



Effective use of IT tools to
Facilitate the Learning & teaching
for Science subjects in Secondary Schools

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What a teacher need to know?

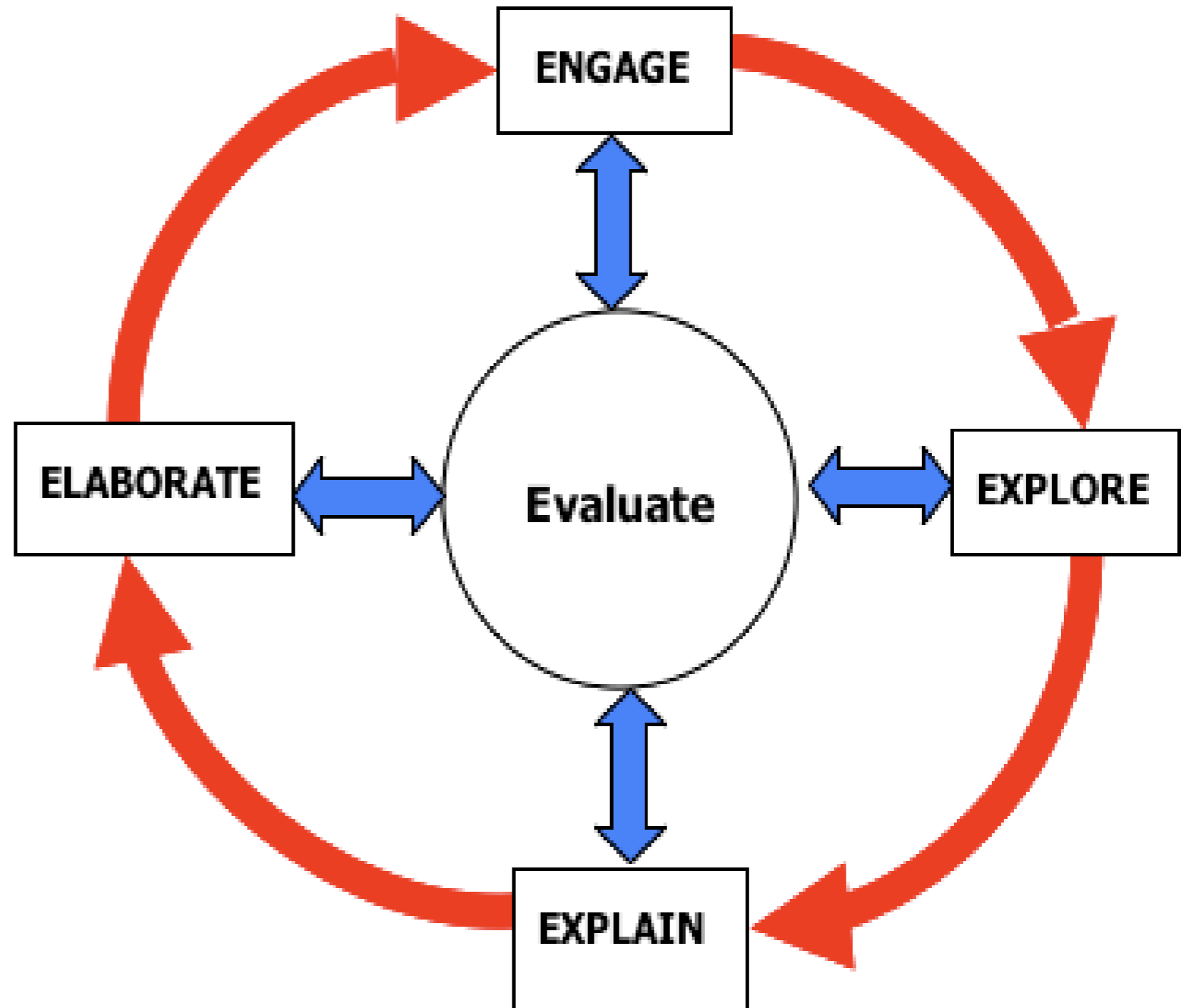
Pedagogical knowledge use
is teachers' methods of teaching and learning.

Content knowledge
is teachers' knowledge about the subject matter to be learn or taught.

Pedagogical knowledge



The BSCS 5E Model



BSCS 5E Instructional Model

- **Engage** – Promote curiosity and elicit prior knowledge
- **Explore** – Generate new concepts through activities/
experiments
- **Explain** – Demonstrate the understanding of the new
concepts
- **Elaborate** – Apply the new concepts in some additional
activities
- **Evaluate** – Assess students' learning progress

What a teacher need to know?

Technology knowledge
is knowledge of
working with
technology tools and
resources.

Pedagogical knowledge
is teachers'
methods of
teaching and
learning.

Content knowledge
is teachers'
knowledge about
the subject matter to
be learn or taught.

Apps used in preparing Science lesson



- search some background or further information



- watch videos for knowing some facts or concepts



- Check students' prior knowledge through setting quiz/ discussion



Apps that used during laboratory activities



Nearpod

- for teacher's presentation and interactive activities, e.g. drawing, polling, quiz, etc.



Keynote

Google docs

Google Docs

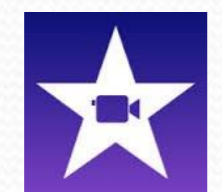


- for recording experimental procedures and results



Skitch

- for photo editing



i-Movie

- for video editing



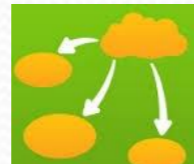
Explain Everything

- for making video presentation

Apps used in construct knowledge and consolidation



× Popplet



× Inspiration

- for making concept map



× Prezi

Prezi



× Padlet

- for sharing ideas/ discussion



× Socrative

- for real time on-line quiz



× Kahoot

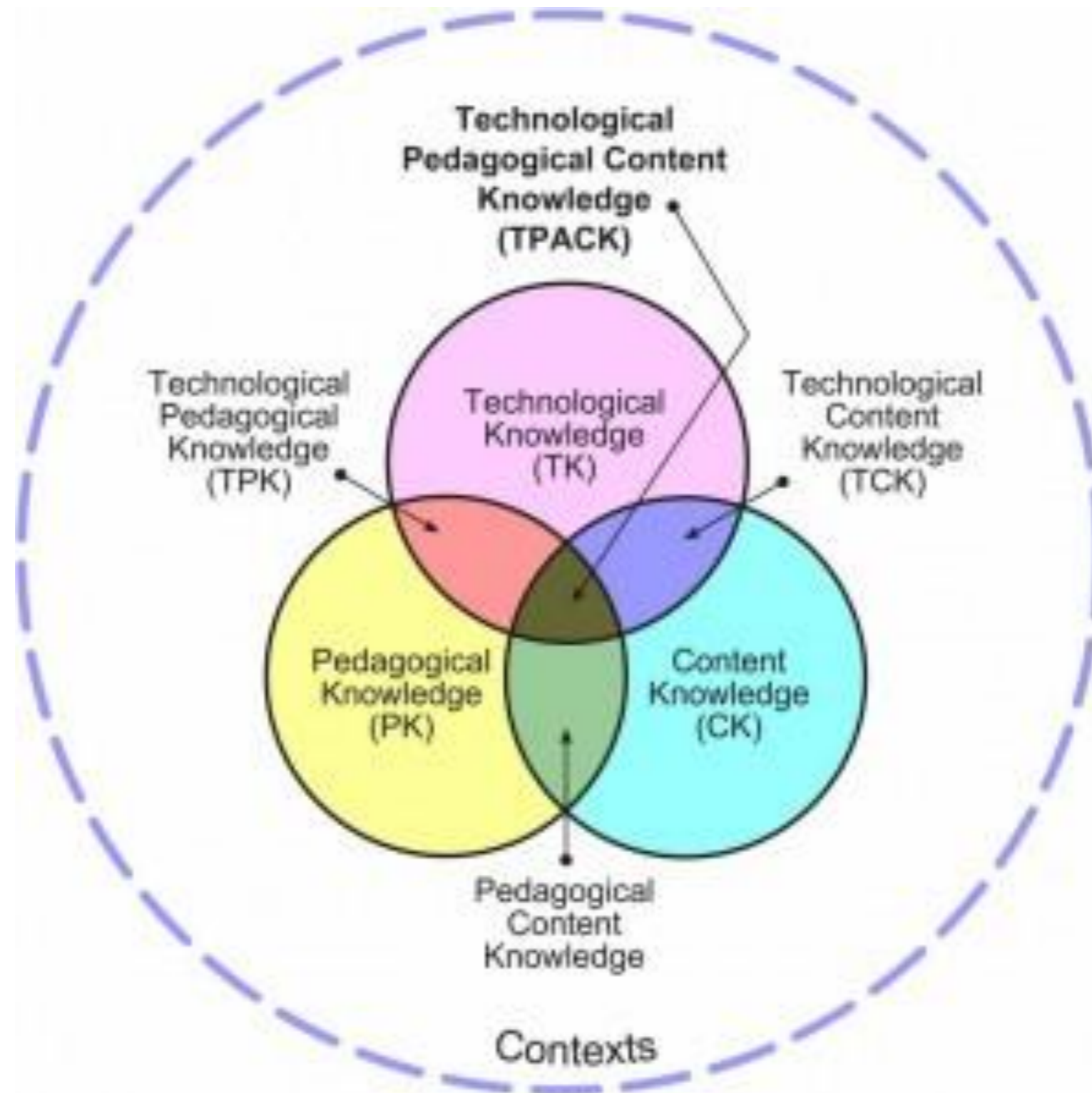
- for checking understanding



× Qrafter

- a QR code scan for getting on-line information or files

Teachers should seamlessly integrate these three knowledge in their classroom !



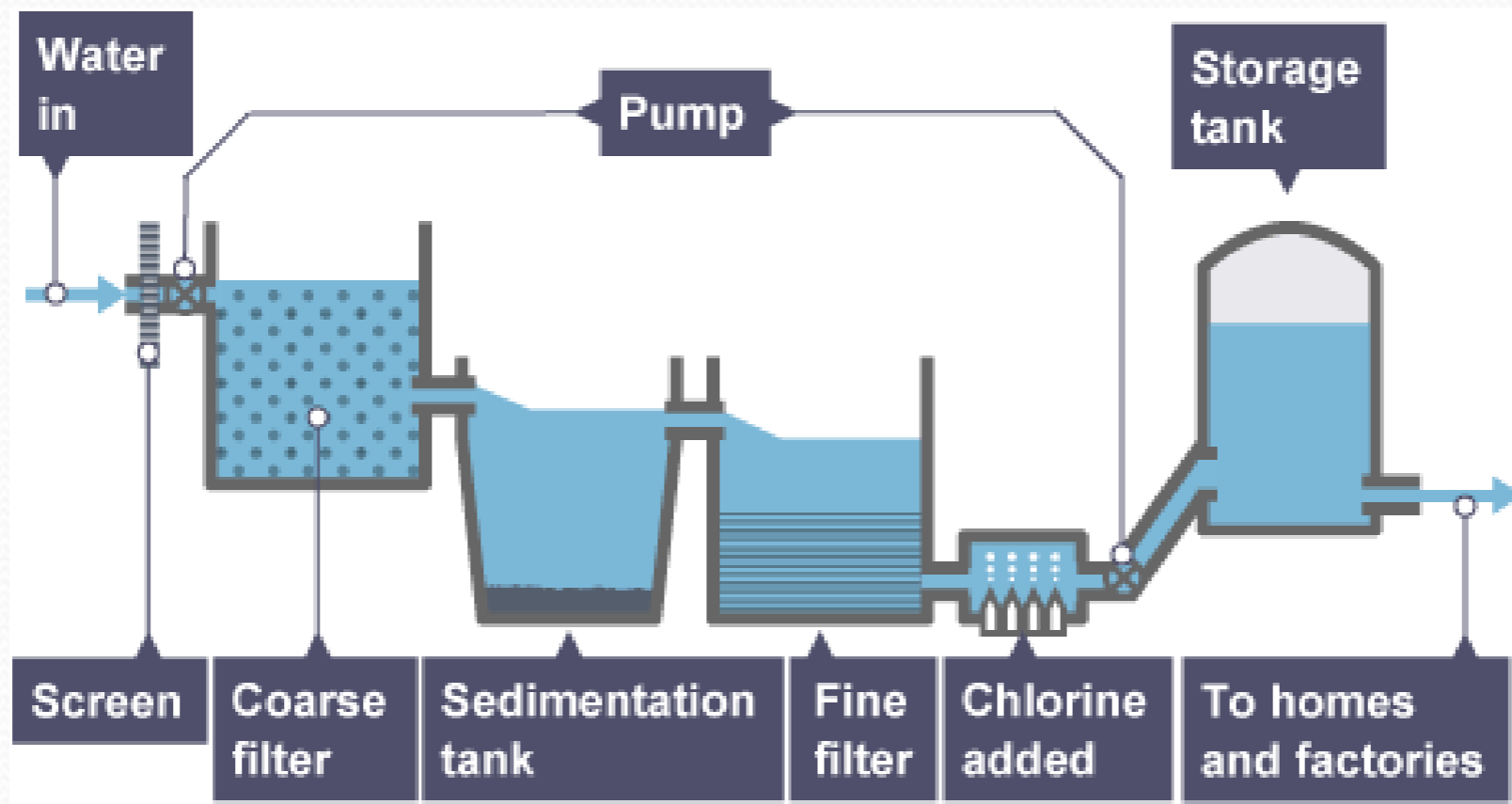


Engage

Google search

×S1 I.S. unit 5 Purifying Water

Tell students to find some water purification methods before the lesson.





Explore

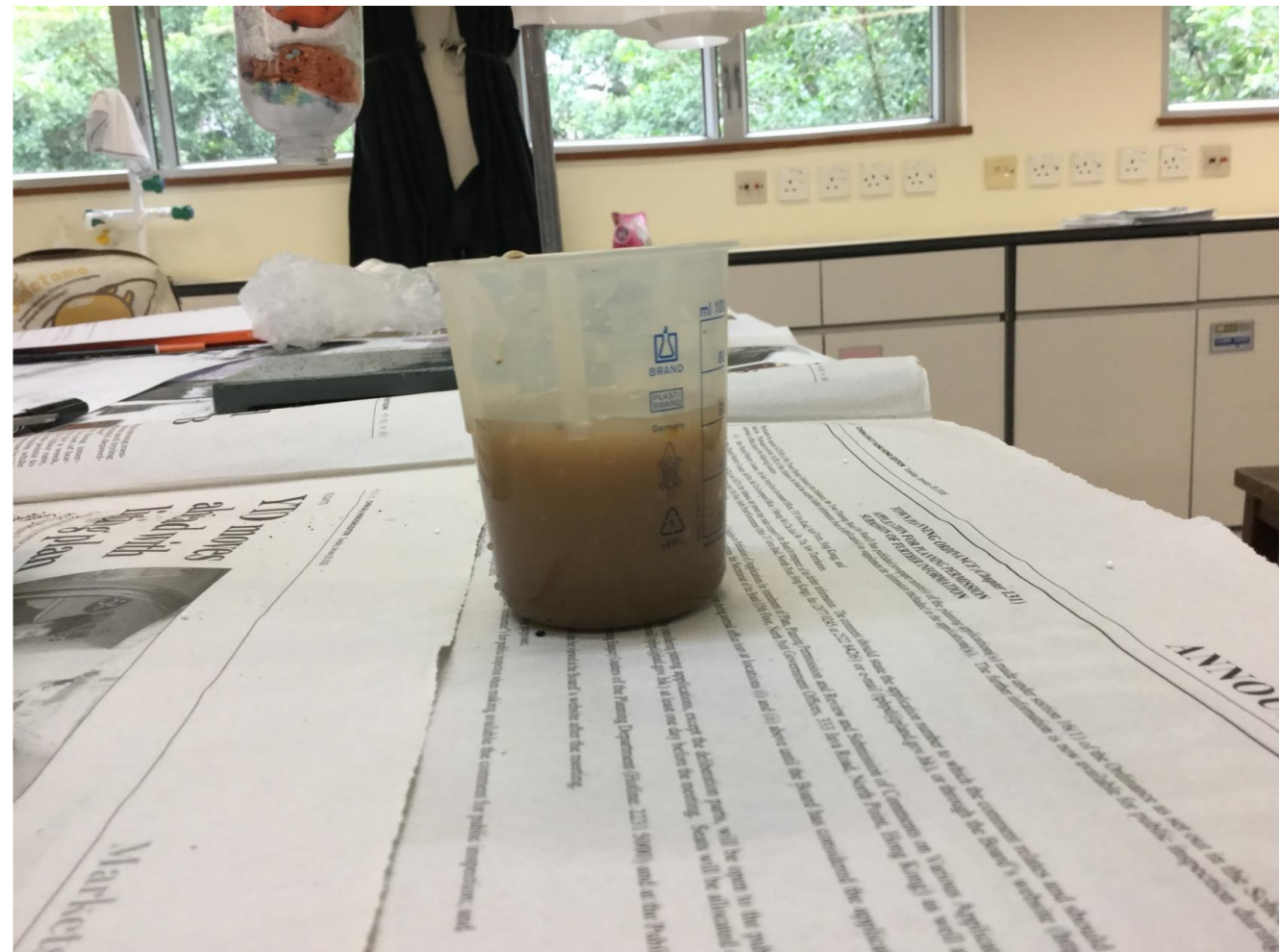
Students use PowerPoint/
Keynote/ Google slide to record
down the design process

Laboratory Activity 5.3
Designing a filter to purify
muddy pond water

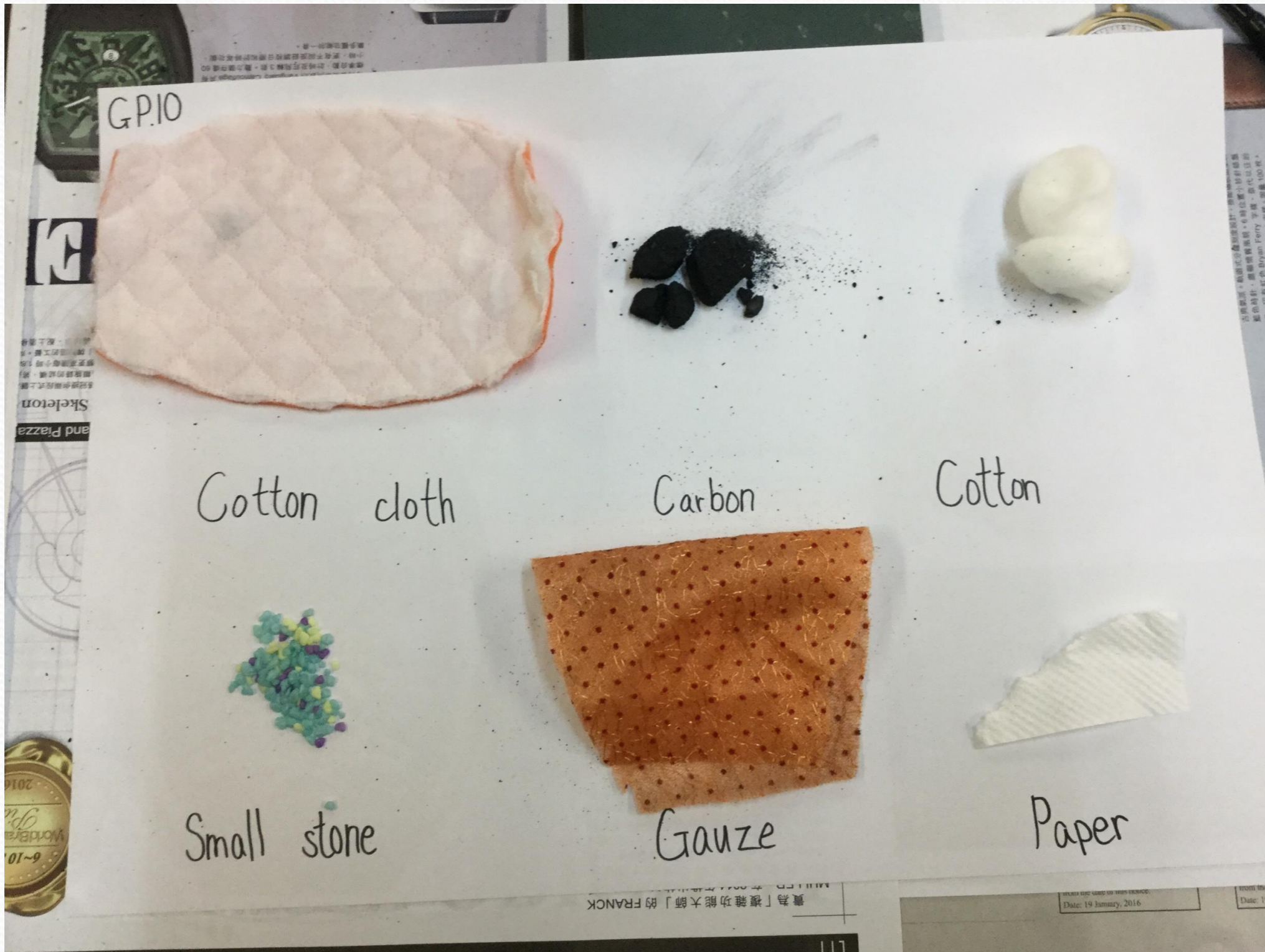
Class:1B Group:10
Names & Nos. Zimkie
Fung (10), Rebecca
Liu(20), Katrina Wong(30,

Filtration

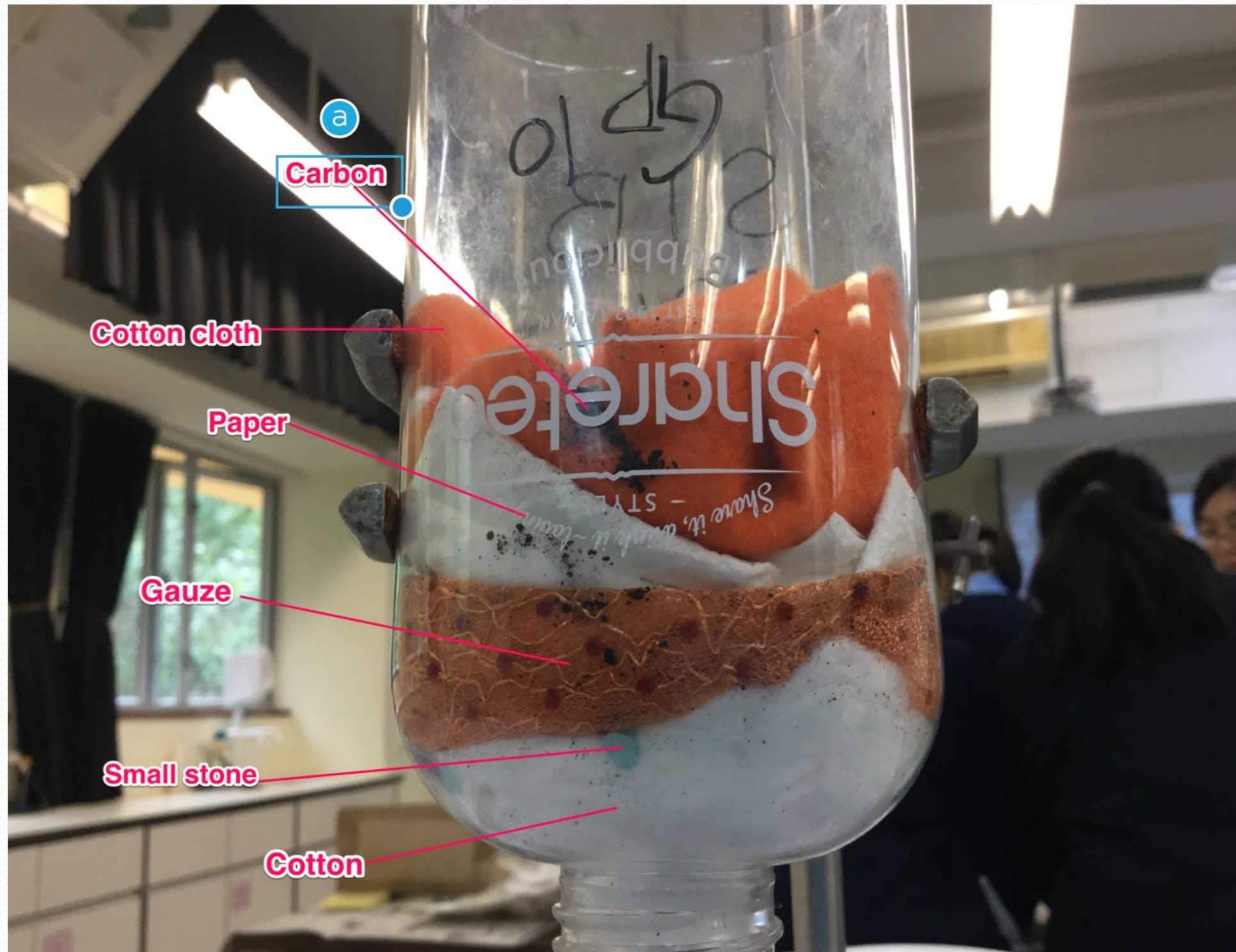
WE CAN USE A FILTER
TO REMOVE SOME
IMPURITIES FROM
WATER.
THE ORIGINAL MUDDY
WATER IS SHOWN IN THE
PHOTO.



Materials inside the filter



Our Finished Filter



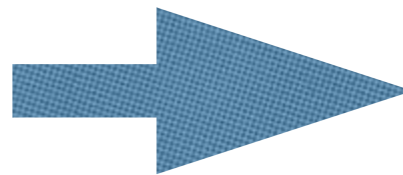
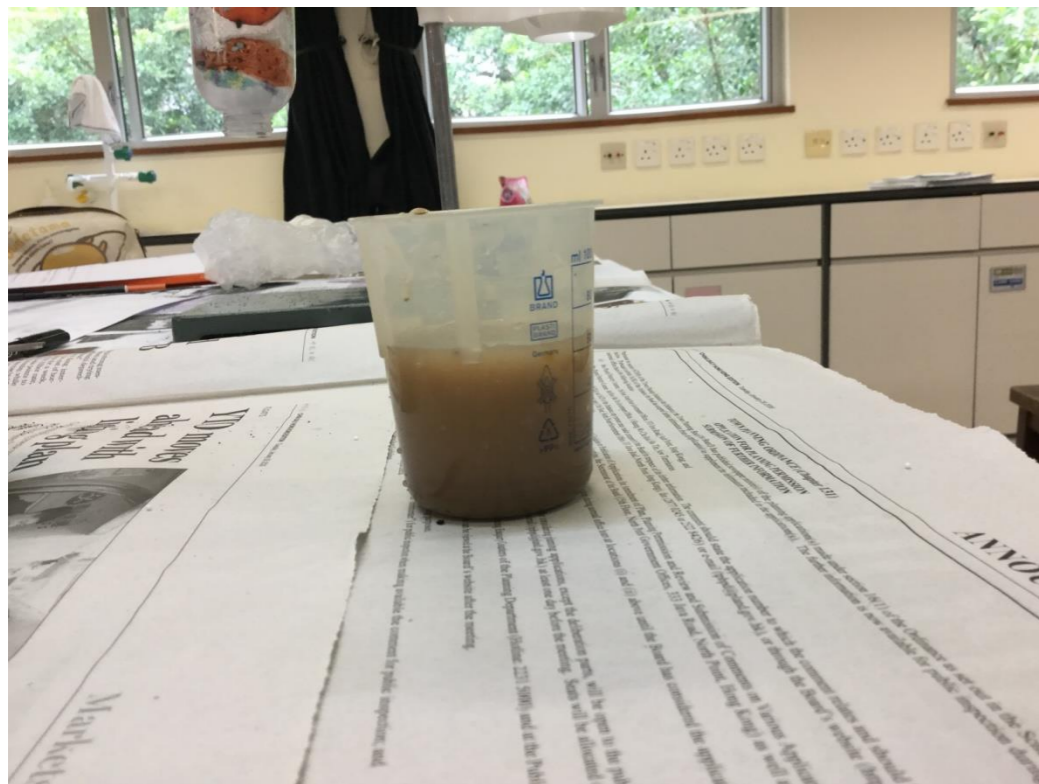
Explore

See How Our Filter Work



Explain

Comparing the muddy water before and after the filtration



Any impurities inside the filtrate? Yes
If yes, how to show get it out? See next two slides.

Evaporate the filtrate to get the impurities

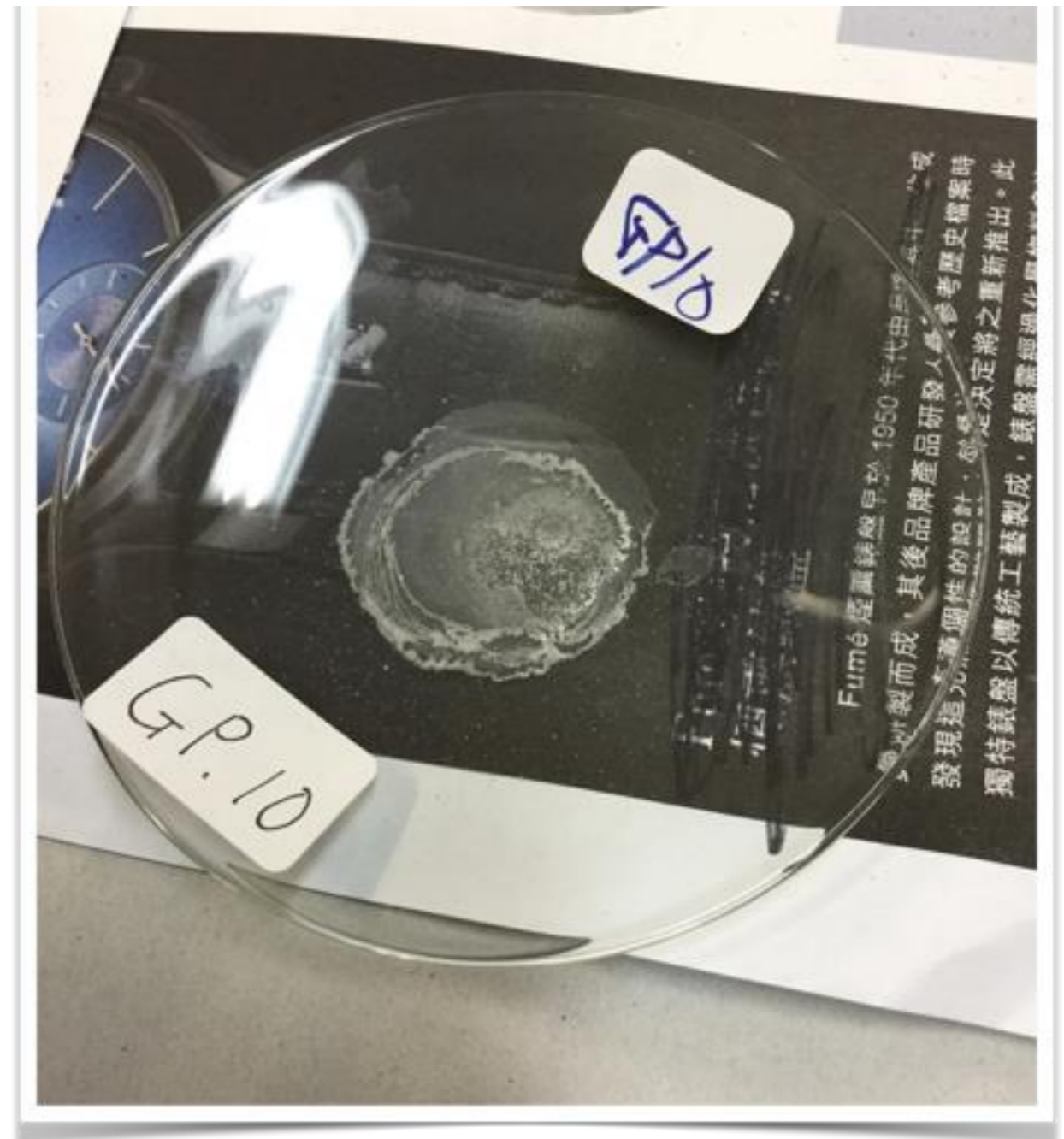
METHOD:

ADD 10 DROPS OF THE FILTERED WATER ONTO A WATCH GLASS.

HEAT THE FILTERED POND WATER OVER THE HOT WATER BATH/ HOT PLATE.

IS THERE ANY RESIDUE ON THE WATCH GLASS (WHEN ALL THE LIQUID ON THE WATCH GLASS HAS EVAPORATED)?

YES! THERE ARE SOME WHITE SOLIDS FOUND ON THE WATCH GLASS. THEY ARE THE IMPURITIES IN THE FILTRATE.



Does the residue dissolve in water?

Explain

METHOD:

USE A CLEAN DROPPER TO ADD A FEW DROPS OF WATER ONTO THE WATCH GLASS. TAKE A PHOTO TO SHOW WHETHER THE RESIDUE DISSOLVES IN WATER OR NOT.

IT IS FOUND THAT THE RESIDUE DISSOLVES IN WATER. SO FILTRATION CANNOT REMOVE SOLUBLE IMPURITIES.



Self Evaluation

by
filling a
google form

Lab 5.3 Designing a filter to purifying pond water

*必填

Class *

選擇 ▼

Group no. *

選擇 ▼

Is the filter efficient? How long (in minutes) does it take to filter 50 ml of pond water? *

您的回答

Compare the pond water with the filtrate. Which one is clearer? *

Filtrate

Pond water

Is the filter effective in removing the solid impurities from the pond water? *

您的回答

Can you improve your filter design any more? How?

您的回答

提交

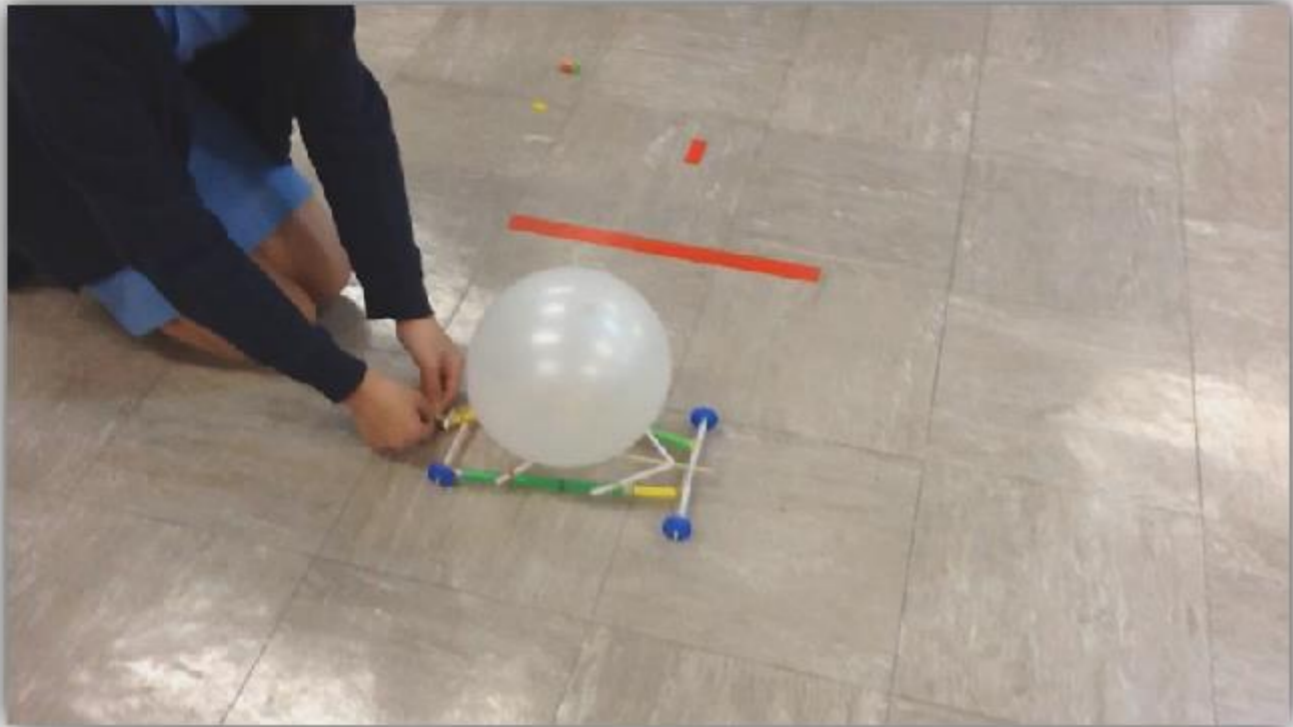
S2 I.S. Unit 9

Balloon Car Design

S2 IS Balloon car design

檔案(F) 編輯(E) 檢視(V) 視窗(W) 說明(H)

Video of the second car trial



The perpendicular distance of its movement = 530 c

00:01:27

S2 IS Balloon car design



Explain
Everything



Another example:
[S1 Density lesson](#)

Variation within group members

Record the data in the google form

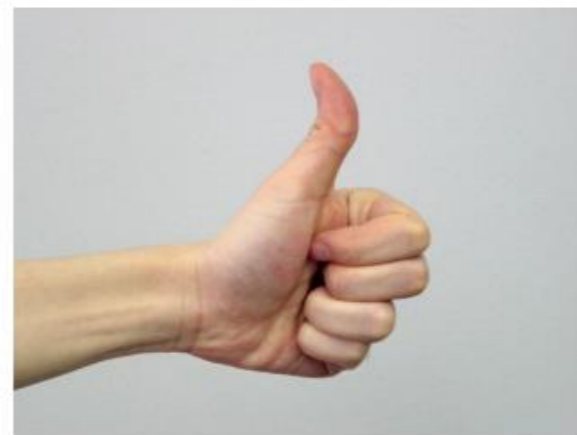
I Can or cannot roll the tongue



II Free or attached earlobes



III The thumb can or cannot bend back





1ABCD Activity 2.4 I-III Variations within humans (Group) (回應) ☆

1617is1student@gmail.com

檔案 編輯 檢視 插入 格式 資料 工具 表單 外掛程式 說明 所有變更都已儲存到雲端硬碟

註解 共用

100%

 Arial

B
I

 更多選項

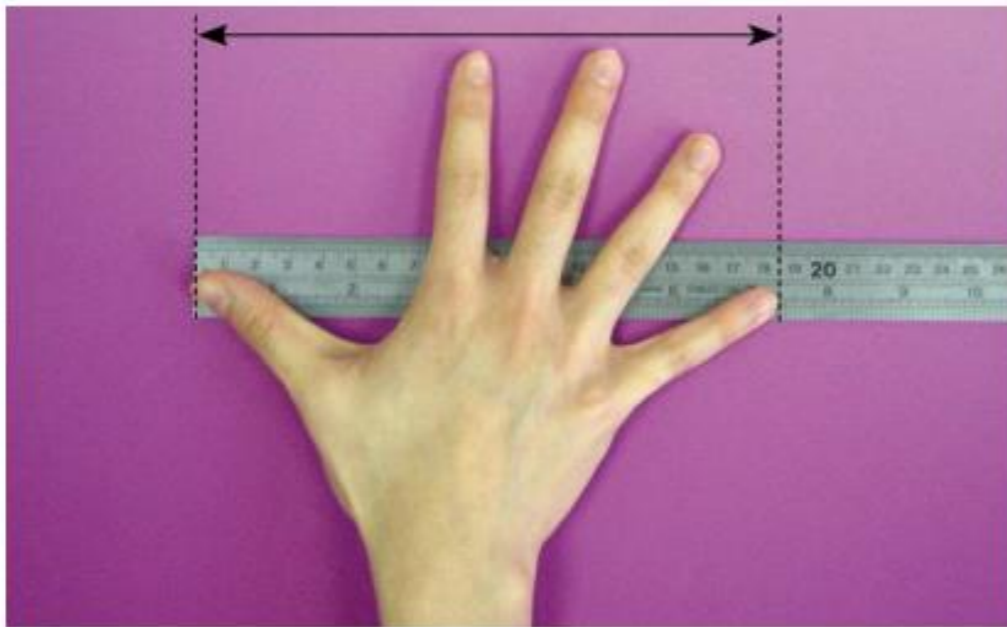
fx

	A	B	C	D	E	F	G	H
1	時間戳記	Class	Group no.	Number of students can roll their tongues	Number of students have free earlobe	Number of students can bend their thumbs back		
2	2016/9/15 上午 11:01:56	1B	2	4	2	4		
3	2016/9/15 上午 11:02:08	1B	3	3	0	2		
4	2016/9/15 上午 11:02:08	1B	1	4	3	3		
5	2016/9/15 上午 11:02:15	1B	4	3	2	2		
6	2016/9/15 上午 11:03:04	1B	7	3	0	2		
7	2016/9/15 上午 11:03:06	1B	9	3	2	1		
8	2016/9/15 上午 11:03:27	1B	8	3	2	1		
9	2016/9/15 上午 11:03:53	1B	6	1	1	1		
10	2016/9/15 上午 11:05:01	1B	10	2	0	0		
11	2016/9/15 上午 11:06:30	1B	5	3	2	3		
12			1B Total	29	14	19		

Variation within classmates

Record the data in the google form

IV Range of hand span (in cm)



V Heartbeat per minute

<https://docs.google.com/forms/d/e/1FAIpQLSeT0eDOfIZlunInwjytArexgvmIMLwAs7Vx7UDQCJL3w4fQMA/viewform>





1ABCD Activity 2.4 IV Variations within humans (Individual student) (回應) ☆

1617is1student@gmail.com

檔案 編輯 檢視 插入 格式 資料 工具 表單 外掛程式 說明 所有變更都已儲存到雲端硬碟

註解 共用

100% NTS % .0 .00 123 Arial 10 B I A

	A	B	C	D	E	F	G	H	I	J
1	時間戳記	Class	Class no.	Range of hand span (cor. to the nearest cm)	Range of heart beat (No. of beat per minute)					
2	2016/9/15 上午 11:20:35	1B	2	19	73					
3	2016/9/15 上午 11:20:58	1B	1	19	82					
4	2016/9/15 上午 11:21:04	1B	25	18	91					
5	2016/9/15 上午 11:21:05	1B	22	20	79					
6	2016/9/15 上午 11:21:20	1B	15	18	94					
7	2016/9/15 上午 11:21:20	1B	11	18	92					
8	2016/9/15 上午 11:21:26	1B	18	20	50					
9	2016/9/15 上午 11:21:36	1B	16	18	78					
10	2016/9/15 上午 11:21:42	1B	5	20	95					
11	2016/9/15 上午 11:21:47	1B	31	20	88					
12	2016/9/15 上午 11:21:57	1B	23	20	70					
13	2016/9/15 上午 11:22:17	1B	30	18	71					
14	2016/9/15 上午 11:22:22	1B	21	16	76					
15	2016/9/15 上午 11:22:26	1B	6	20	71					
16	2016/9/15 上午 11:22:34	1B	23	20	70					
17	2016/9/15 上午 11:22:36	1B	4	17	81					
18		1B	14	19	92					
19		1B	24	20	72					
20	2016/9/15 上午 11:22:46	1B	26	20	78					
21	2016/9/15 上午 11:22:48	1B	12	21	93					
22	2016/9/15 上午 11:22:49	1B	8	18	71					
23	2016/9/15 上午 11:22:53	1B	13	19	72					
24	2016/9/15 上午 11:23:17	1B	28	18	65					
25	2016/9/15 上午 11:23:17	1B	3	20	76					

