

# *Engage@Roslin*

## Flu Lab: EBSOC Out & About



*Inspiring the next generation of  
scientists*

## Researcher Guide

# EBSOC Out & About: Flu Lab



THE UNIVERSITY of EDINBURGH  
Easter Bush  
Science Outreach Centre

In this hands-on, experimental workshop, students will use real laboratory techniques to identify chickens that are infected with bird flu.

## Overview

There is a constant risk of bird flu in the UK's farmed chickens from wild birds, such as ducks. Flu is caused by a virus called influenza, and it is highly contagious. Rapid detection of bird flu outbreaks and isolation of infected animals is extremely important.

During this workshop, pupils will use micropipettes and other lab equipment to help them perform a mock diagnostic test for flu. The hands-on workshop will cover some of the science behind flu diagnosis.

The pupils will have the opportunity to speak with and interact with professional scientist from The Roslin Institute, who are working together to understand how flu affects farmed chickens and other animals.

## Brief Description of Work

A hands-on workshop, which includes the following techniques:

1. Using micropipettes
2. Carrying out a mock diagnostic test (colour change assay)

## Workshop outline

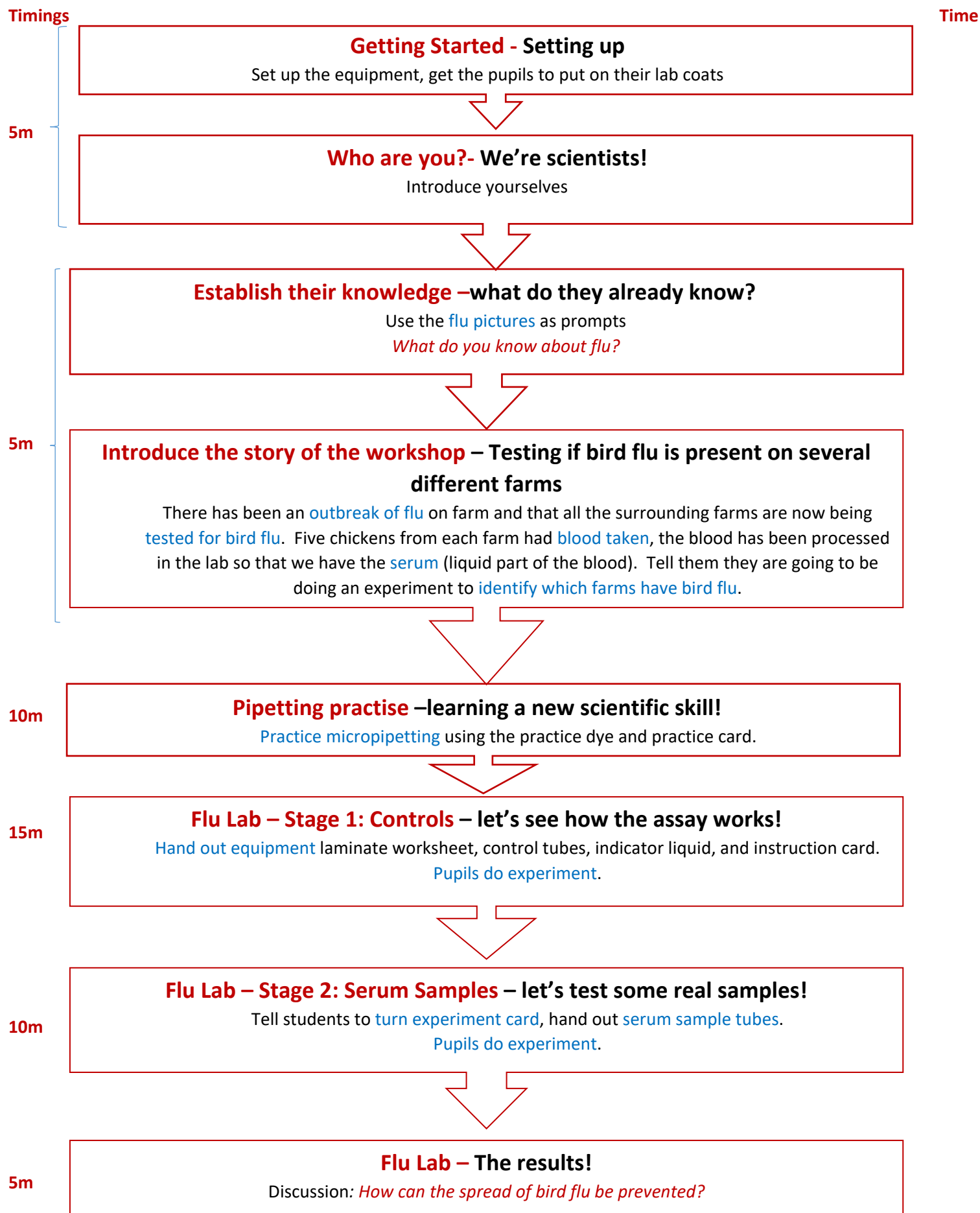
- Introduction to flu
- Introduction to micropipettes
- Mock diagnostic test (colour change assay)
- Assess and interpret experimental results
- Discussion with professional scientists who are working to understand how infectious diseases affect livestock and how to prevent them, and about their work and career path.



Get hands-on  
with real-life  
science



# Flu Lab Quick Guide Workshop Timeline



## How do you hold a micropipette?

- Use the hand which feels most comfortable
- Place your **thumb** on the **plunger**



- **Press down** on the plunger until you feel some resistance – this position is called the **1st stop**
- Then **press down more** until the plunger is all the way down – this position is called the **2nd stop**

## How do you set the volume?

- **Turn the plunger** to set the volume  
**The smallest volume is 5µl and the biggest volume is 50µl**
- **Set the pipette to 30µl** – press the plunger to the 1st stop.
- Now **set the pipette to 10µl** – press the plunger to the 1st stop

**Can you feel the difference in how far the plunger moves to the 1st stop?**  
**What will it feel like if you set the pipette to 5µl?**

# How to use a Micropipette

## How do you take up liquid?

Practice how to take up liquid using the practice loading dye:

- 1) Put a **disposable tip** on the pipette  
**Remember to change your pipette tip between each sample!**
- 2) Press the plunger down to **1st stop**
- 3) Place the pipette tip in the liquid
- 4) Slowly bring your thumb up to release the plunger

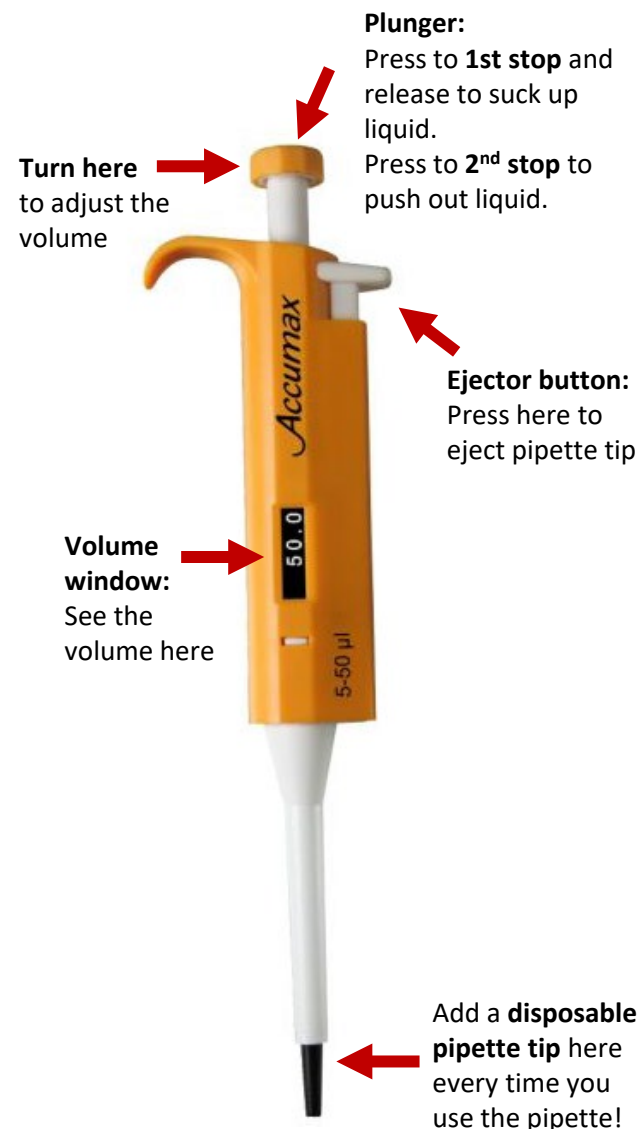
**The liquid will be sucked up into the pipette tip**

## How do you dispense liquid?

Practice how to dispense liquid using the **Playing with pipettes** practice card:

THE UNIVERSITY of EDINBURGH Easter Bush Science Outreach Centre	
Playing with pipettes	
What does 10µl look like?	<input type="checkbox"/>
What does 7.5µl look like?	<input type="checkbox"/>
What does 5µl look like?	<input type="checkbox"/>

- 1) Place the tip where you want the liquid to go
- 2) Press the plunger right down to **2nd stop**  
**This pushes all of the liquid out, plus an extra bit of air**
- 3) Lift the pipette tip away from the liquid
- 4) Slowly release the plunger
- 5) Eject the pipette tip into your waste pot

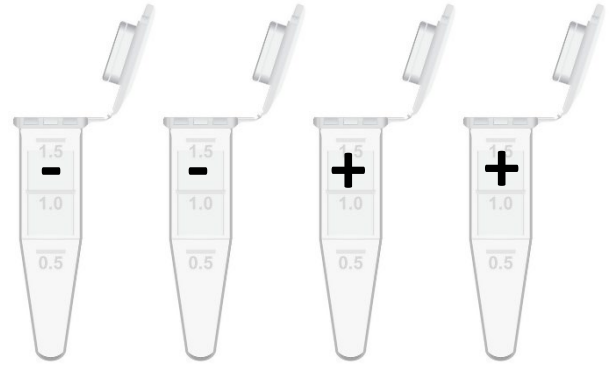


# Flu Lab Protocol #1

## Testing the Control Samples



1. Label 4 empty tubes



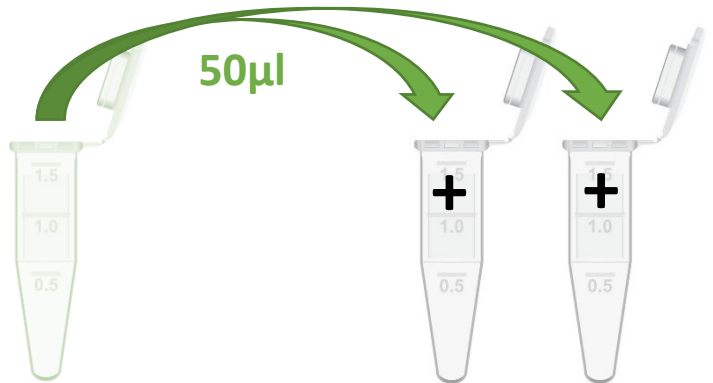
2. Add 50µl **-ve control** to 2 empty tubes

*Change tip!*

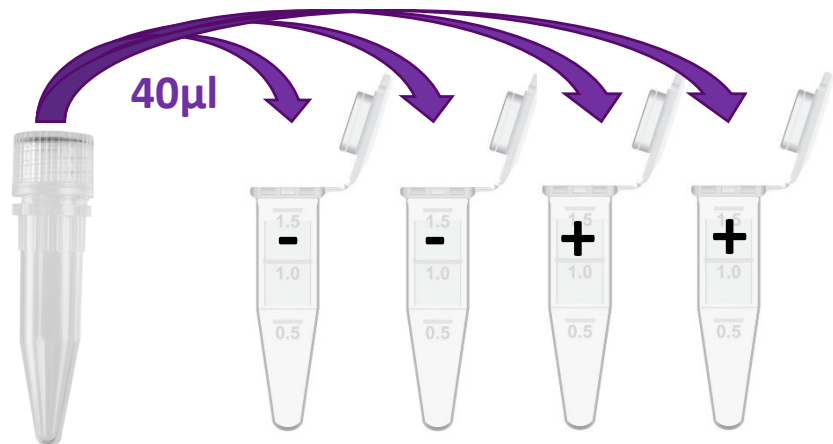


3. Add 50µl **+ve control** to 2 empty tubes

*Change tip!*



4. Add 40µl **indicator solution** to all tubes



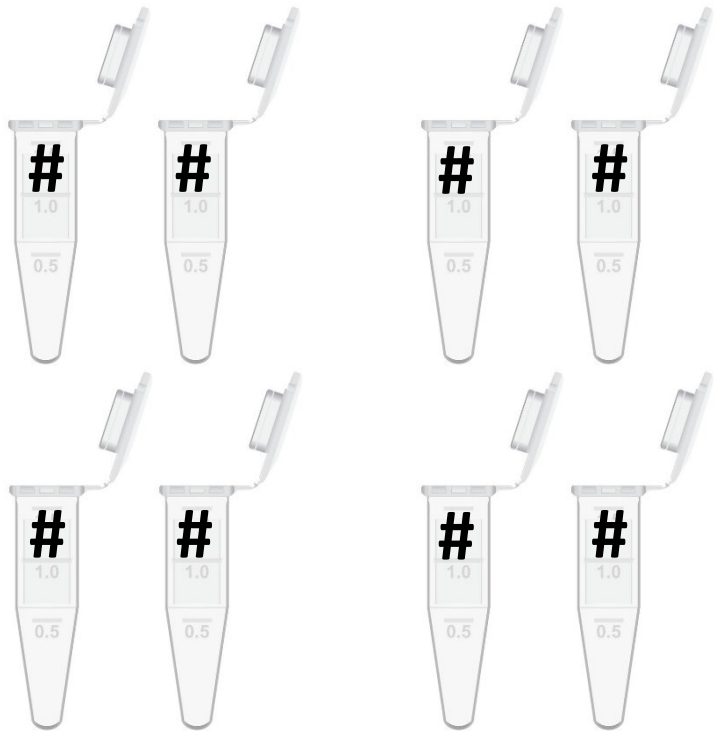
5. Flick to mix, observe the colour and write the results on your worksheet

# Flu Lab Protocol #2

## Testing the Serum Samples

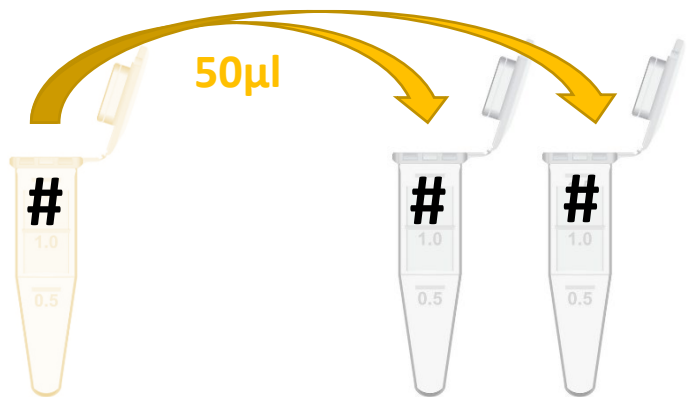


1. Label 8 empty tubes with your four sample numbers

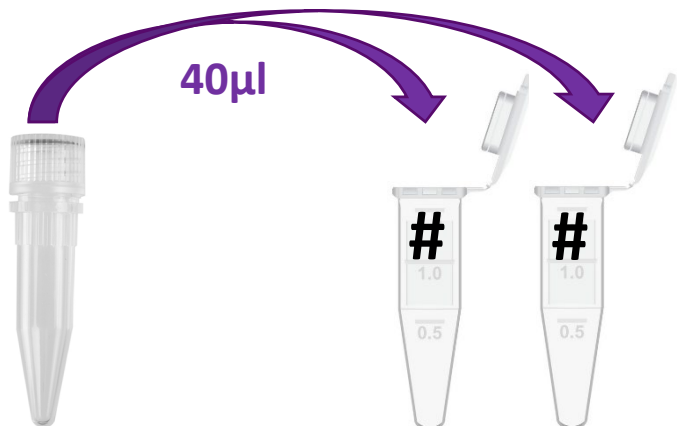


2. Add 50µl **each serum sample** to 2 empty tubes

*Change tip between samples!*



3. Add 40µl **indicator solution** to all 8 tubes



4. Flick to mix, observe the colour and write the results on your worksheet

## Testing the Control Samples

1. Test the control samples, in duplicate, and write what you see in the table.

	Negative control (-) Serum sample from chicken without flu	Positive control (+) Serum sample from chicken with flu
Test #1		
Test #2		

- Serum samples from **healthy chickens** will turn ..... after the indicator solution is added.
- Serum samples from **chickens infected with flu** will turn .....after the indicator solution is added.

## Testing the Serum Samples

1. Write the sample numbers of your four serum samples in the table below.
2. Test your four serum samples, in duplicate, and write what you see in the table.

Serum sample number	[ ]	[ ]
Test #1		
Test #2		
Does this chicken have flu?		

Serum sample number	[ ]	[ ]
Test #1		
Test #2		
Does this chicken have flu?		

# Do you keep chickens, ducks, geese...?

Help protect your birds from the risk of **#birdflu**

## Did you know?

There is a constant risk of bird flu in the UK from wild birds. As it's highly contagious take action to protect your birds from catching it.



## Remember

Any very sick birds, or unexplained deaths, must be assessed by your vet. By law suspicion of bird flu is notifiable and can affect poultry movement and trade.



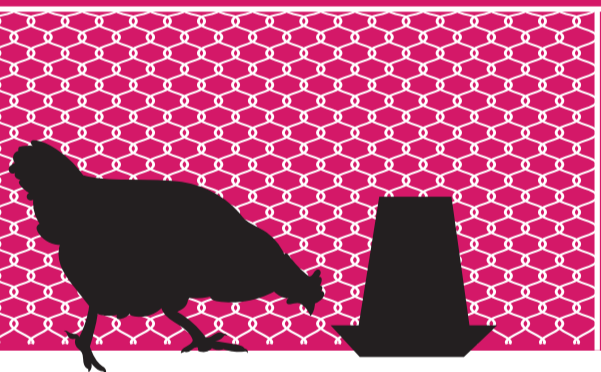
## Tip 1: Cleaning

Clean footwear before and after visiting your birds. Keep areas clean and tidy, and regularly disinfect hard surfaces. Humanely control rats and mice.



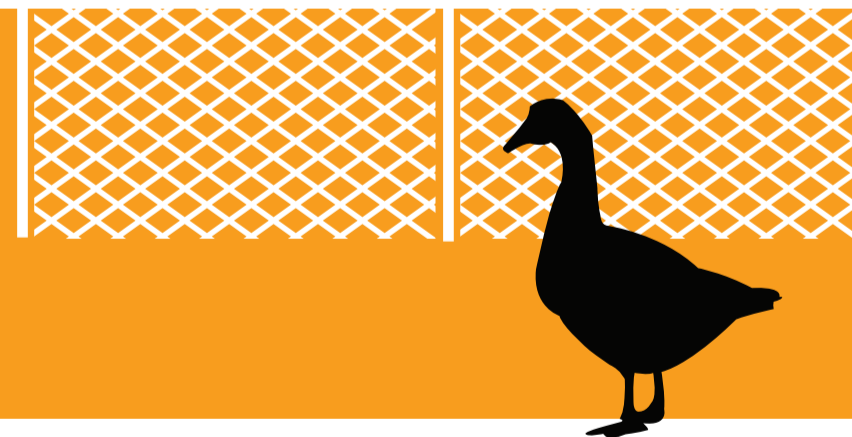
## Tip 2: Feeding

Place your birds' food and water in fully enclosed areas that are protected from wild birds, and remove any spilled feed regularly.



## Tip 3: Fencing

Keep your birds separate from wildlife and wild waterfowl by putting suitable fencing around the outdoor areas they access.



## Tip 4: Stay aware

<http://animalhealth.system-message.co.uk>



Sign up for free online to receive alerts on any outbreaks of bird flu, and register your birds on GOV.UK.

Supported by:



Scottish Government  
gov.scot



The Poultry Club  
OF GREAT BRITAIN





## Flu Lab- Technical Notes

**Before you arrive at the school** you must check that you have everything you need and have aliquoted out all the tubes- see REAGENTS list in the next section.

### Materials

Per group (4 pupils per group)

Laboratory Equipment	Quantity
P50 pipette	2
Pipette tips	1 box
Tube rack	1
Tissue	2 pieces
Waste beaker	1
Clear 1.5ml tubes	12

Reagents	Quantity
Pipetting practice dye	2
Blue tube with H <sub>2</sub> O ( <b>negative control</b> )	1
Green tube with lemon juice ( <b>positive control</b> )	1
Yellow tubes with " <b>serum samples</b> "	4
Screw cap tubes with <b>indicator solution</b>	

PPE	Quantity
Lab coats	4
Safety glasses	4
Gloves	4 pairs

Educational Materials	Quantity
Results laminated sheets	1
Whiteboard pens	1
Micro-pipetting instruction card A4	1
Pipetting practice cards	4
Instructions for experiment A4 (2 sided)	1

### Before the workshop

#### 1) Aliquot Pipetting Practice Dye:

Use a dropper to fill **20x 1.5ml clear Eppendorf** with "pipetting practice dye". The pipetting practice dye is a mixture of water and blue food colouring.

Label the top of each tube with a "**P**" to show it is Practice Dye. These filled tubes can be reused for another session.

#### 2) a) Aliquot Negative Controls:

Use a dropper to aliquot water (1ml) into **10x 1.5ml blue Eppendorf**. Preferably used dH<sub>2</sub>O. If using tap water, please test the pH before the workshop.

#### b) Aliquot Positive Controls:

Use a dropper to aliquot the lemon juice (1ml) into **10x 1.5ml green Eppendorf**.



In each rack place 1 blue (negative control) and 1 green (positive control) tube, give workshop stage, **Flu Lab- Stage 1: Controls**

### 3) Aliquot “serum samples”:

In a rack place **20x 1.5ml yellow Eppendorf tubes**. To 9x of the tubes add 1ml dH<sub>2</sub>O and to the other 11x tubes 1ml lemon juice (acidic solution. \* this means that 55% of the chickens are infected with flu)

Mix the tubes up so that each group get some + and some – tubes (**ensure that each group get at least 1 positive sample**)

Now, label the tubes 1 – 40 randomly i.e. *group 1* has samples 6, 29, 13 & 21

Give these out during the workshop stage, **Flu Lab- Stage 2: Serum Samples**

### 4) Aliquot indicator solution

Use a dropper aliquot 1ml of 1% litmus solution (a non-hazardous pH indicator) into 10 screwcap tubes.

## During the workshop

### 1) Set up the room

Set up each table (4 pupils per group, maximum 5 groups) with the:

- Group letter card
- Laboratory Equipment
- PPE
- Educational Materials
- Racks containing pipetting practice dye, positive and negative control

Have all other materials ready on hand on a table that you can access easily. Please note, you can give each student in each group a number 1 – 4 and then assign them tasks i.e. “*student 1- please come and collect the serum samples*”

## After the workshop

### 1) Clear up the room

All waste should be taken away, please use a waste bag that can be taken back to your organisation for correct disposal. **Do not use the waste disposal system of the school.**

Please note, none of the reagents are toxic or hazardous, however they do look like laboratory waste materials so they should be disposed of in accordance with your organisation’s waste disposal protocol.



Some tubes can be saved and reused:

- Pipetting Practice Dye
- Indicator Solution
- All 50ml Falcon tubes and droppers used to set up the positive, negative controls and serum samples\*

\*ensure the tubes are dry before storing in the outreach box