

Architectural Design IV Spring Semester
Primary School Project

**Science Laboratories (Biology, Chemistry
and Physic)**



Design Staff 2023-2024

What is a school laboratory?

A laboratory school is a facility where teachers and students can learn educational experiments. They observe children interacting with various materials and with queries and new concepts they encounter every day.

Effective teaching and learning of science involves a perpetual state of **show and tell**.



➤ The laboratory teaching and experiments that are being conducted there **help** encourage **deep understanding of children**.

➤ Children are able to **retain** the knowledge for **longer when they see the experiments** being performed in front of their eyes.

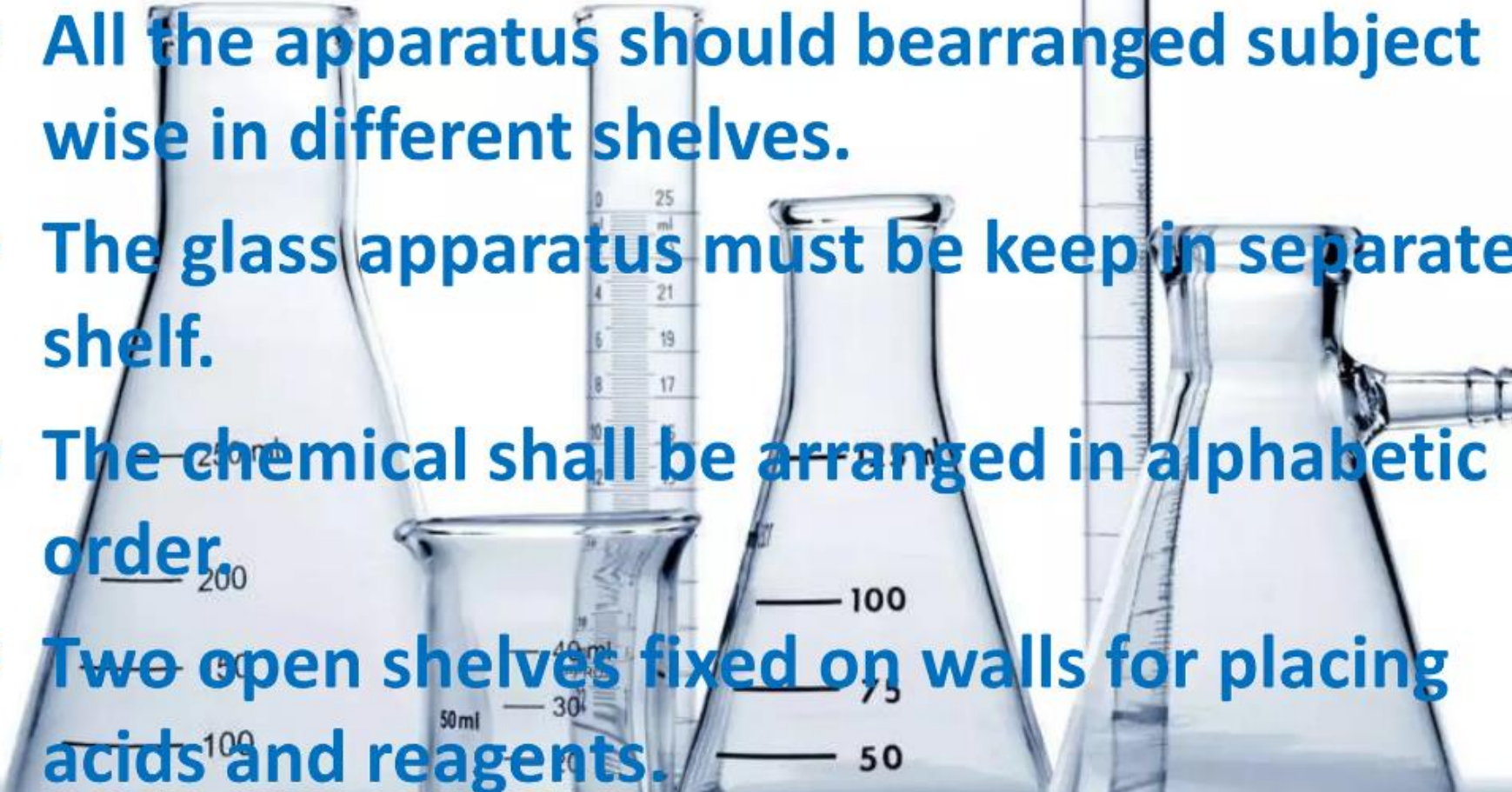


➤ Science lab equipment allows students to **interact directly** with the data gathered.

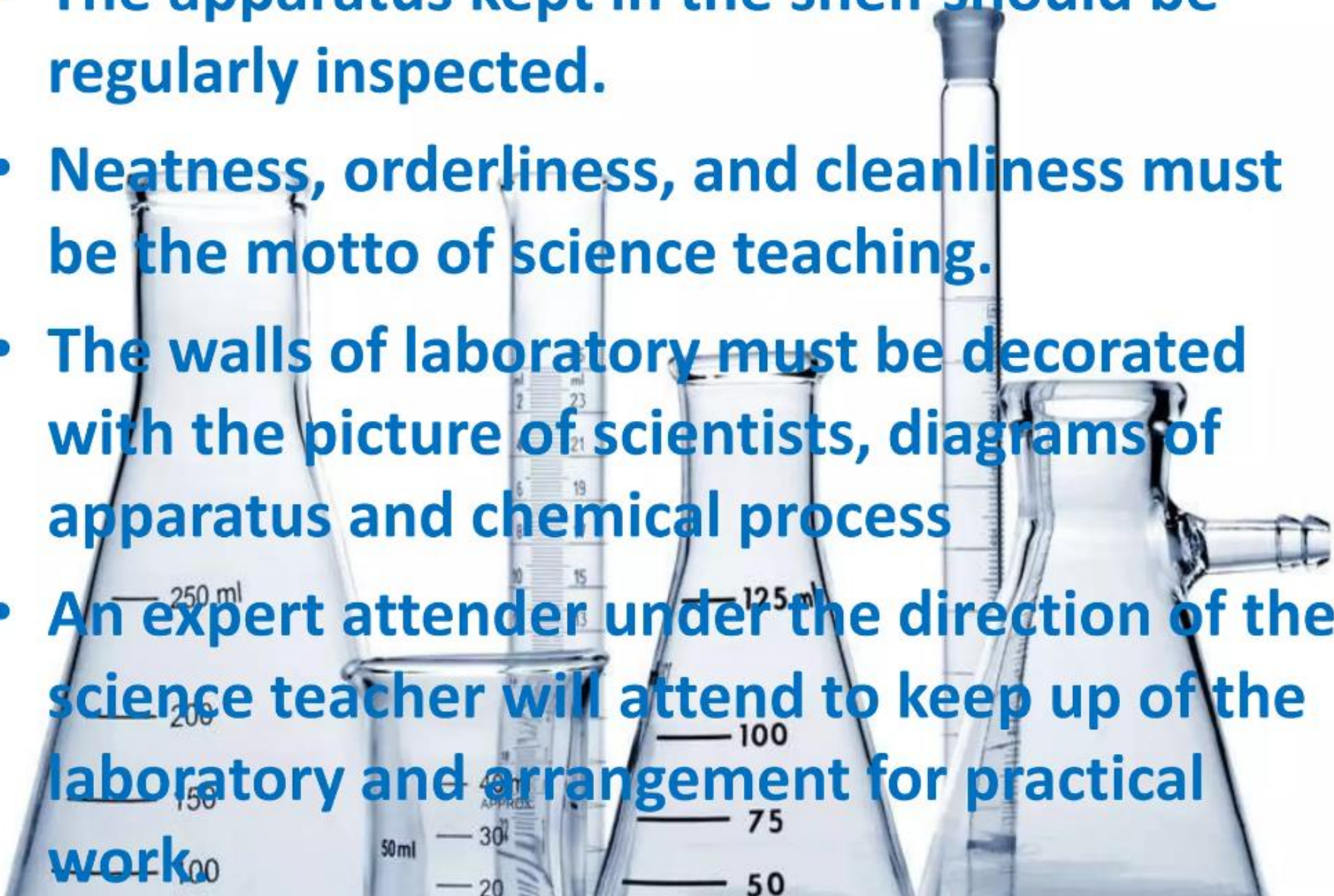
➤ They get **first-hand learning** experience by performing various experiments on their own.

➤ There are several scientific theories and concepts that are difficult to explain directly from the book, anatomy models, physics science kits make it easy to understanding.

LABORATORY MANAGEMENT

- All the apparatus should be arranged subject wise in different shelves.
 - The glass apparatus must be kept in separate shelf.
 - The chemicals shall be arranged in alphabetic order.
 - Two open shelves fixed on walls for placing acids and reagents.
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- A collection of laboratory glassware including Erlenmeyer flasks, a graduated cylinder, and a beaker, arranged on a surface. The glassware is clear and has various markings and labels. One flask on the left is labeled '200' and '100'. A graduated cylinder in the center has markings from 0 to 25 ml. Another flask on the right is labeled '100', '75', and '50'. A beaker in the foreground is labeled '50 ml' and '30'. The background is a plain, light color.

- The apparatus kept in the shelf should be regularly inspected.
- Neatness, orderliness, and cleanliness must be the motto of science teaching.
- The walls of laboratory must be decorated with the picture of scientists, diagrams of apparatus and chemical process
- An expert attender under the direction of the science teacher will attend to keep up of the laboratory and arrangement for practical work.



Laboratory discipline:

- No pupil should have a place assigned to enter the laboratory in the absence of teacher.
- Every student should have a place assigned to him where he will perform his experiment.
- Reagent bottle should be return to the shelf immediately after the use.
- Waste filter paper burned up matchsticks should not be thrown up into sinks.
- Waste box should be kept in the lab.



Significance of school laboratory



- It help the teacher to introduce variety into the nature of experiments.
- The pupils are encouraged to device and prepare apparatus as a hobby.
- The application of science to everyday life is made evident.
- It helps students to develop an interest to learn science.
- It provide training to pupils resourcefulness and Manuel skill

Five Design Elements for School Labs

1. Flexibility

Effortlessly and efficiently dividing science lessons between practical and theoretical learning helps students apply their knowledge more effectively.

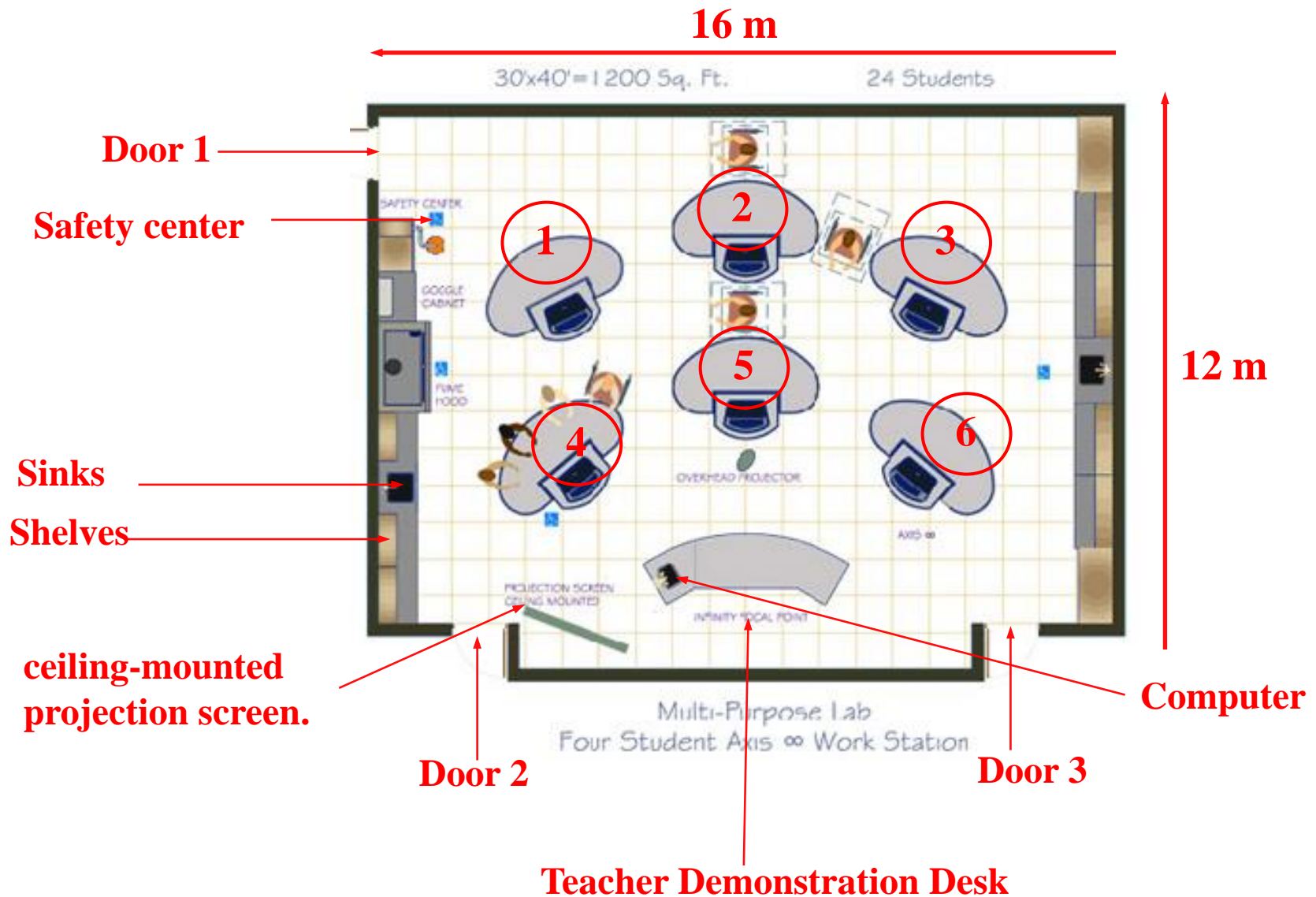


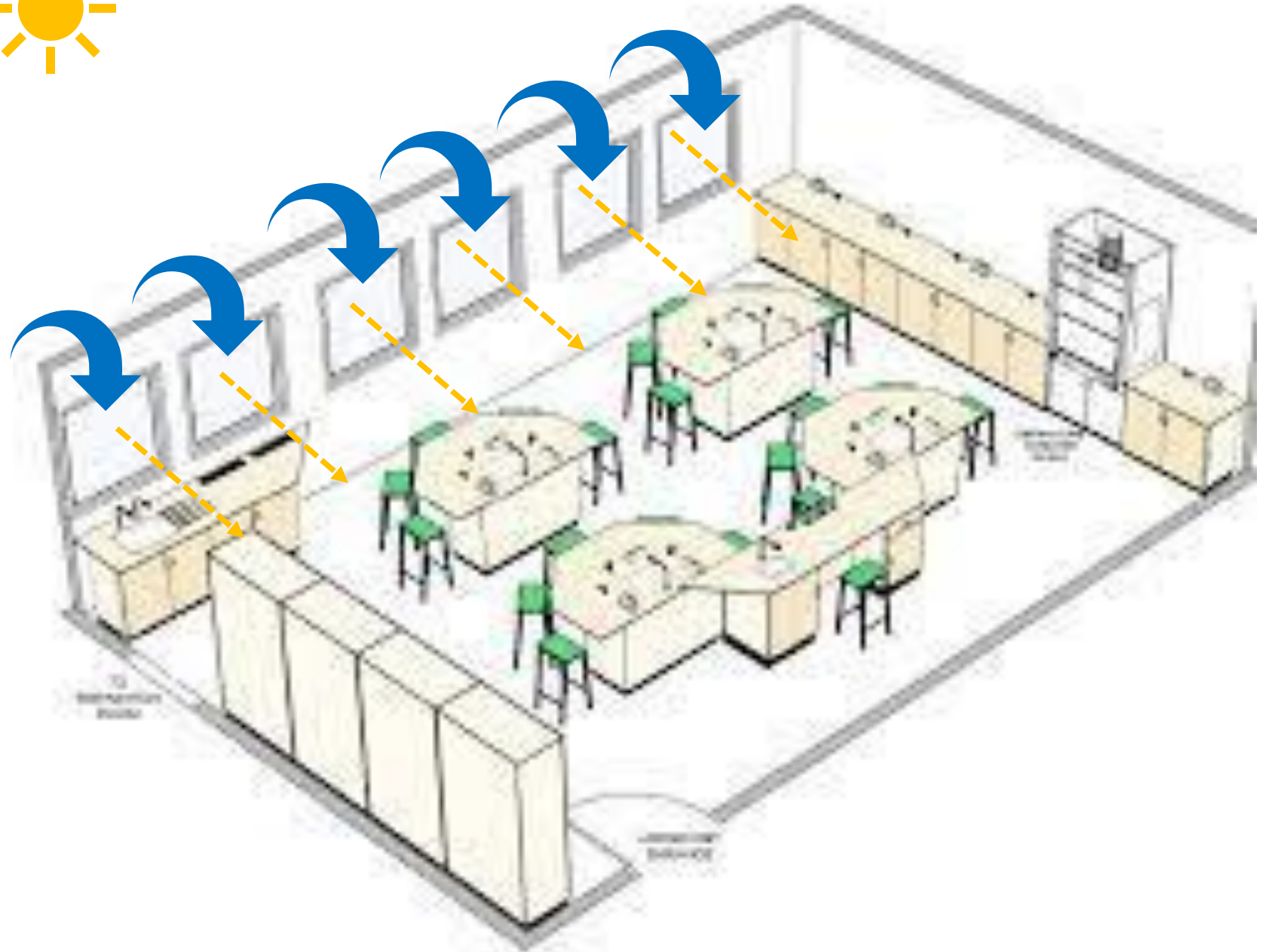
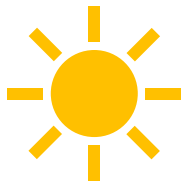
2.BIOLOGY LAB:

In the biology lab, the students study detailed structures, morphological, histological and physiological aspects of plants, animals and humans.



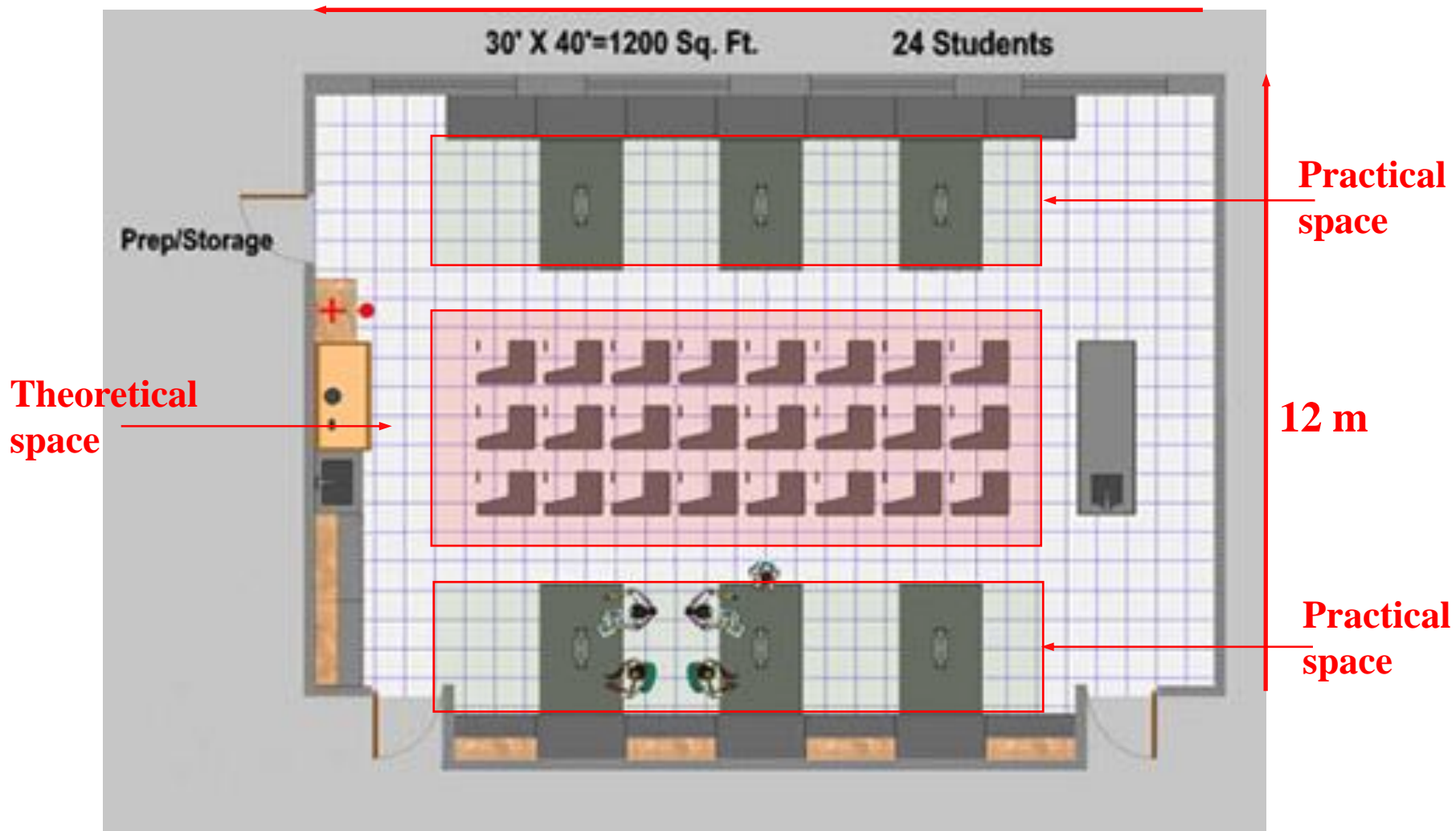
TYPICAL MULTI-SCIENCE LAB USING AXIS INFINITY TABLES For 24 students





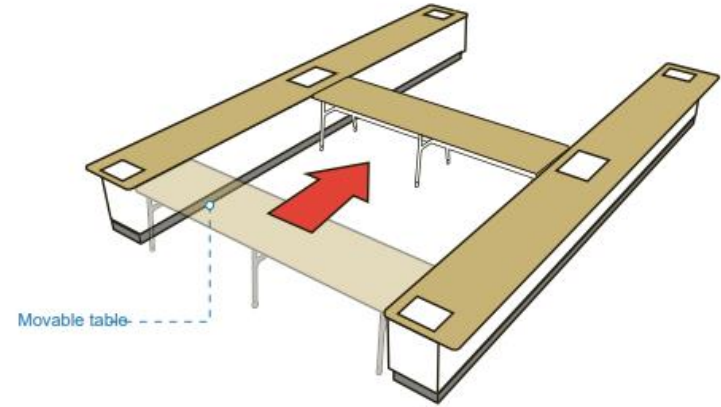
TYPICAL MULTI-SCIENCE LAB USING SIX SHELDON PIER TABLES *For 24 students*

16 m



Formal Teaching Mode

This class of 24 pupils consists of 16 pupils in groups of 2 situated around the perimeter of the laboratory. The remaining 8 pupils are seated at the upper end of the central island in close proximity to the teacher. This configuration has the advantage that all pupils around the perimeter face the teacher during conventional teaching mode. The perimeter benches are each serviced by a 200mm x 300mm sink and a double gas outlet. The central island is serviced by four 300 x 400 sinks and 2 double gas outlets.



Flexibility

This laboratory's main advantage is the flexibility it gives by means of a single movable bench. This means the laboratory can be reconfigured by the teacher without the need for external assistance. The movable table is situated between two long fixed benches and is guided by their edges. Positioning the movable table in different locations gives the opportunities for numerous laboratory configurations. The table can be positioned at the bottom of the laboratory for formal teaching and it can be moved to the centre of the laboratory to give two discreet work areas.



U-channel

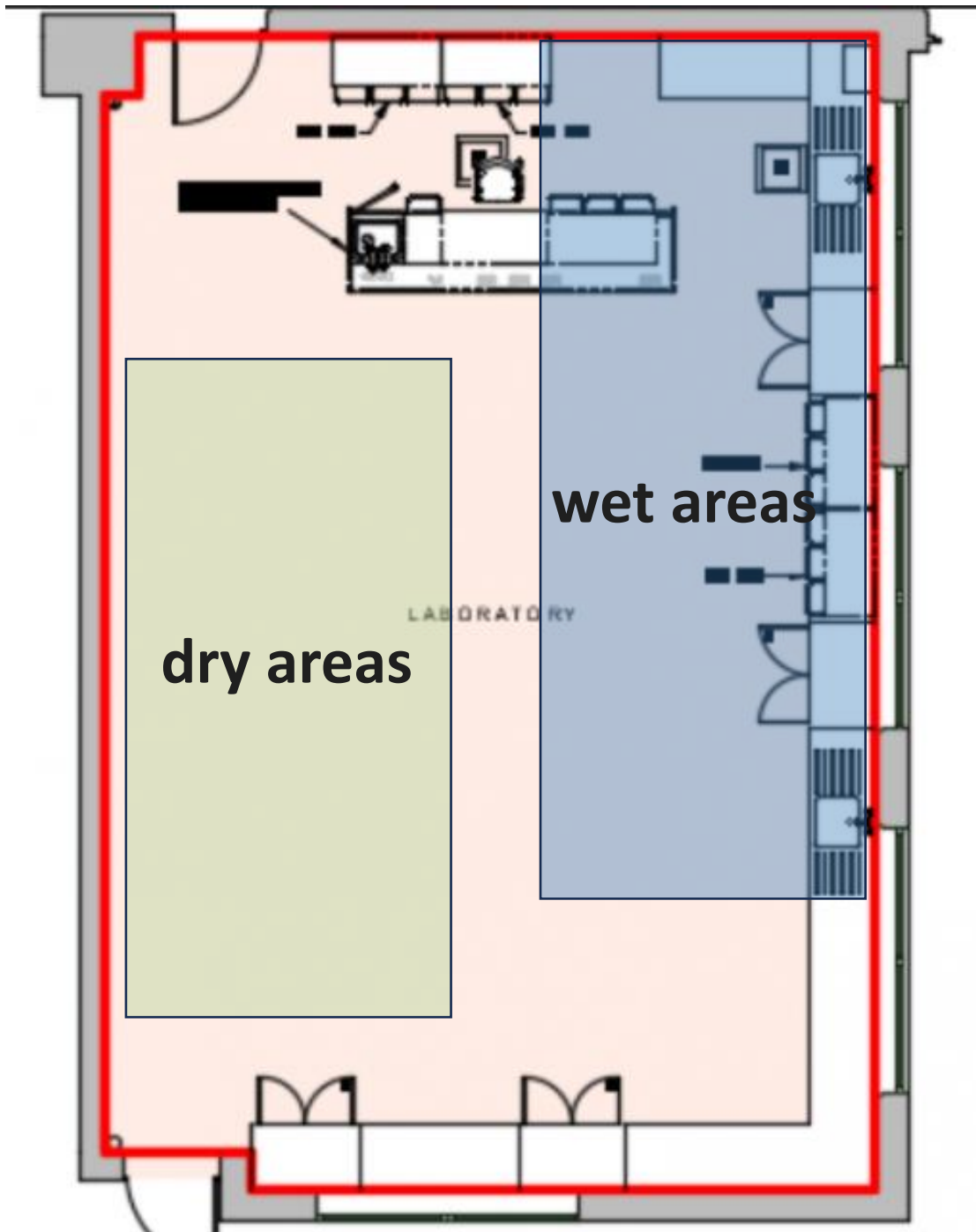


H-channel



N-channel

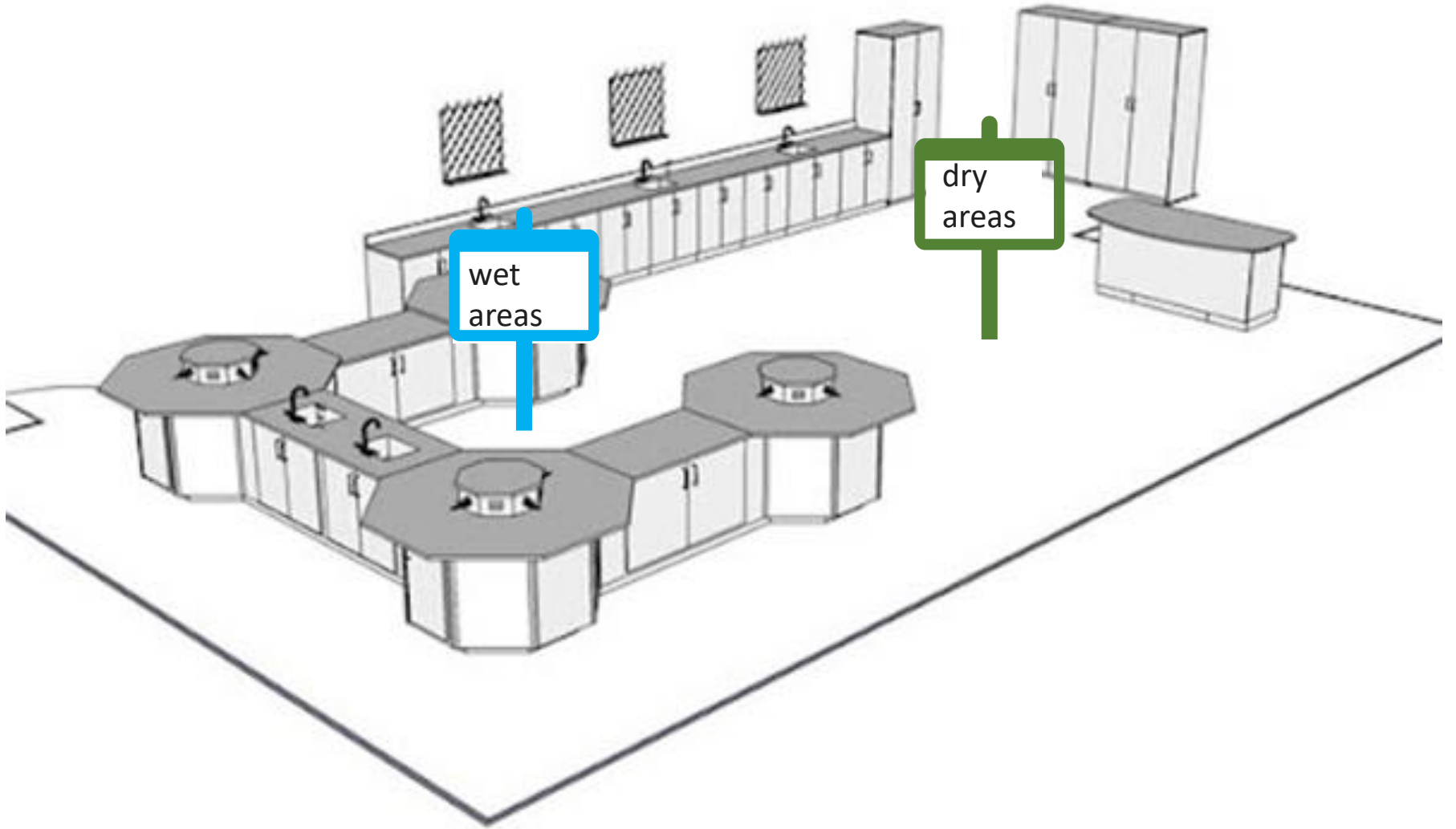




dry areas

wet areas

LABORATORY



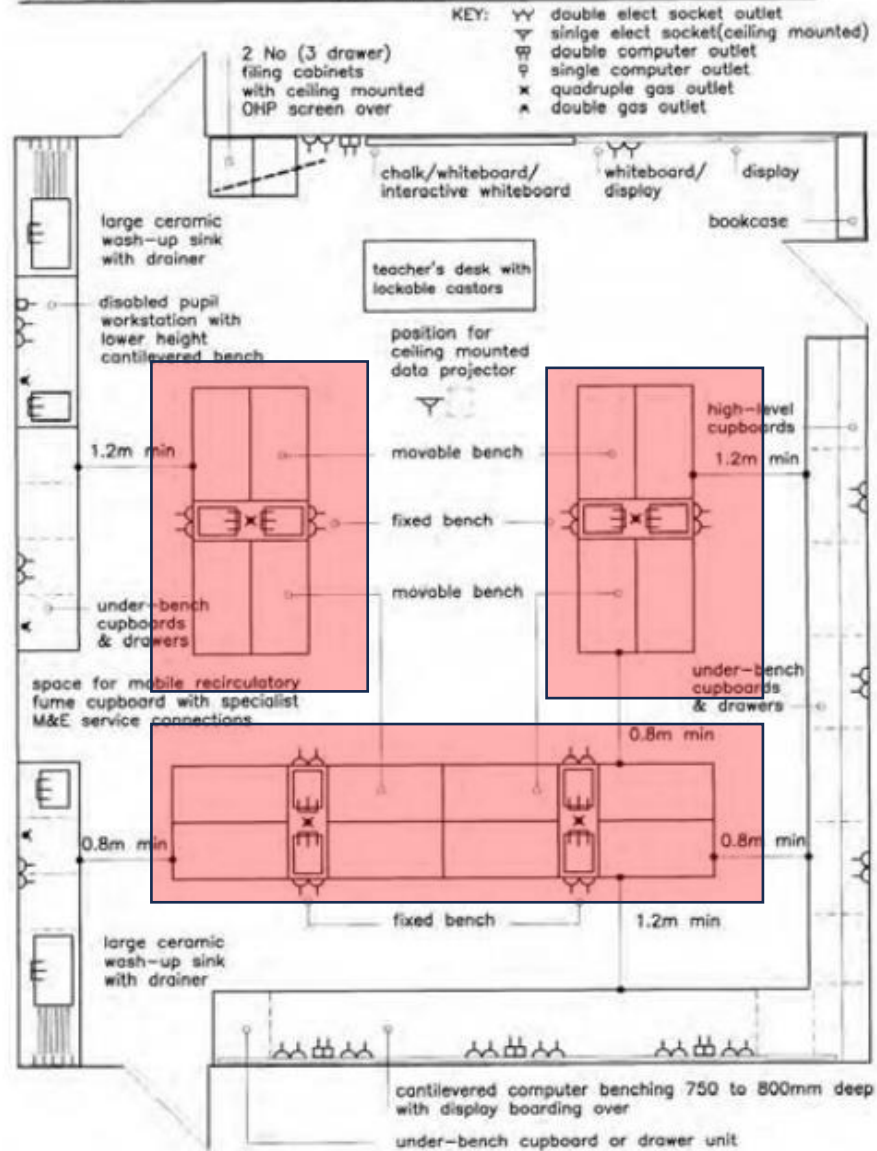
wet
areas

dry
areas

BIOLOGY OR
GENERAL PURPOSE
SCIENCE LABORATORY
SUGGESTED LAYOUT
Scale 1:50

PART 19
SCIENCE
SKETCH SC4

BH(4)19-4.dwg



Colour



According to the article 'Colour Schemes seen as the way to better behaviour' (Times, April 30, 2005) "classrooms.....are changing colour as schools discover that children are better able to concentrate in a colourful environment". It goes on to state that "warm, vibrant colours encourage extrovert behaviour and cooler greens and blues promote calmness". Colour can be used to effect positively the behaviour of pupils. It is well known that

pupils respond better to environments that are bright, stimulating and well kept. In these colour schemes contrasting colours are used to emphasise different surfaces. The work surfaces are all light colours to reflect daylight with walls in muted tones. Furnishings are a mixture of secondary colours like green, purple and oranges in conjunction with blue.

calm



muted



vibrant



active



'children are better able to concentrate in a colourful environment'

Times, April 30, 2005

HOW TO MINIMIZE HAZARDS IN A SCHOOL SCIENCE LAB

Any kind of work with chemicals, gases or scientific equipment brings with it its share of hazards, even if those carrying out the work are experienced adults.

With this in mind, a school science laboratory is an environment that requires thorough care and attention paid to health and safety procedures, as well as effort to minimise hazards wherever possible.

1. PROVIDE THOROUGH TRAINING

Before allowing students to work with any laboratory grade equipment, thorough training should be given to the class.

2. PROVIDE SUFFICIENT PERSONAL PROTECTIVE EQUIPMENT (PPE)

All school laboratories should have an inventory of PPE that can be utilised during lessons involving any potentially harmful chemicals.

3. LOCK CHEMICALS AND EQUIPMENT AWAY

Ensure that all chemicals and equipment are safely locked away out of pupils' reach when not in use.

4.NEVER LEAVE STUDENTS UNSUPERVISED

It may go without saying but students should never be left unsupervised in a laboratory, even if hazardous chemicals are not in use.

5. PAY ATTENTION TO GENERAL SAFETY ADVICE

While keeping children and teenagers safe in laboratory environments certainly requires some extra care and attention, that isn't to say that general lab safety advice should be neglected.

6.ENCOURAGE STUDENTS TO REPORT ANY ACCIDENTS

Ensure that students know to report any mistakes or accidents to the teacher or lab technician immediately.

7.PROVIDE EMERGENCY PRECAUTIONS

School laboratories must have the necessary emergency treatment equipment on hand to prevent long-term injuries in the case of an accident.

THANK
YOU

