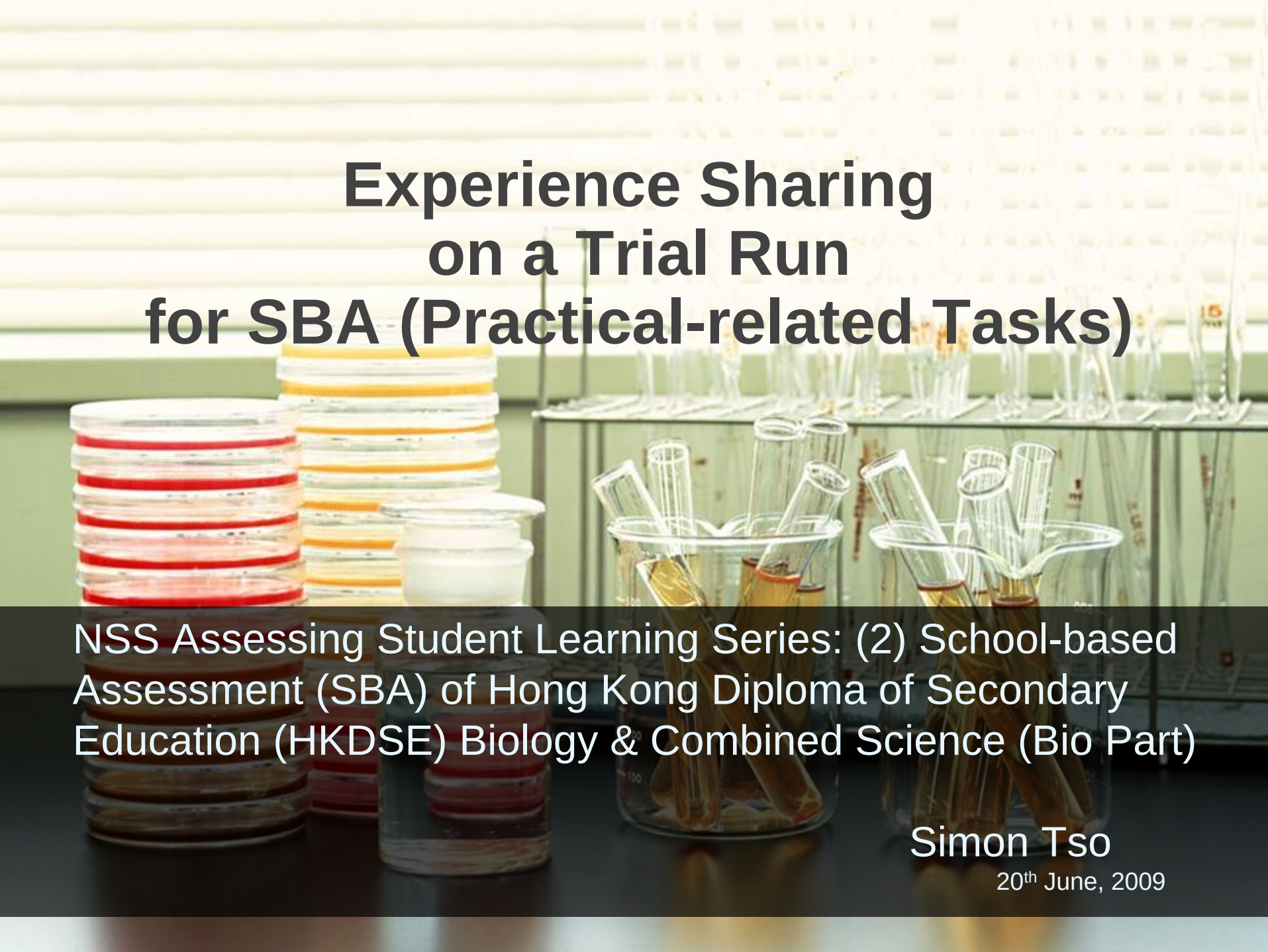


Experience Sharing on a Trial Run for SBA (Practical-related Tasks)

NSS Assessing Student Learning Series: (2) School-based Assessment (SBA) of Hong Kong Diploma of Secondary Education (HKDSE) Biology & Combined Science (Bio Part)

Simon Tso

20th June, 2009

Background

Background

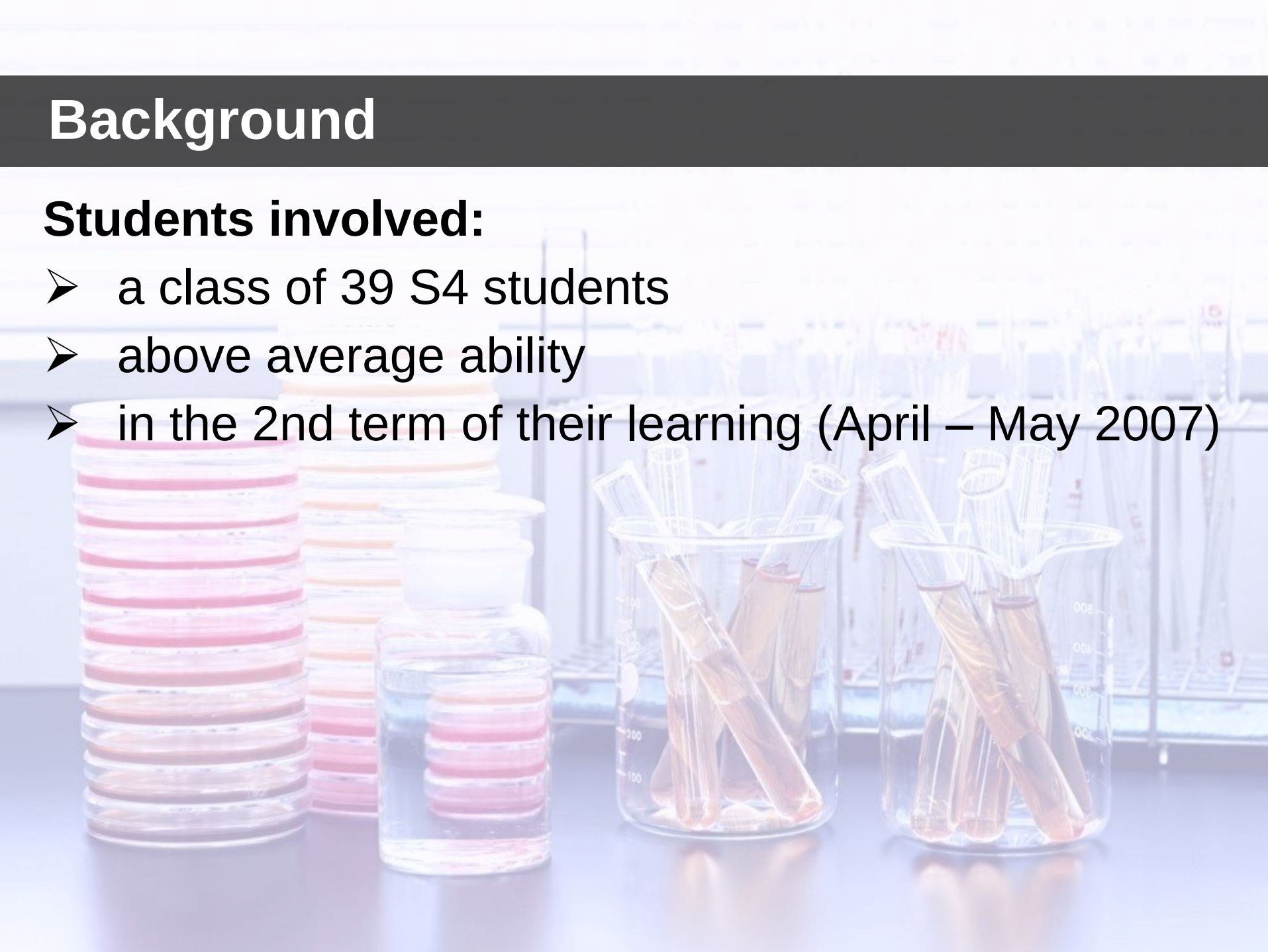
Activity type: Investigative Practical Work

Assessment area: Area A (Practical Skills)
Area B (Investigation Report)

Background

Students involved:

- a class of 39 S4 students
- above average ability
- in the 2nd term of their learning (April – May 2007)



Background

Objectives of the trial run:

1. to test the ability of my students in learning of laboratory skills
2. to test the ability of my students in writing up a full report of projected standard required in NSS Biology
3. to find out the difficulties in assessing the practical skills in a large group of lower senior secondary students
4. to find out the features of investigative practical tasks that are more suitable for assessment of Area A (practical skills)

Background

Planning for the trial run:

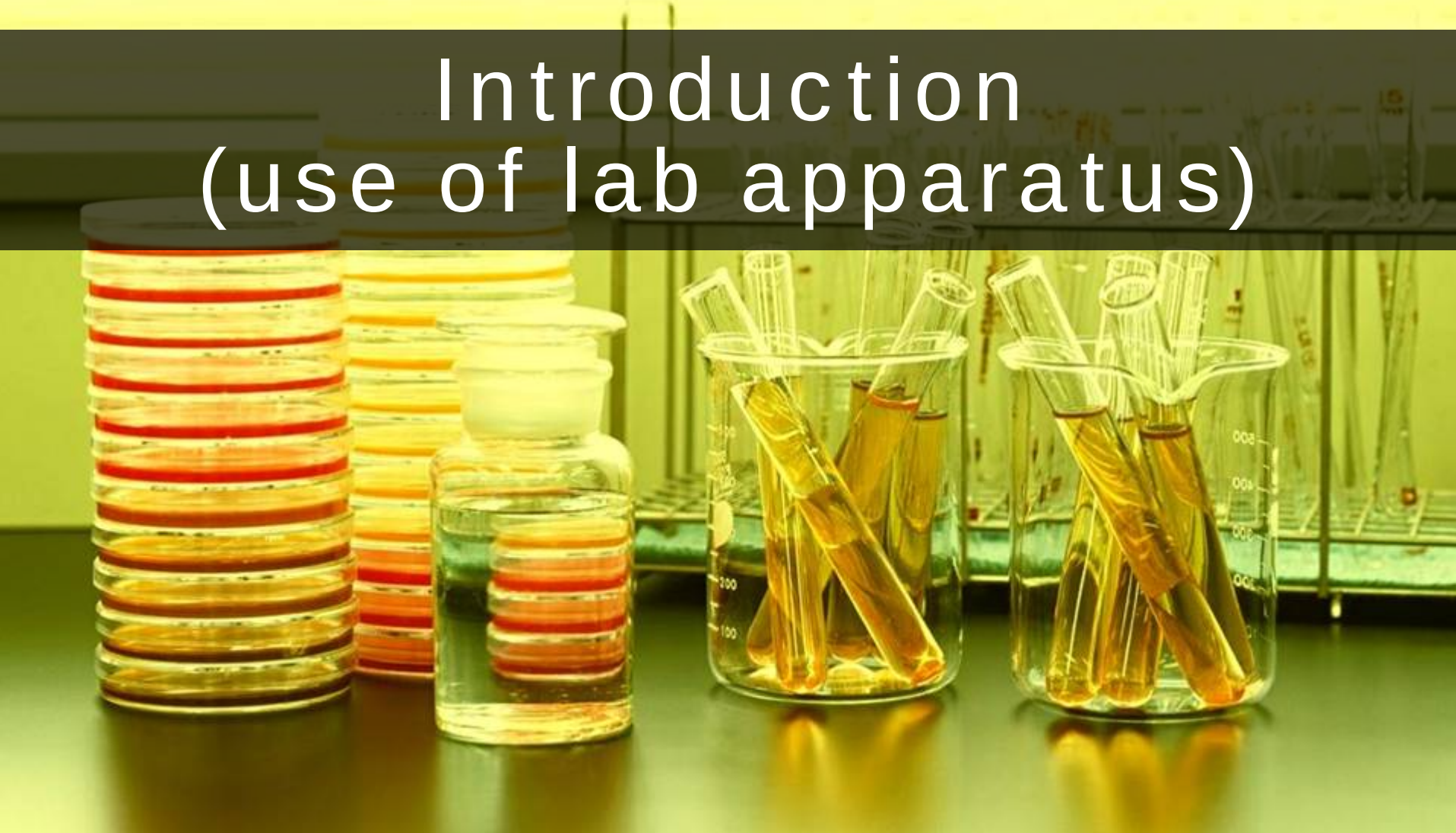
1. Introducing the use of some laboratory apparatus (30 min)
2. Introducing some generic laboratory skills (20 min)
   Trial on selected generic laboratory skills (40 min)
3. Introducing basic report-writing skills (30 min)
4. Designing an investigation (30 min)
5. Performing the investigation & writing up a lab report (results/discussion/conclusion) (60 min)

Background

Aim of investigation:

To compare the vitamin C concentration in the juice of orange, green grape, kiwifruit and honeydew melon

Introduction
(use of lab apparatus)



Introduction (use of lab apparatus)

Test tube

Boiling tube

Test tube rack

Mortar & pestle

Filter funnel with filter paper / filter cloth

Dropper / Teat pipette

Pipette + filler

Knife

White tile

Towel

Marker pen

Test-tube brush

Scouring pad

Introduction & Trial (Generic laboratory skills)

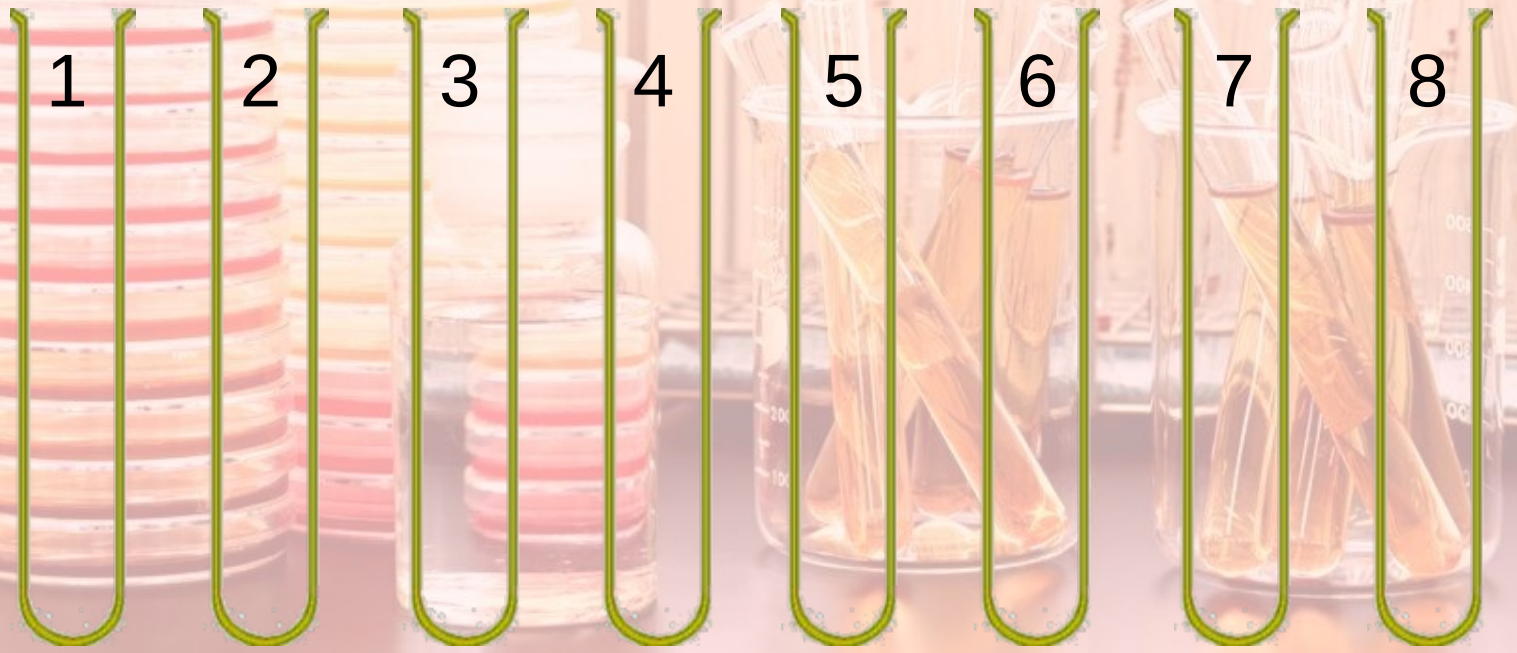
Experiments involving ***large amount of tubes***

a. Appropriate ***amount*** of tubes are used & ***labelled first*** (labelled near the mouth).

Experiments involving ***large amount of tubes***

a. Appropriate ***amount*** of tubes are used & ***labelled first*** (labelled near the mouth).

b. The tubes are assembled in a ***neat*** way (e.g. according to numbers).



Experiments involving ***transfer & mixing of solutions***

a. The appropriate ***total volume*** used for mixing is decided.

How much liquid to be used for reactions/activities?

~1/3 of the capacity

What is the capacity of each kind of tubes?

test tube

boiling tube

Experiments involving ***transfer & mixing of solutions***

a. The appropriate ***total volume*** used for mixing is decided.

b. **Measuring cylinder** is used properly for transferring required volume of liquid (if ***very accurate volume*** is ***not*** needed).

c. **Pipette** is used properly for transferring required volume of liquid (if ***accurate volume*** is needed).

d. Solutions in tubes are ***mixed*** using appropriate method.

e. Solution is ***transferred*** from tube to tube or from bottle to tube properly.

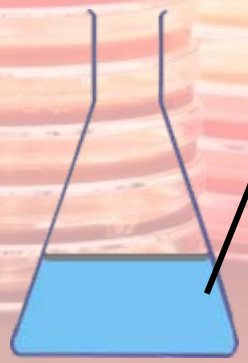
Experiments involving ***titration***

What is titration?

- A laboratory method to ***determine the concentration*** of some substance in a solution.
- Done by ***slowly adding measured amounts of some reagent*** until a reaction is shown to be complete

Experiments involving ***titration***

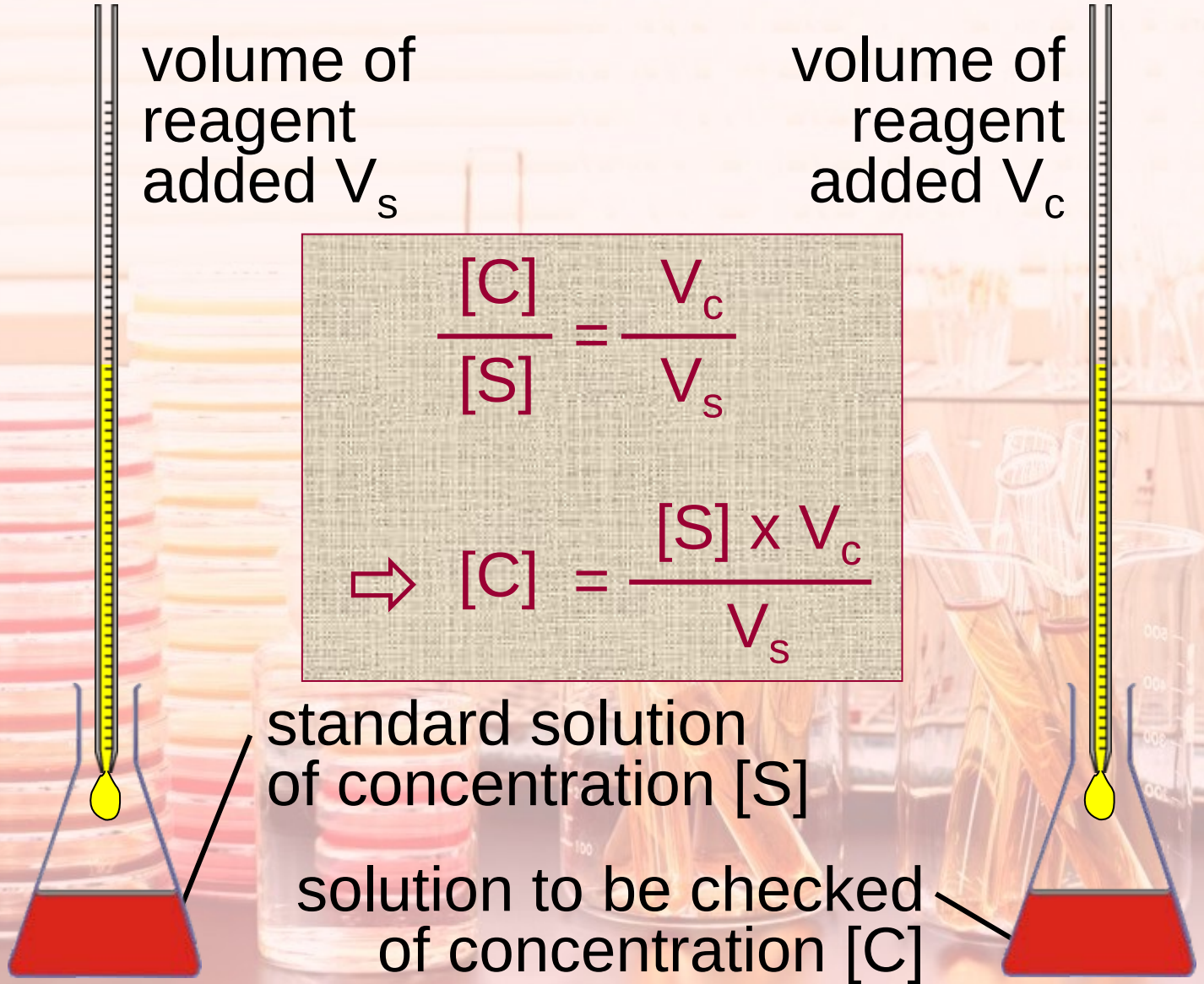
of equal volume



standard solution
of concentration [S]

solution to be checked
of concentration [C]

Experiments involving ***titration***



Experiments involving ***titration***

Animation for illustration:

- reagent to react with the substance
- substance to check

Experiments involving ***titration***

Animation for illustration:

$$\frac{[C]}{[S]} = \frac{V_c}{V_s}$$

- reagent to react with the substance
- substance to check

Experiments involving the ***extraction of juice*** from specimen

a. The ***peel*** of specimen is not used (unless the investigation of peel is expected).
b. The specimen is placed on a white tile & cut into small segments using a razor blade / knife (so that grinding can be done ***more efficiently***).
c. The waste material is discarded into a litter bin provided immediately to keep the ***cleanliness*** of working place. (Never discard solid waste into the sink!)

Experiments involving the ***extraction of juice*** from specimen

d. The ***mortar*** & ***pestle*** are used properly for grinding.

e. Filter paper / filter cloth is ***folded correctly*** & the level of extract poured is ***well below*** the top of filter paper throughout filtration.
OR
The supernatant layer is ***decanted directly & carefully*** to obtain extract (if filter paper / filter cloth is not available).

Experiments involving ***comparison***

Standard volume, ***equal*** amount of time in treatment, ***equal*** temperature etc., are used among different treatments.

Designing an investigation

Designing an investigation

Scenario:

"Orange is one of the richest sources of vitamin C" is a common concept held by many people including Stephen who has been given this idea since he was a child. This is one of the reasons why he eats an orange everyday. Recently some of Stephen's friends told him that there are many fruits with higher vitamin C content than orange. He wondered if he should change his habit to eat other fruits.

Designing an investigation

Scenario:

You are asked to design and carry out an investigation to compare the vitamin C concentration in the juices of the following common fruits:

orange, green grape, kiwifruit and honeydew melon

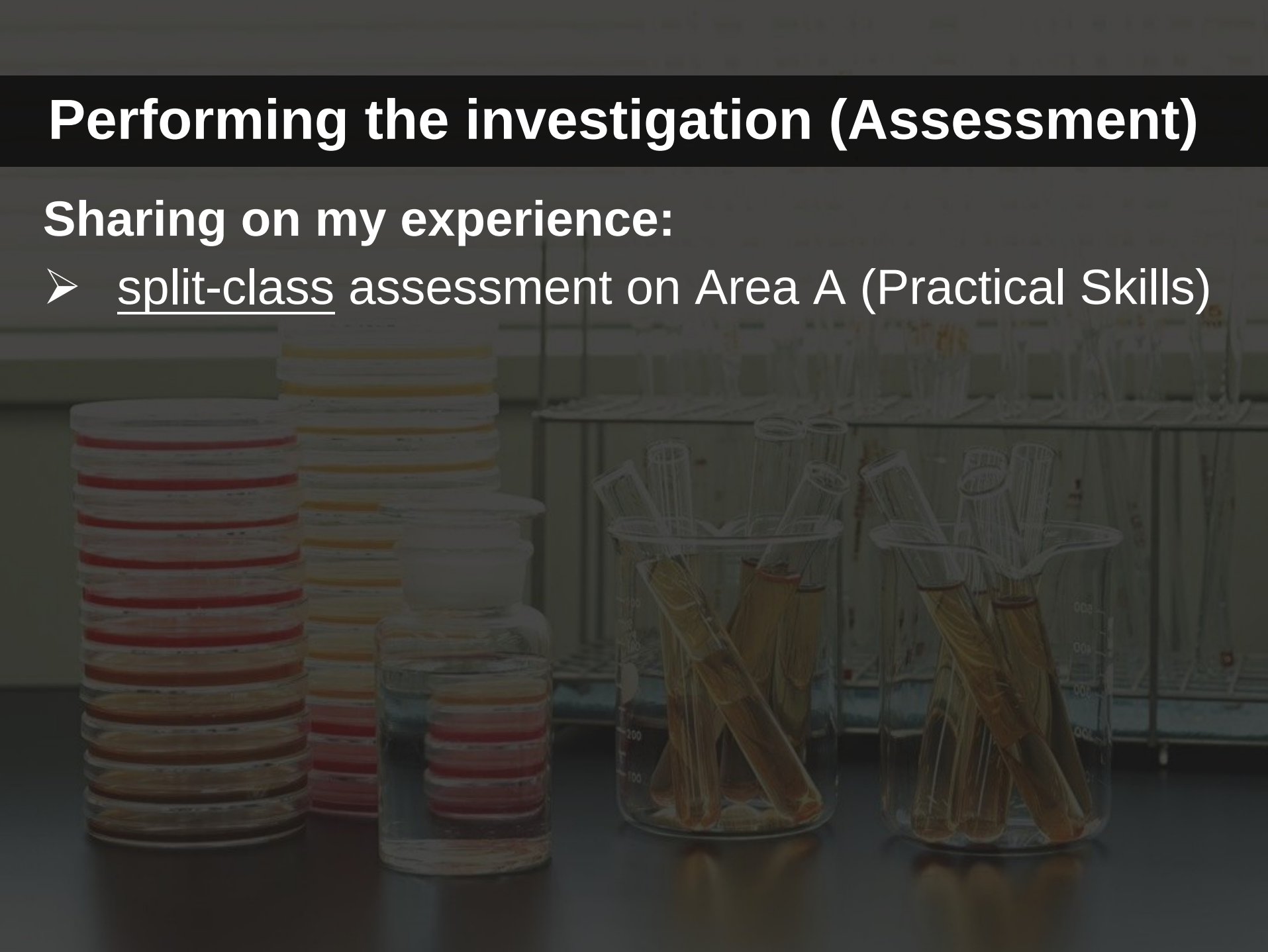
Based on your experimental data and some other considerations, will you recommend Stephen to change his habit and eat other fruits in order to obtain more vitamin C?

Performing the investigation

Performing the investigation (Assessment)

Sharing on my experience:

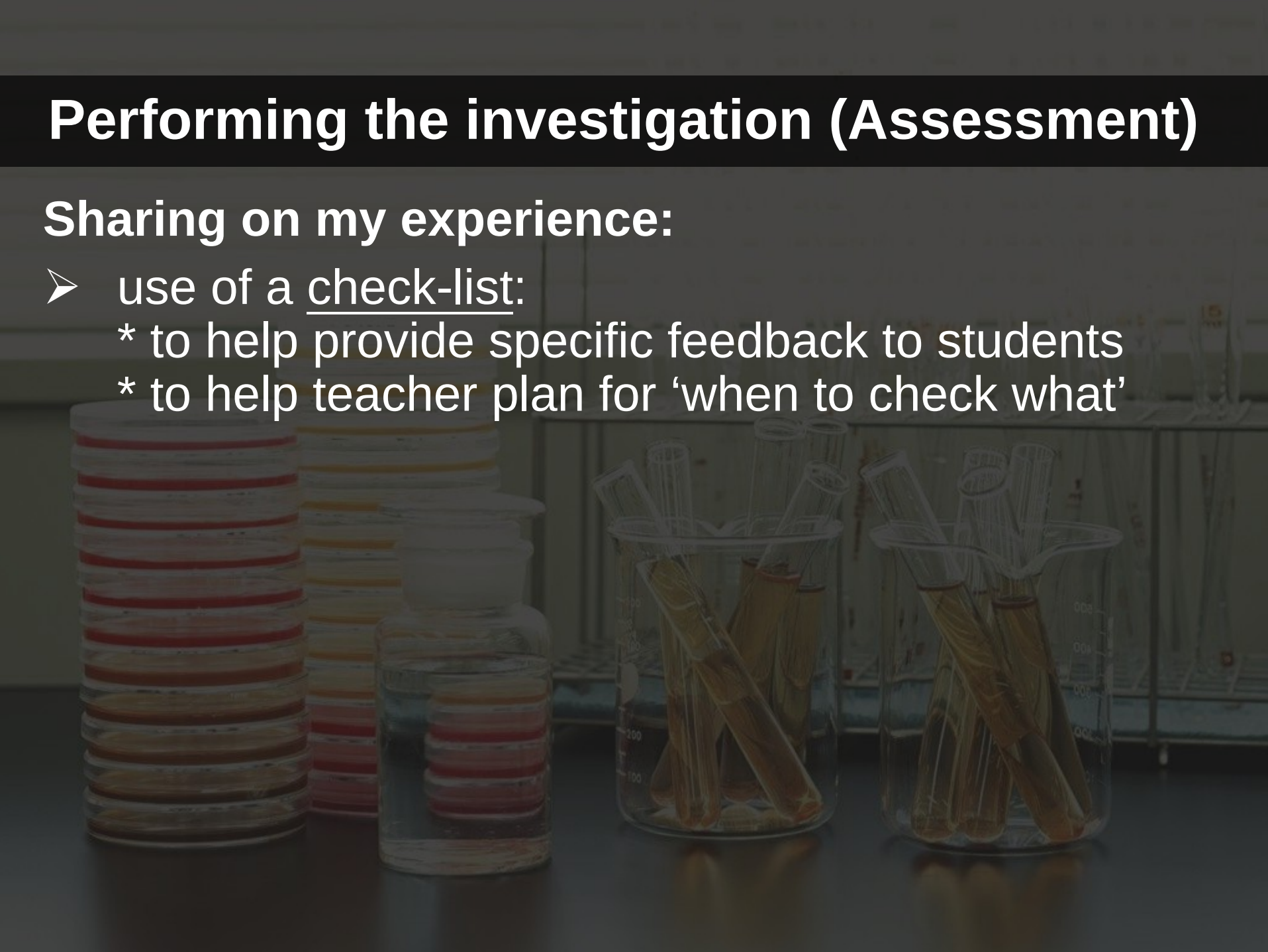
- split-class assessment on Area A (Practical Skills)



Performing the investigation (Assessment)

Sharing on my experience:

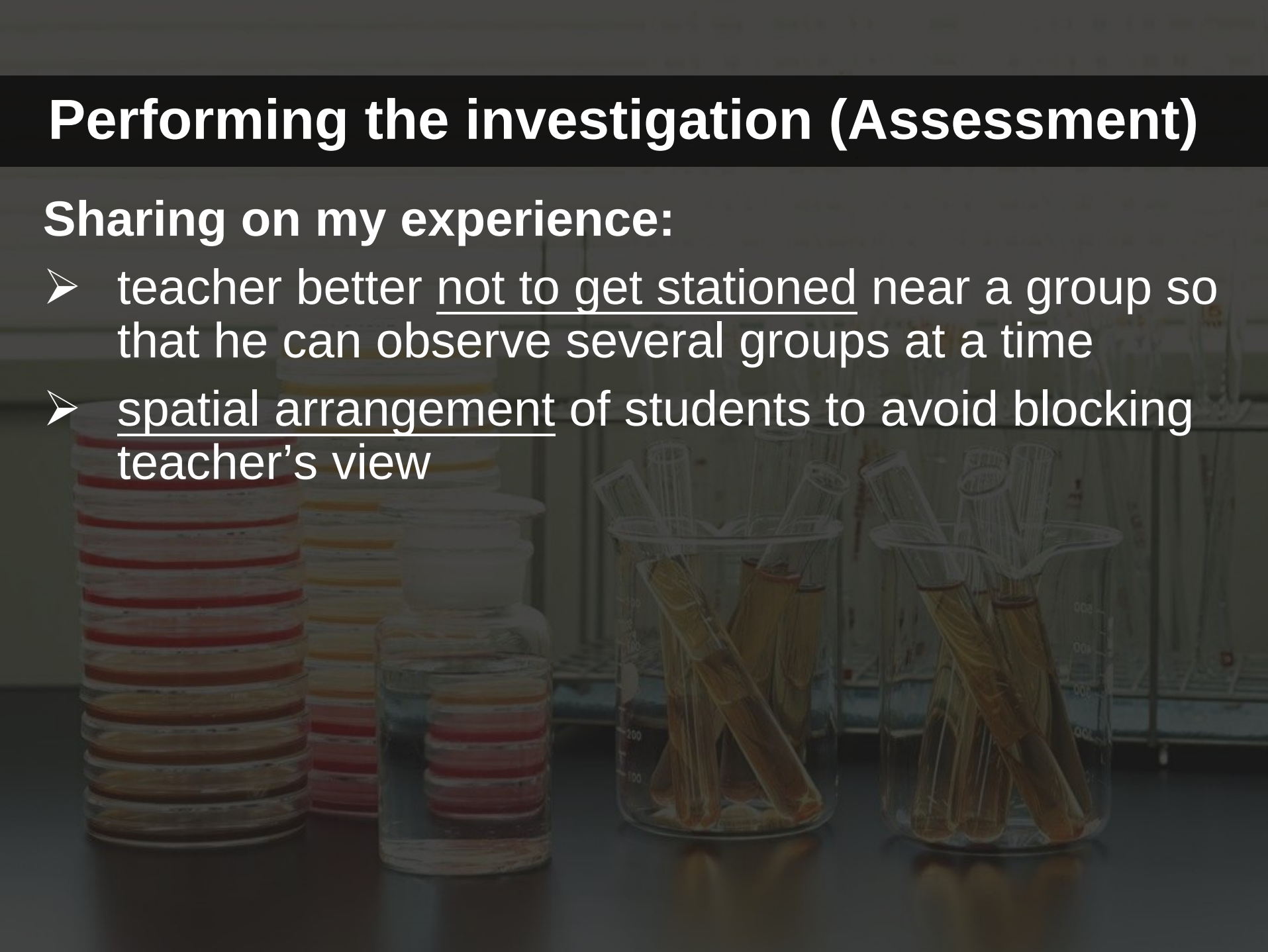
- use of a check-list:
  * to help provide specific feedback to students
  * to help teacher plan for ‘when to check what’



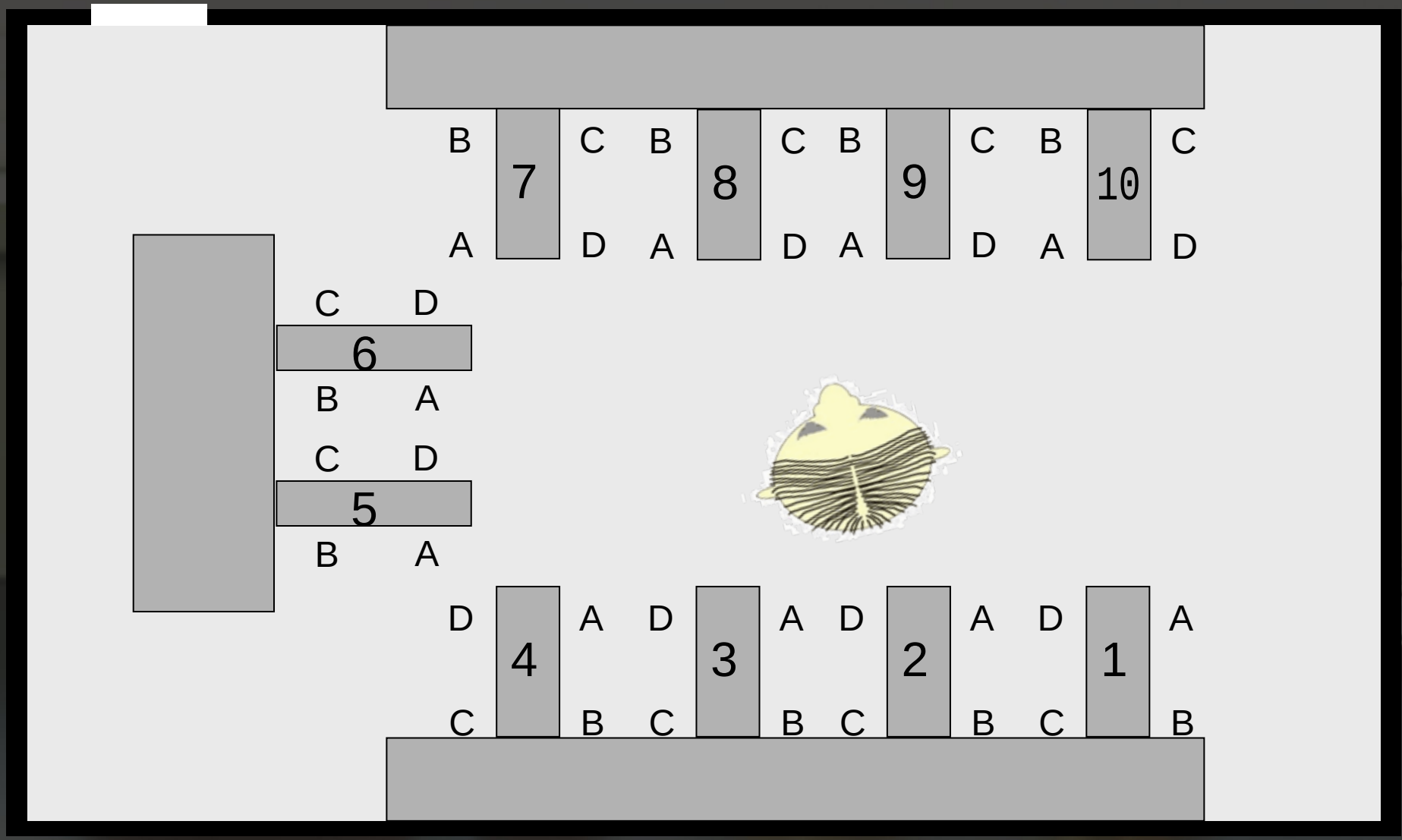
Performing the investigation (Assessment)

Sharing on my experience:

- teacher better not to get stationed near a group so that he can observe several groups at a time
- spatial arrangement of students to avoid blocking teacher's view



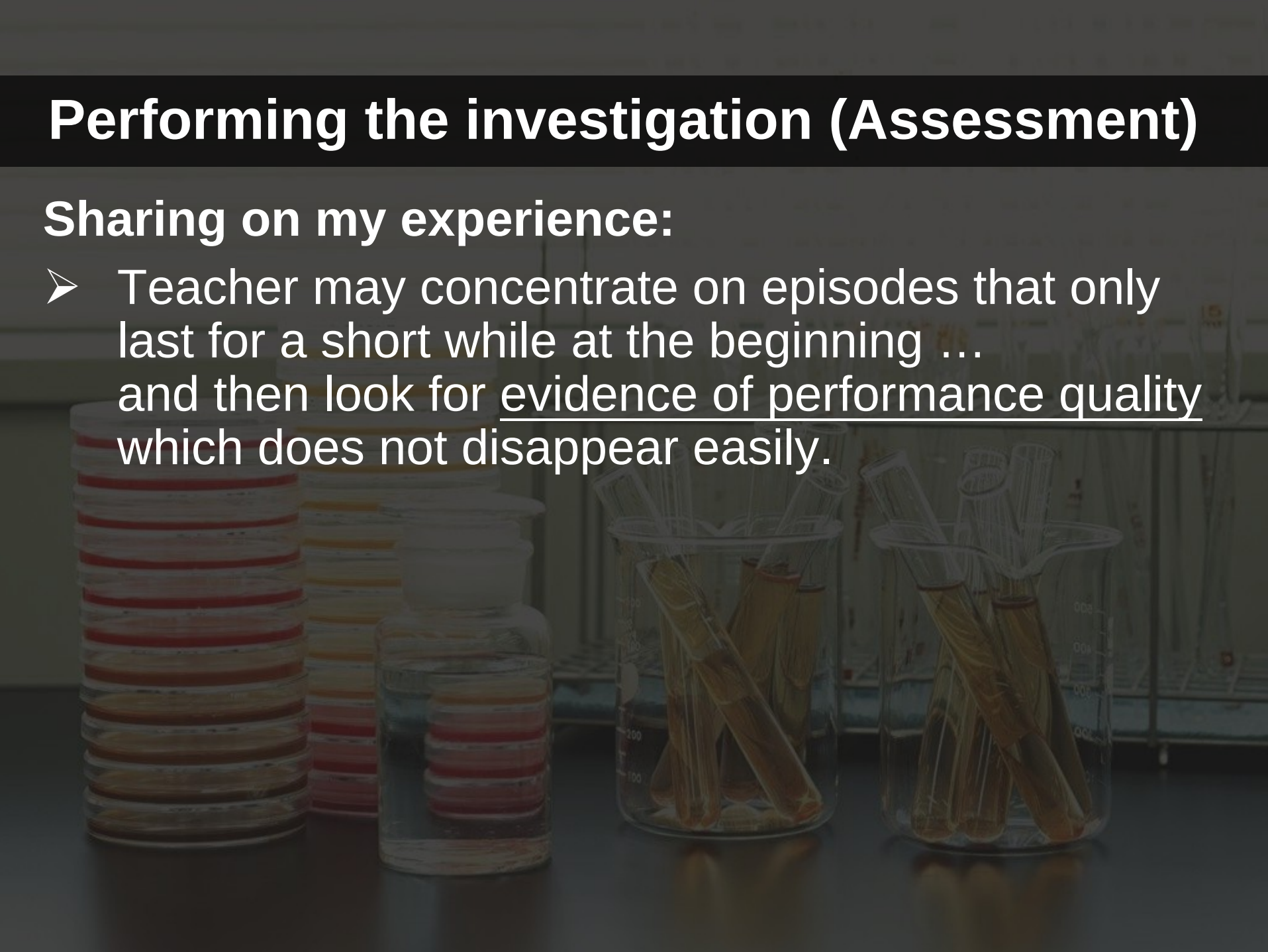
Performing the investigation (Assessment)



Performing the investigation (Assessment)

Sharing on my experience:

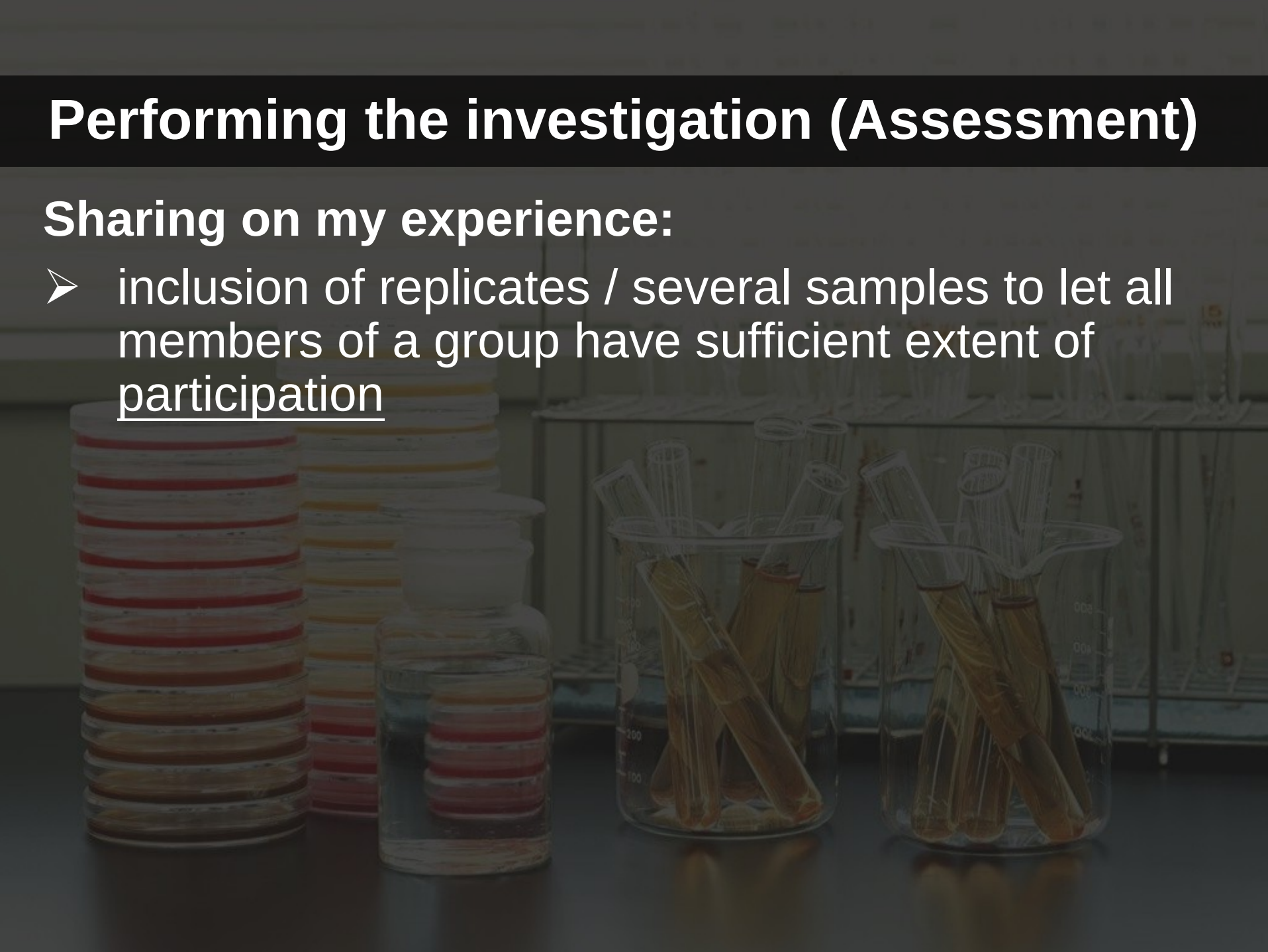
- Teacher may concentrate on episodes that only last for a short while at the beginning …
  and then look for evidence of performance quality which does not disappear easily.



Performing the investigation (Assessment)

Sharing on my experience:

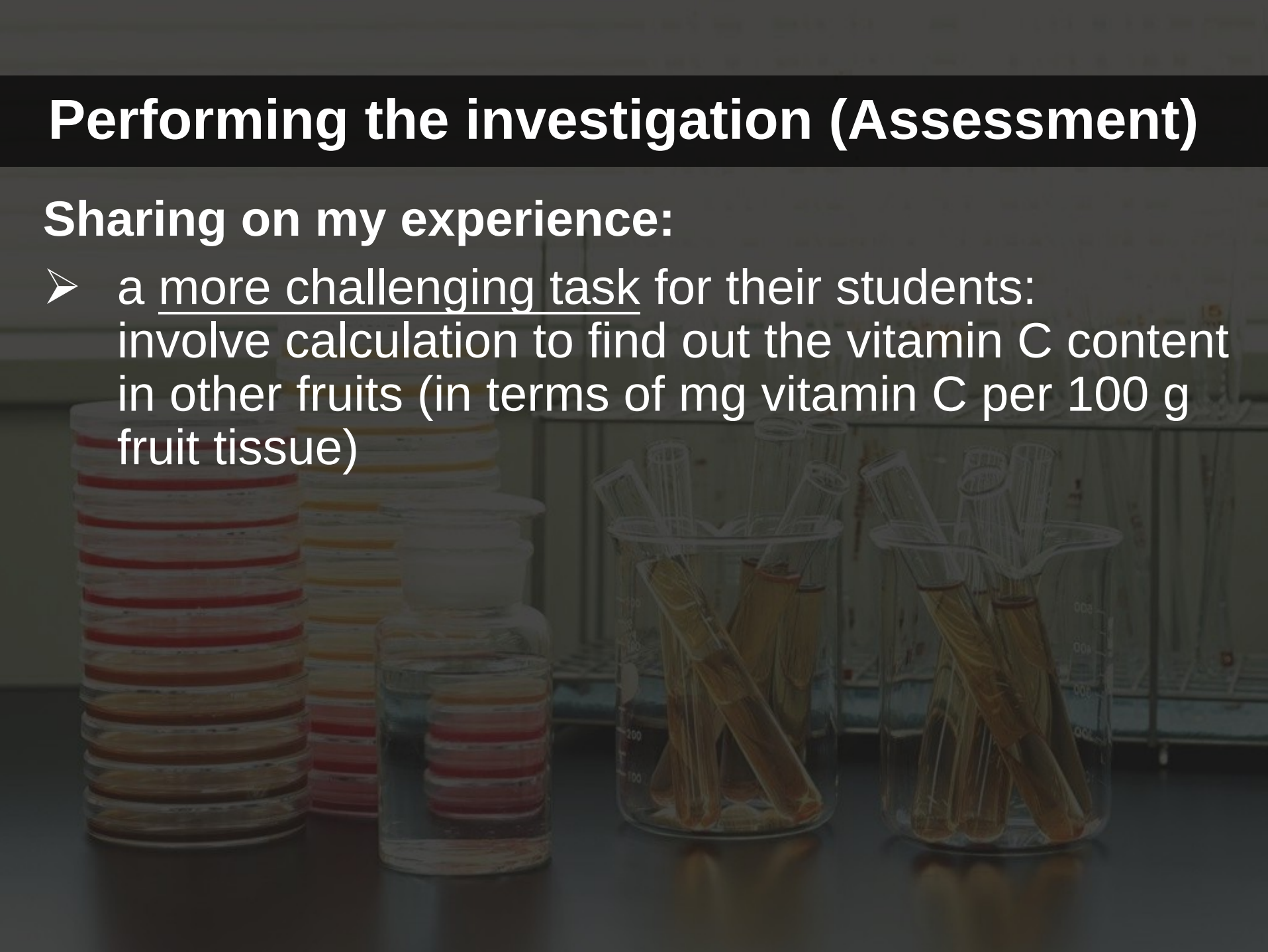
- inclusion of replicates / several samples to let all members of a group have sufficient extent of participation



Performing the investigation (Assessment)

Sharing on my experience:

- a more challenging task for their students: involve calculation to find out the vitamin C content in other fruits (in terms of mg vitamin C per 100 g fruit tissue)



~ End of Sharing ~