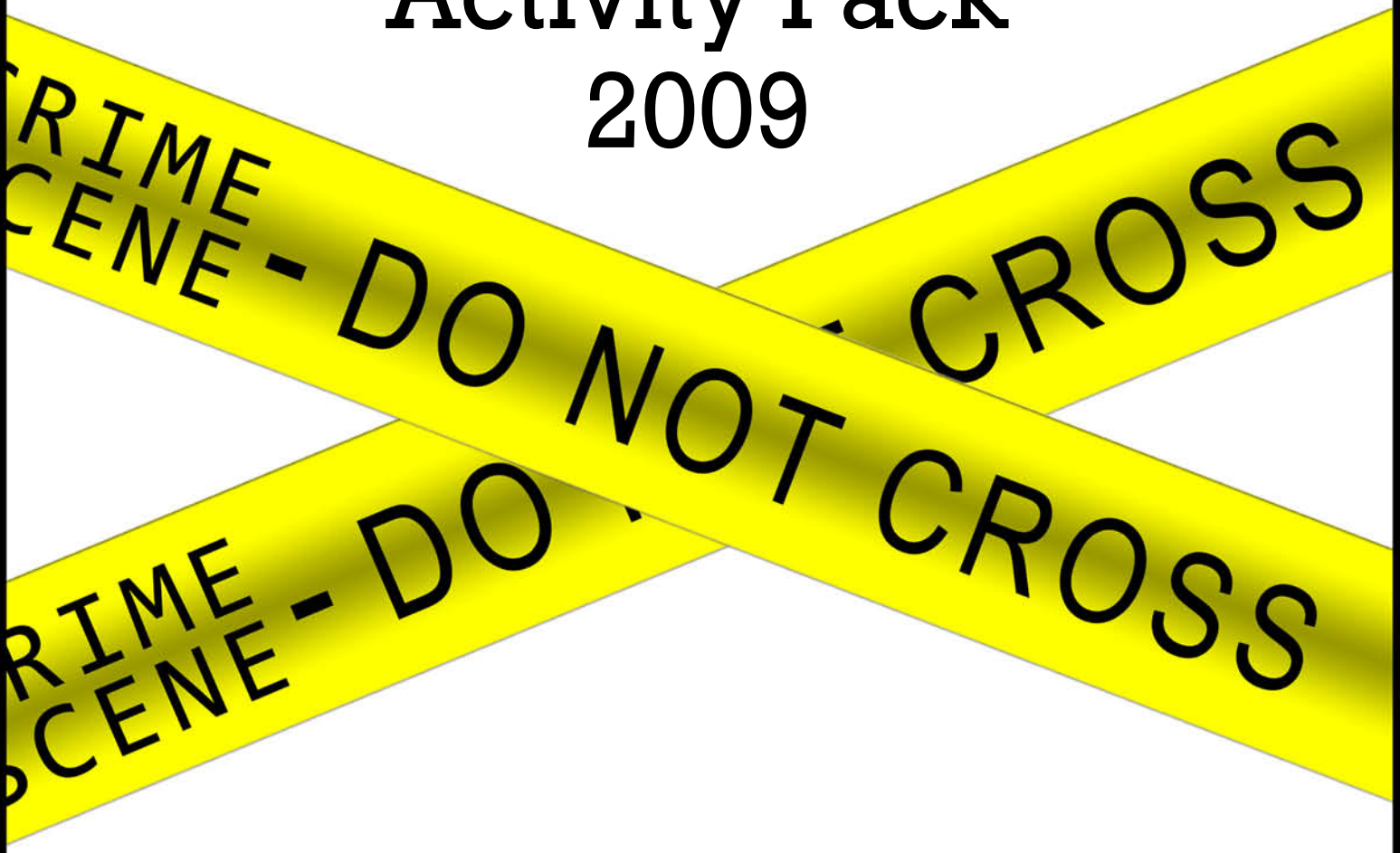
Science Week Activity Pack 2009



SCIENCE WEEK
8 - 15 NOVEMBER 2009

Crime Scene Assignment # 1

Blood Splatter

Equipment

Chocolate sauce
Red food colouring
Large sheets of paper
Straws
Scientific Calculator

Blood splatter analysis can tell the story of how a crime happened by using trigonometry. This is just one of the many uses of maths in the crime lab.

1. Make the fake blood by mixing 3 parts chocolate sauce to one part water. Then mix in the red food colouring until you achieve the right colour.

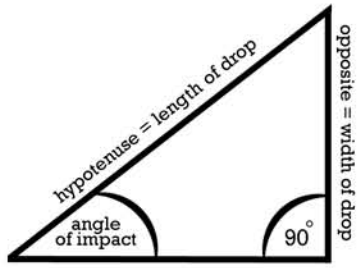
2. Now you're ready to splatter. Put a straw into the mixture and place your thumb over the top of the straw.

3. From a distance aim at the sheets of white paper (to be done outside as it can get very messy) and move your arm in a straight arc while taking your thumb off the top of the straw. This should give you a nice straight line of blood splatters.

4. Take some more chocolate blood in the straw and and stand directly above a new sheet of paper. Now release your thumb and let the blood fall directly downwards.

What is the difference between the blood splatters? Are they perfectly rounded or do some have tails?

Just like rain, blood droplets fall as perfect spheres. If they are projected from an angle they will land at an angle causing a longer splash with a tailed end. We can easily calculate the angle to see the path of impact.



$$\text{angle of impact} = \sin^{-1}\frac{\text{width}}{\text{length}}$$

1. Measure the length and width of the blood droplet.

2. Use your scientific calculator to divide the width by the length

3. When you get the answer press the button Sin-1 and this will give you the angle of impact.

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Crime Scene Assignment # 2

Lifting Prints

When surveying a crime scene, investigators use different techniques to identify the culprit that caused the crime.

Biometrics refers to technologies and techniques that are used to analyse human characteristics such as finger prints, voice patterns, footprints and hand measurements.

A fingerprint can reveal an individuals identity because the arrangement of ridges on every human finger is unique.

No two people have the same fingerprints, even identical twins have different fingerprints.

The practice of using fingerprints as a means of identification is called dactyloscopy.

Equipment

Cocoa powder and talc
Small powder brush
Clear sticky tape
Coloured card

1. To dust for fingerprints, sprinkle talcum powder on dark surfaces and cocoa powder on light surfaces.

2. Use a small paint or makeup brush with soft bristles to gently brush off the excess powder reveal the print.

3. Use clear sticky tape to lift the print and then stick it to colored paper.

e.g. To get started, try pressing your finger to a glass. Dust with cocoa powder and lift the print onto light coloured paper.

Now that you have collected the prints, what kinds of patterns do you see?

loop

tented arch

arch

whorl

Crime Scene Assignment # 3

Inky Business

The school's pet gold fish has been kidnapped and all that is left in it's place is a ransom note written on a paper towel. There are several pens beside the note, but which one did the

Equipment

5 different types of black felt tip pens or markers

Bowl with a 1/4 Inch of water

Paper towel

Stick tape

1. Cut the paper towels into long strips about a half an inch wide

2. Tape one end of the strip around a lollypop stick using sticky tape so it hangs downwards

3. Using a different felt tip pen each time draw one dot of ink on the end of the paper towel strip.

4. Put the lollypop stick across the top of a glass and let the paper towel strip hang down to the bottom and into the water.

5. Leave for ten minutes.

6. How many different colours do you see on the paper towel?

7. Ask your teacher for the ransom note that the kidnapper left. Cut out a small section of the note that has ink on it and do the same thing as above.

8. Which pen was used to write the ransom note?

What is happening?

Black ink is made up of a mixture of several colours.

The technique used to separate these mixtures is called chromotography.

Analytical chemists use chromatography and it is very important for analysing fluids left at the crime scene

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