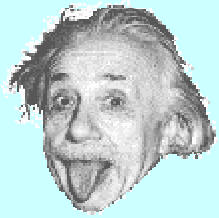
Tinkle Testing

Today, you are going to analyse some urine samples.
We all produce urine, but everybody's is slightly different!

Forensic scientists and doctors can discover a lot about someone from their urine, including kidney disease, diabetes and drug abuse.

Eye protection must be worn



Remember – it might be a wee bit of artificial urine today (made to a special recipee), but it's pretty realistic, so treat it with care!

Start off with Sample 0 to get you into the swing of it. Make sure you note down all your observations in your **PiDDLE CHART**.

Job 1

Examine the urine carefully by eye and … nose!

Comment on the **colour** of the sample – use words like **YELLOW**, **AMBER**, **DARK**, **PALE**. Examine the sample for its **odour** (smell).

Note how clear the sample is (**CLEAR** or **CLOUDY**).

Job 2

The next job is to find out if the sample contains **protein** – protein leaks into the urine if the kidney is damaged.

Divide the sample equally between two test tubes. Put one test tube into the hot water bath and leave the other test tube at room temperature.

After a few minutes, take the test tube out of the water bath, and compare the heated and unheated urine. If the heated sample is more **CLOUDY**, it contains protein. Note your result on the **PiDDLE CHART**.

Flush away the heated urine. Keep the unheated urine.

Job 3

The next job is to find out the **pH** of the unheated urine.

Dip a piece of universal indicator paper into the urine. Quickly take it out, and leave it for 30 seconds. Compare the new colour with the colour chart, and note the pH number on your **PiDDLE CHART**.

Job 4

The last job is to find out if the urine contains **glucose** using **Clinistix** like the one in the picture:

Dip a Clinistix into the unheated urine sample, and **immediately** take it out. Count to ten, then check the colour with the colour chart. Record whether the urine is negative, light, medium, or dark (dark means it contains a lot of glucose).

You are now a fully-fledged Tinkle Tester, ready to test other urine samples to reveal whom the villain is. There are four suspect urine samples, and one from the scene of the crime. See if you can work out who was caught on the job!

Piddle Chart

Your name:

.....

Record your results for Sample 0 in the table below.

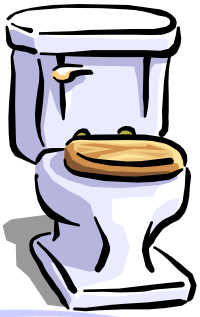
Job 1	Colour	
	Odour	
Job 2	Unheated	
	Heated	
Job 3	Colour	
	pH	
Job 4	Clinistix result	

Record your results for Samples 1 to 4, and the villain's sample, in the table below.

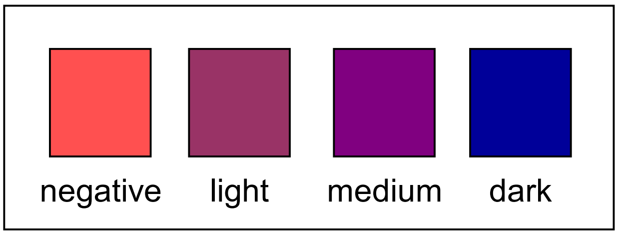
	Sample 1	Sample 2	Sample 3	Sample 4	Villain
Colour					
Odour					
Protein? ✓ or X					
pH					
Glucose					

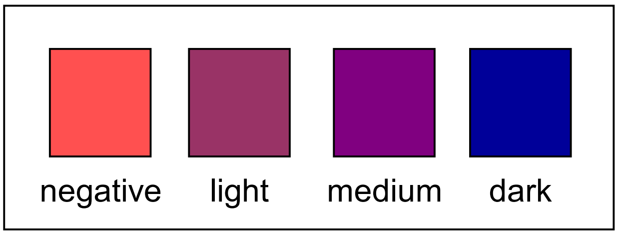
I think that Sample …… belonged to the villain.

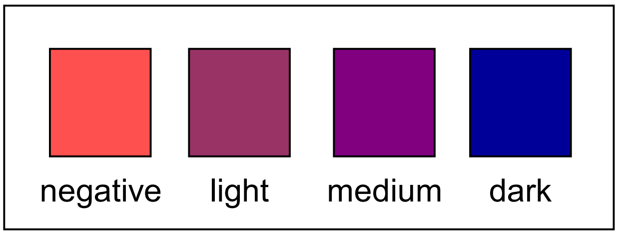
Were you right? Get your chart checked to see if you really are *flushed* with success!

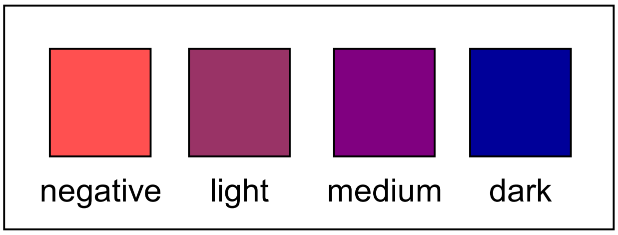


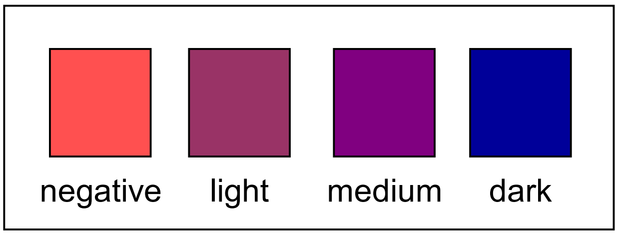
Spare charts

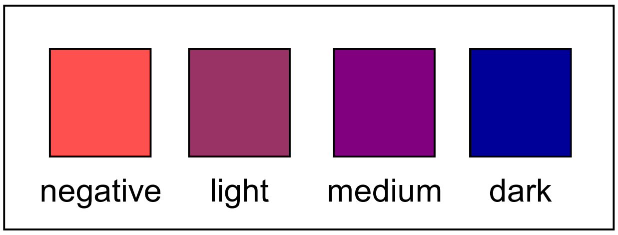


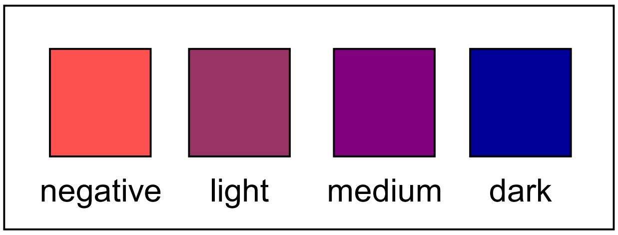


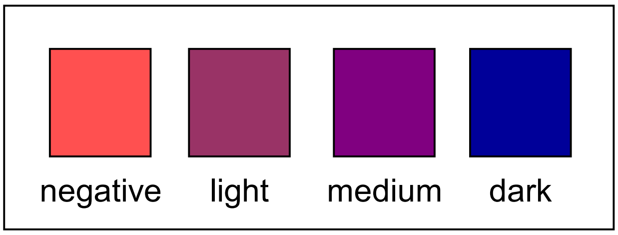












Teacher Guide for Urine Analysis

Contents:

Activity notes

There is a fair amount of excitement involved in this activity, so we find that it is important to impress upon the students that they should treat the samples following normal laboratory rules. The identity of the villain can be changed if you run the activity more than once. We find that it is easy for the students to distinguish between the samples listed below, but you could make up other combinations. The protein test works well, but you might want to use the biuret test instead. We use *Bayer Diagnostics* Clinistix strips to test for glucose. These are easy to use, and give the activity an authentic feel. However, you may wish to use Benedict's reagent instead (and you could use the hot water bath to heat the samples instead of using Bunsen burners).

Urine Analysis

Students' checklist

Check you have:

- 1 x teat pipette
- 1 x test tube rack
- 5 x test tubes (or boiling tubes)
- Universal indicator paper with colour charts
- Clinistix glucose test strips with colour charts

Urine Analysis

Technicians' notes

For 5 groups of students:

5 x teat pipettes
5 x test tube racks
10 x test tubes (or boiling tubes)
Labelled water bath set at 70°C with test tube rack
Universal indicator paper with colour charts
Bayer Diagnostics Clinistix glucose test strips with colour charts

Artificial urine samples:

Sample 0
Dissolve 3g sodium chloride, 5g urea, 1g glucose powder and 1g albumin powder in 1dm^3 water.
Add 1 drop of 2M hydrochloric acid.

Sample 1
Dissolve 3g sodium chloride, 5g urea and 1g glucose powder in 1dm^3 water.
Add 3 drops of 2M hydrochloric acid.

Sample 2
Dissolve 3g sodium chloride and 1g glucose powder in 1dm^3 water.
Add 3cm^3 of 1M ammonia solution.

Sample 3
Dissolve 3g sodium chloride, 5g urea and 1g albumin powder in 1dm^3 water.

Sample 4
Dissolve 3g sodium chloride, 1g glucose powder and 1g albumin powder in 1dm^3 water.

Villain sample
Select one of Samples 1 to 4.

Note: You may wish to add some yellow food colouring to enhance the appearance of the samples.