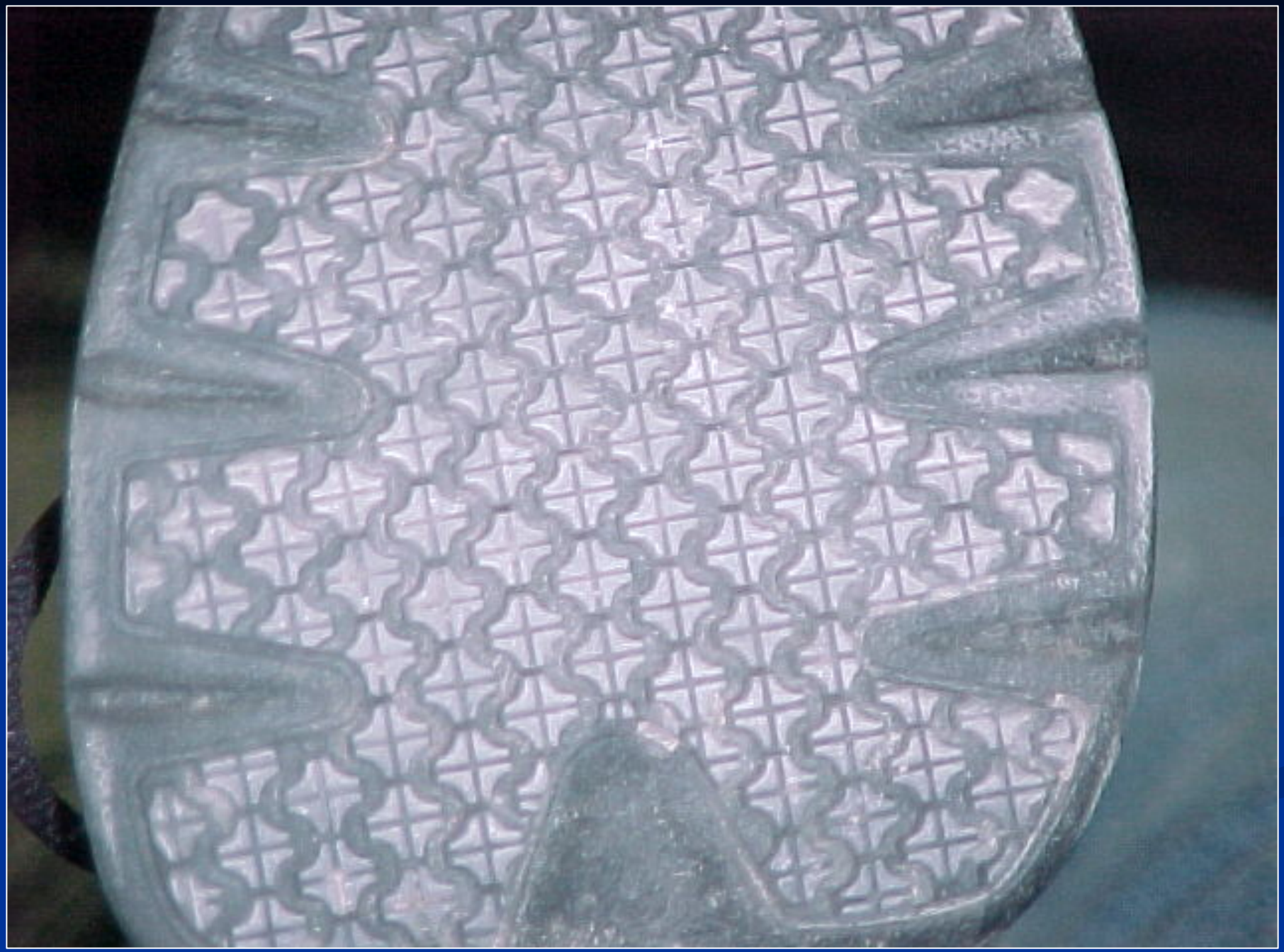
The game is afoot..

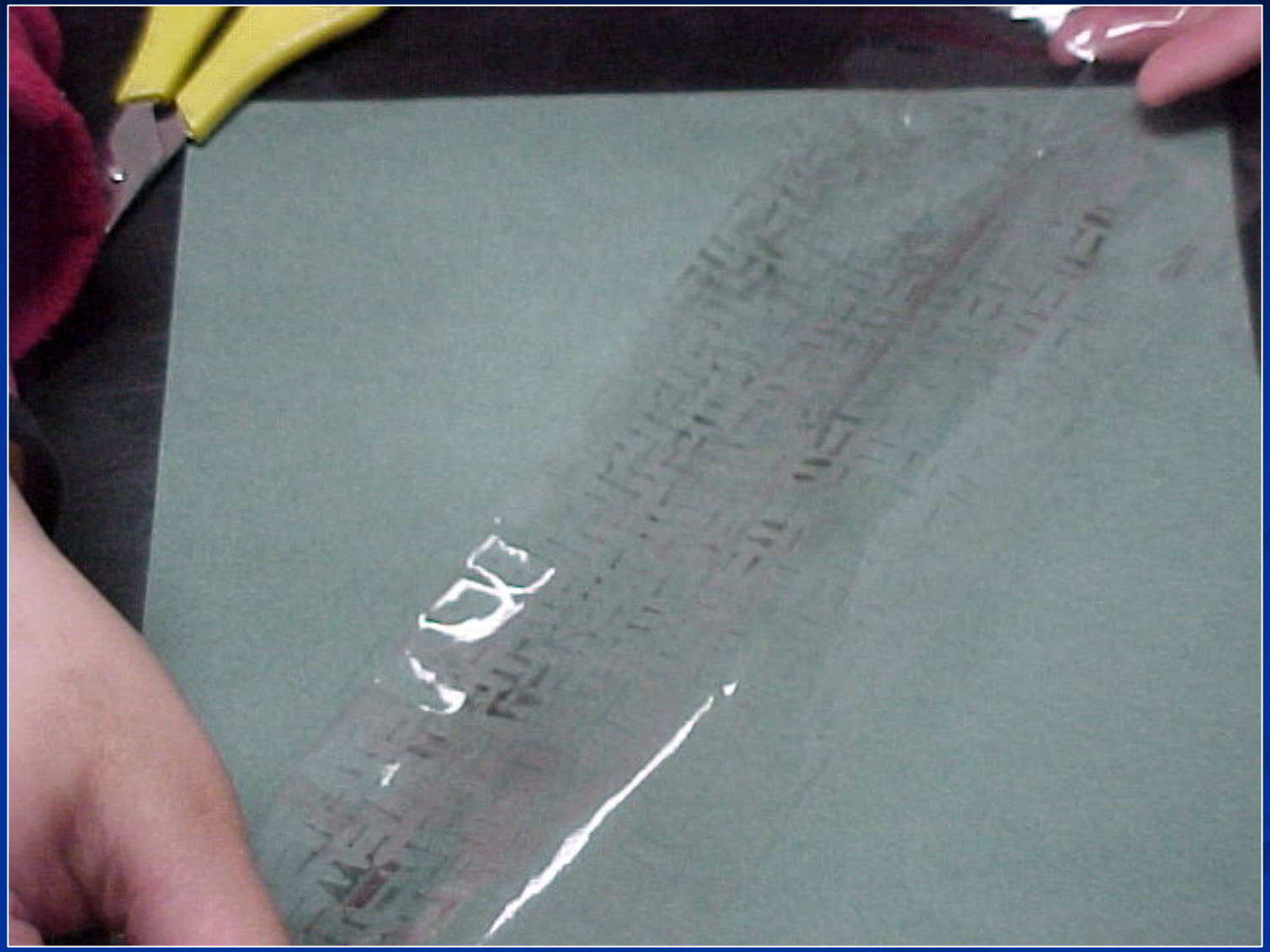

5


CSI

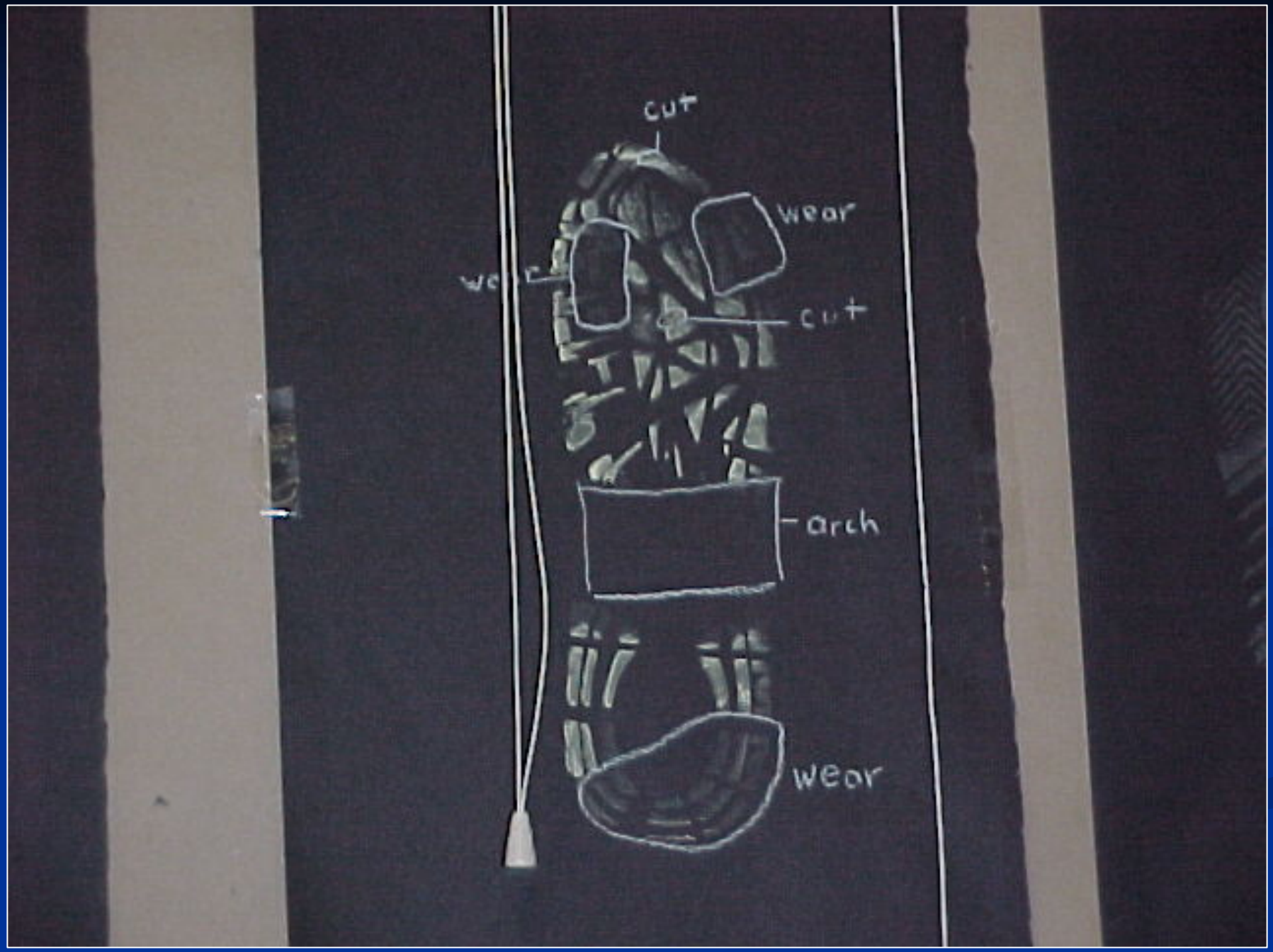

C3

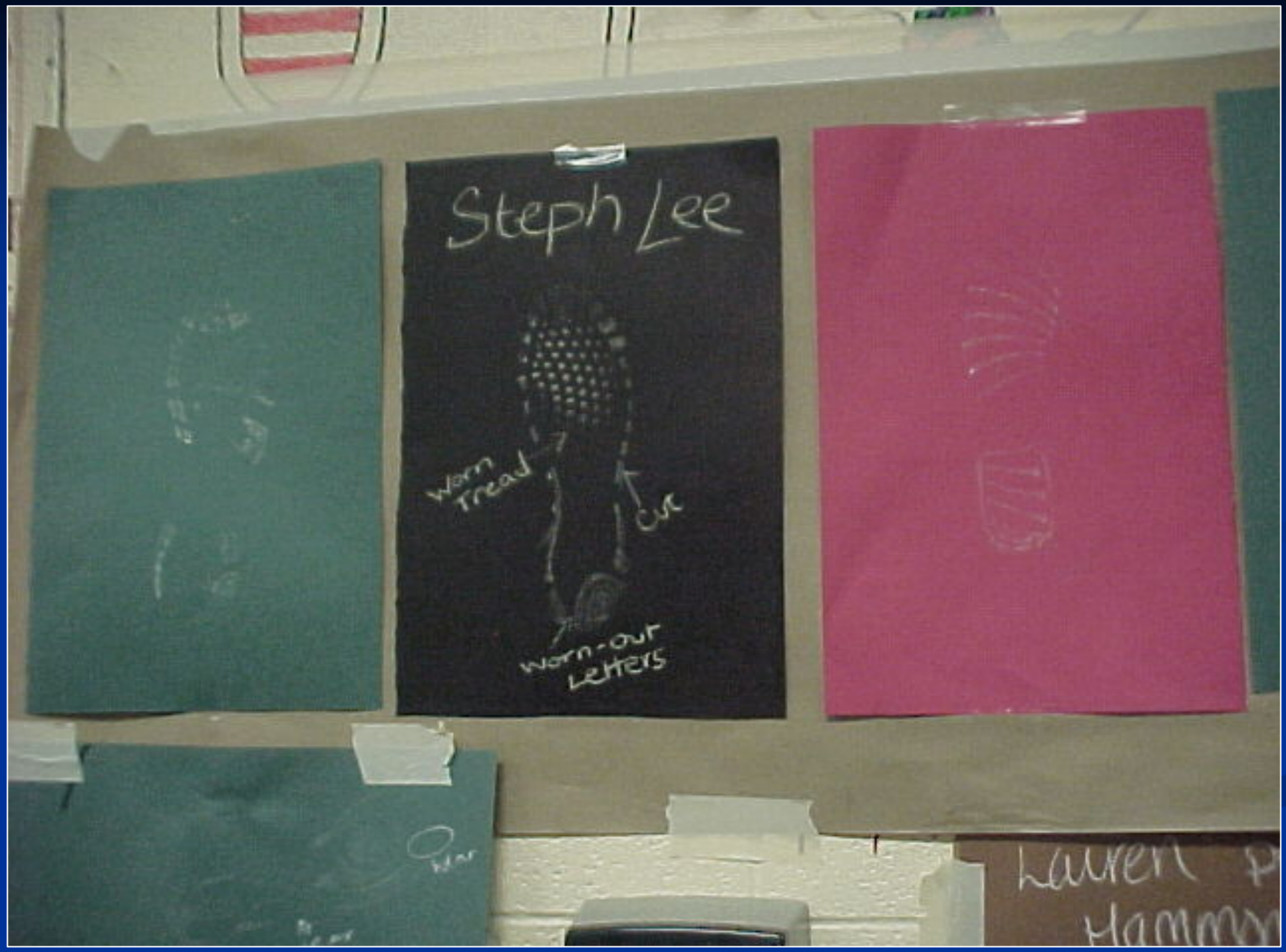
Impressions



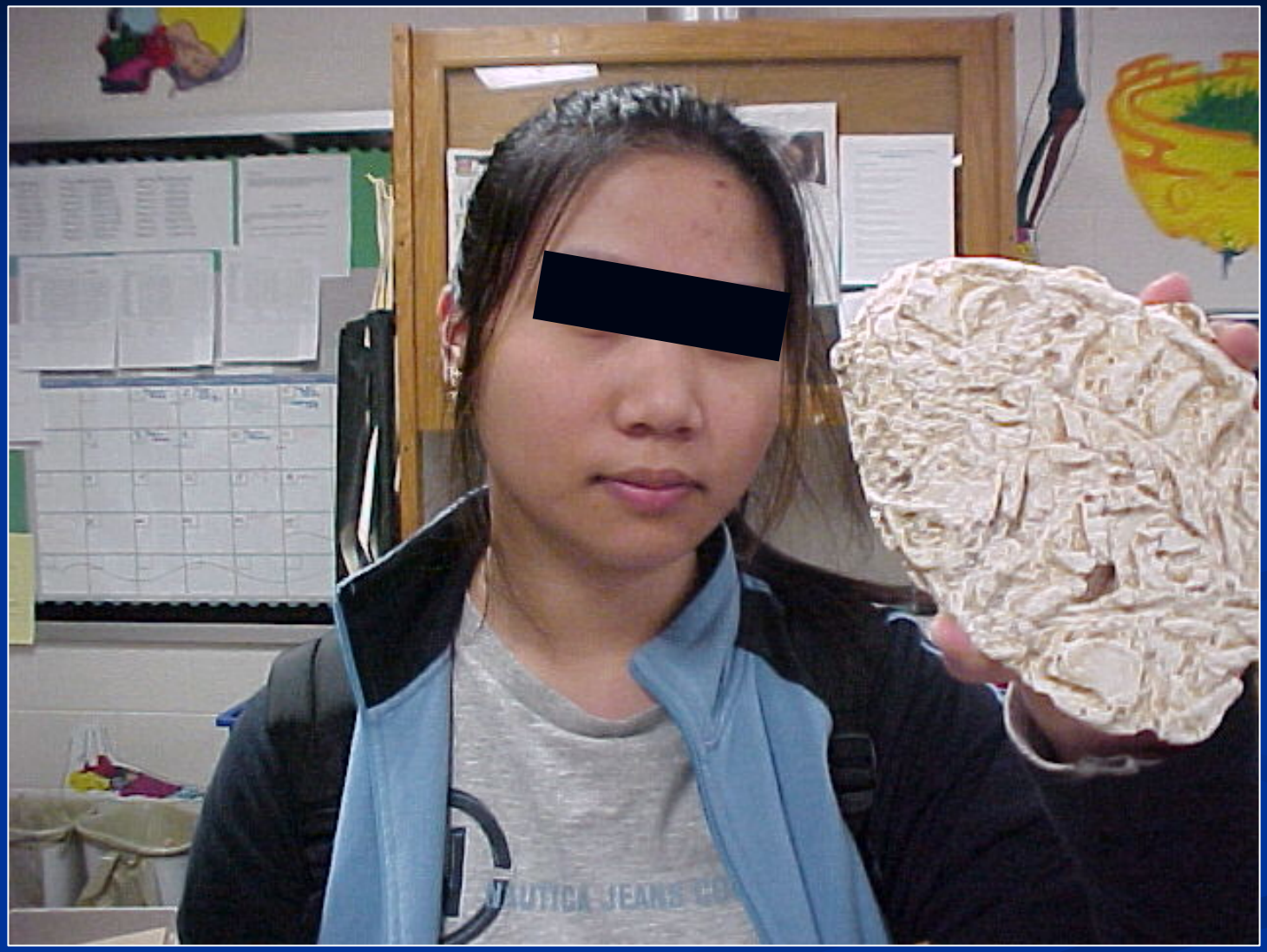


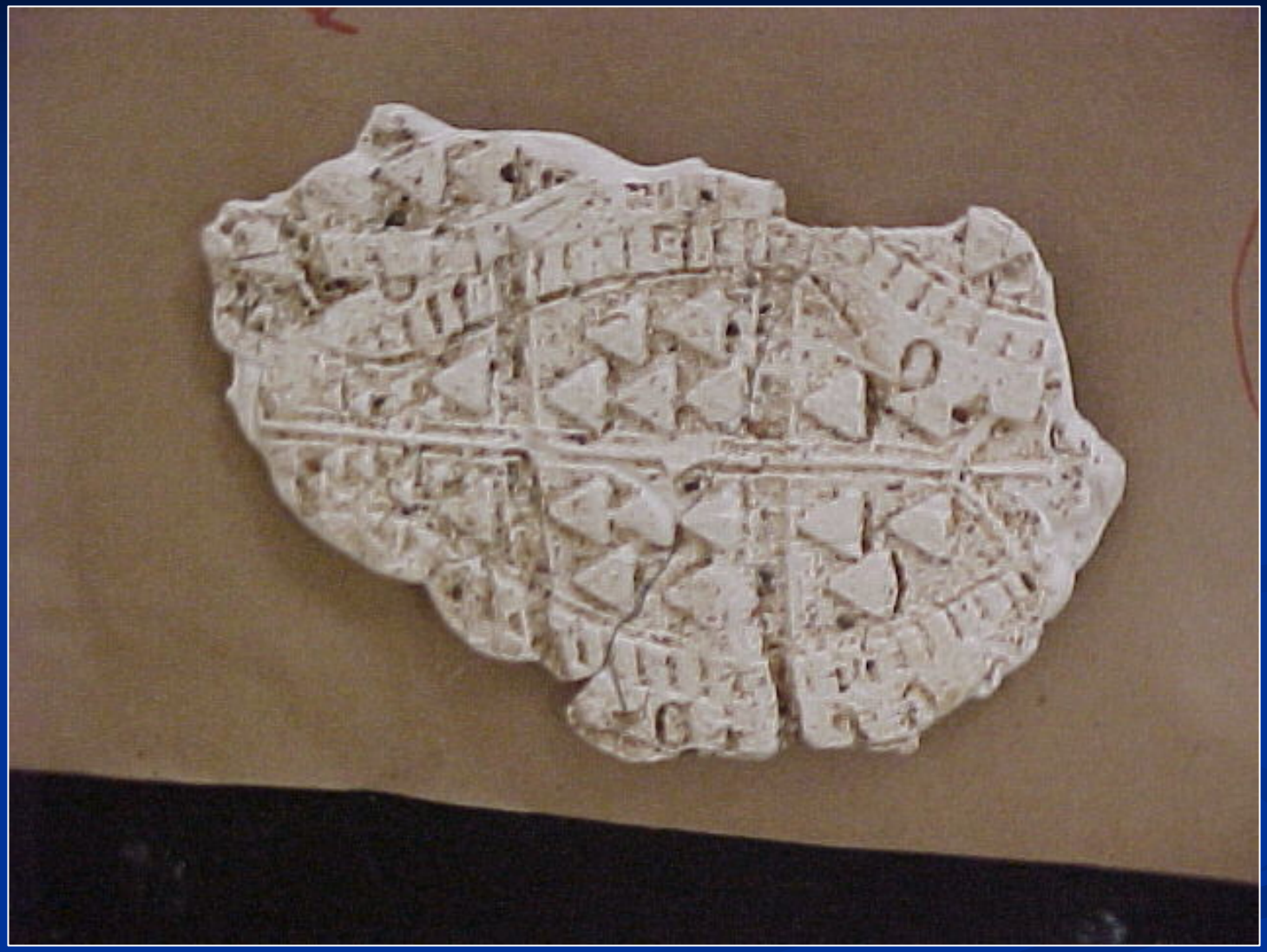

NUMERUS
CARPALE
HUMAN HEART
FORMED
OPPOSITION CIRCUMDUCTION

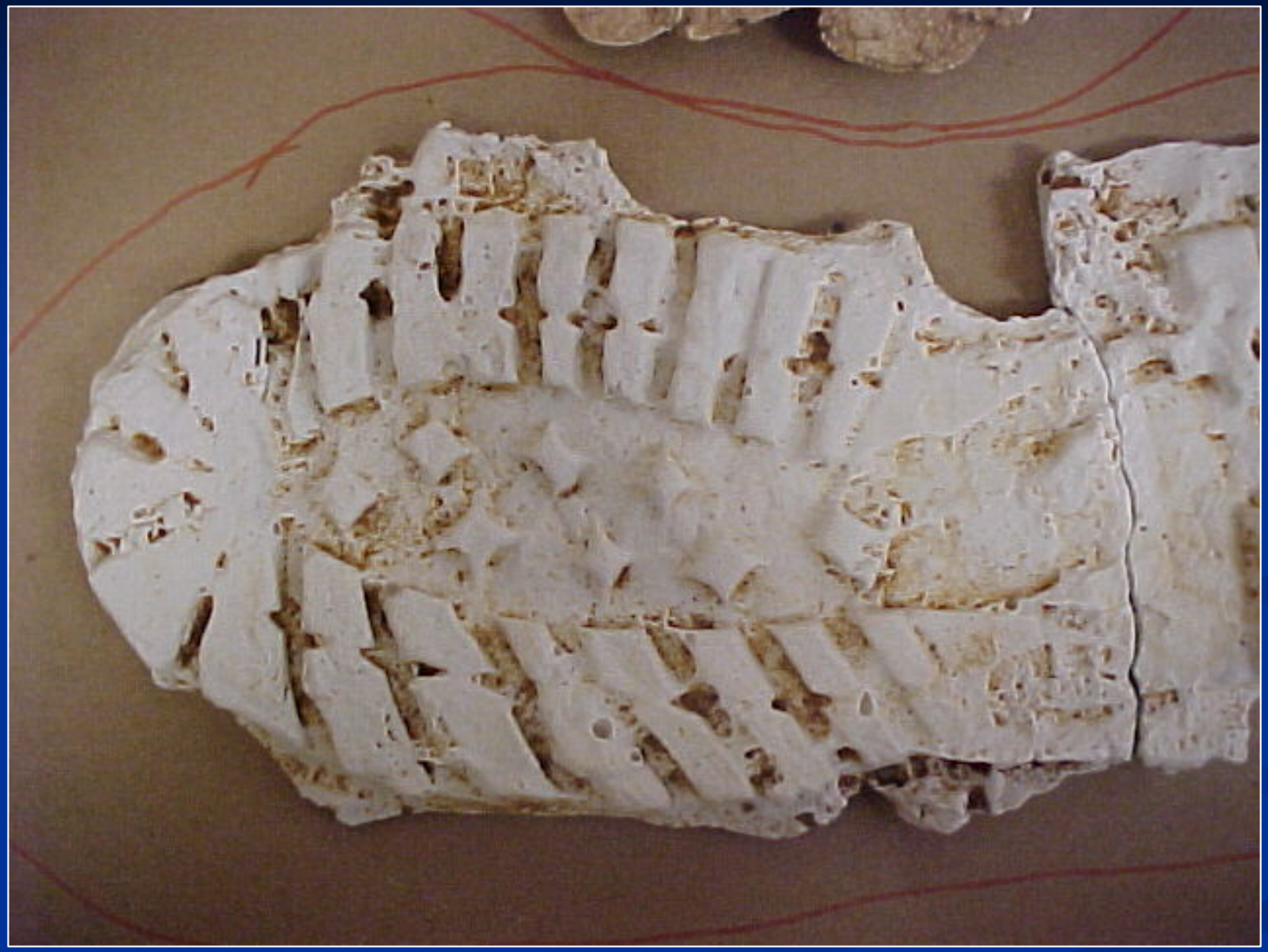

cut
wear
wear
cut
arch
wear


Steph Lee
worn tread
out
worn-out letters


USG
Plaster
of Paris



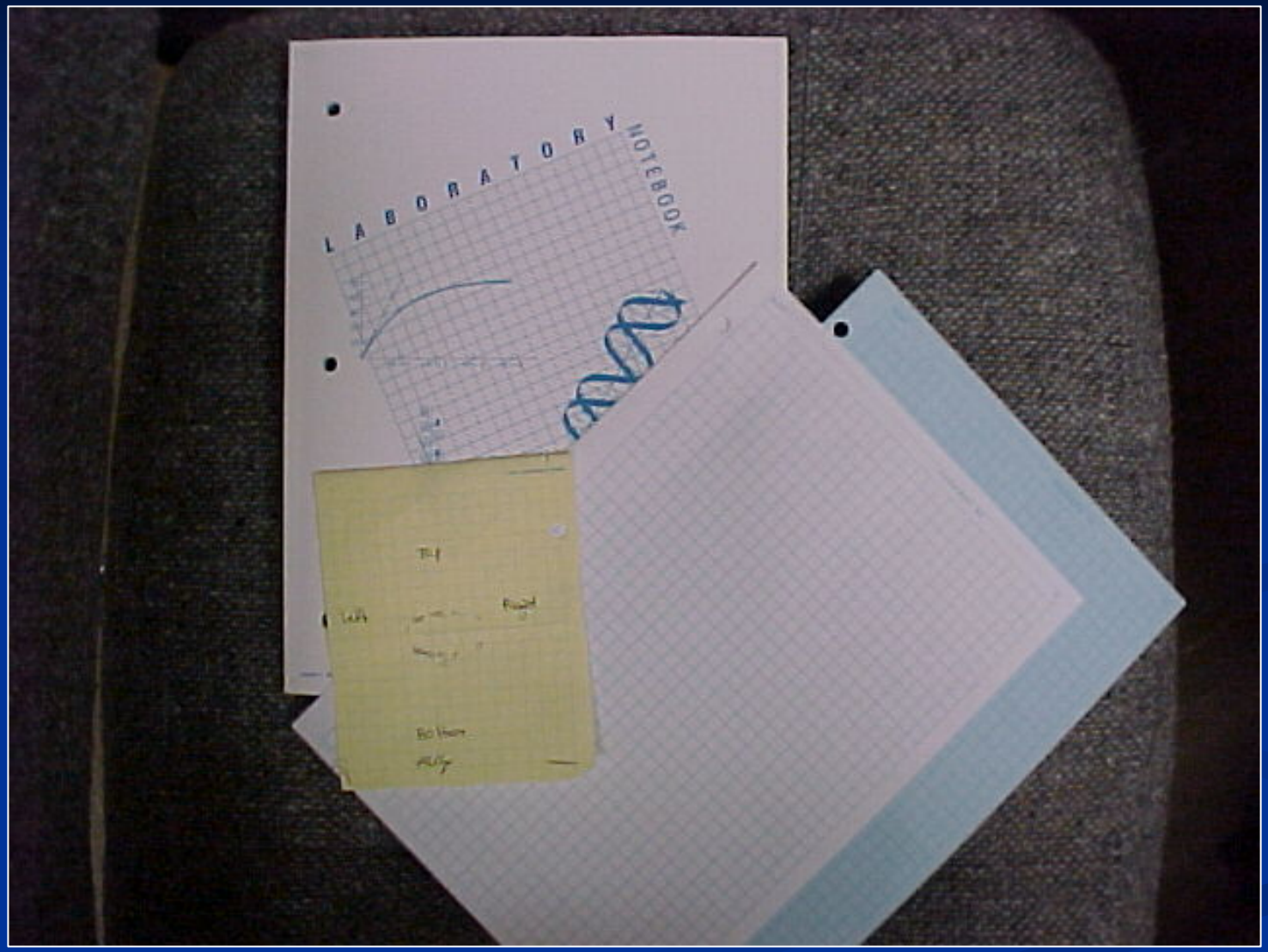


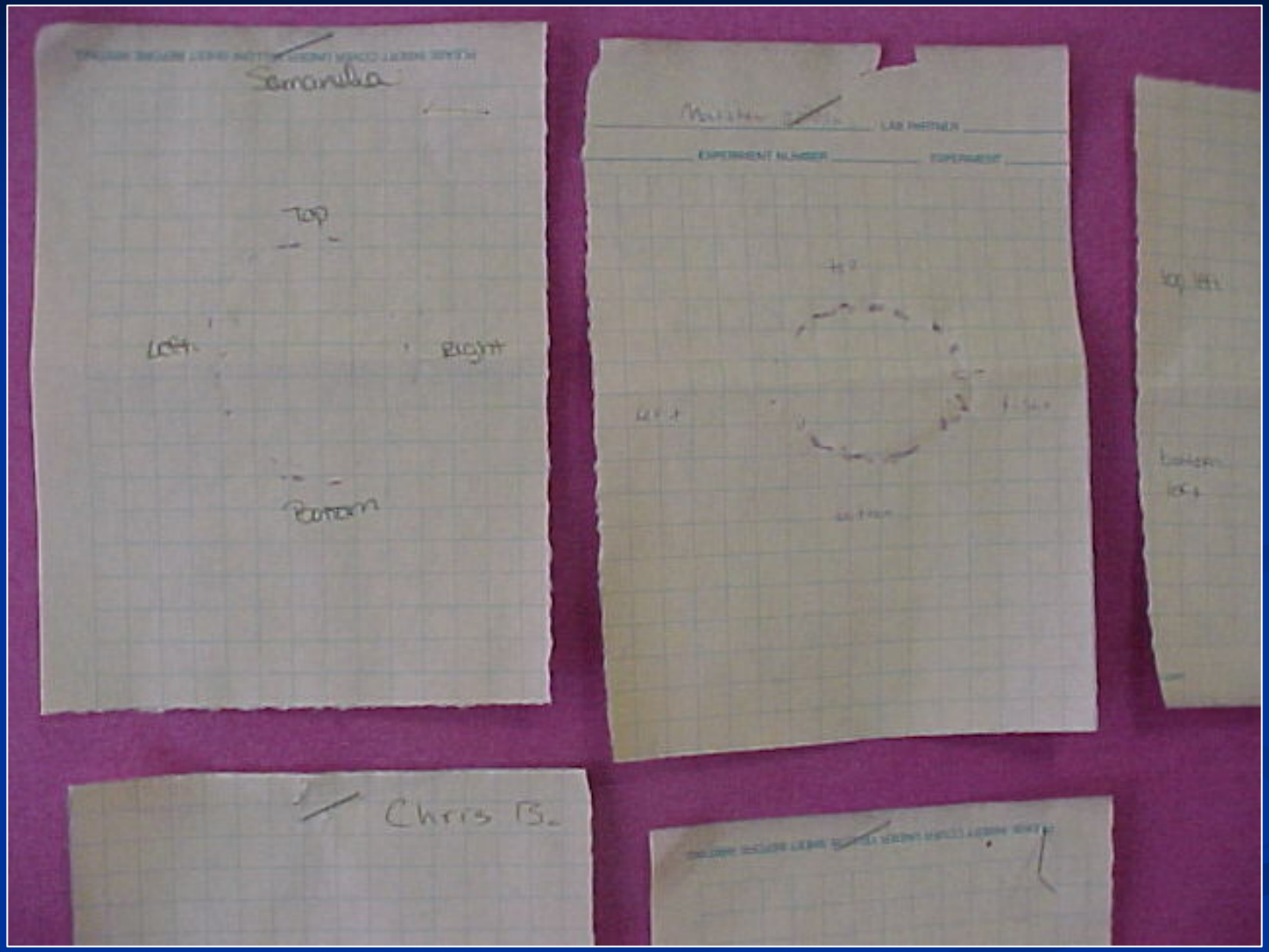


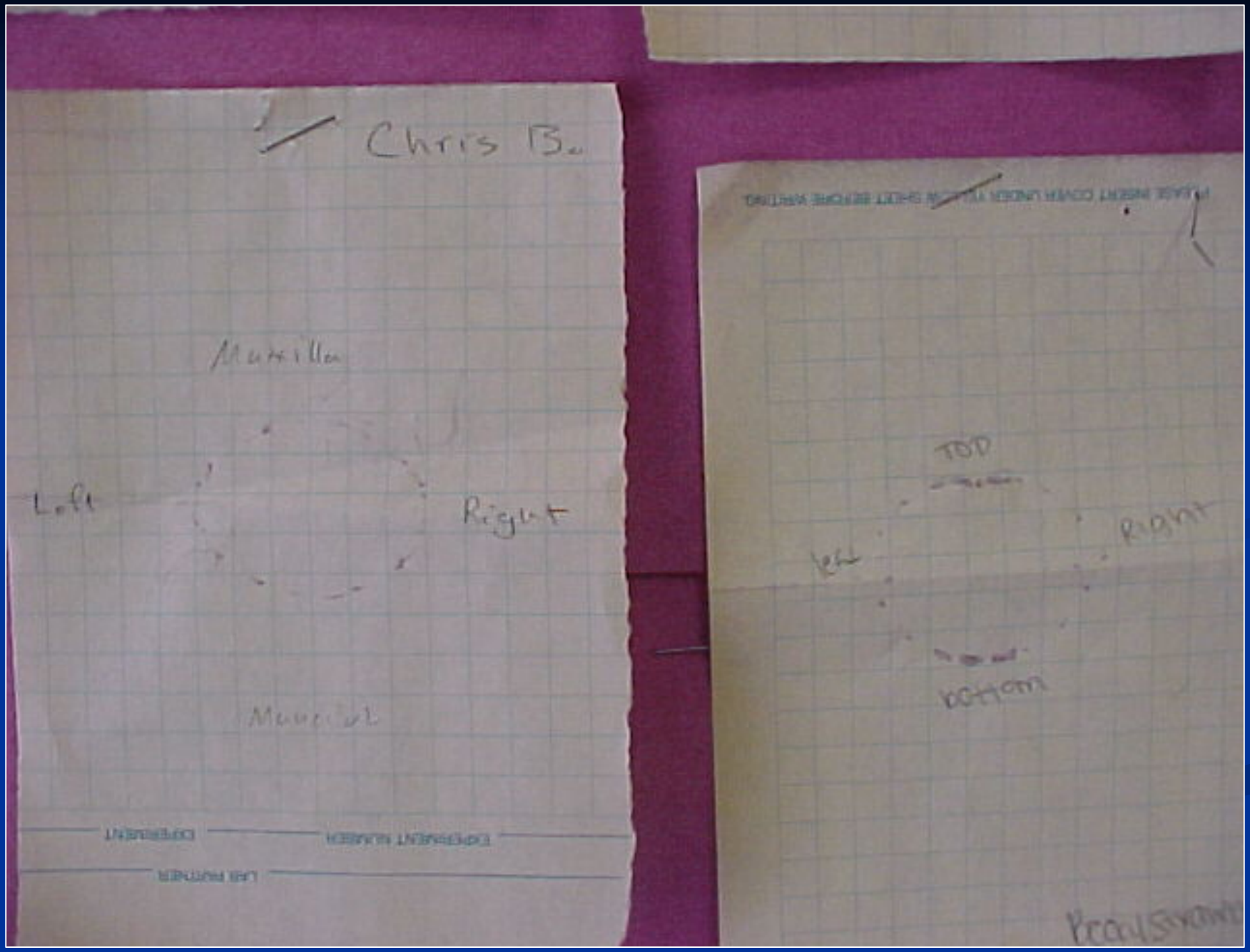

VEROYAL

Is it human?

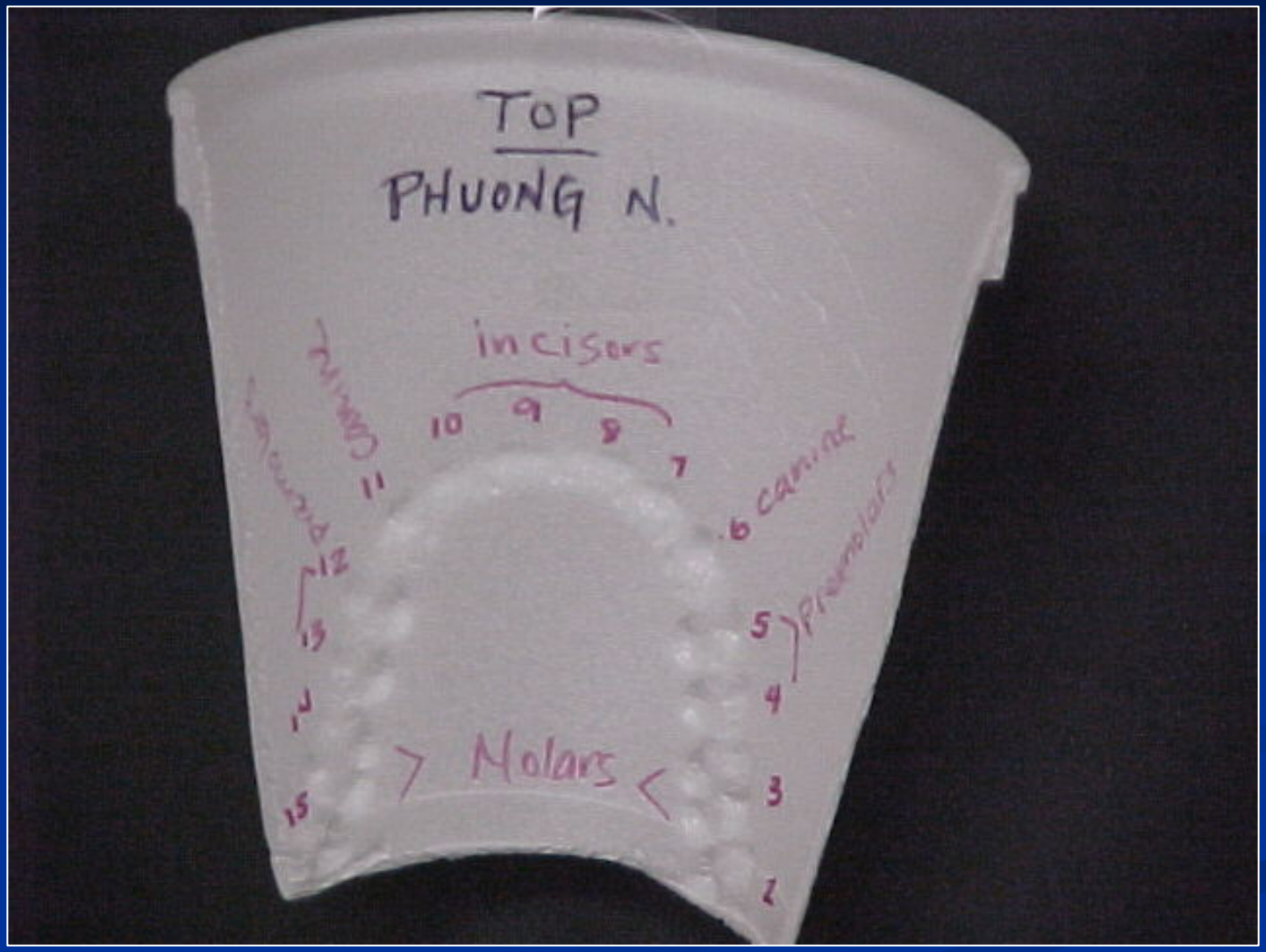
Bite Marks Odontology

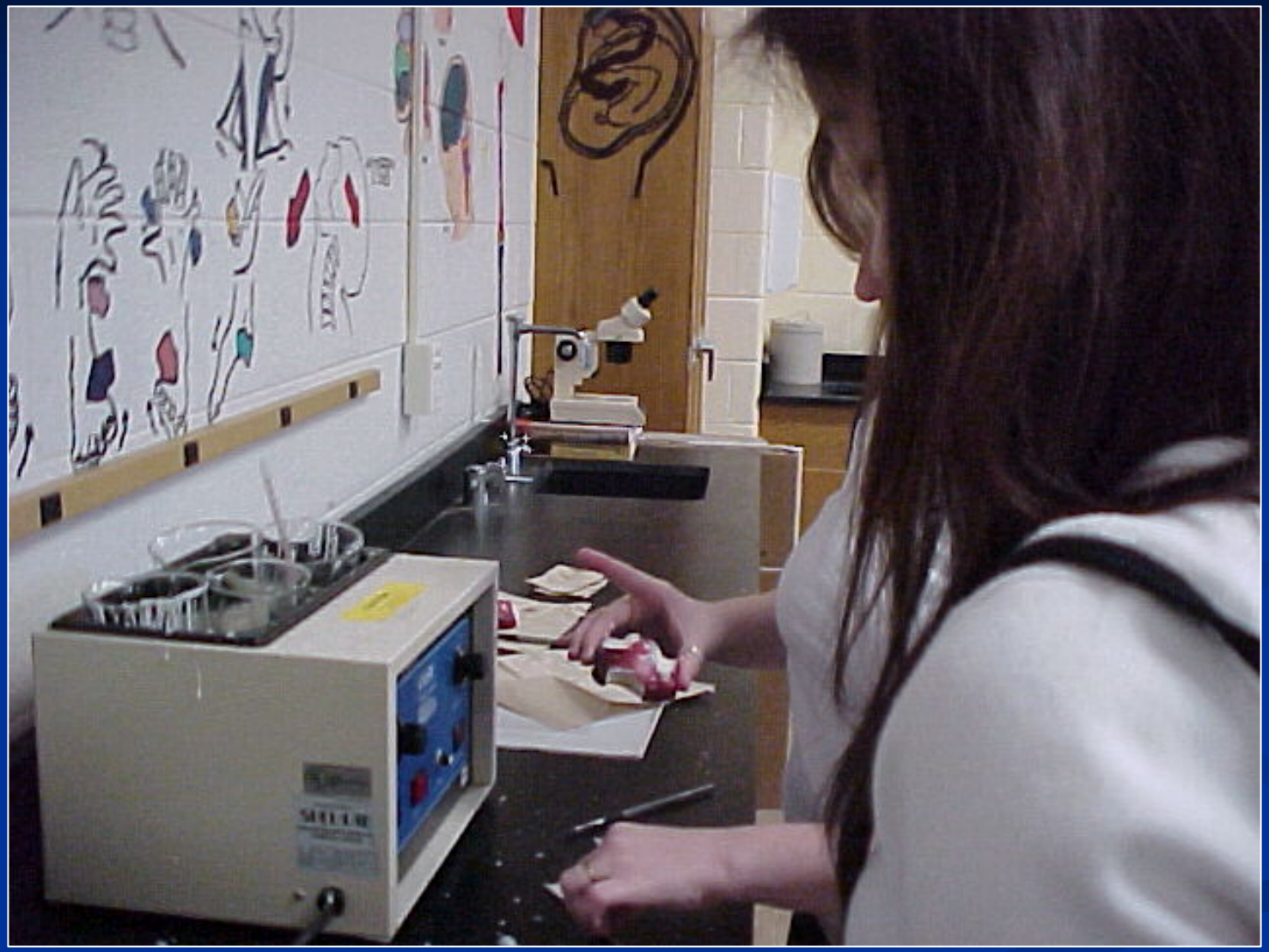

LABORATORY NOTEBOOK

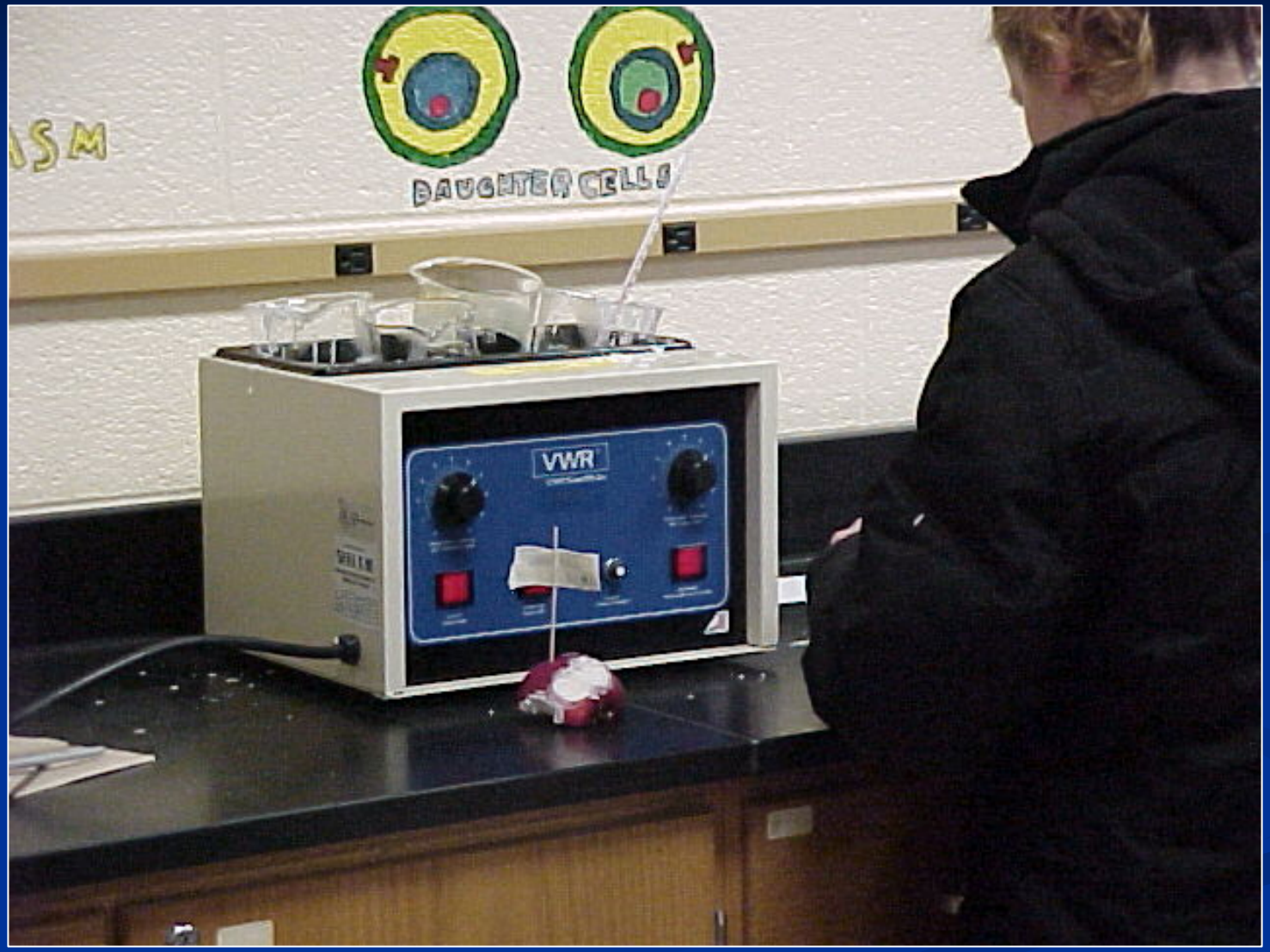

Samantha
Top
Left
Right
Bottom
LAB PARTNER
EXPERIMENT NUMBER
EXPERIMENT
Chris B.

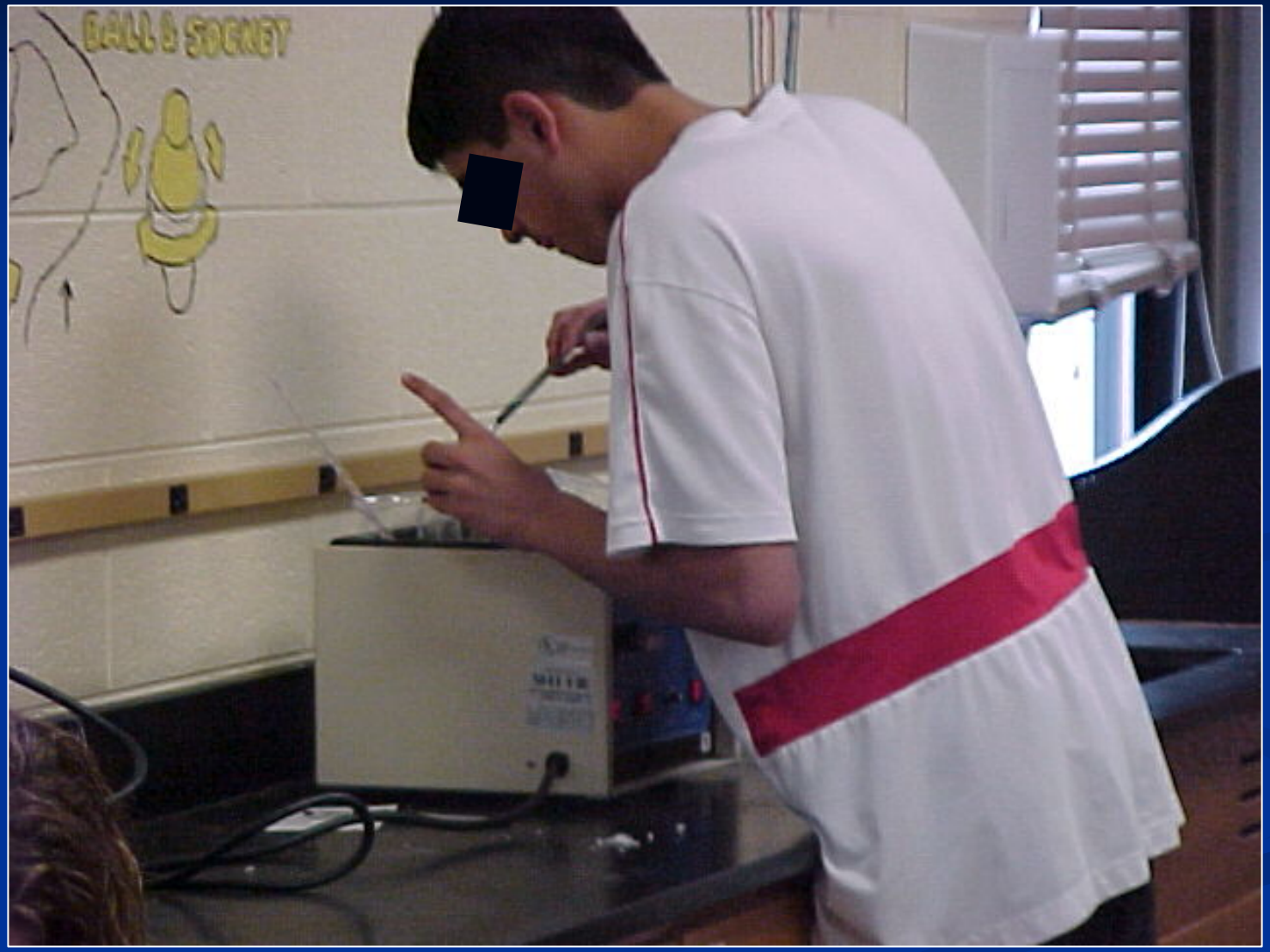

Chris B.
Maxilla
Left
Right
Mandible
TOP
Left
Right
bottom


Bottom

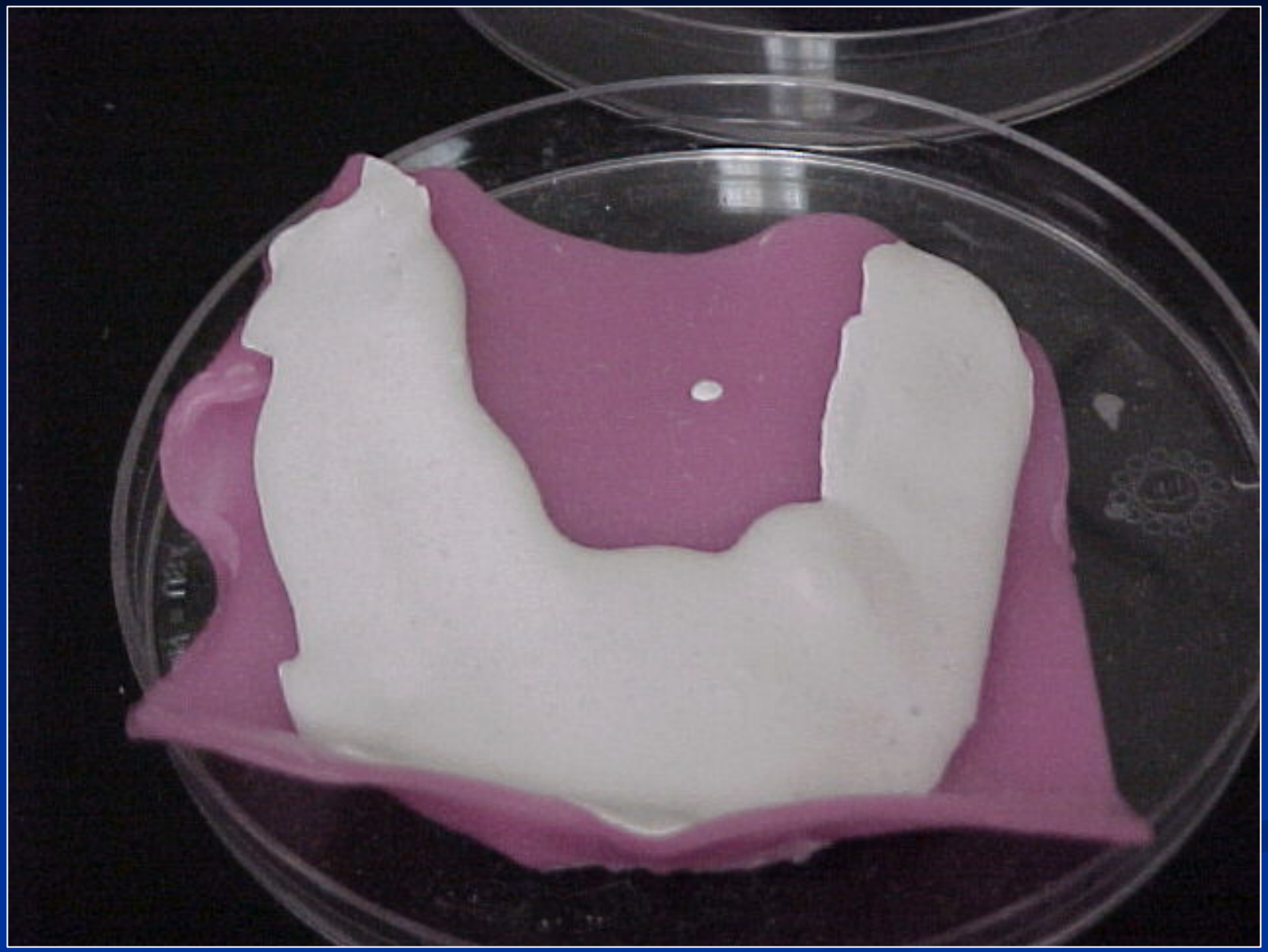

TOP
PHUONG N.
incisors
10 9 8 7
11
6 canine
12
13
5
4
3
2
Premolars
Molars
14
15




DAUGHTER CELLS
VWR


BALL & SOCKET

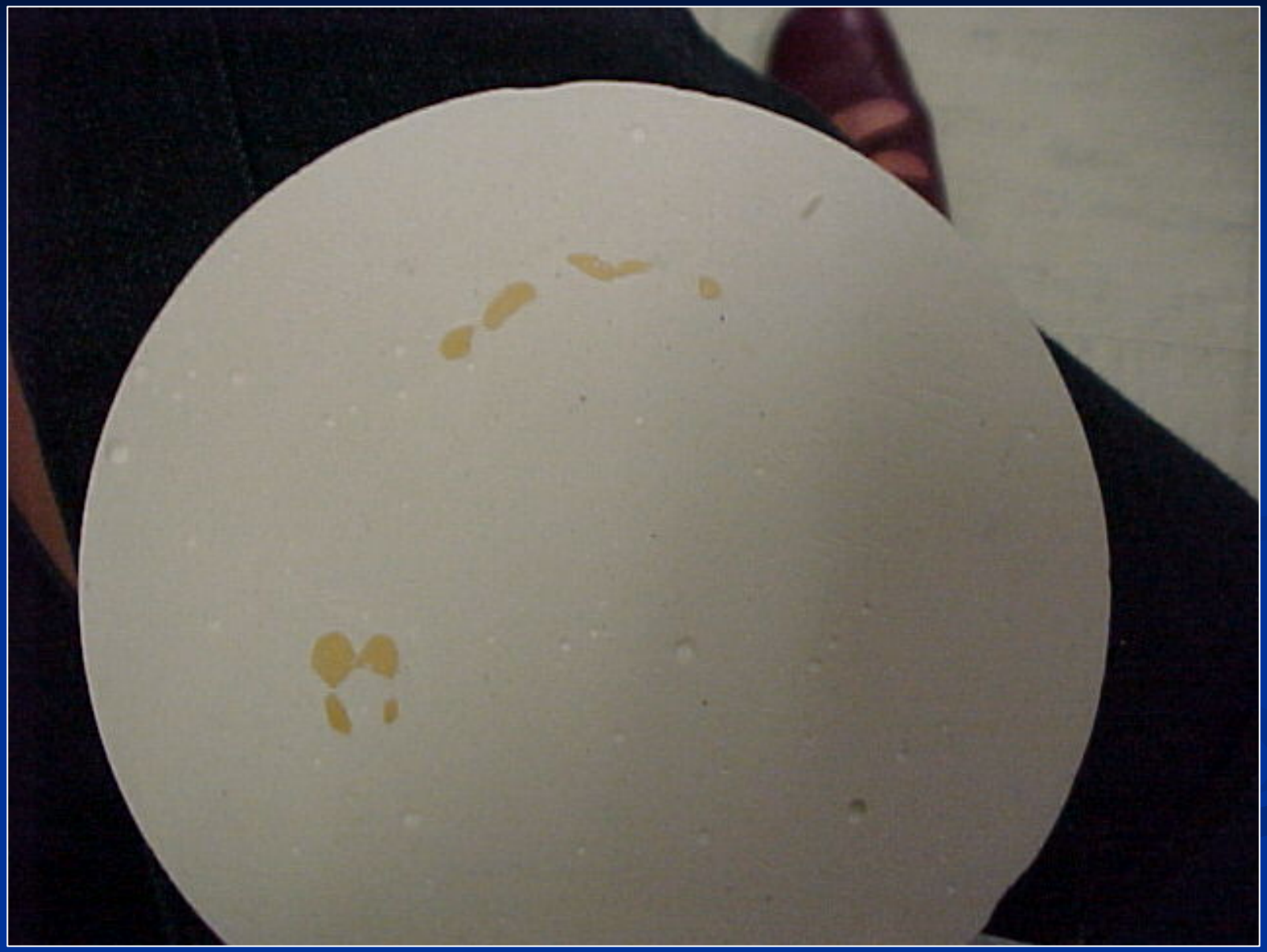

Domtar



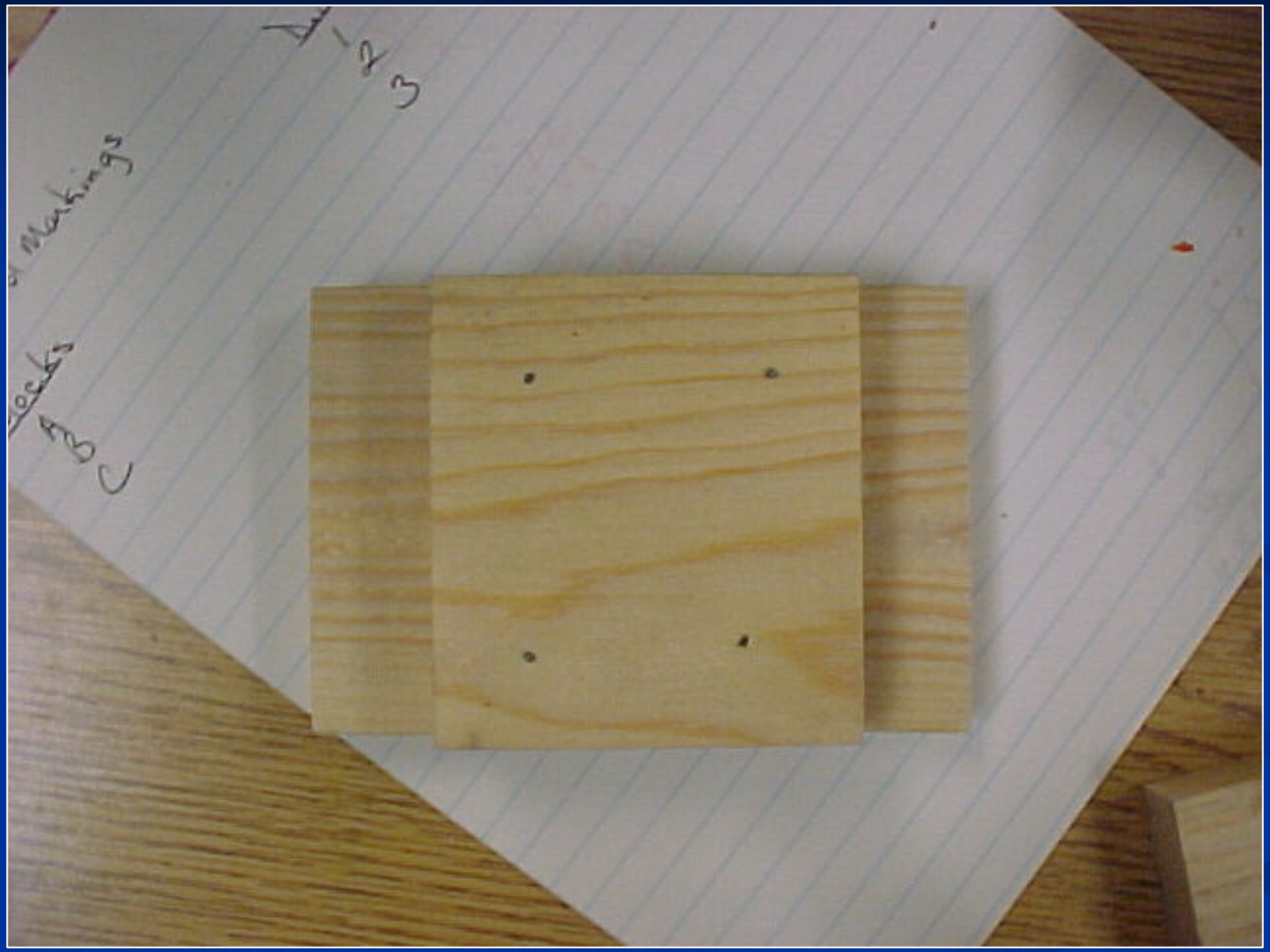
Digital Bite Mark Analysis
"Adobe Photoshop"

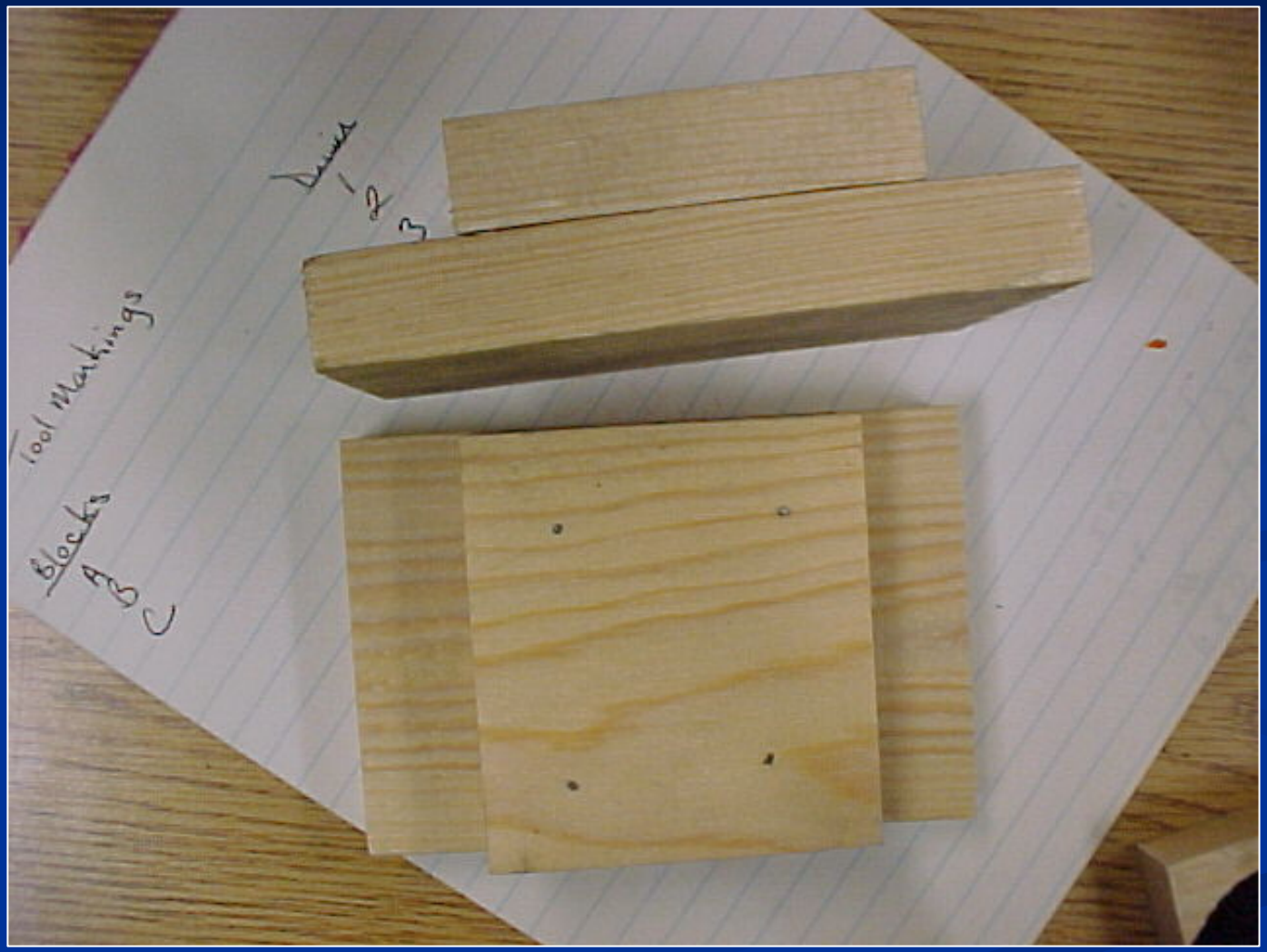

LIVING
CULTURES
METRIC 1 2 3 4 5
6 5 4 3 2 1

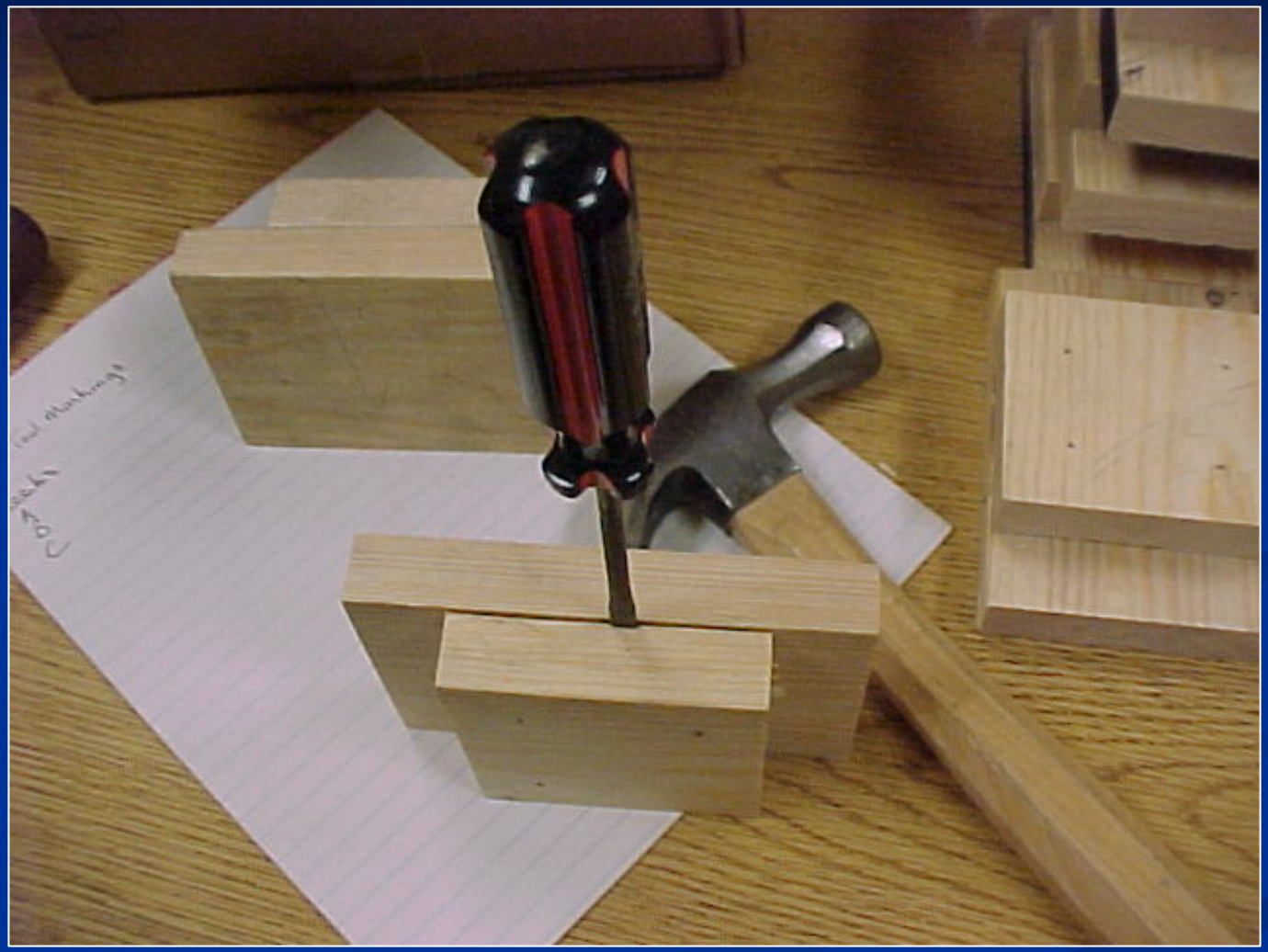

30

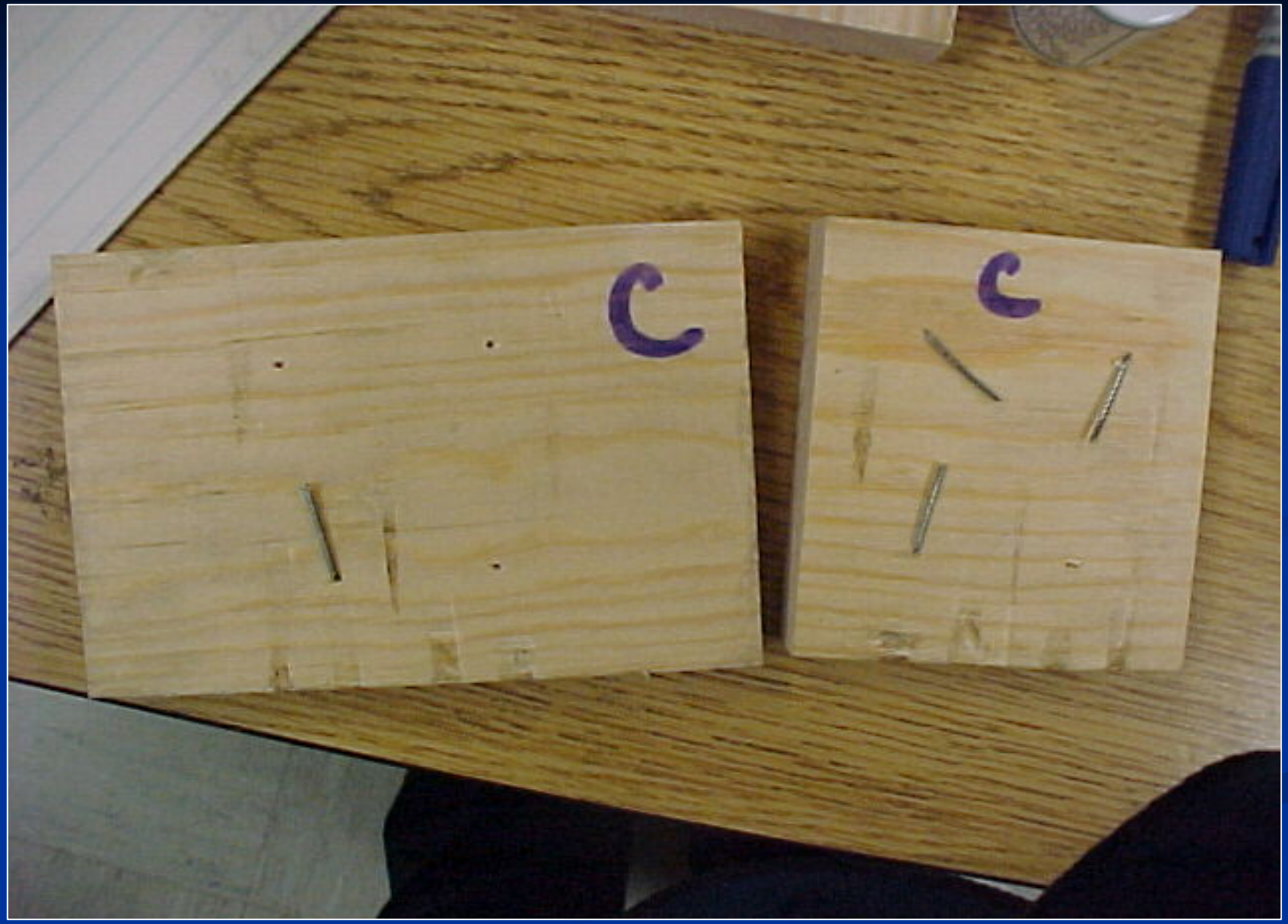


Tool Marks

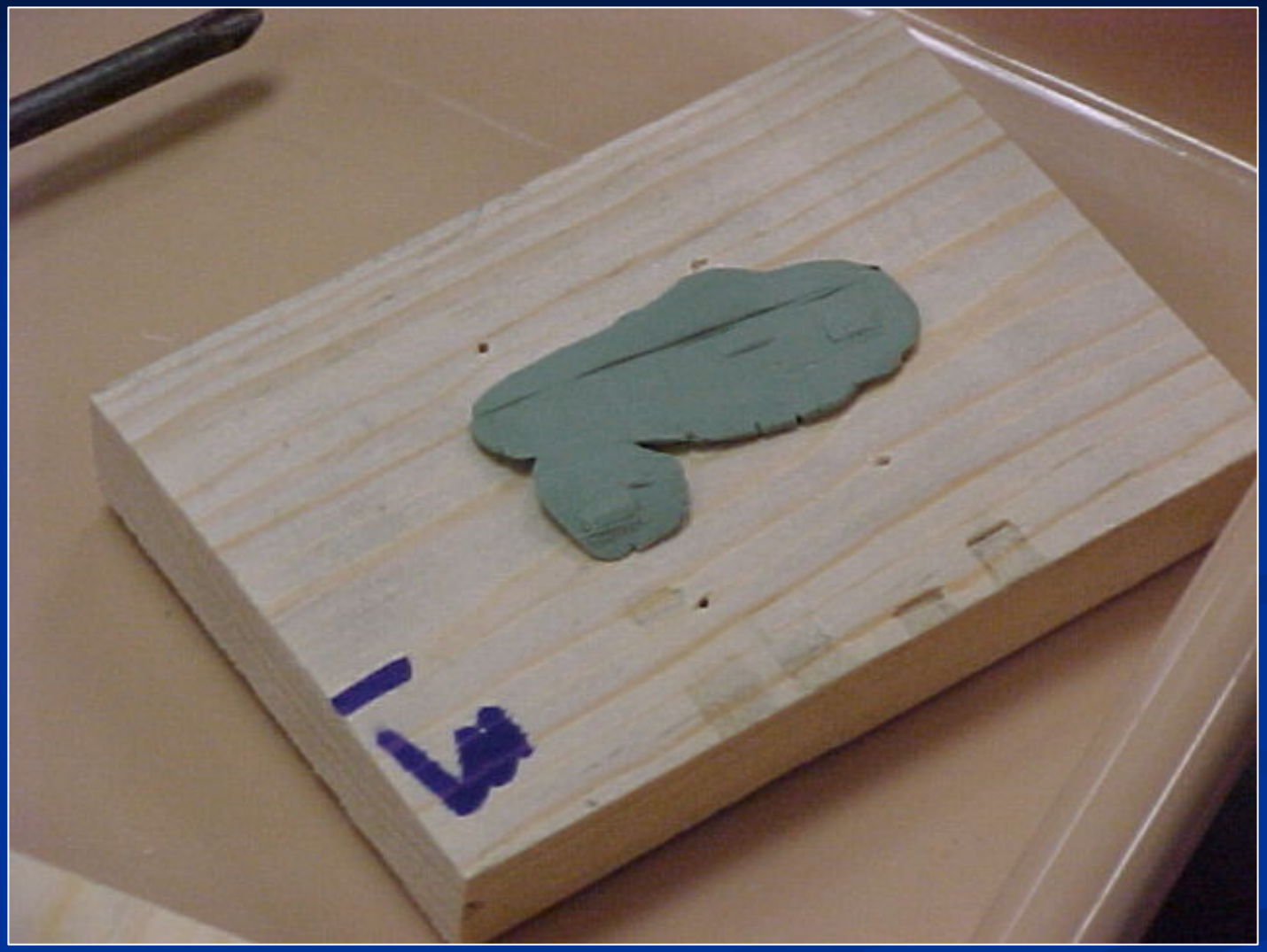

1 2 3
Markings
Blocks
A B C

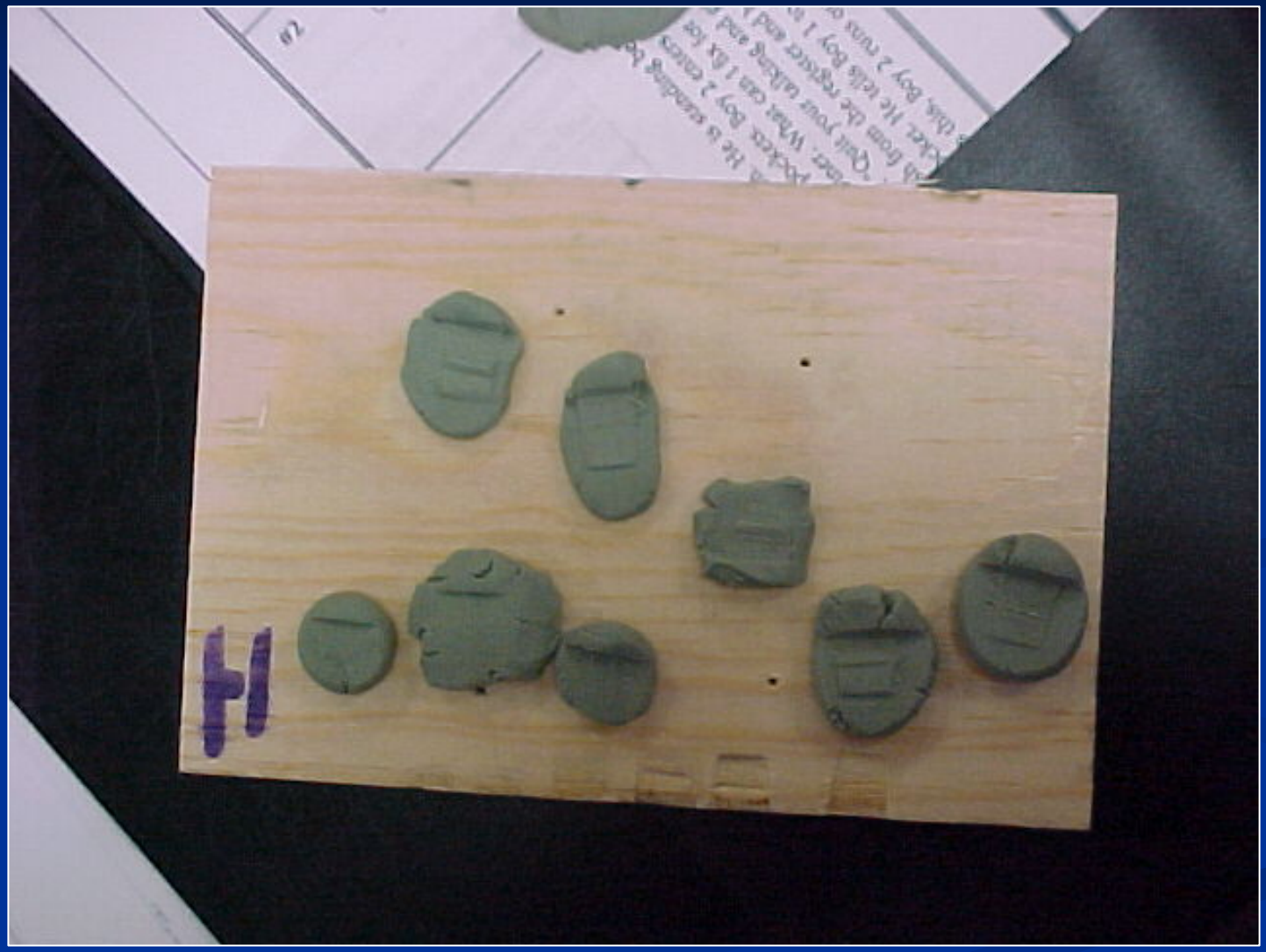

Tool Markings
Blocks
A B C
Lines
1
2
3




C
C


Clayola
MODELING CLAY
THE 3-DIMENSIONAL ART EXPERIENCE
Colored Non-Hardening
Klay
AP

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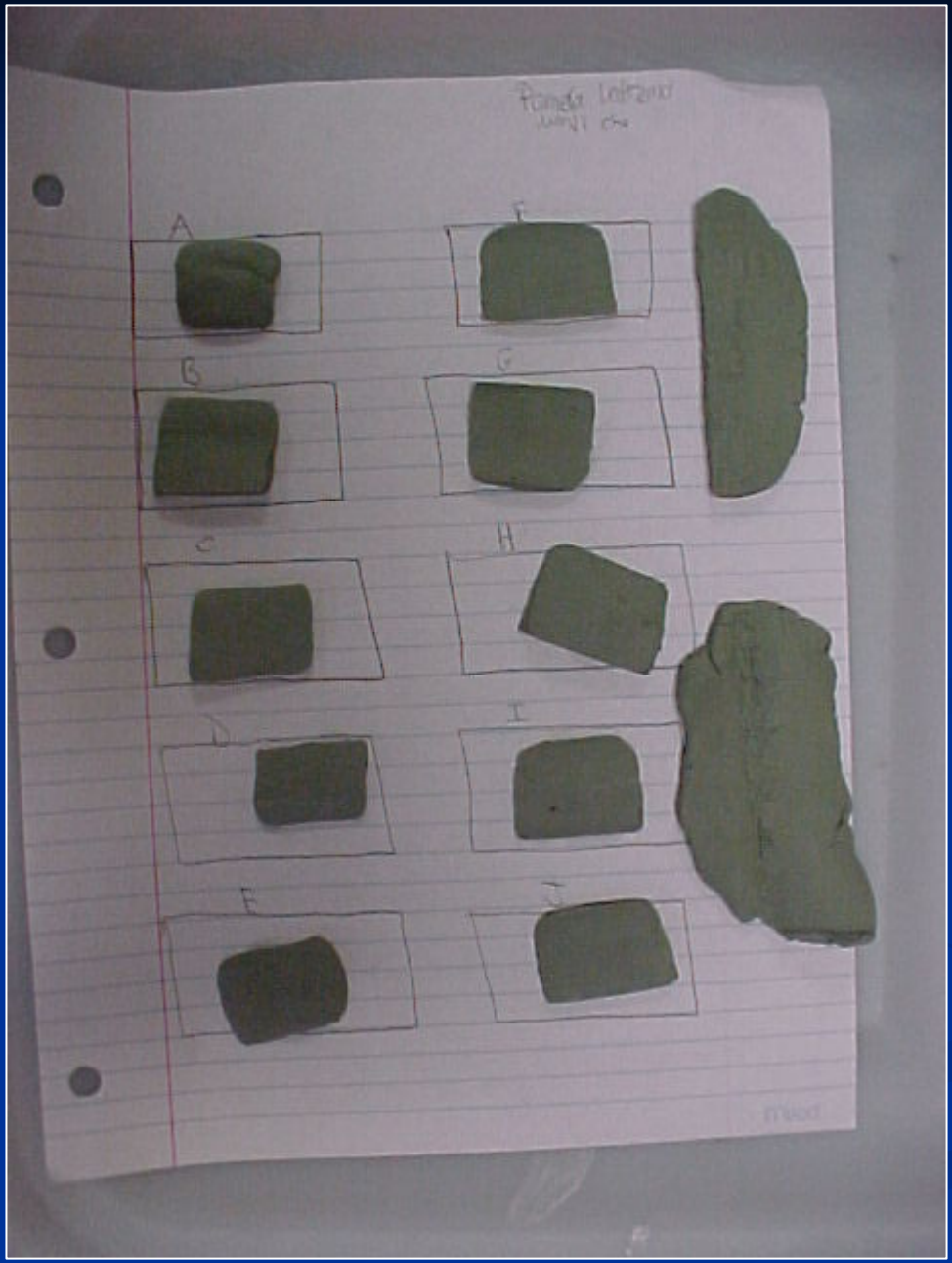
A
F
B
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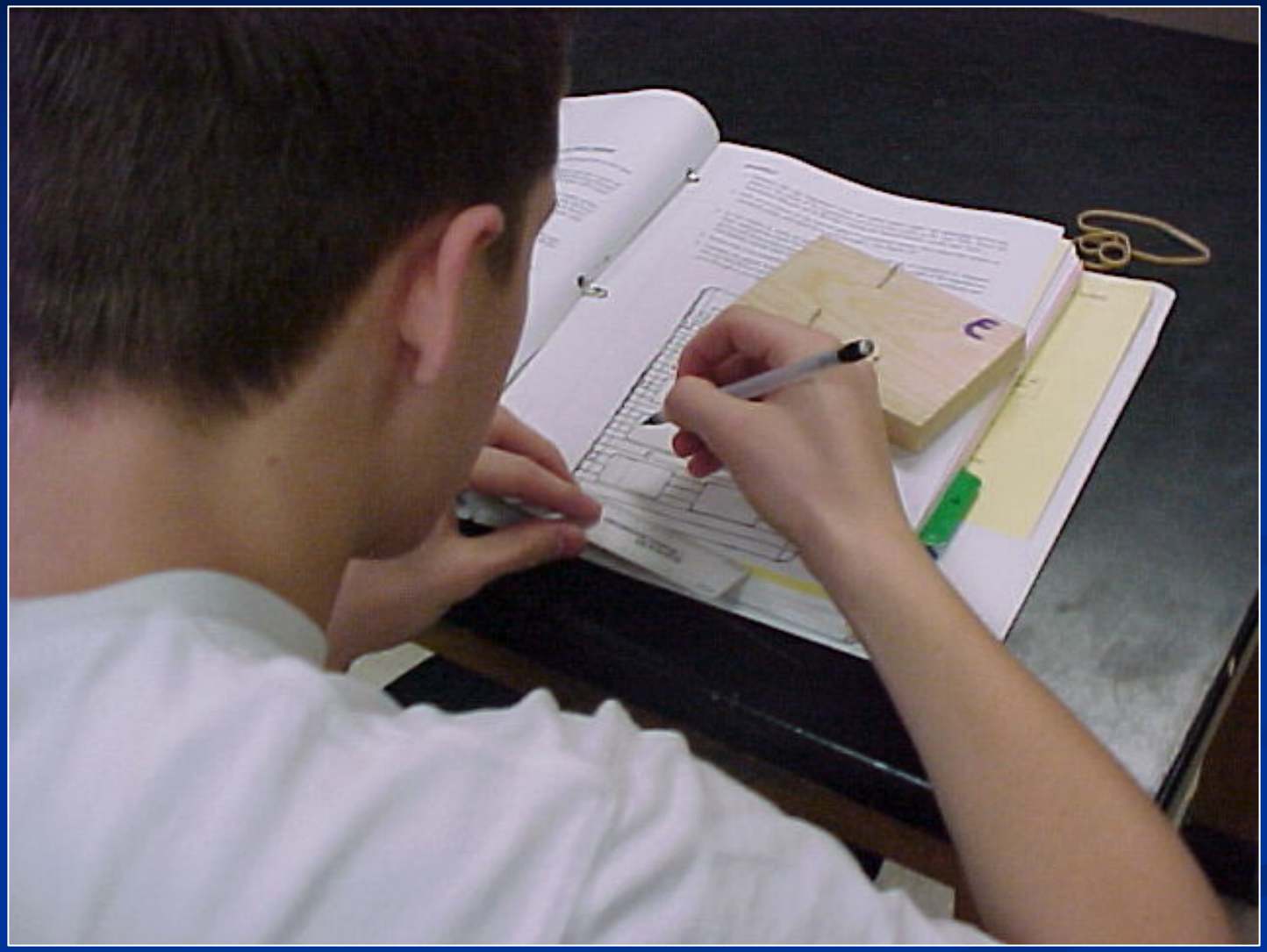
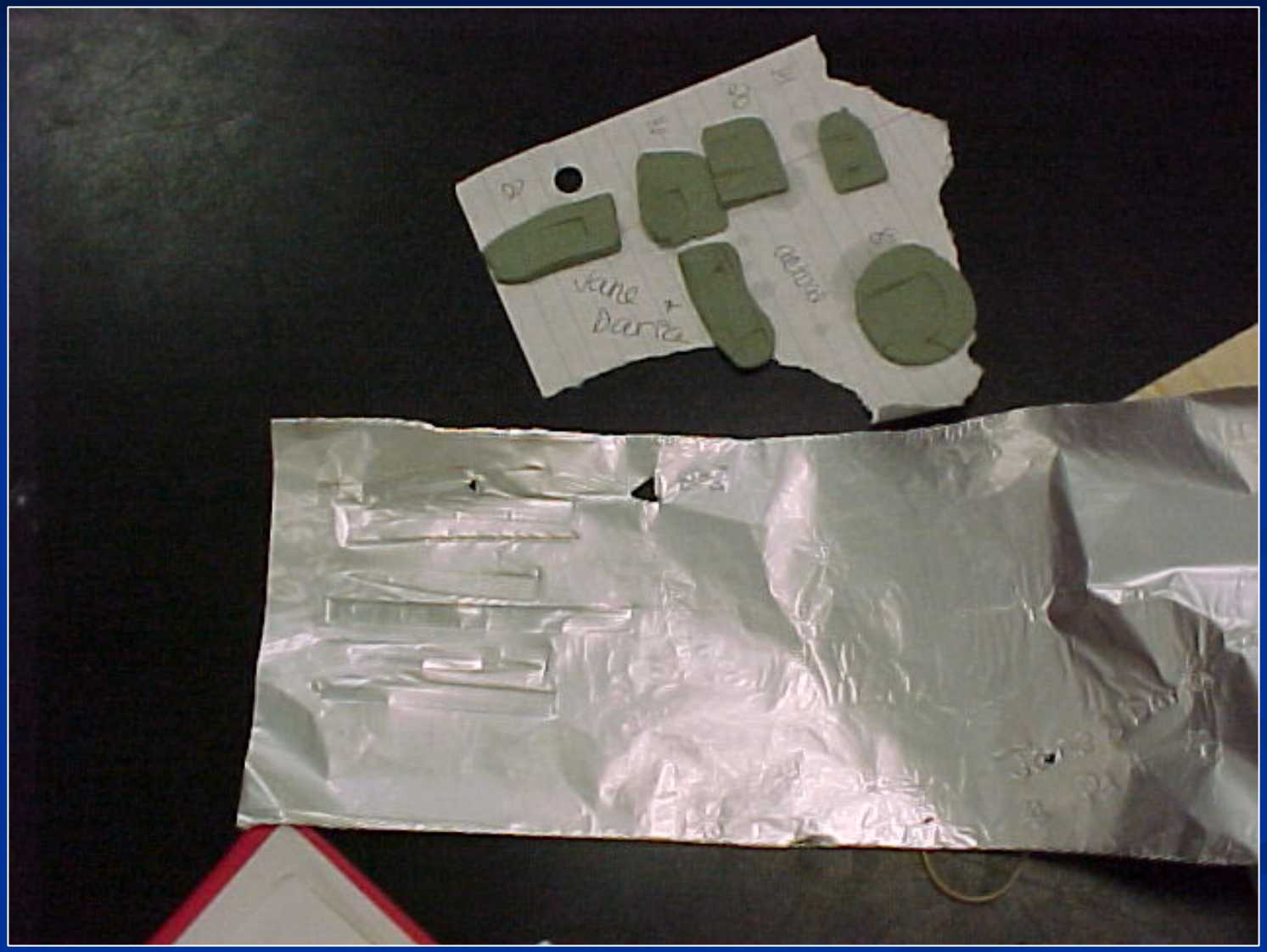
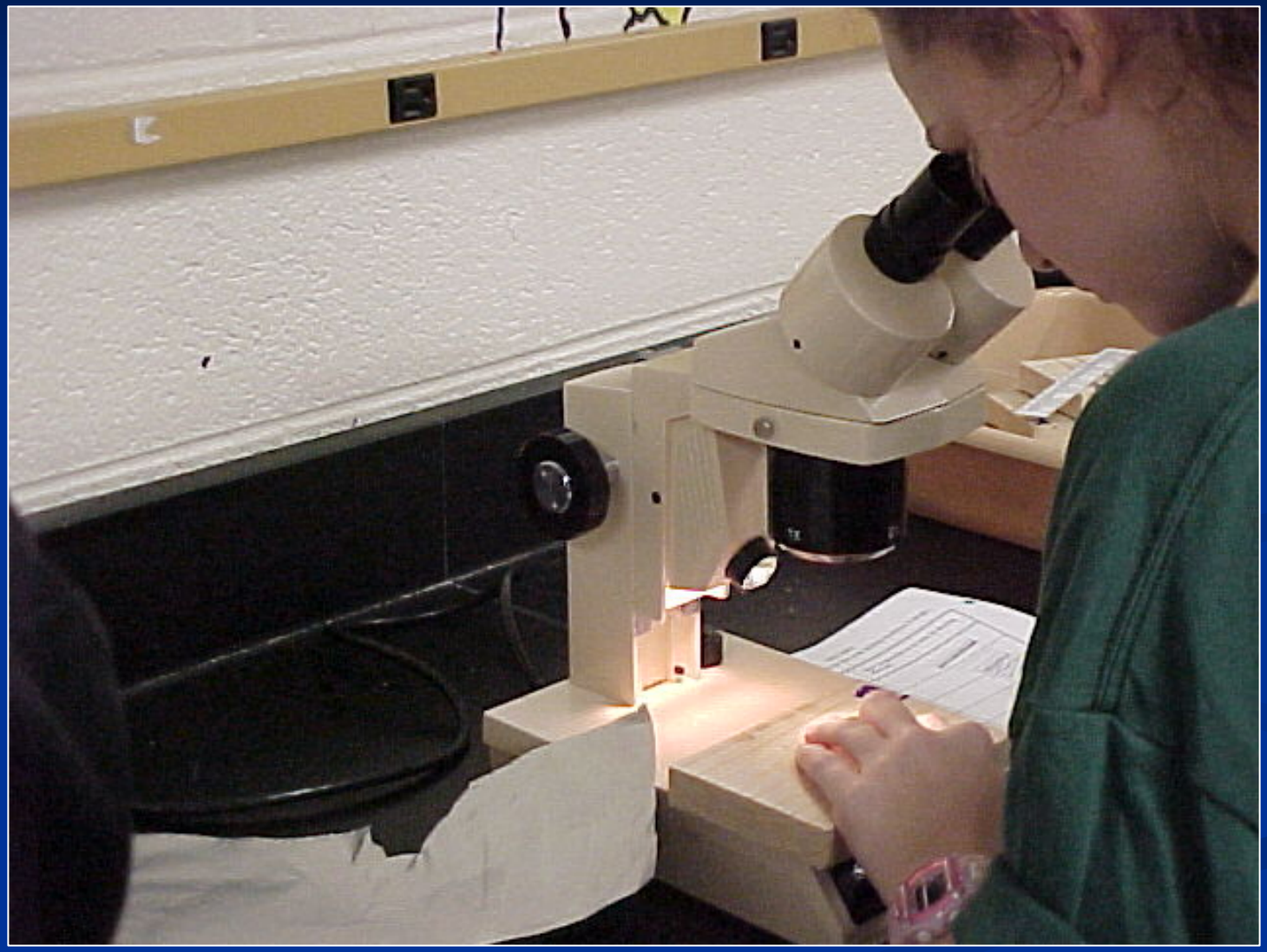
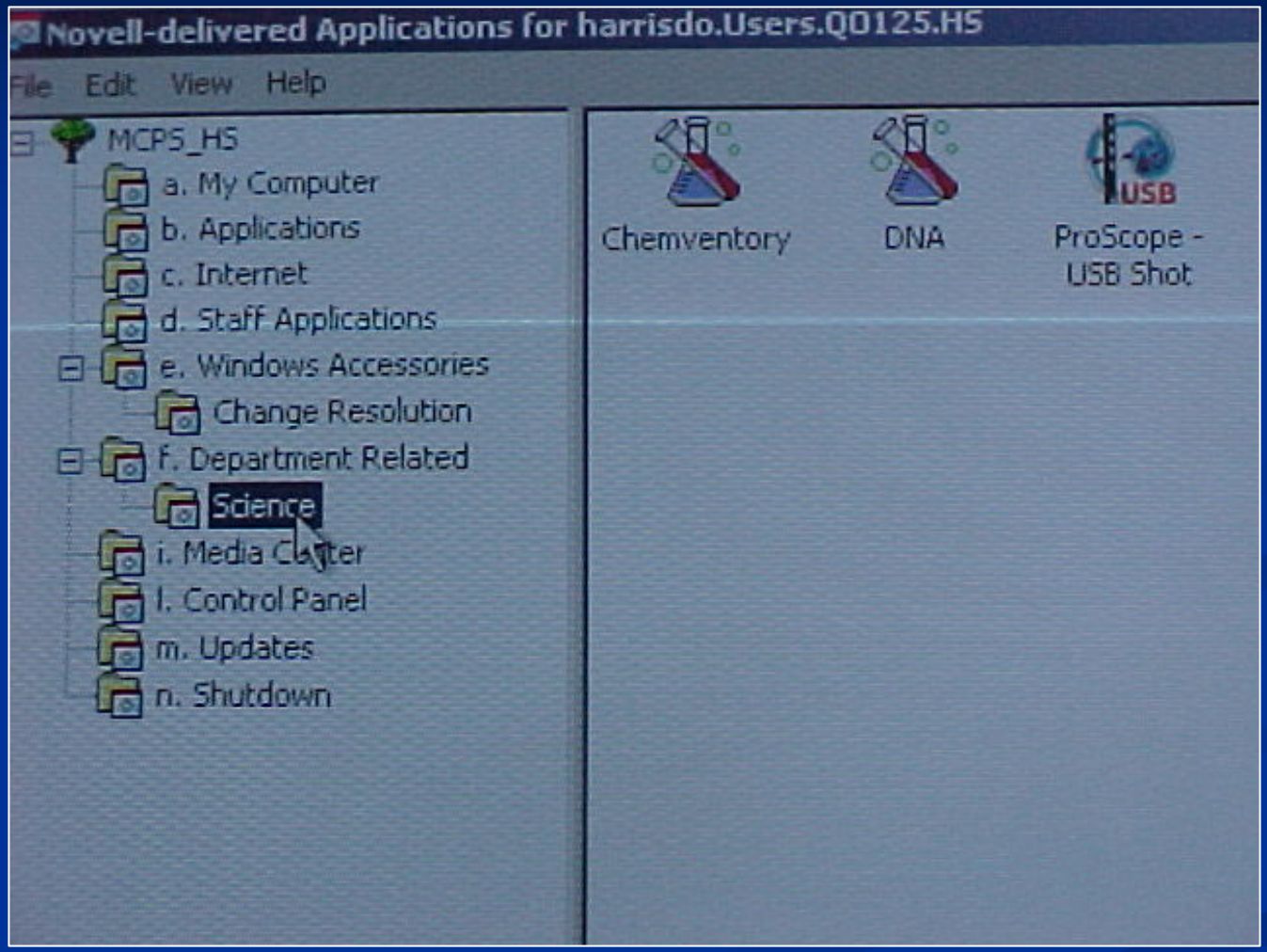







EDUCATION
INDUSTRIAL
LAW ENFORCEMENT
the ProScope
PC WORLD MAGAZINE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File Edit View Help
MCPS_HS
a. My Computer
b. Applications
c. Internet
d. Staff Applications
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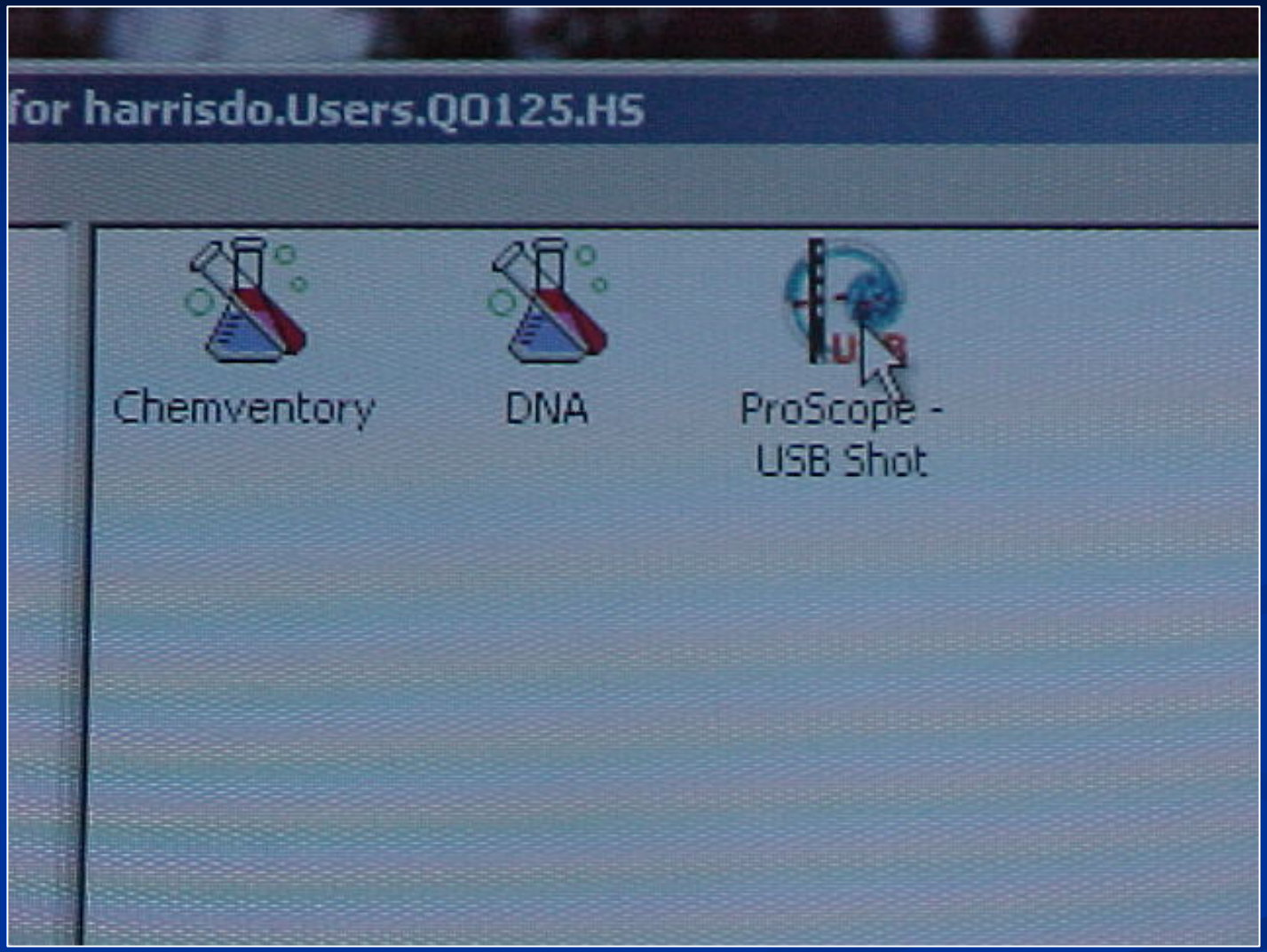
i. Media Center
l. Control Panel
m. Updates
n. Shutdown
Chemventory
DNA
ProScope - USB Shot


for harrisdo.Users.Q0125.HS
Chemventory
DNA
ProScope -
USB Shot

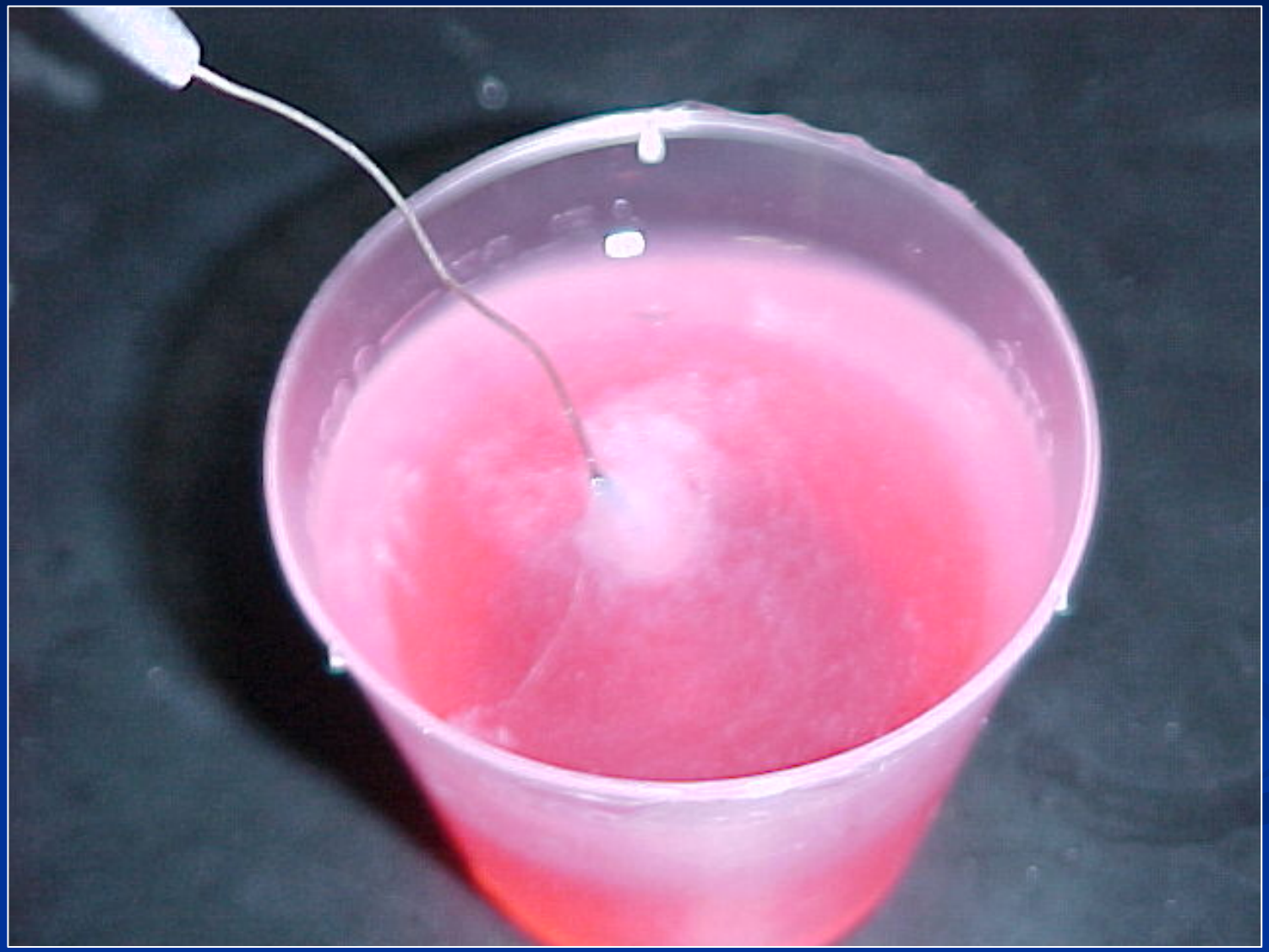

NuTone
SIEMENS

DNA Recovery


BASE
pH 7→13


Buffer

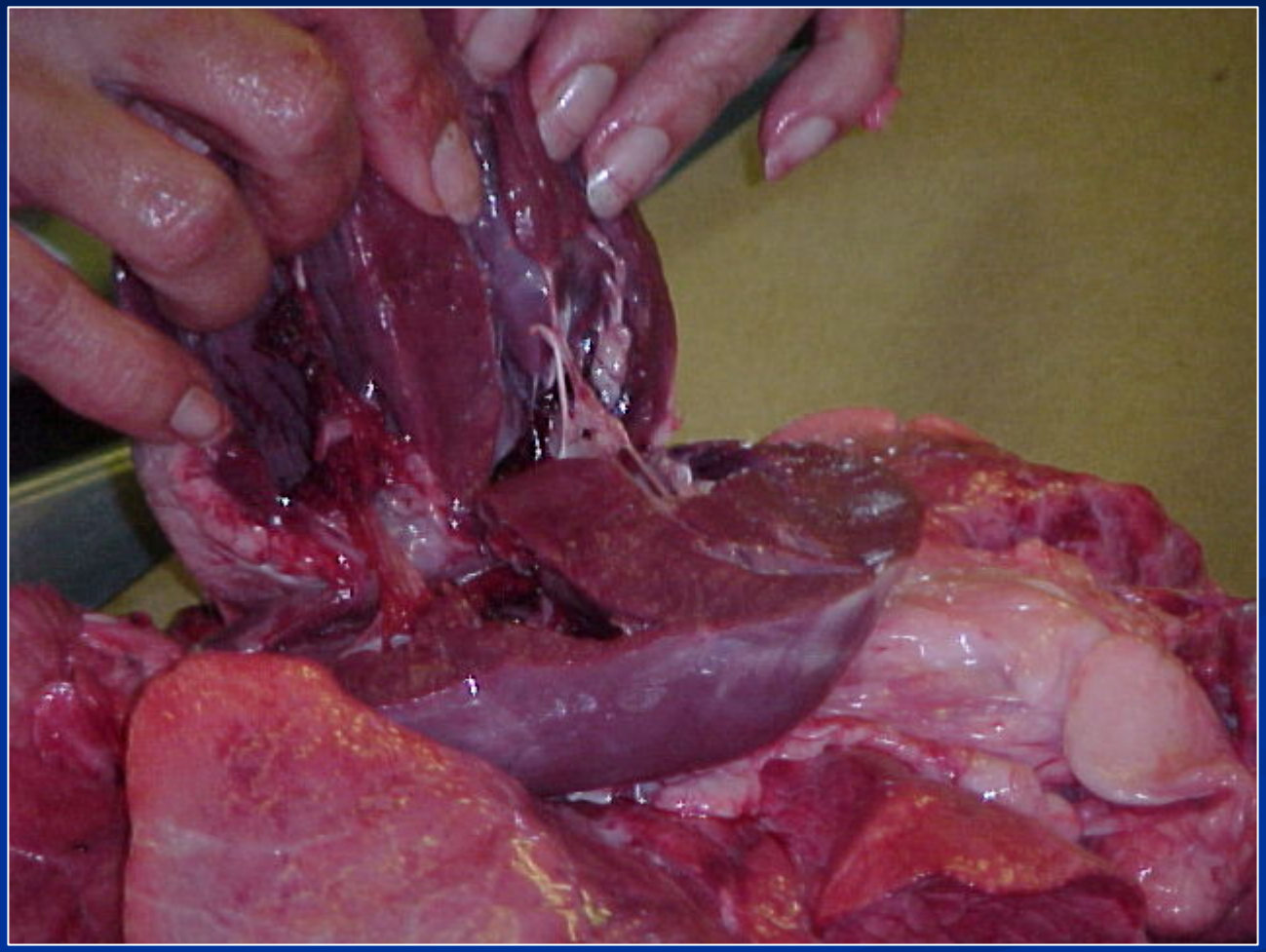

6 DRAMS



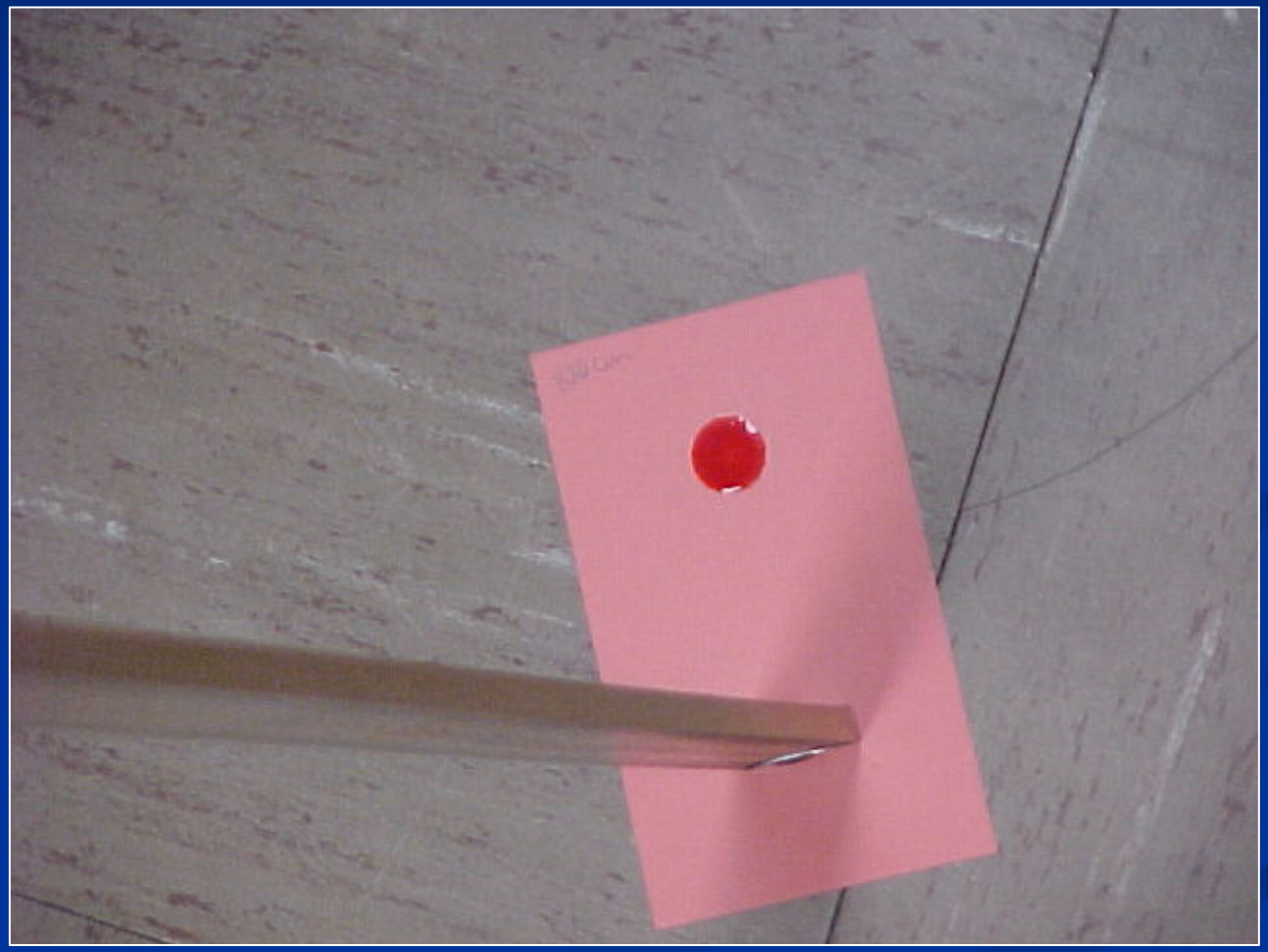

Buffe

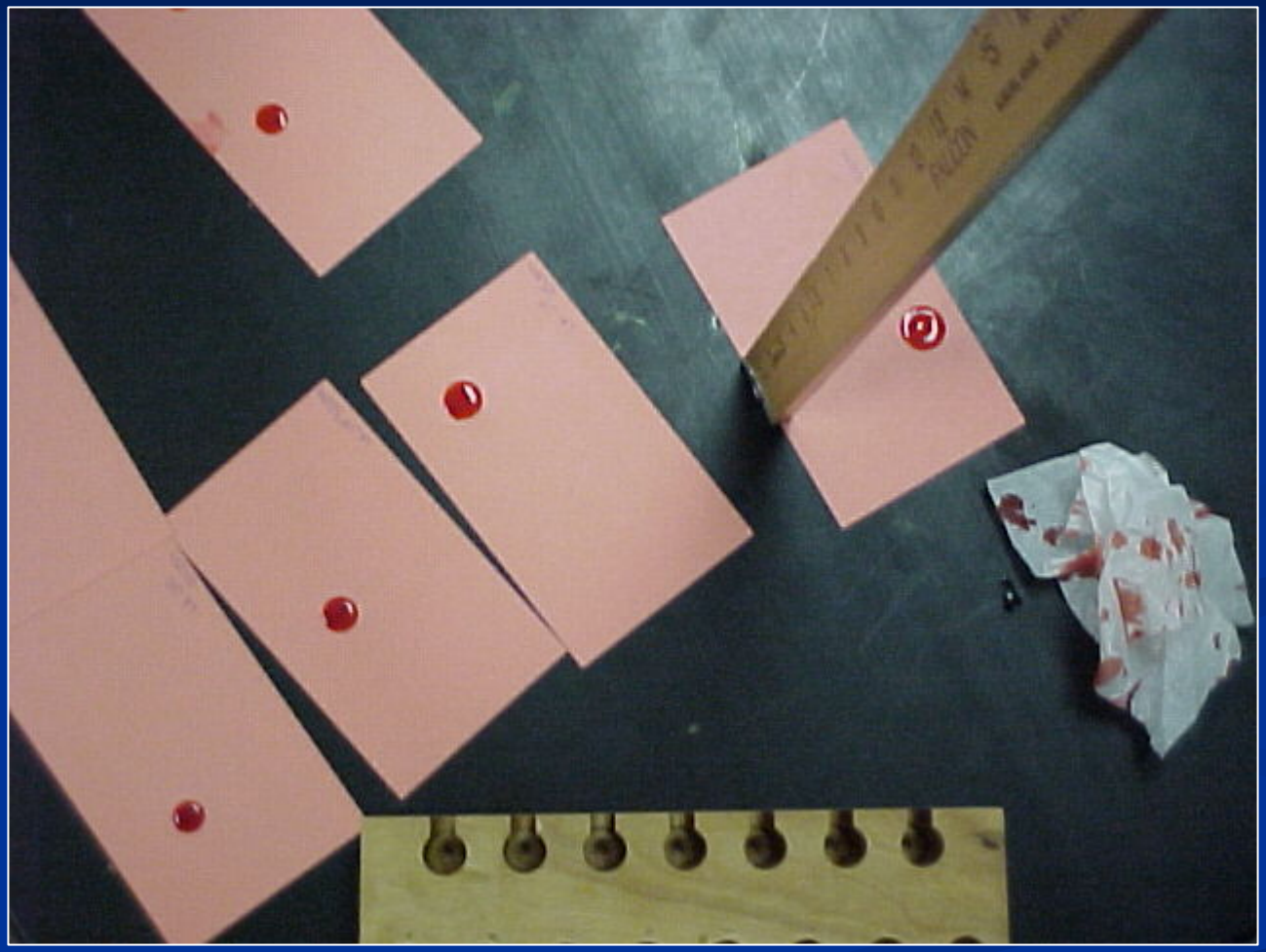
On–Line Activities

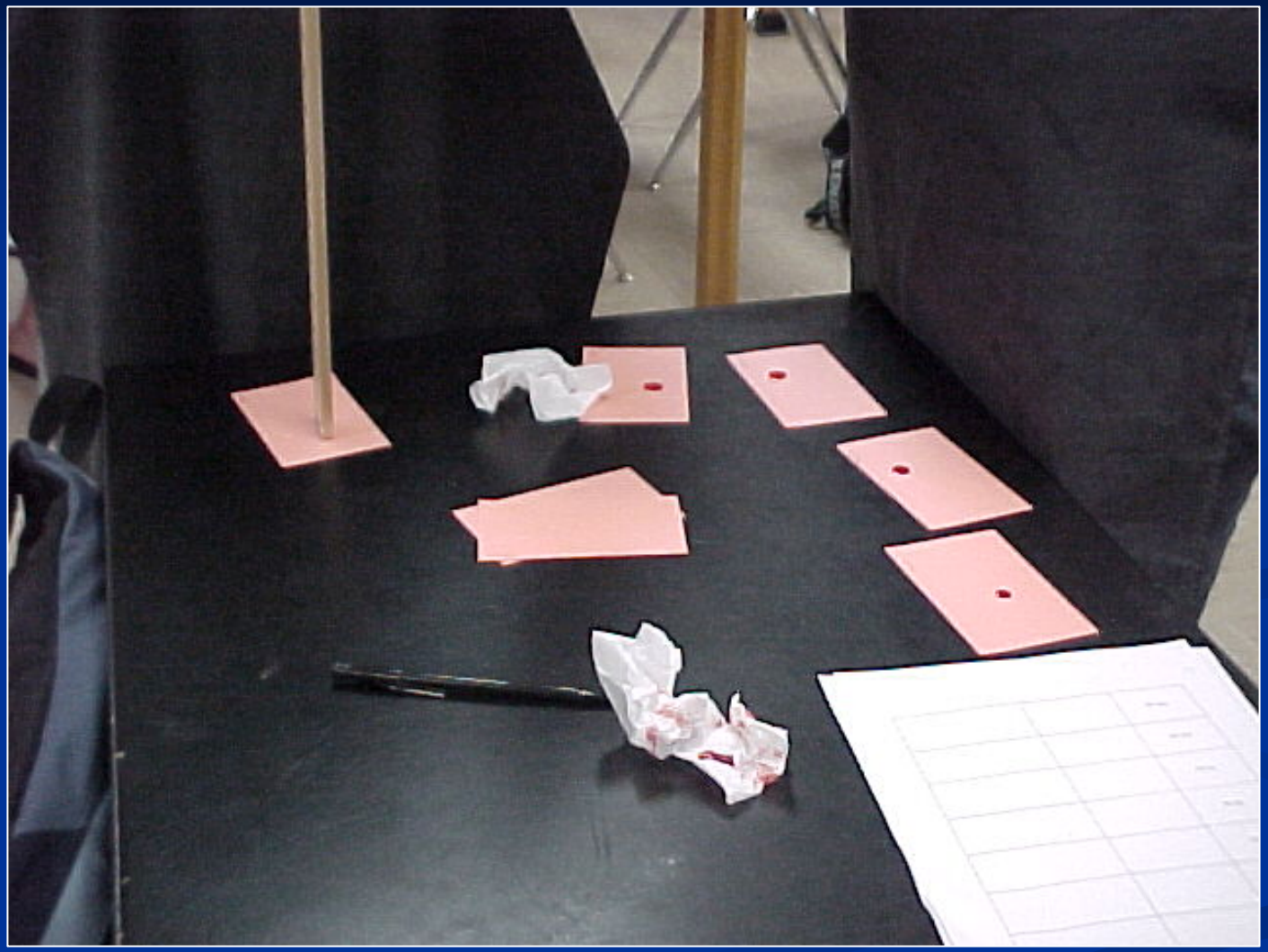
Blood and Blood Spatter

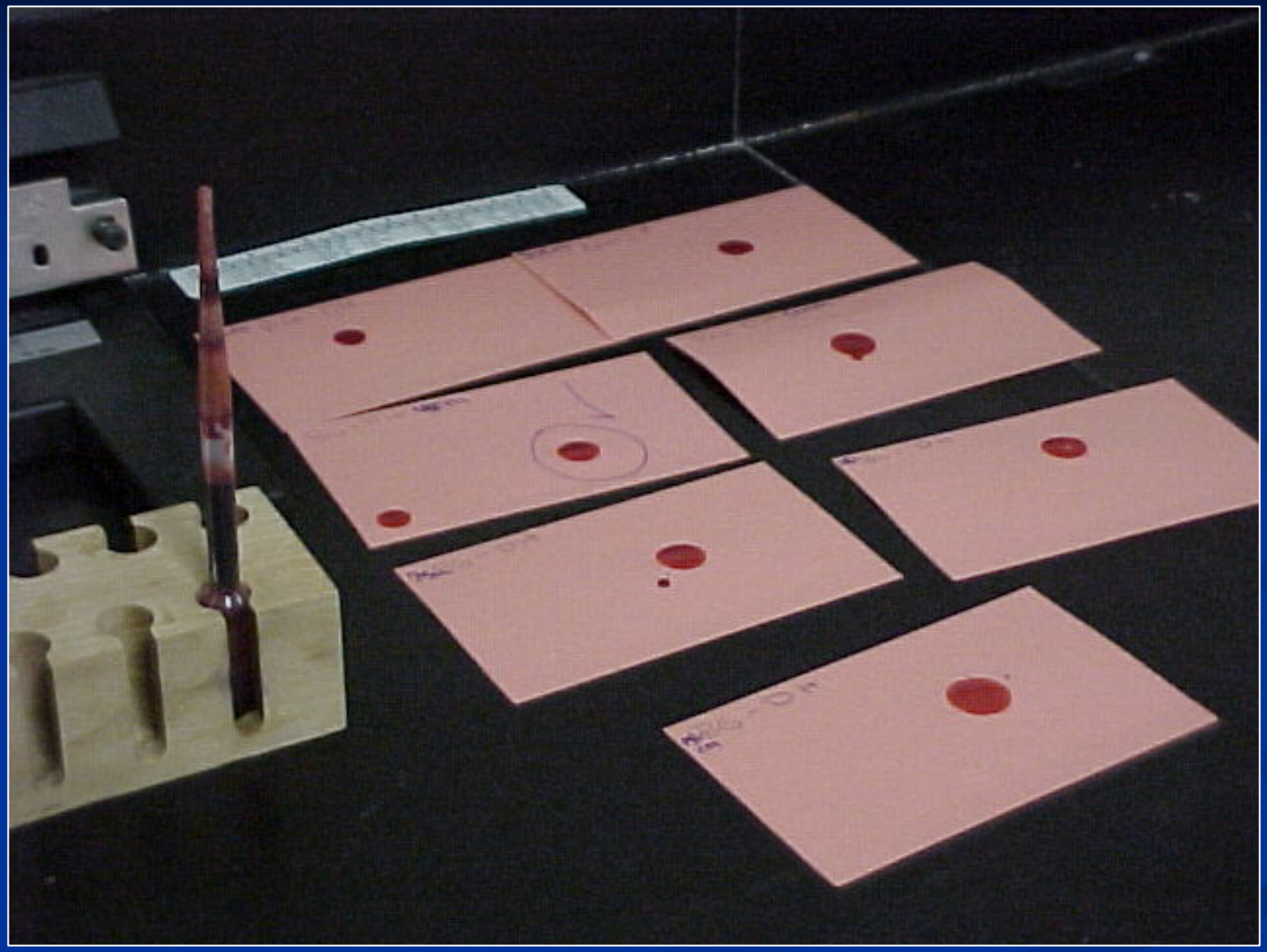


Simulated Blood

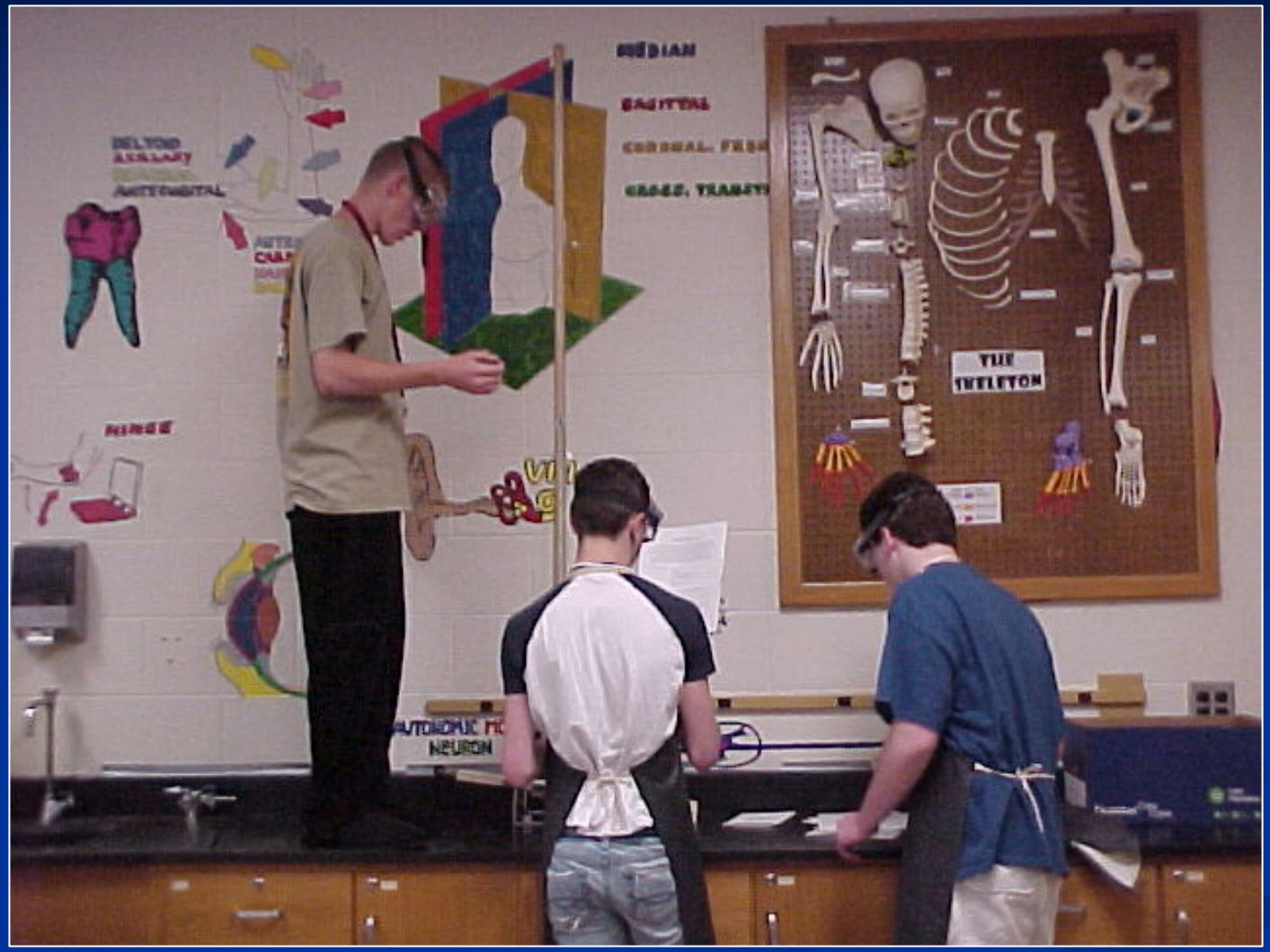


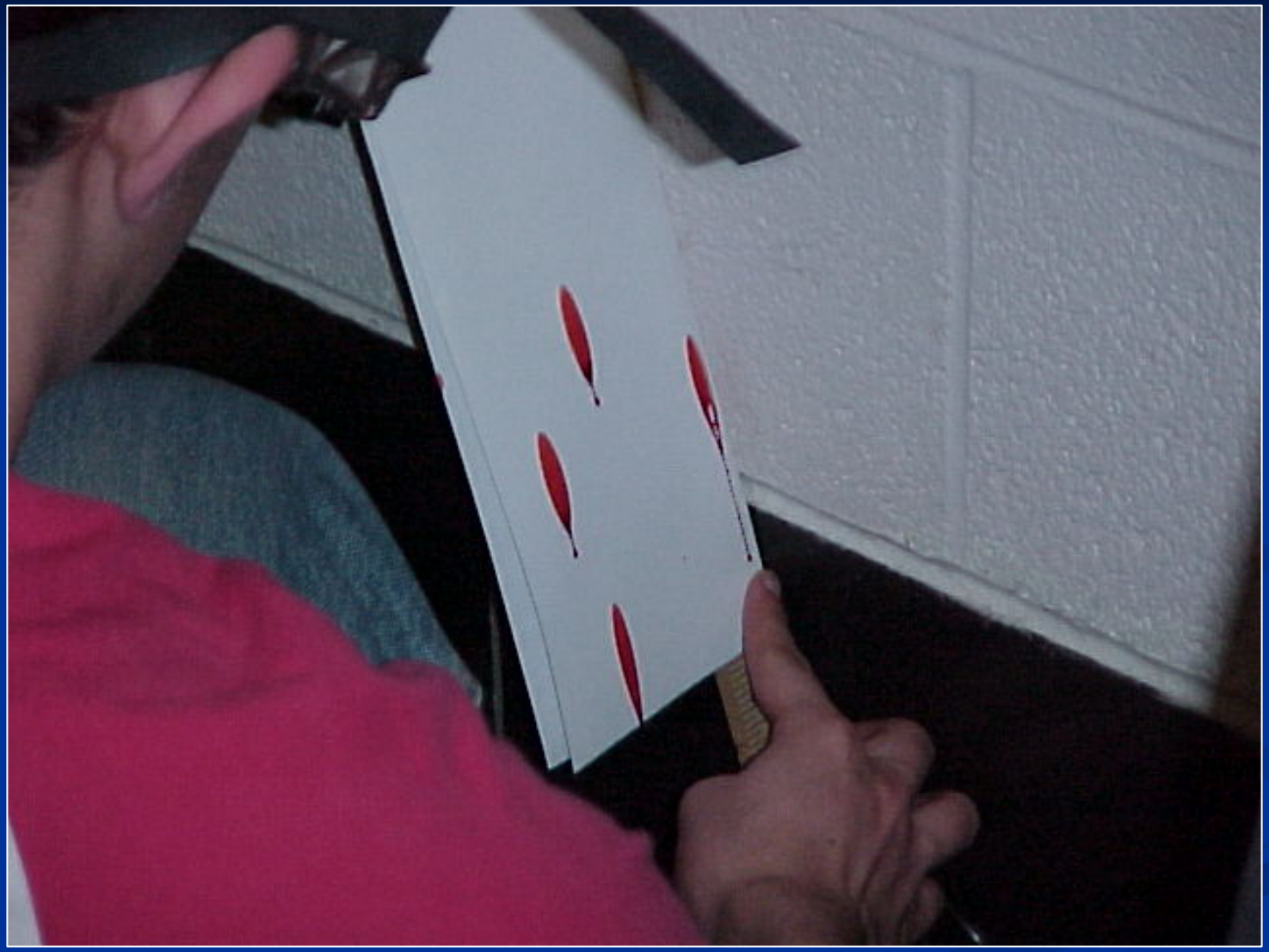


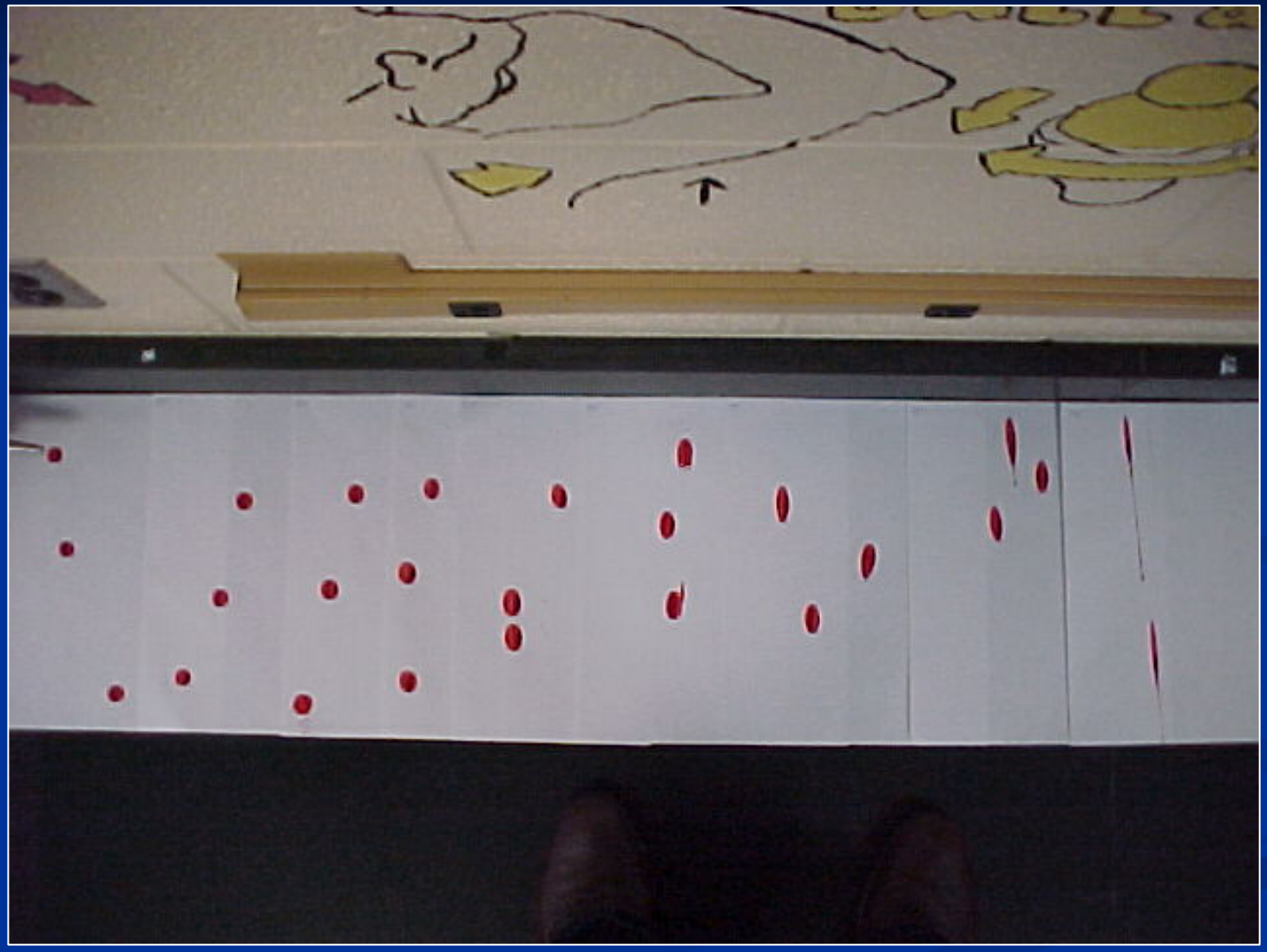


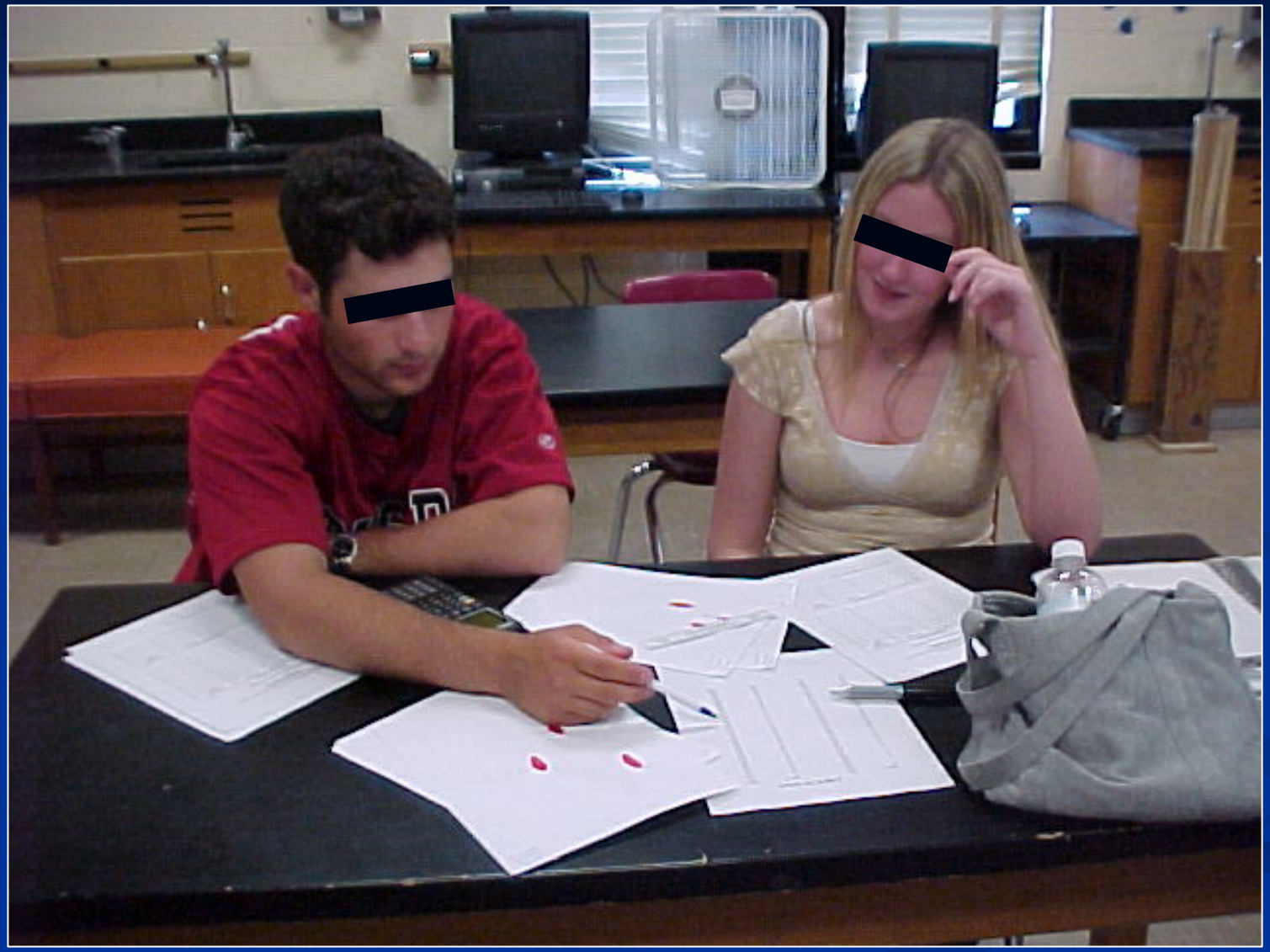


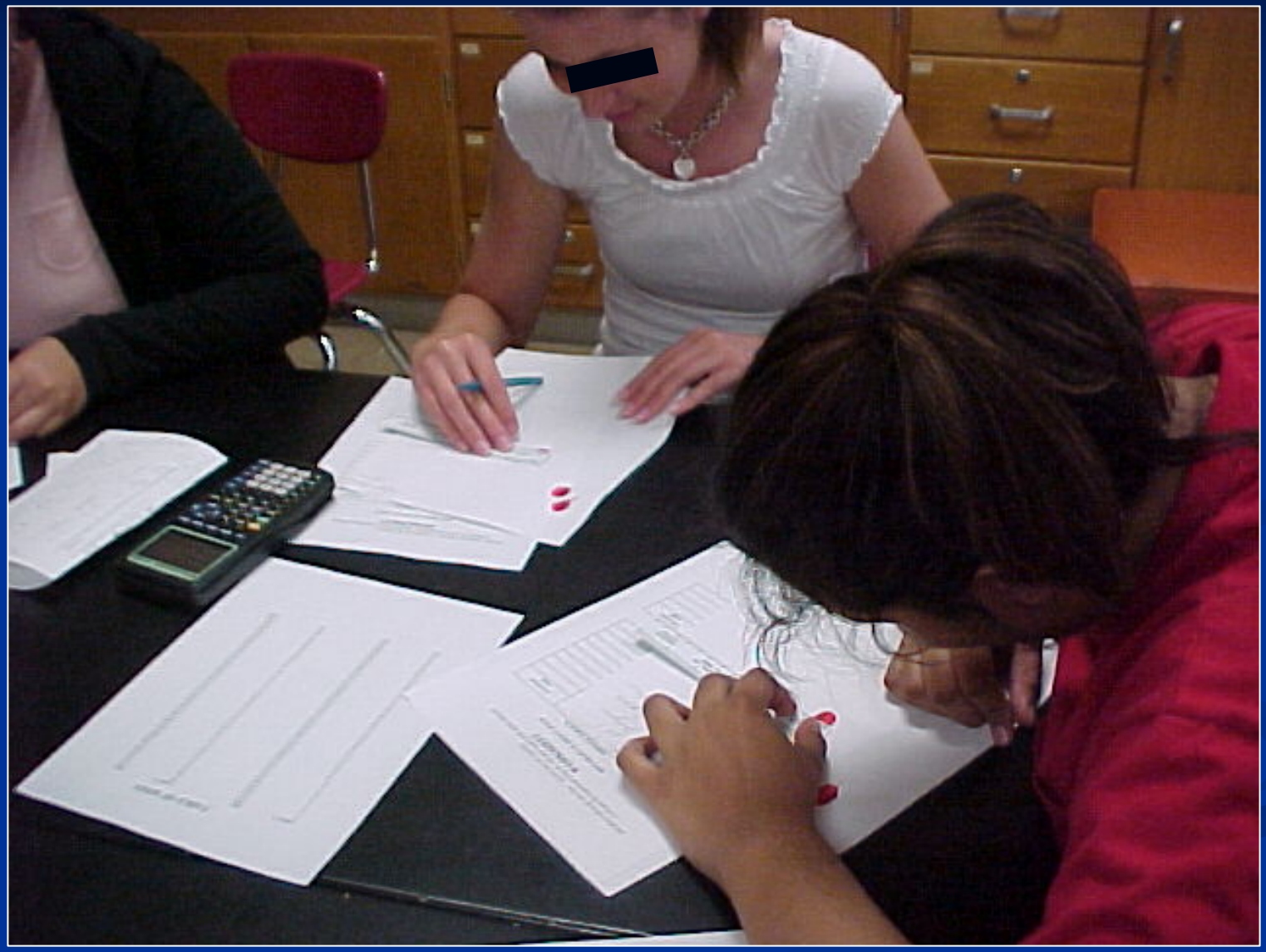

MEDIAL
LATERAL
PROXIMAL
DISTAL
INFERIOR

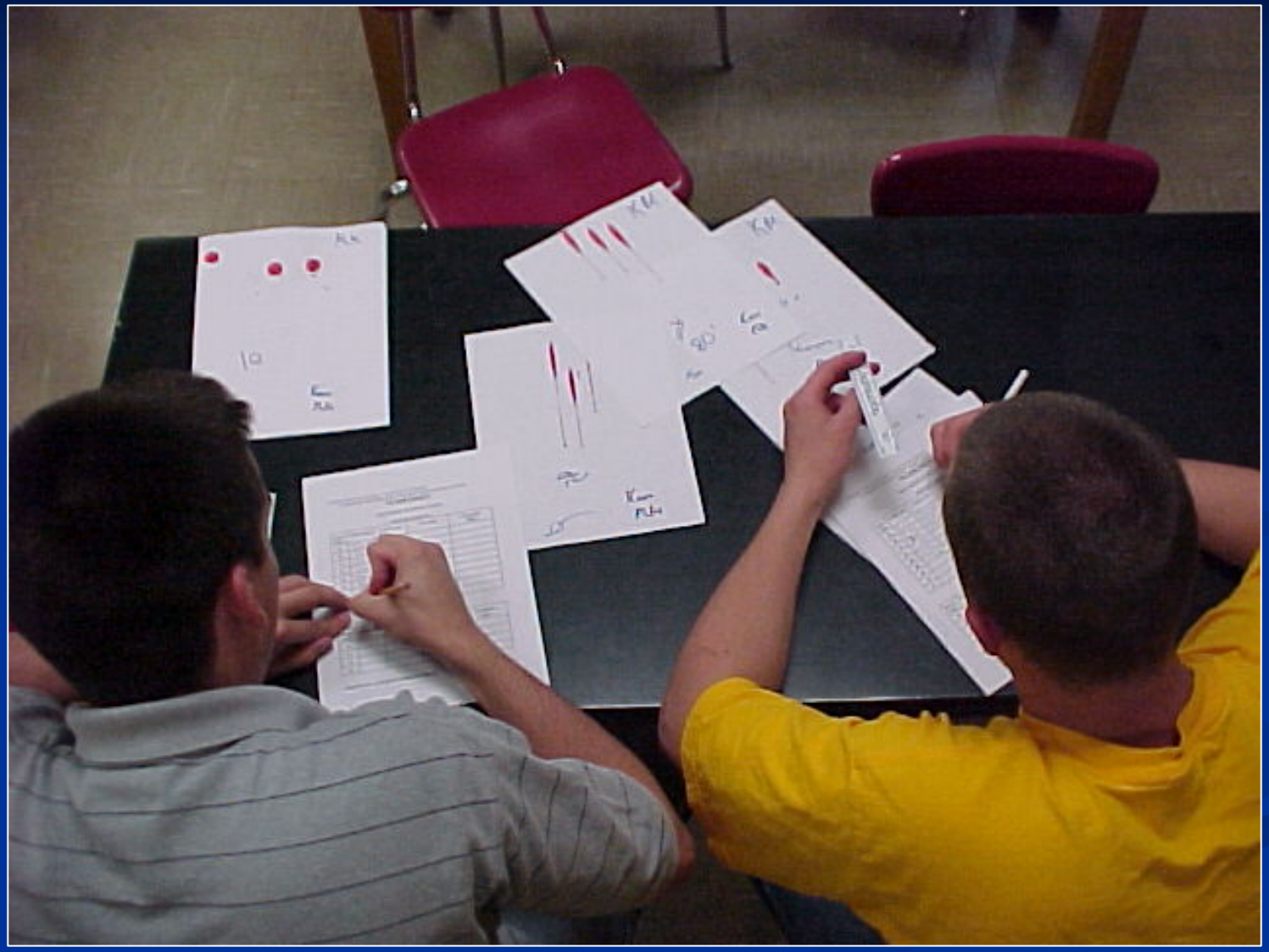

MEDIAN
SAGITTAL
HINGE
THE SKELETON

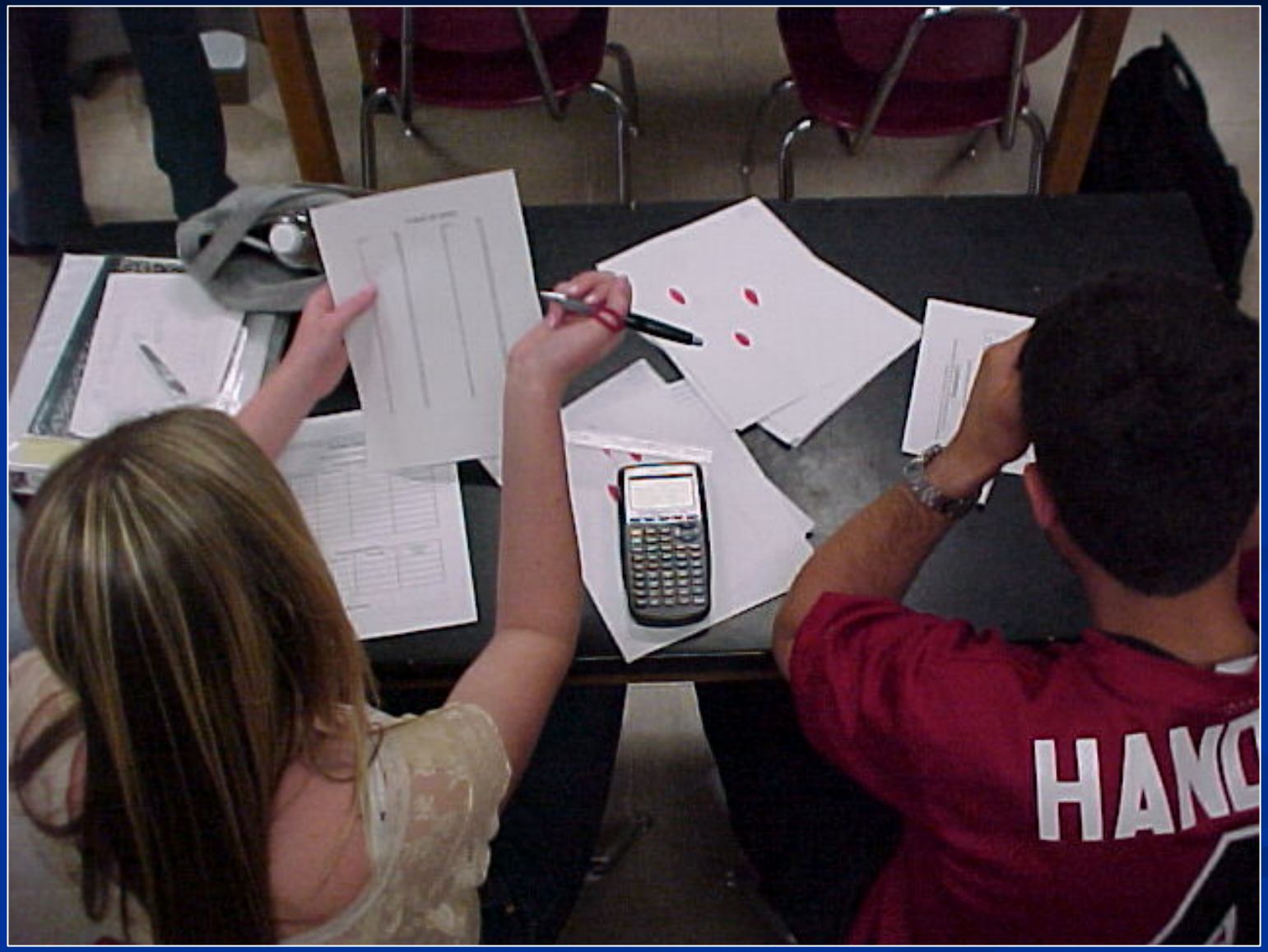








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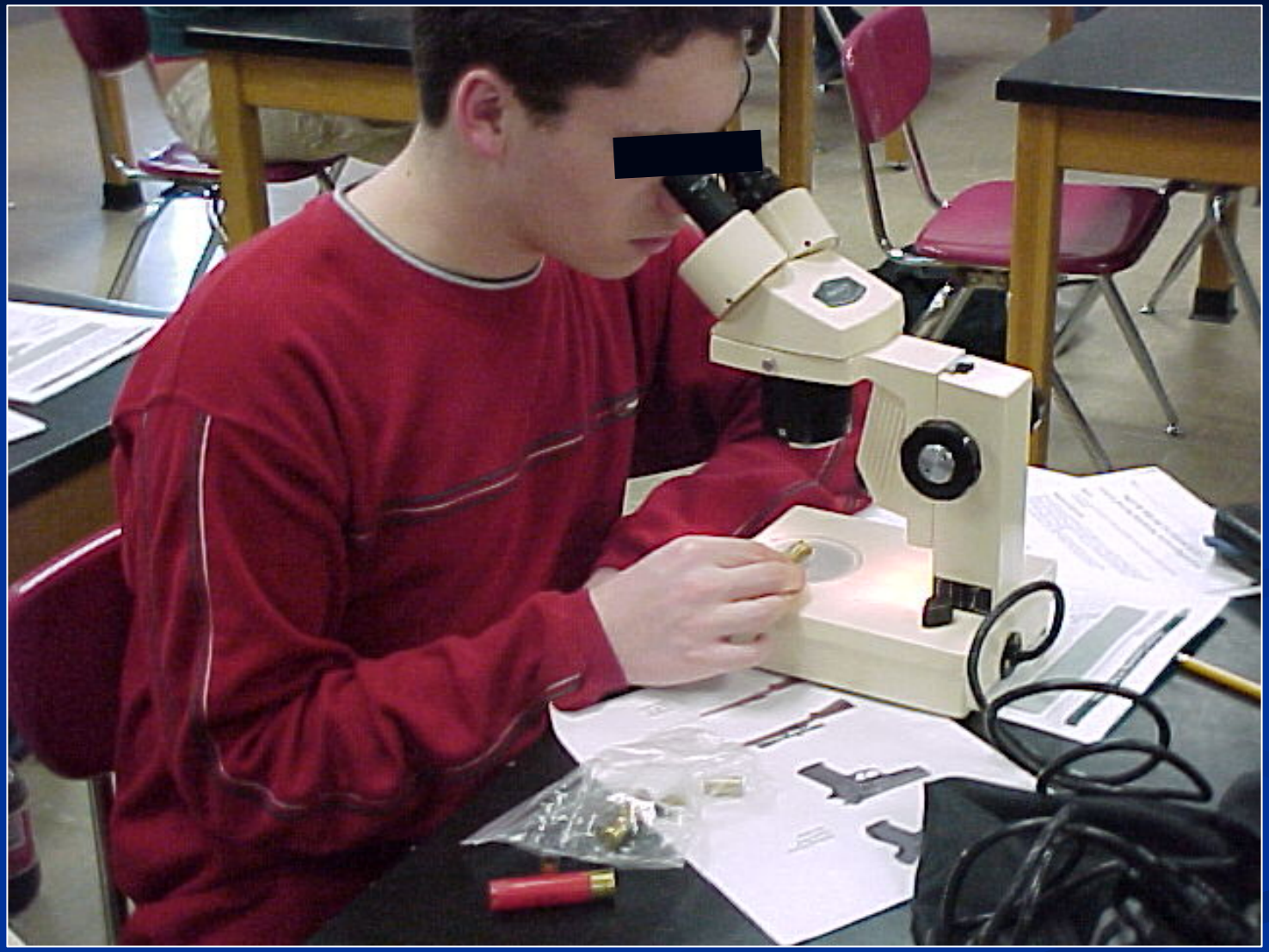
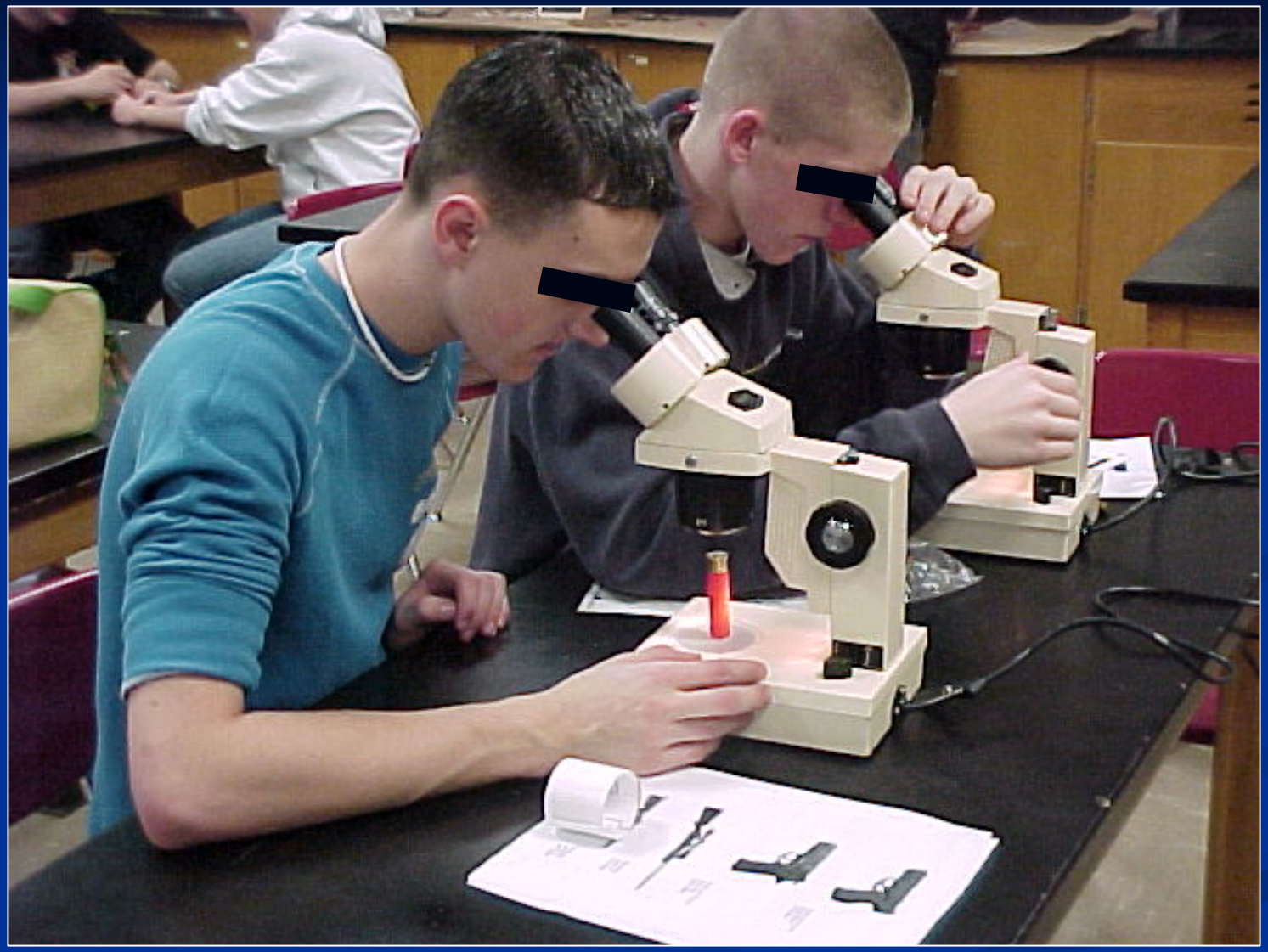
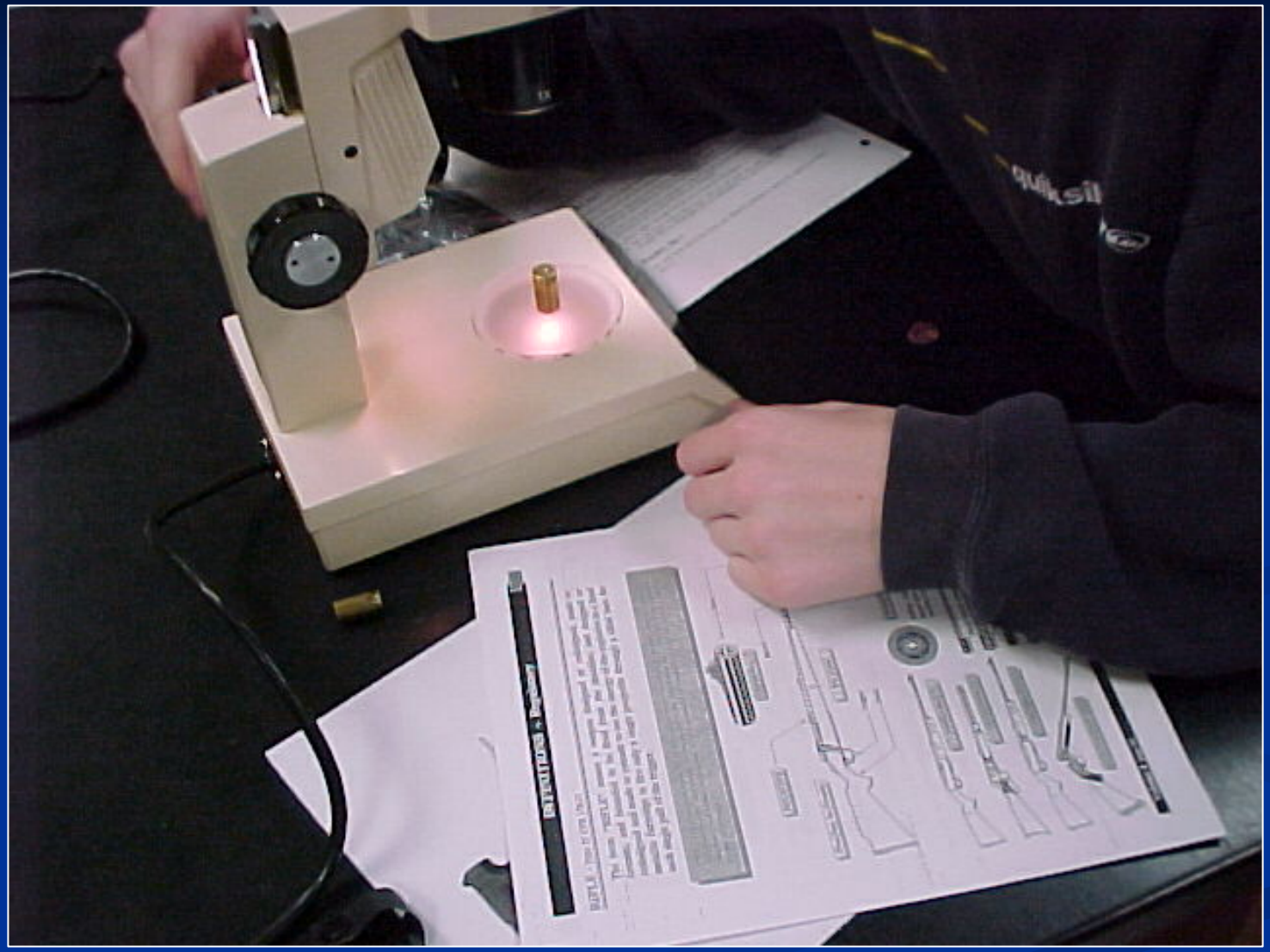
Firearms

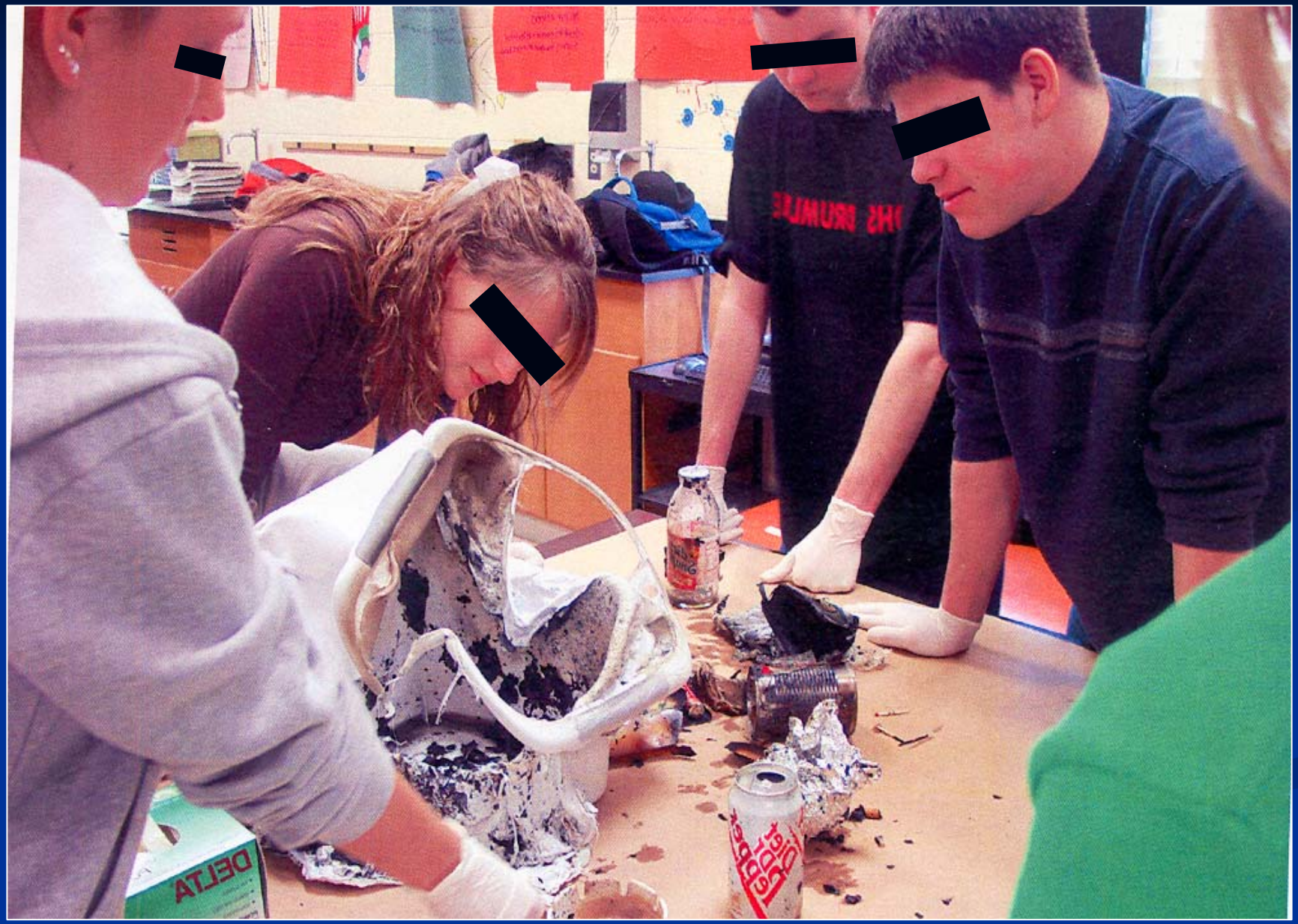






Arson


MONTGOMERY COUNTY MARYLAND
DELTA

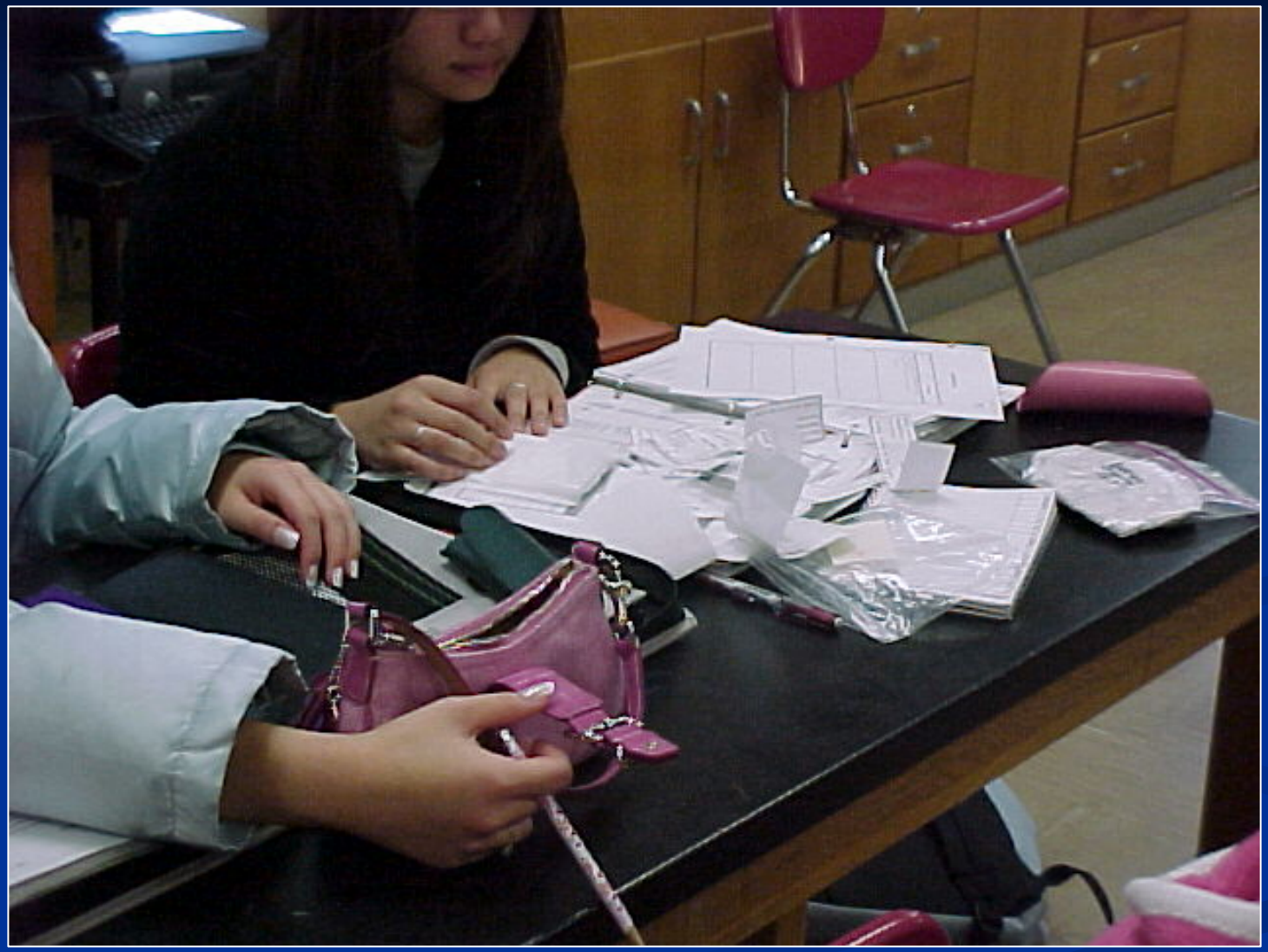

DELTA

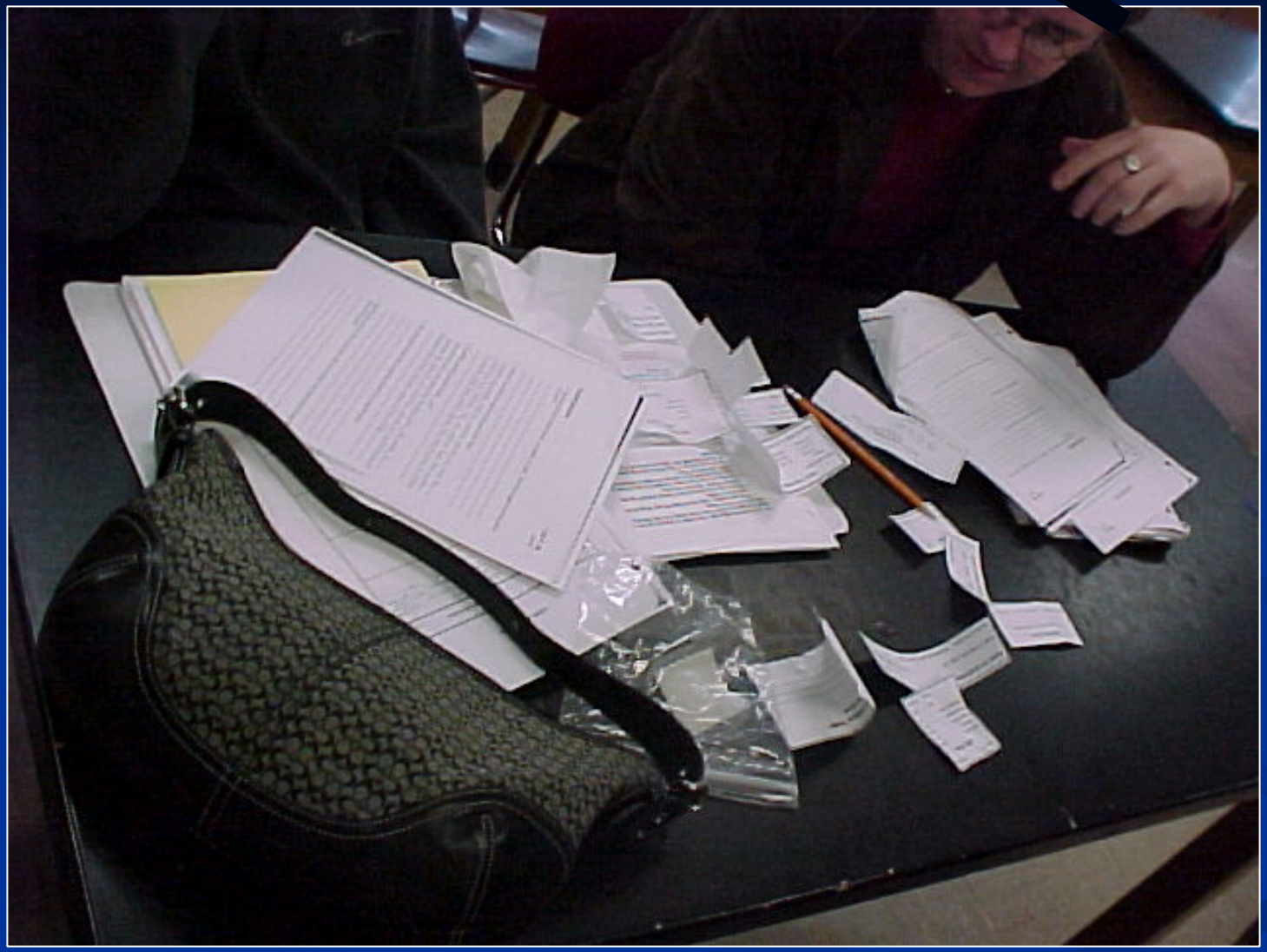

ENCE

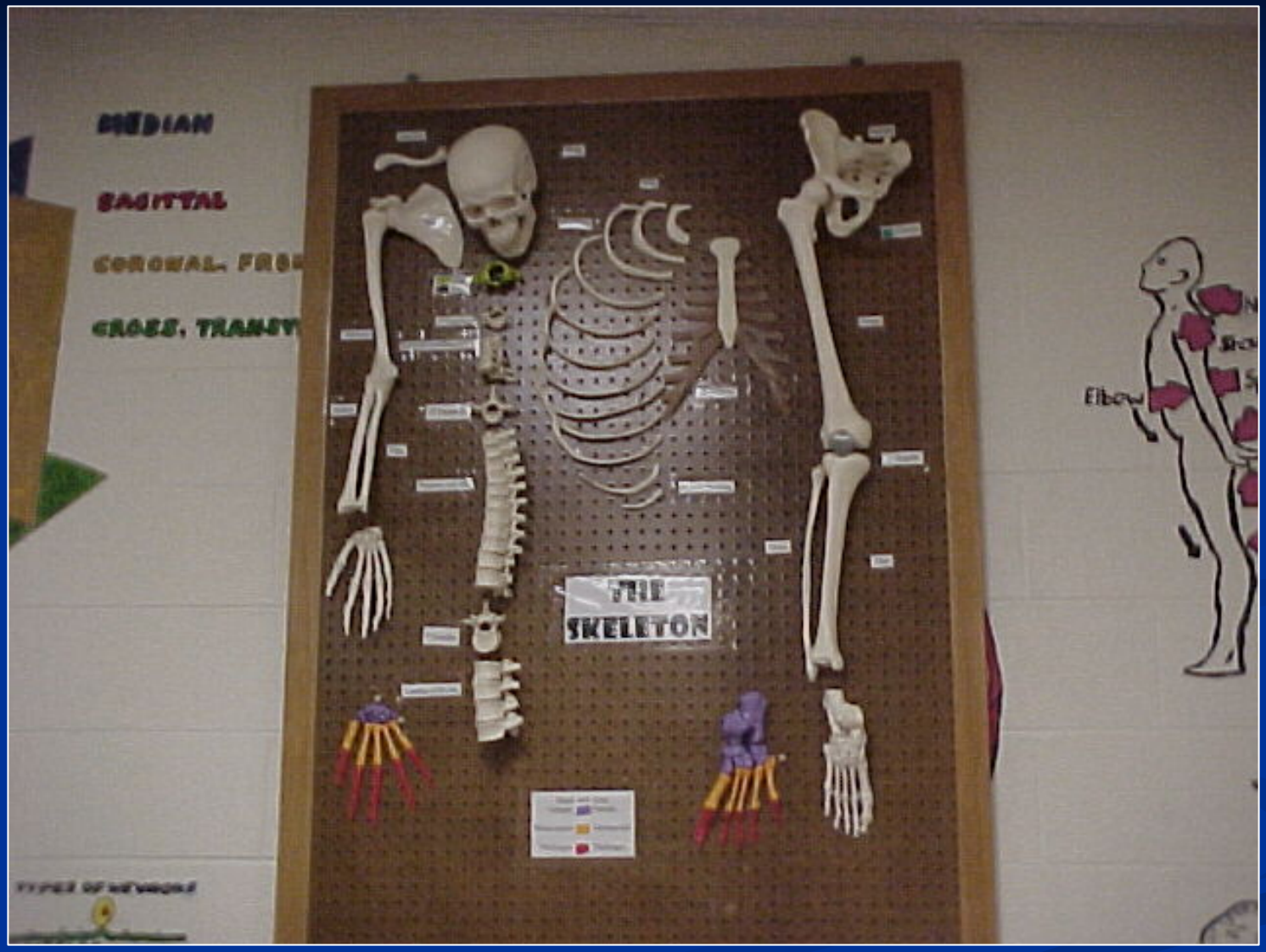

CHAIN OF CUSTODY

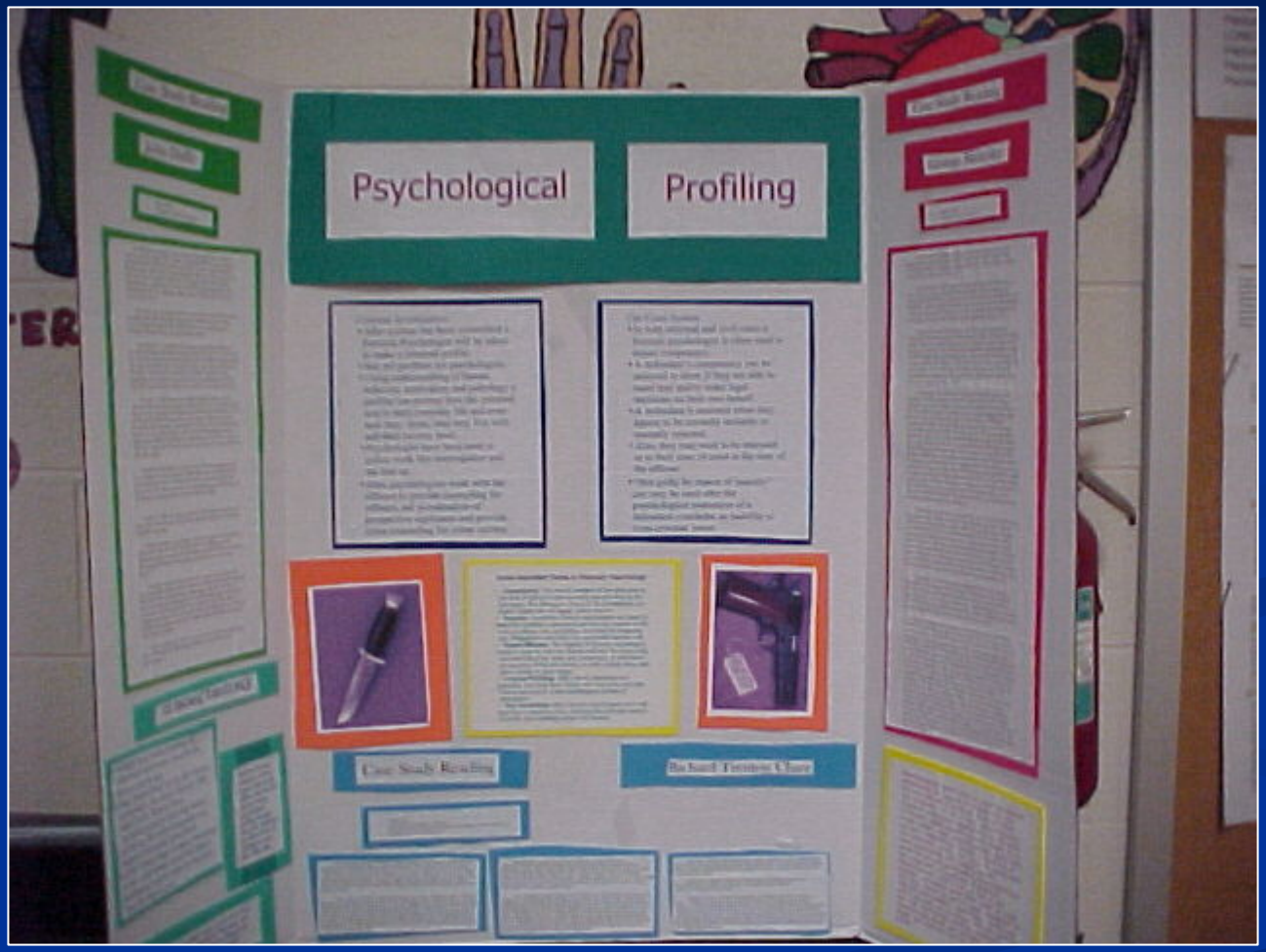
Short Mystery Solving

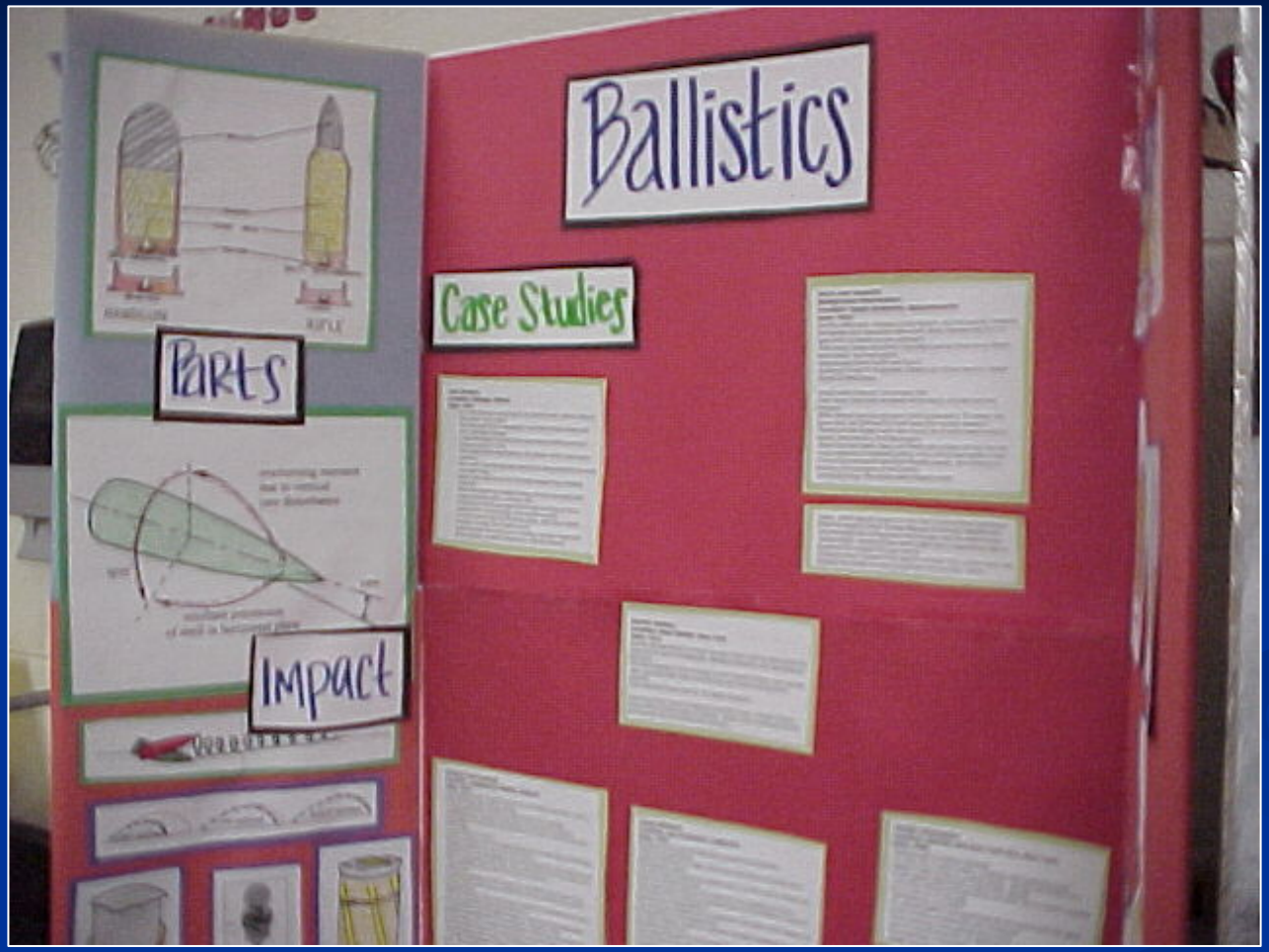
Profiling

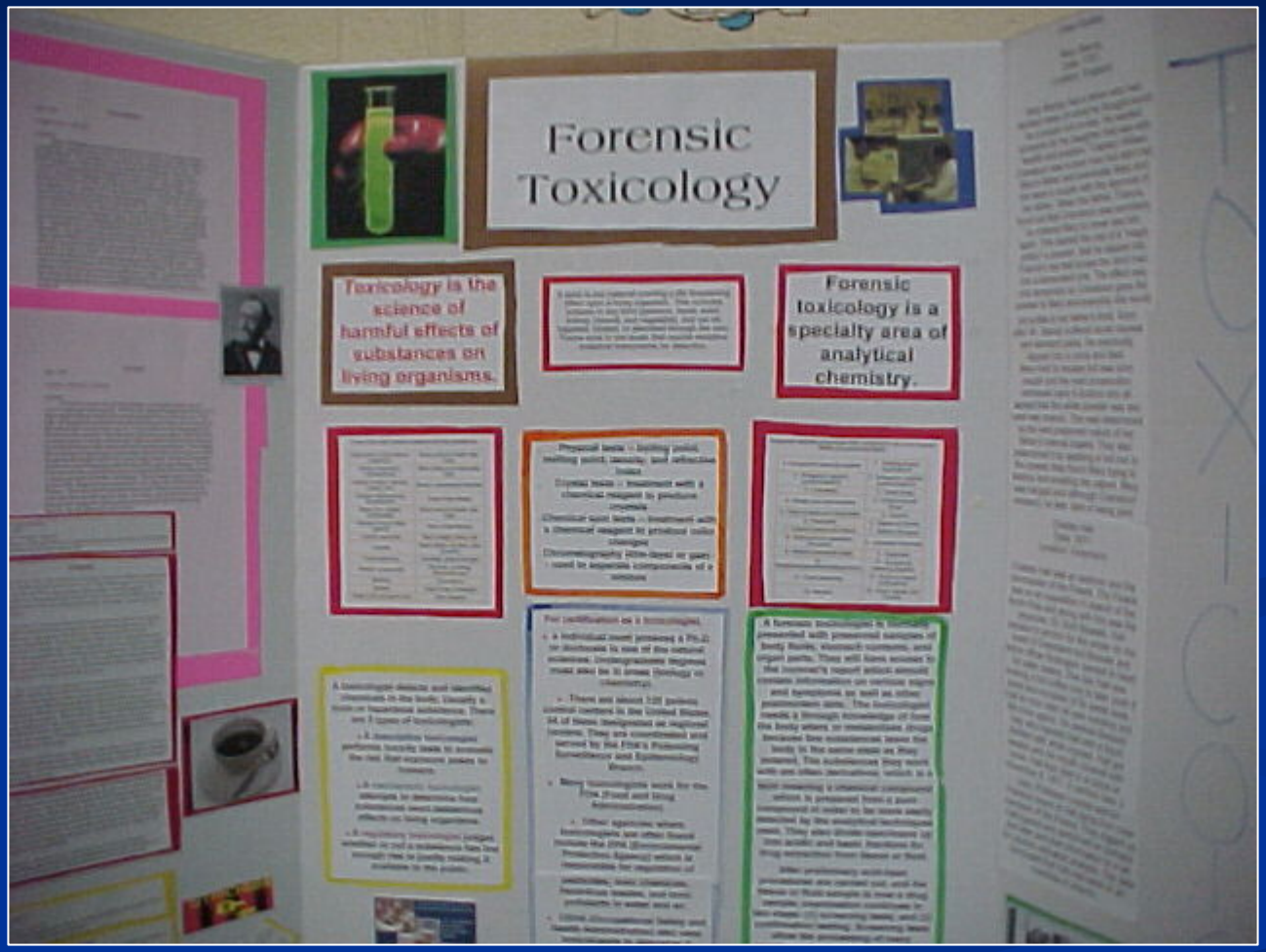


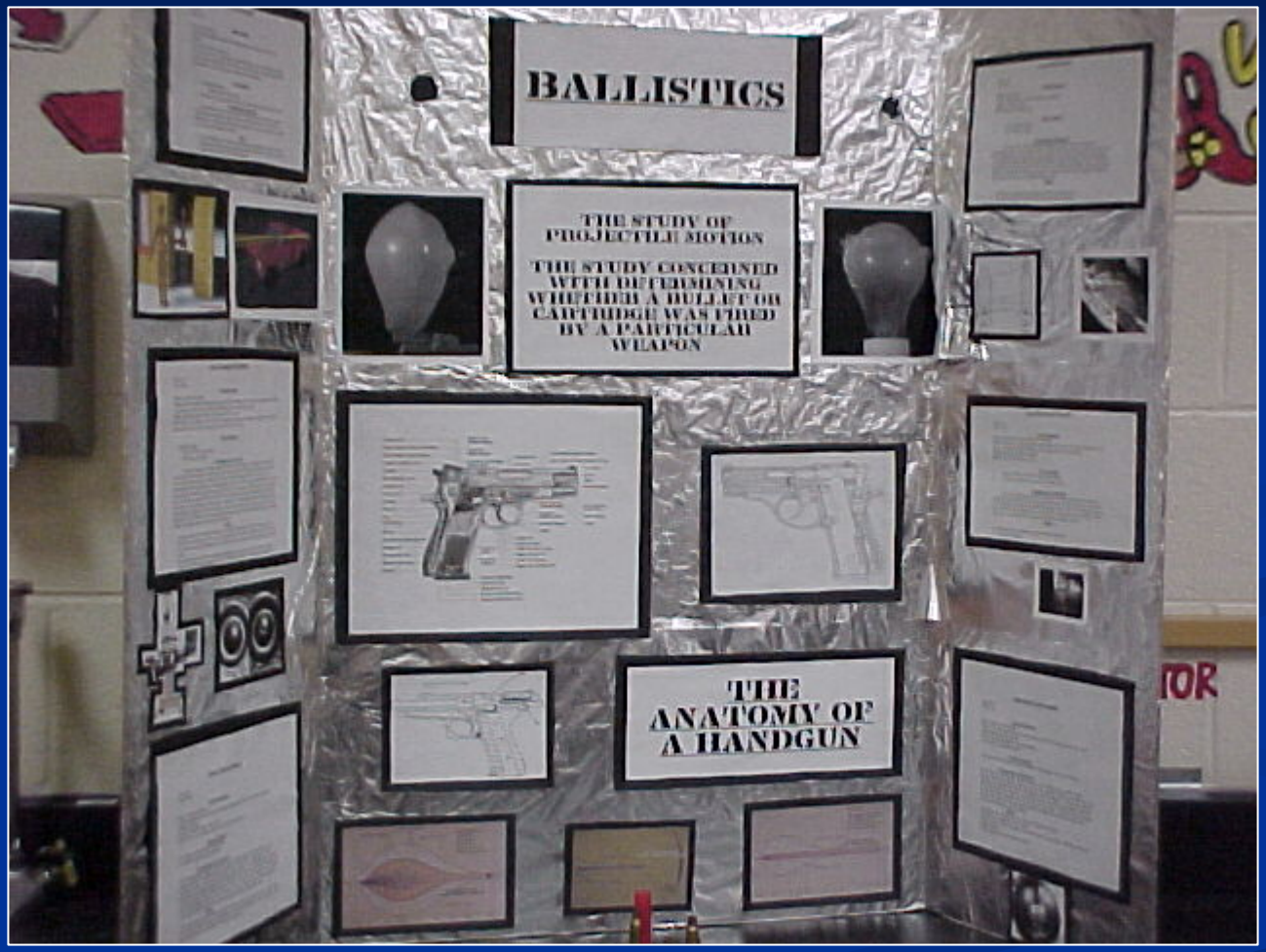


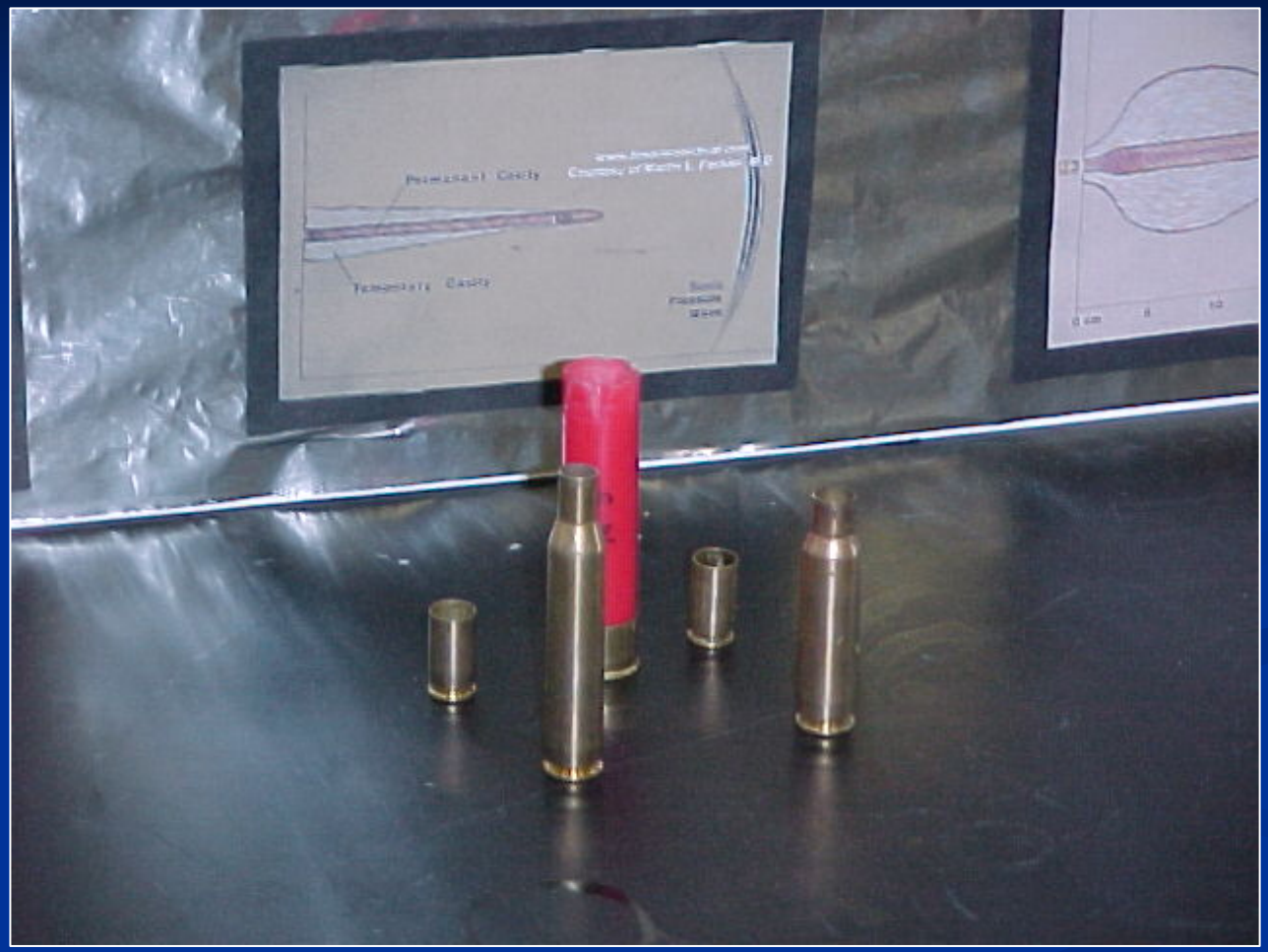

MEDIAN
SAGITTAL
CORONAL, FRO
CROSS, TRANSV
THE SKELETON
Elbow


Psychological
Profiling

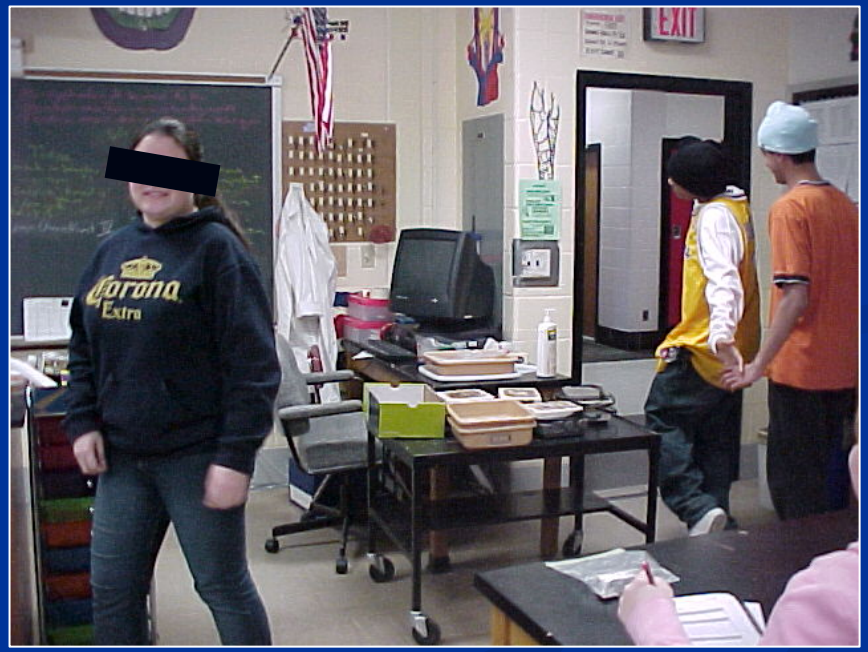

Ballistics
Case Studies
Parts
Impact


Forensic Toxicology
Toxicology is the science of harmful effects of substances on living organisms.
Forensic toxicology is a specialty area of analytical chemistry.


BALLISTICS
THE STUDY OF PROJECTILE MOTION
THE STUDY CONCERNED WITH DETERMINING WHETHER A BULLET OR CARTRIDGE WAS FIRED BY A PARTICULAR WEAPON
THE ANATOMY OF A HANDGUN



Observation Skill Skits



“No one person is smarter than the team”

Reading with a Purpose: Harris Pic List

- Father of Forensics; Colin Evans

  ISBN # 0-425-210073
- The Casebook of Forensic Detection; Colin Evans
- Sherlock Holmes; Sir Author Conan Doyle