

# Applying Science Process Skills

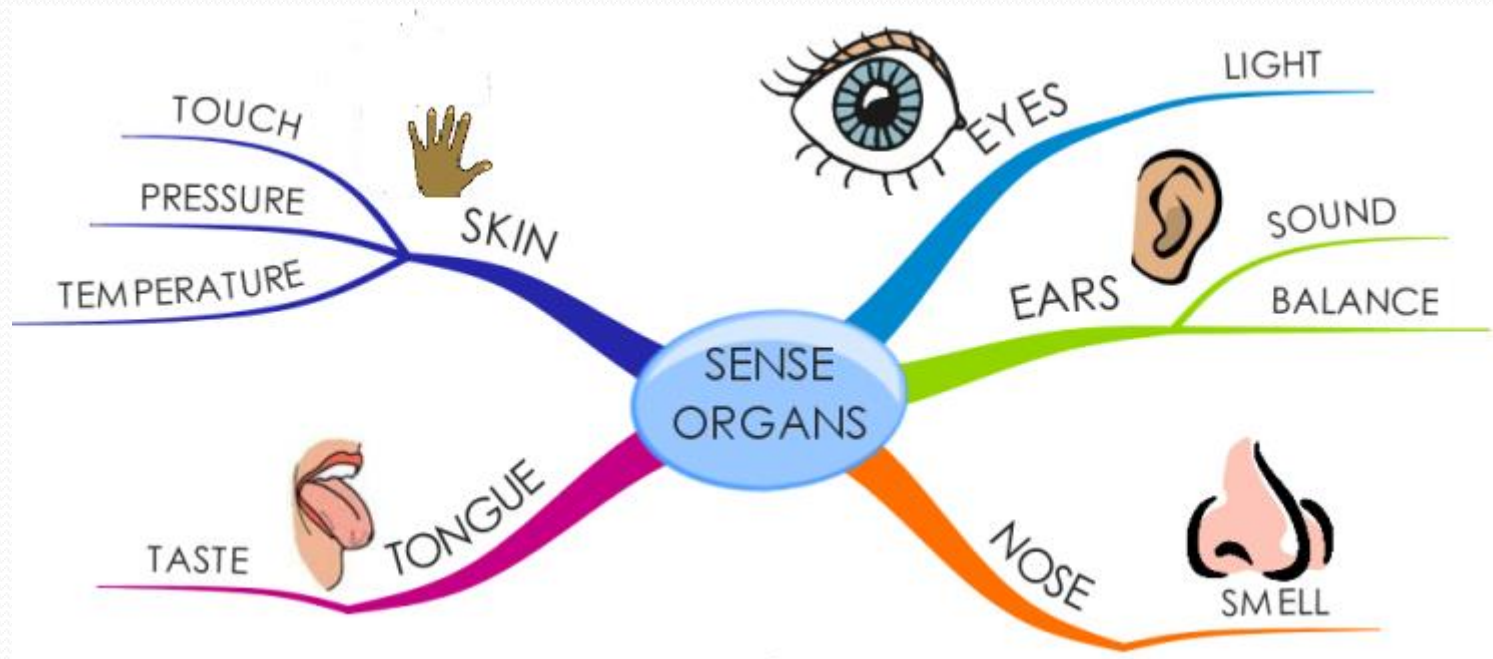


Lee Shok Mee  
[shokmee\\_lee@recsam.edu.my](mailto:shokmee_lee@recsam.edu.my)



# 1 Observation

Using sensory organs...



# Observations

Can be:

***Quantitative*** – measureable or countable

3 meters long

80 kilograms

32 degrees Celsius

***Qualitative*** – describable, not measureable

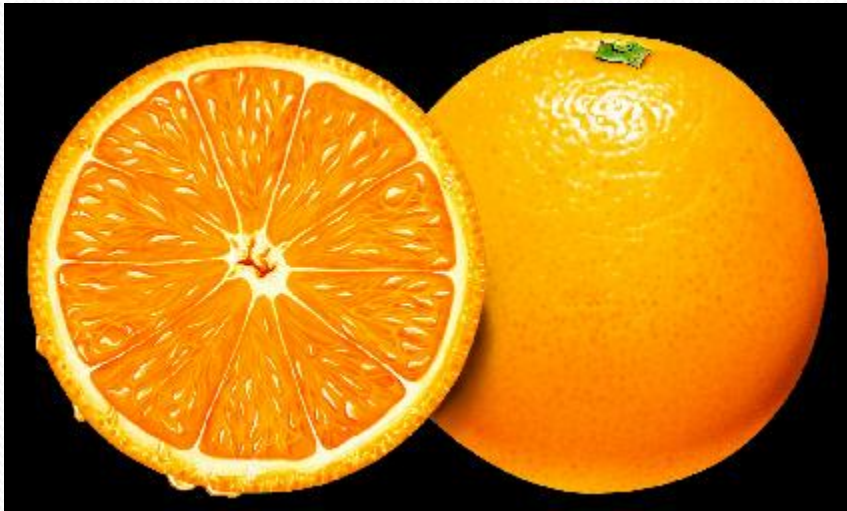
Blue tables

Fishy smell

Tastes bitter

# Activity 1: Making observation

## Observing an orange



## Record your observation

### Qualitative

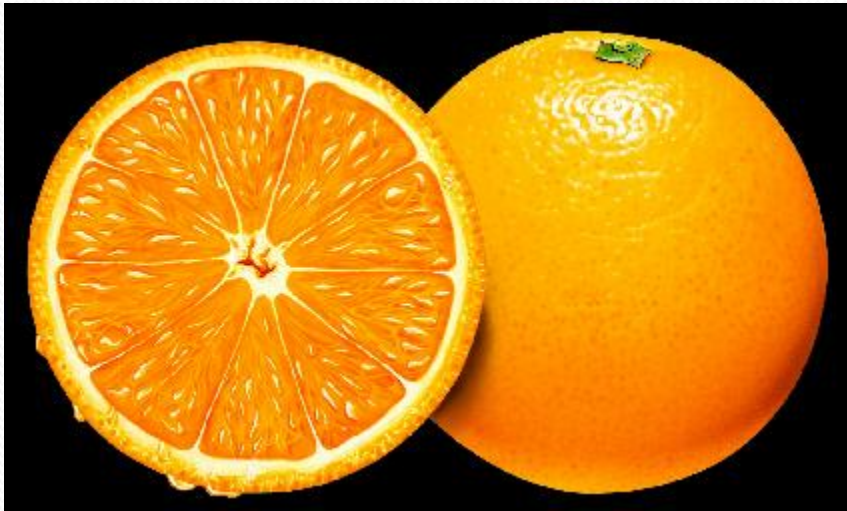
- Color
- Shape
- Size
- Smell
- Produce sound when shake?
- Hard or soft
- Float or sink
- Juice

### Quantitative

- Weight
-

# Activity 1: Making observation

## Observing an orange



## Record your observation

### Qualitative

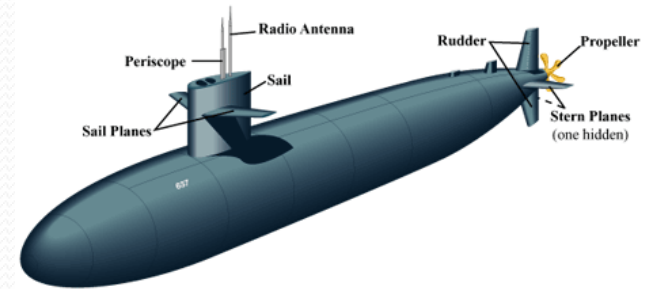
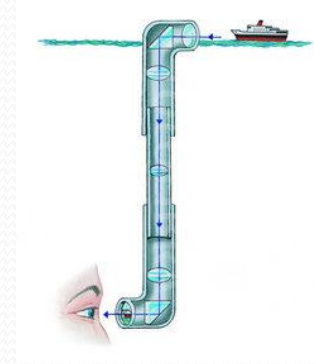
- Colour...
- Smell...
- Skin texture
- Produce sound when shake?
- Hard or soft...
- Float or sink...
- Juicy ...

### Quantitative

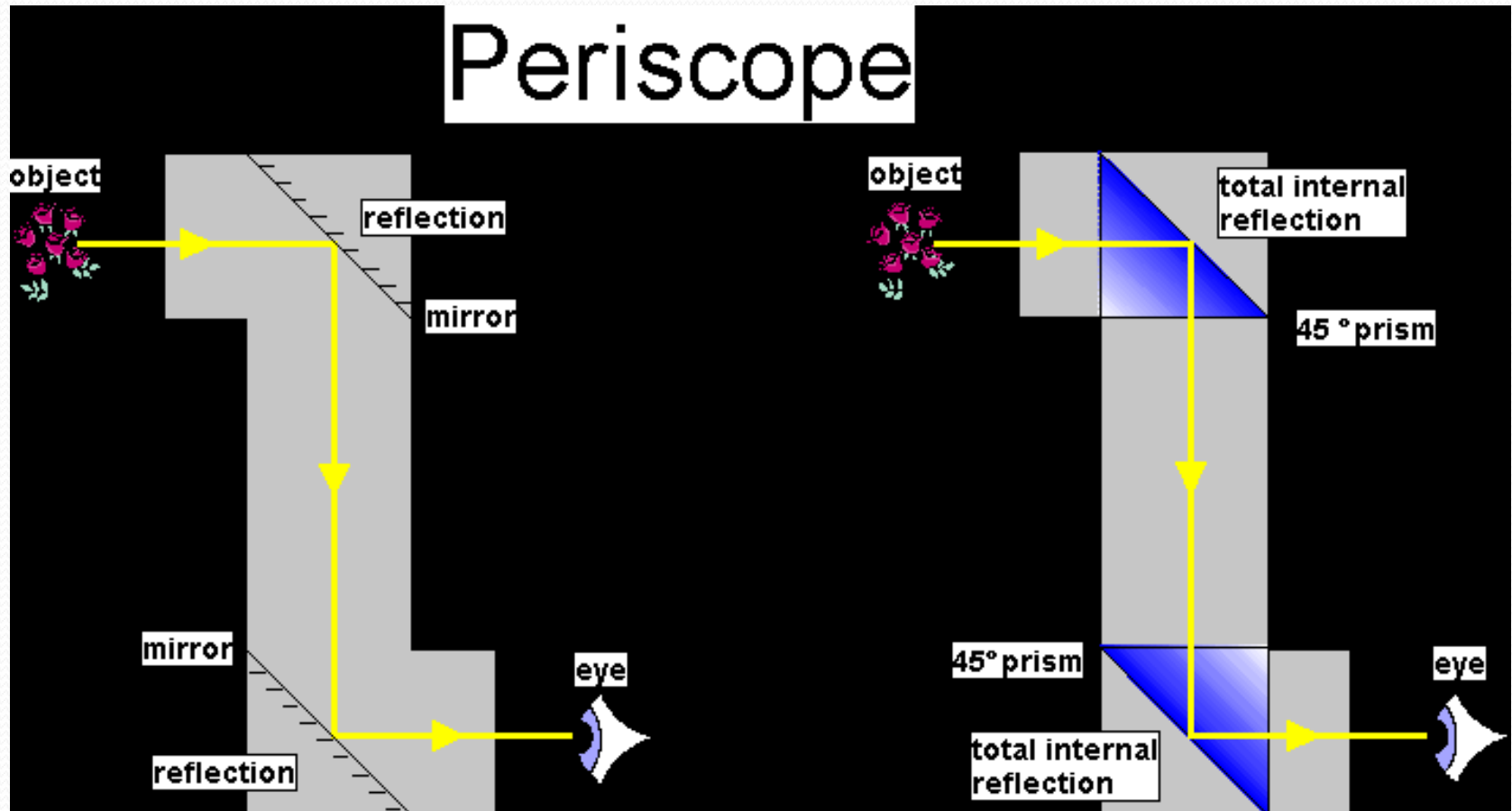
- Weight
- ...



# Overcoming human limitations...technology?



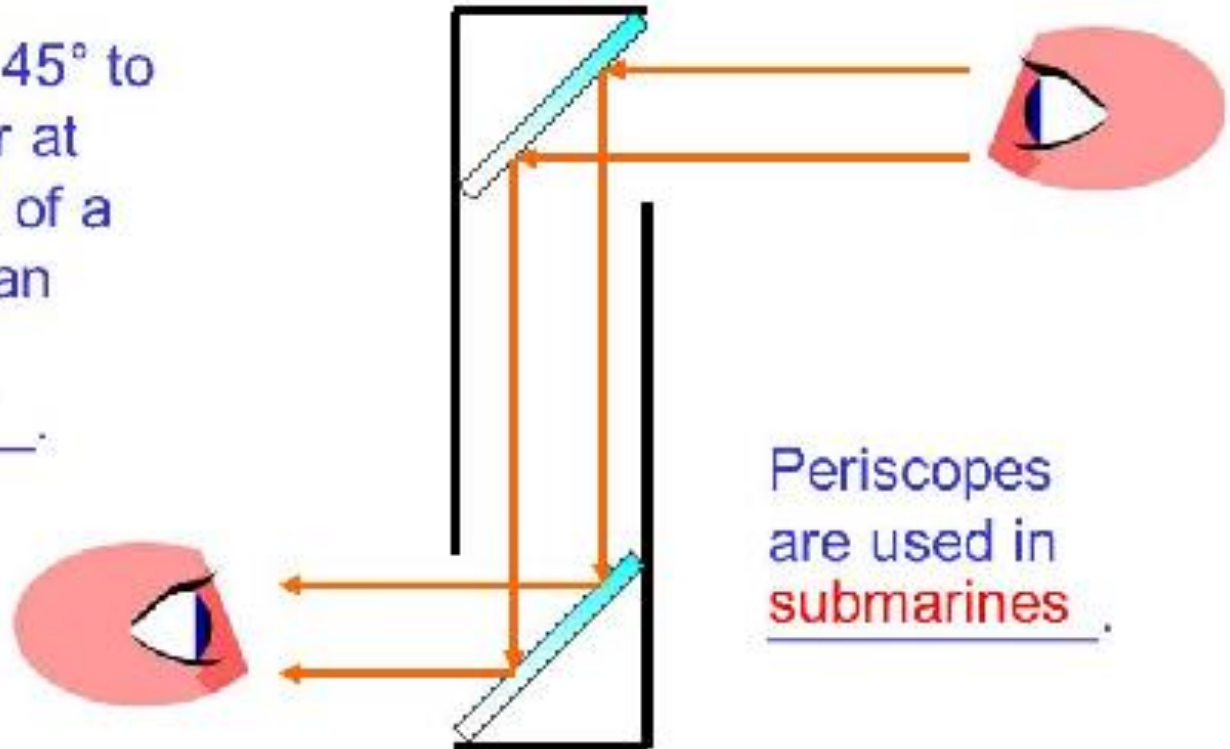
# How a periscope works



## Activity 2

# Constructing periscope...

By positioning two plane mirrors at  $45^\circ$  to each other at either end of a tube we can make a periscope.



Periscopes are used in submarines.



## 2 Classification

How...?

Common features?

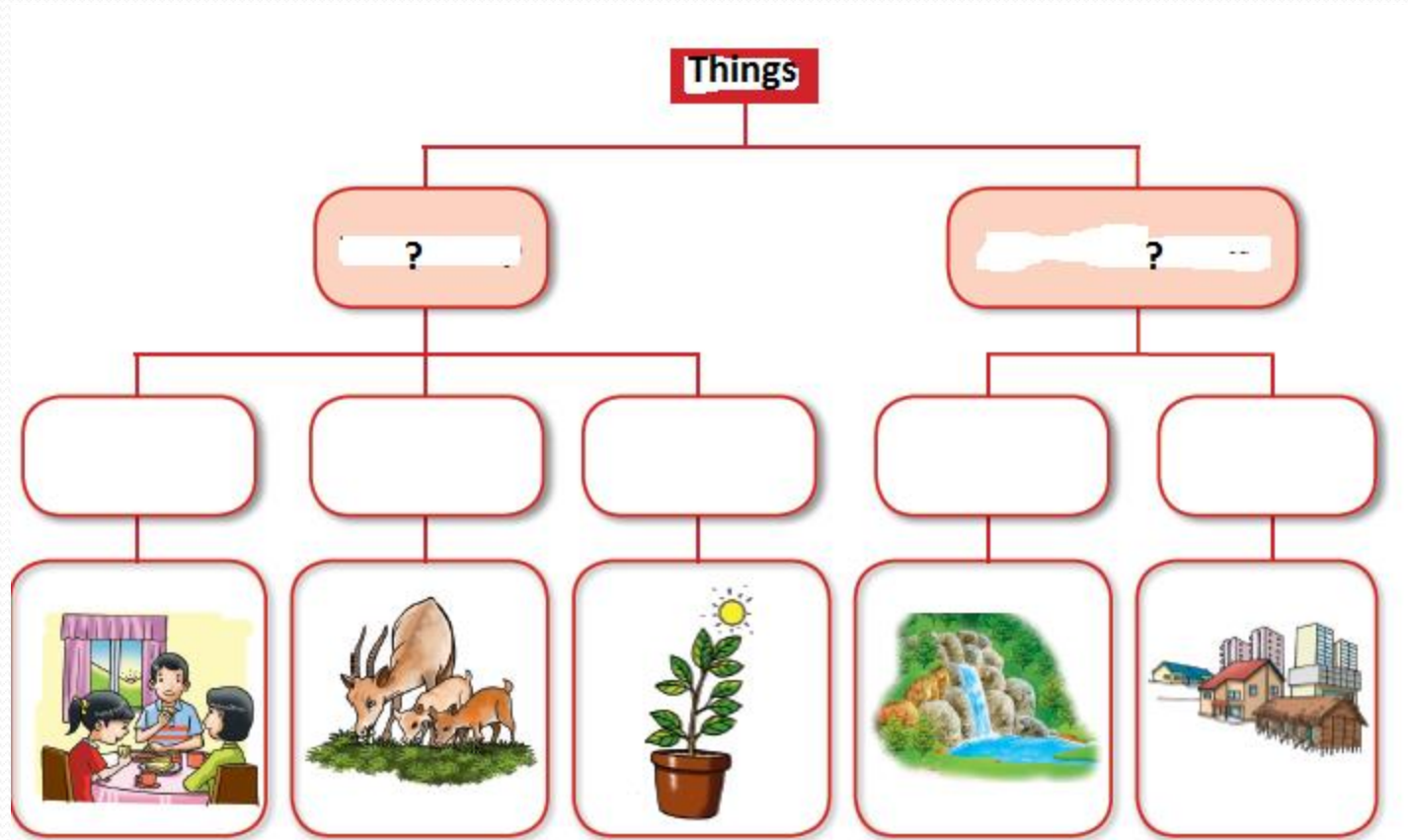


Common function?



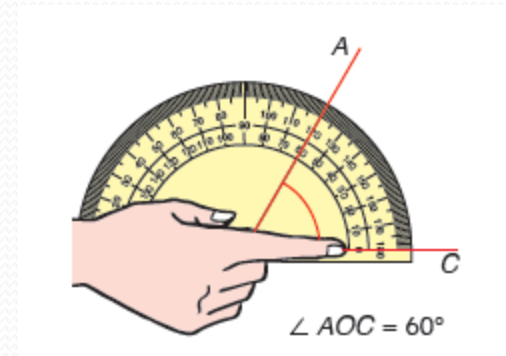
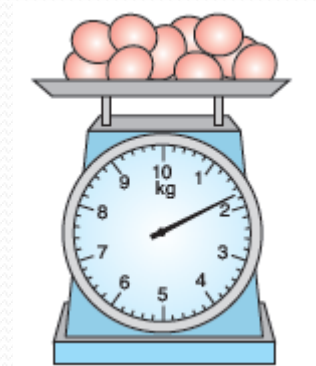
Group name?

# An example of classification



# 3 Measuring and using numbers

Equipment and standard units...



# 4 Inference

Leading to conclusion...



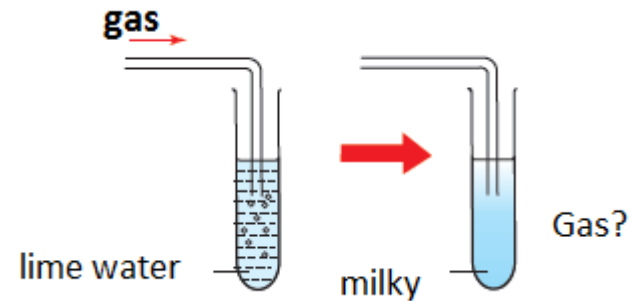
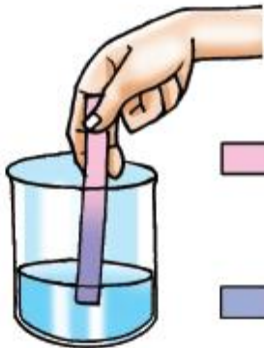
Tyre tracks worn out...?



Shoes muddy...?



Animals...?



# Practice: Inference

- Conclusions or deductions based on observations.
- The process of drawing a conclusion from given evidence.

## *Practice:*

- **Observations:**
  - I hear people shouting for help
  - I smell spicy odour from neighbour's kitchen...
  - I see many passing cars dripping with water ...
- **Inference = ?**



# Practice: Inference

Now what do you think?

Make 3 OBSERVATIONS

Make an INFERENCE



## Activity 3 Making acid-base indicator



# 5 Prediction

What would possibly happen based on data, info....

Which seedling will grow taller?



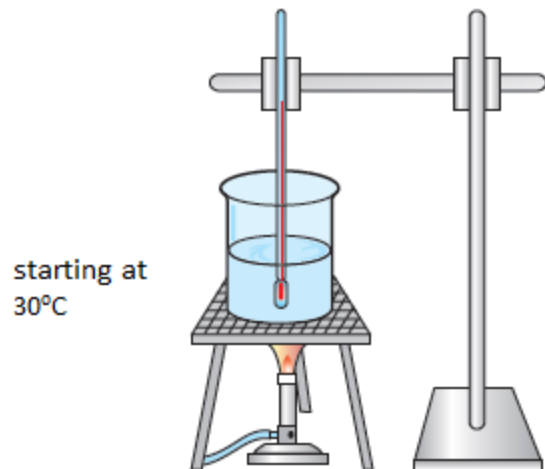
P

Garden soil

Q

Sandy soil

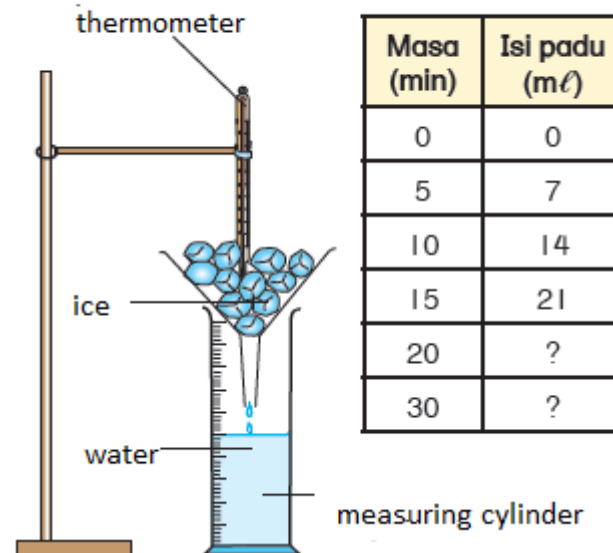
How long will it take for water to boil?



starting at  
30°C

Every minute, Temperature increases 10 °C

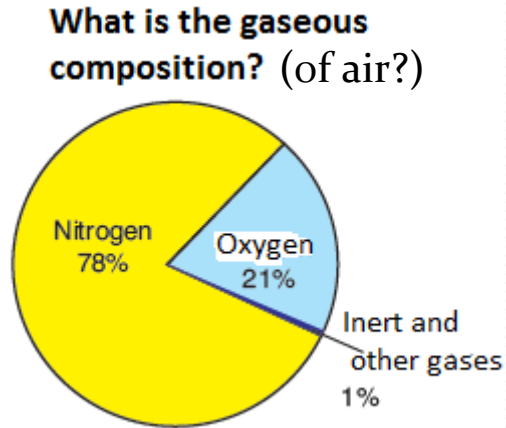
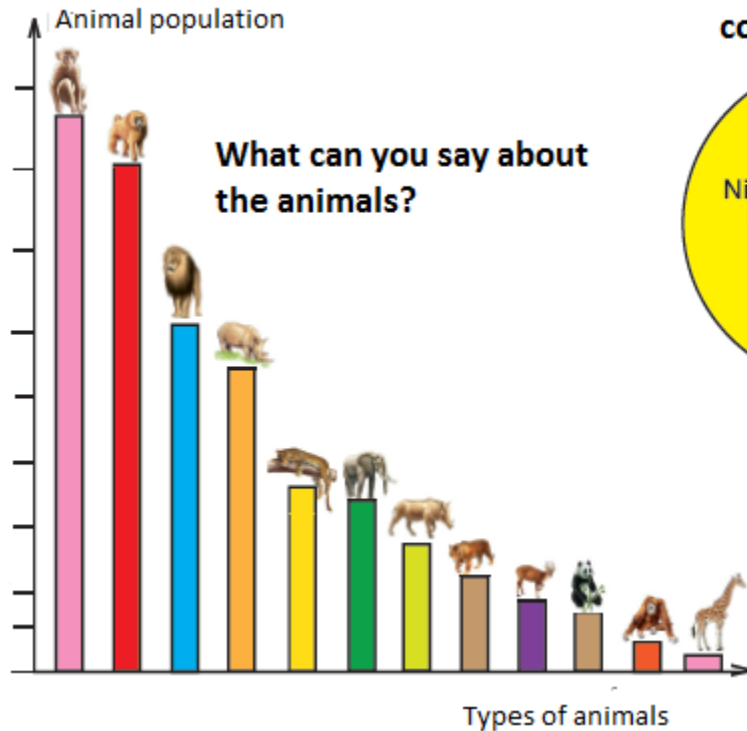
What will be the temperature...?



Guess how far the stone will reach?  
Why not predict?

# 6 Communication

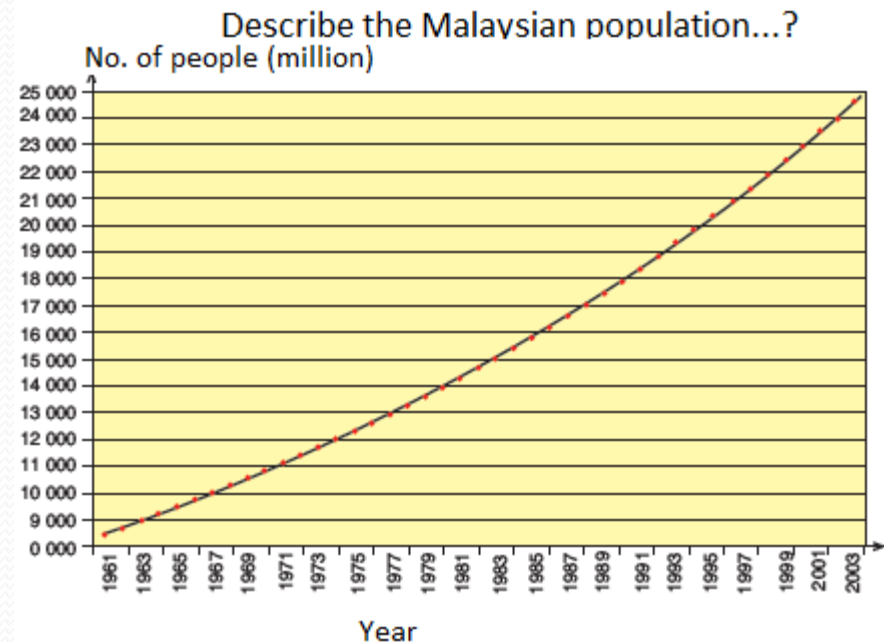
Reporting, sharing info thro' writing, graph, diagram, model...



Formula	Model	water
H <sub>2</sub> O		



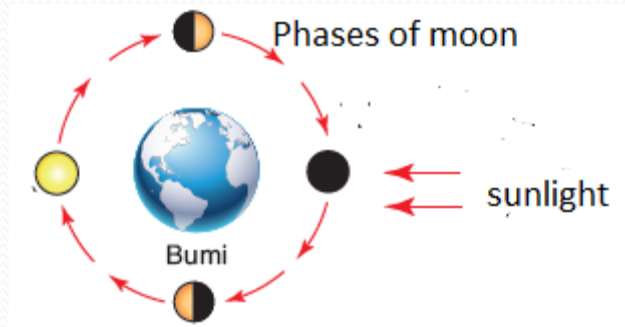
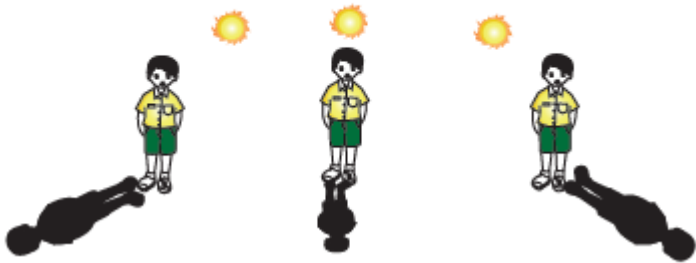
??



# 7 Space-time relationship

Happenings in relation to time and place

Shadow positions in relation to sun position and time



Volume & time



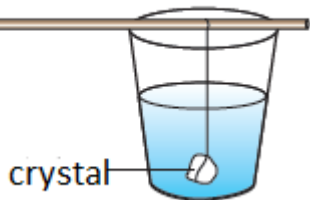
Size/volume with time



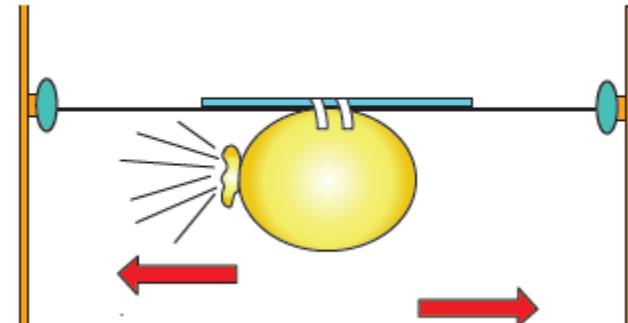
Shape and time



Mass & time



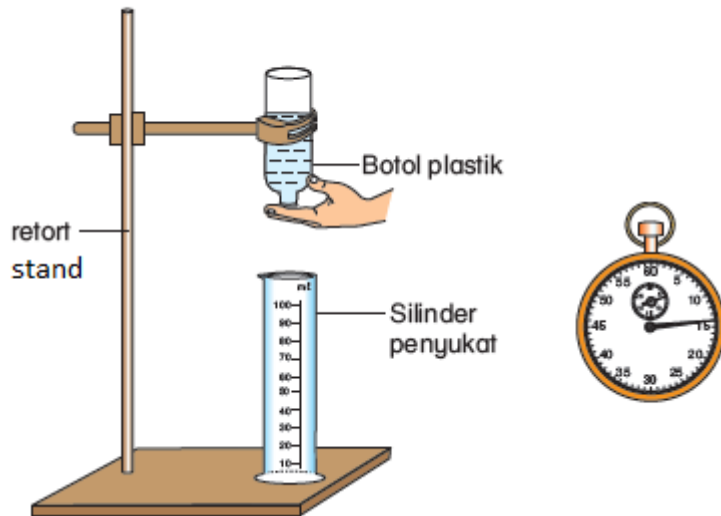
Direction and time



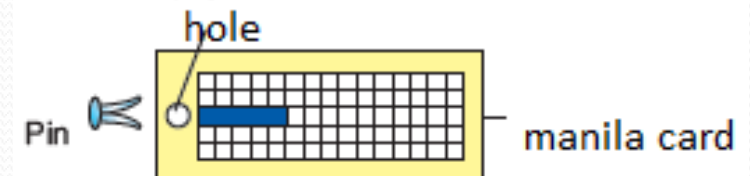
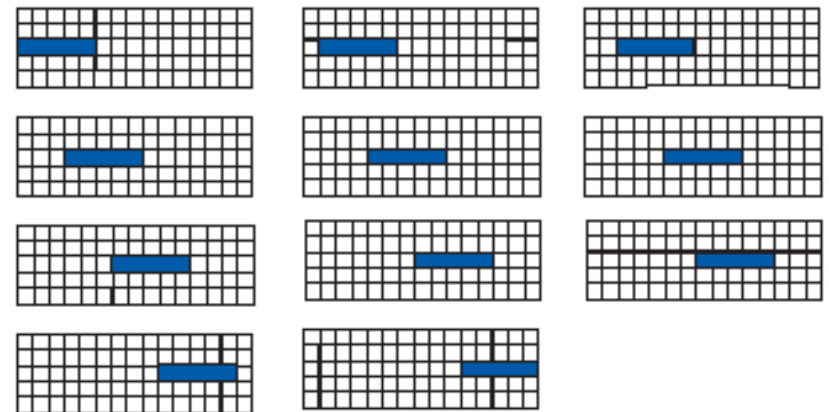
## Activity 4 Investigating space-time relationship

(Use rotocopter...?)

What is the rate of water dropping out?

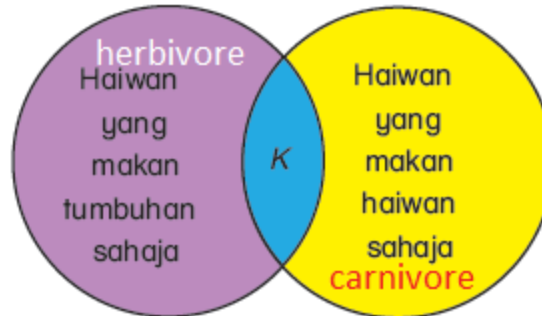


Showing movement,,,space-time relationship

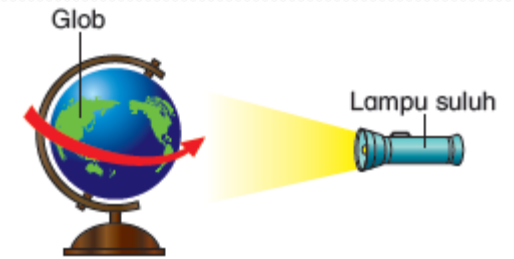




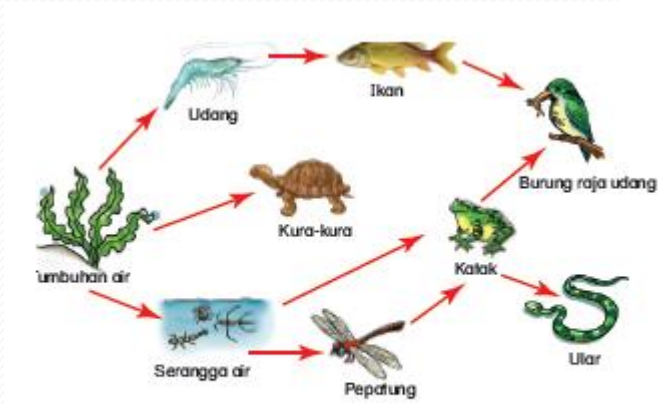
# 8 Interpretation of data



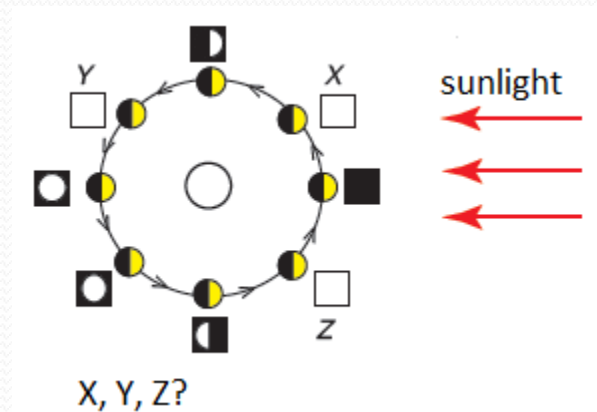
Give an example of K ?



What is it showing?



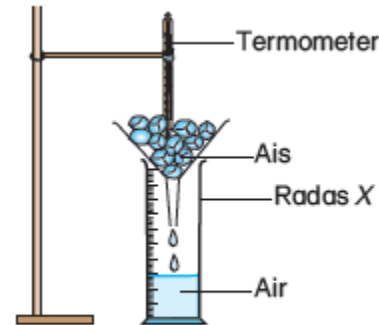
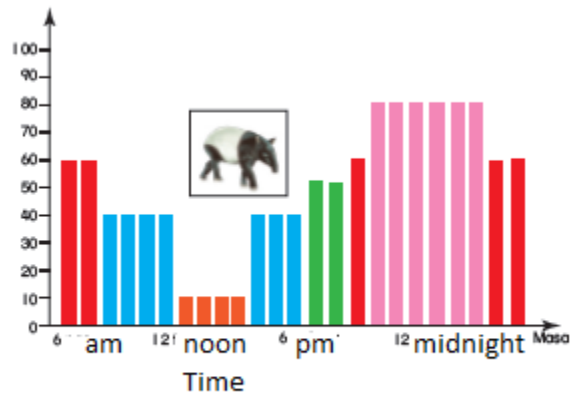
How many food chains?  
List the different food chains.



	X	Y	Z
A			
B			
C			

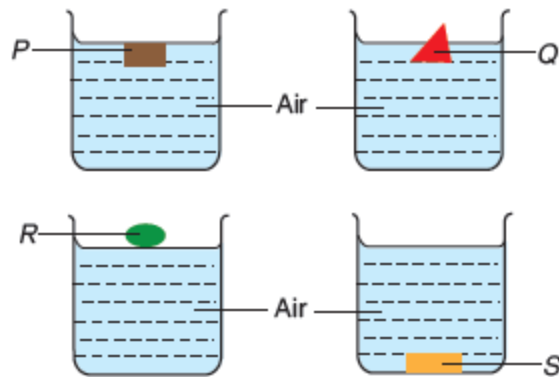


Activity

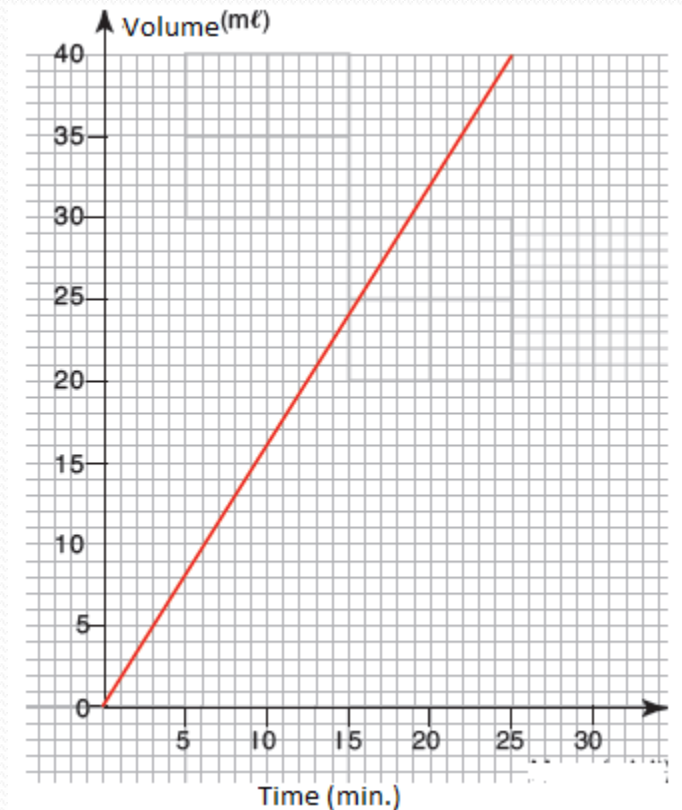


Time (min)	Volume (mℓ)
0	0
5	8
10	16
15	24
20	32
25	40

Rate of melting?

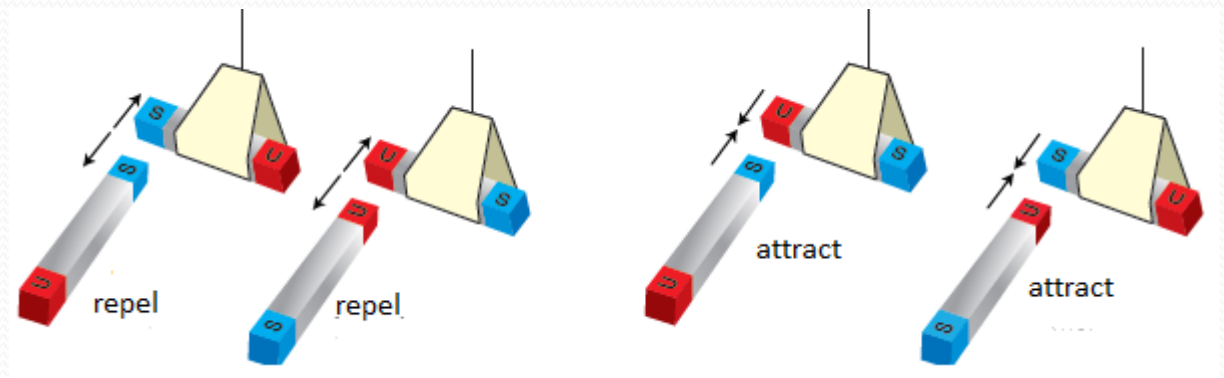
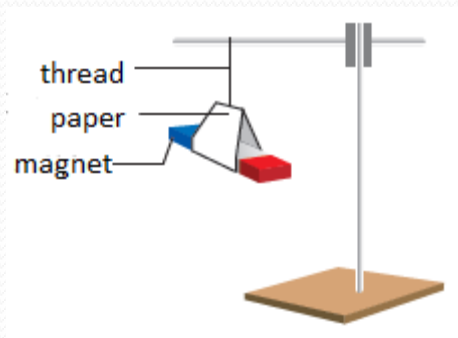
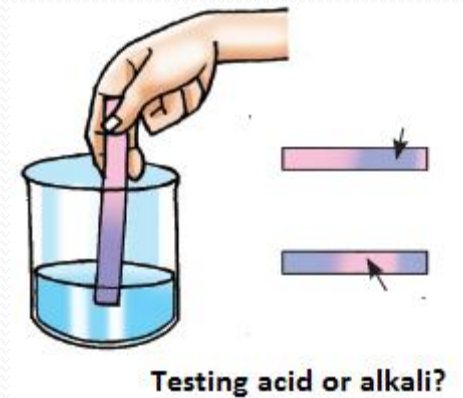
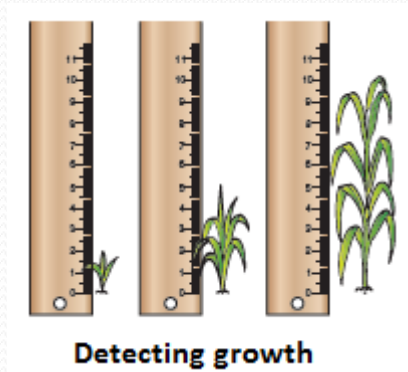


Density ranking?

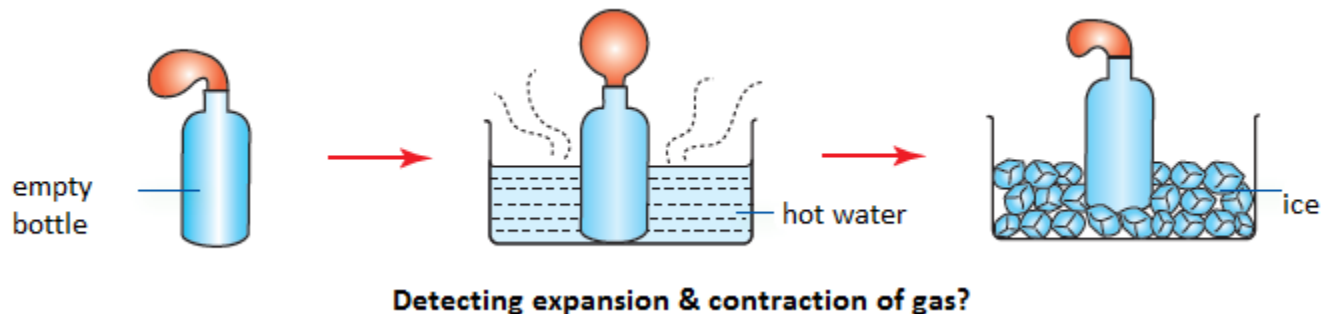
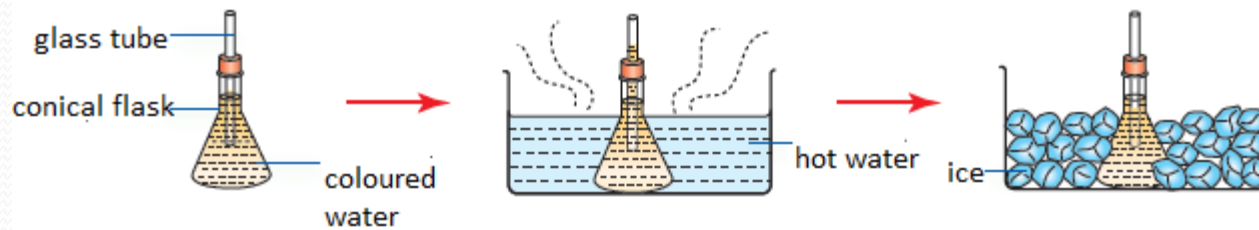
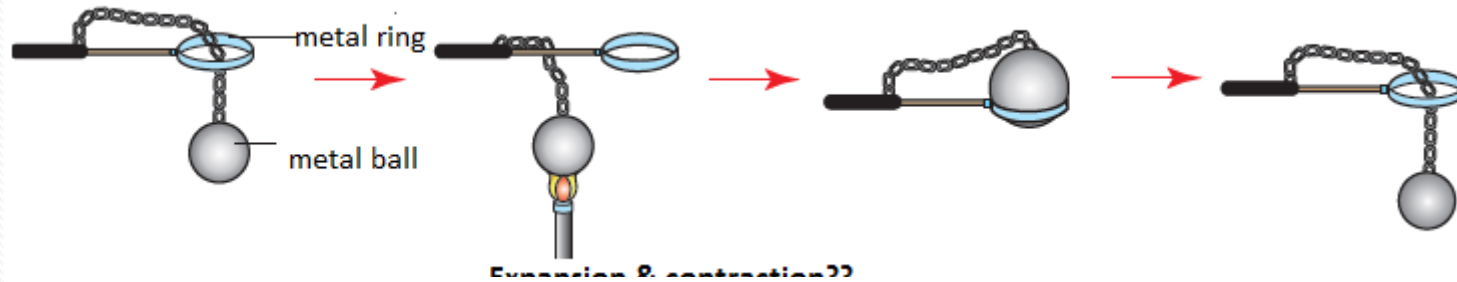


# 9 Defining operationally

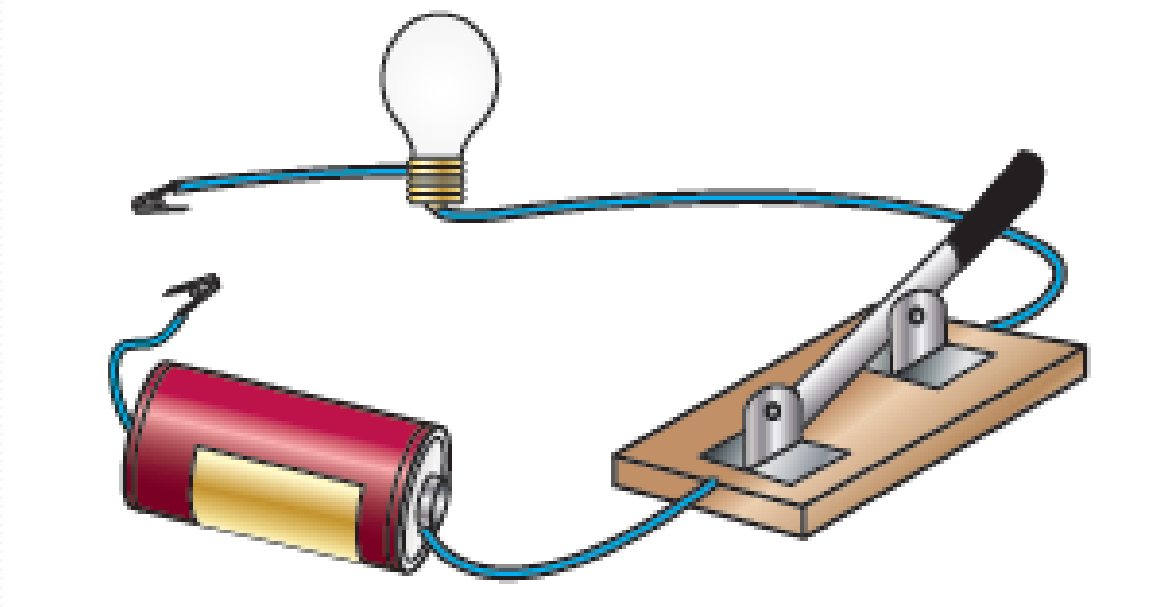
could be visually observed



# Defining operationally



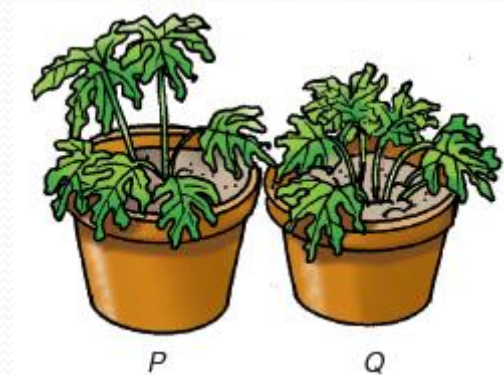
## Activity 5 (continued)



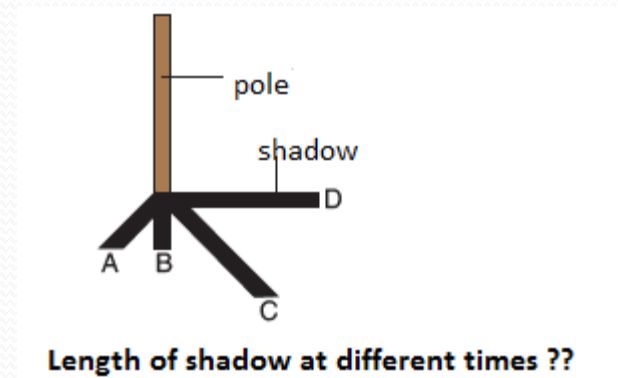
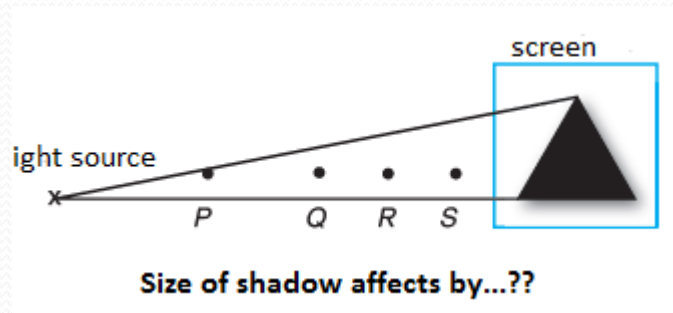
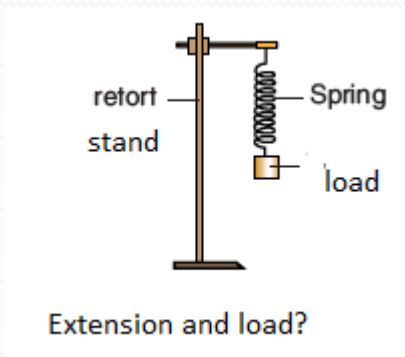
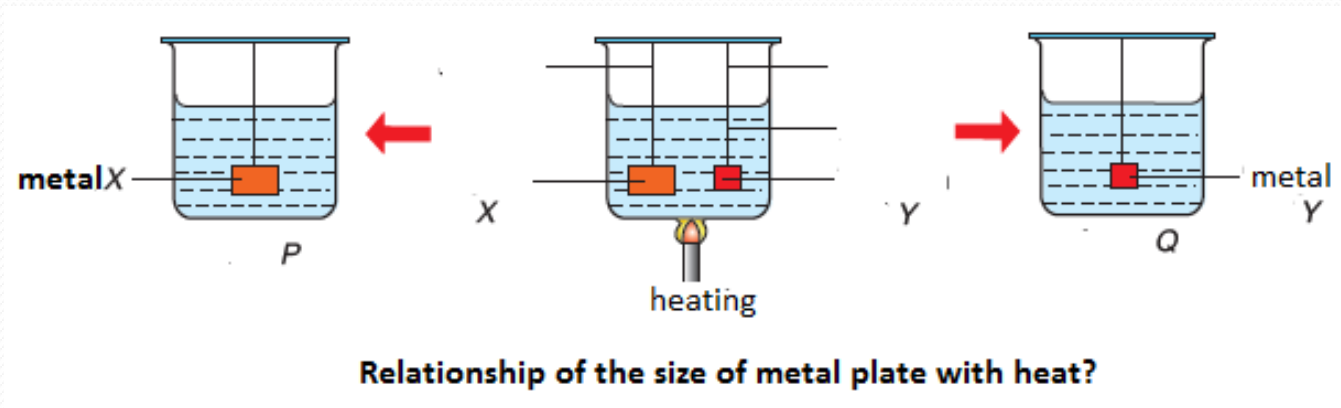
**Determine conductor or insulator of electricity**

# 10 Controlling variables

- What to change    Manipulated/independent variable
- What have happened    responding/dependent variable
- What remain the same    constant variable

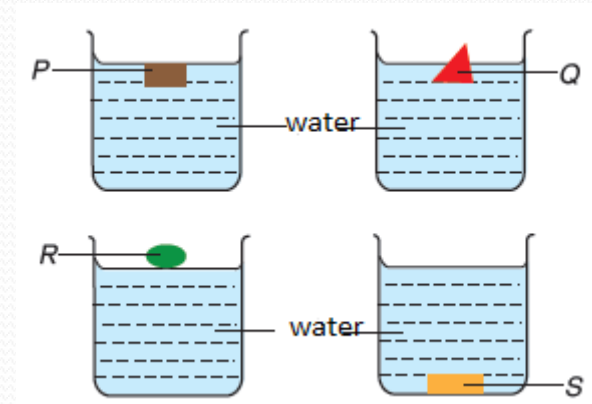
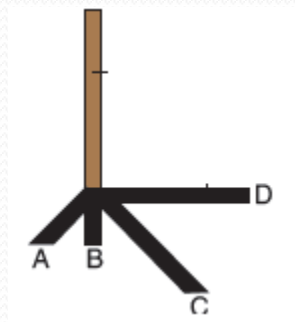
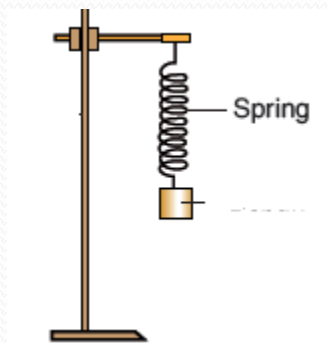
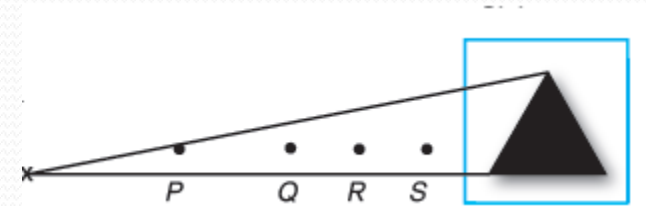
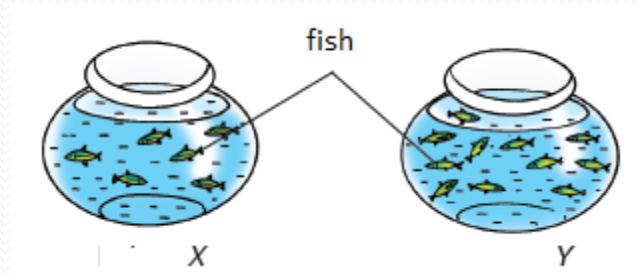
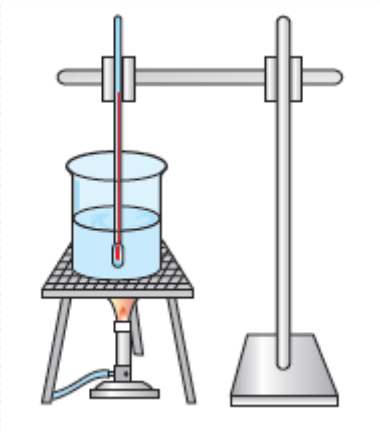


## Activity 6 controlling variables

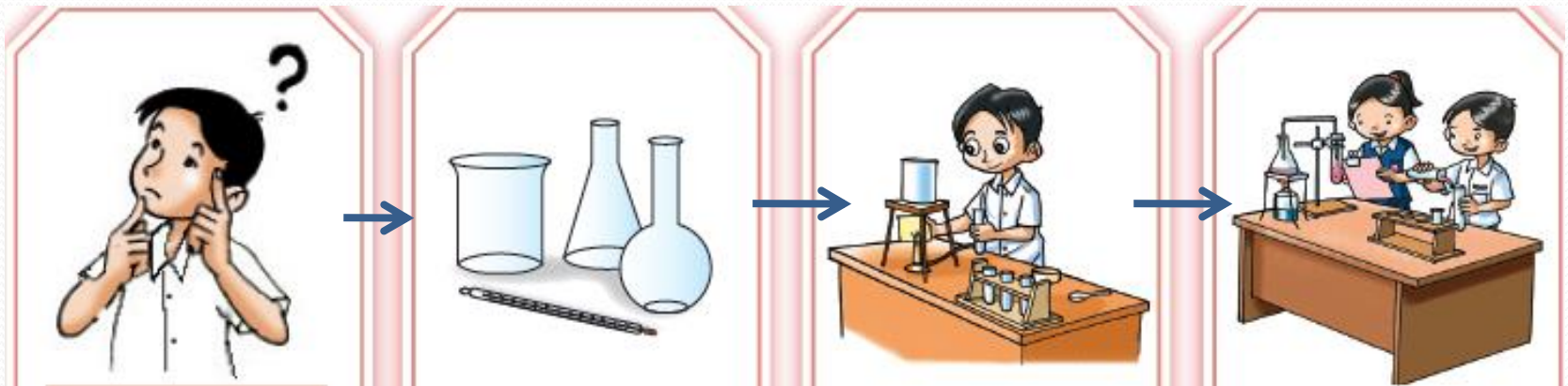




# 11 Making hypothesis



# 12 Experimenting

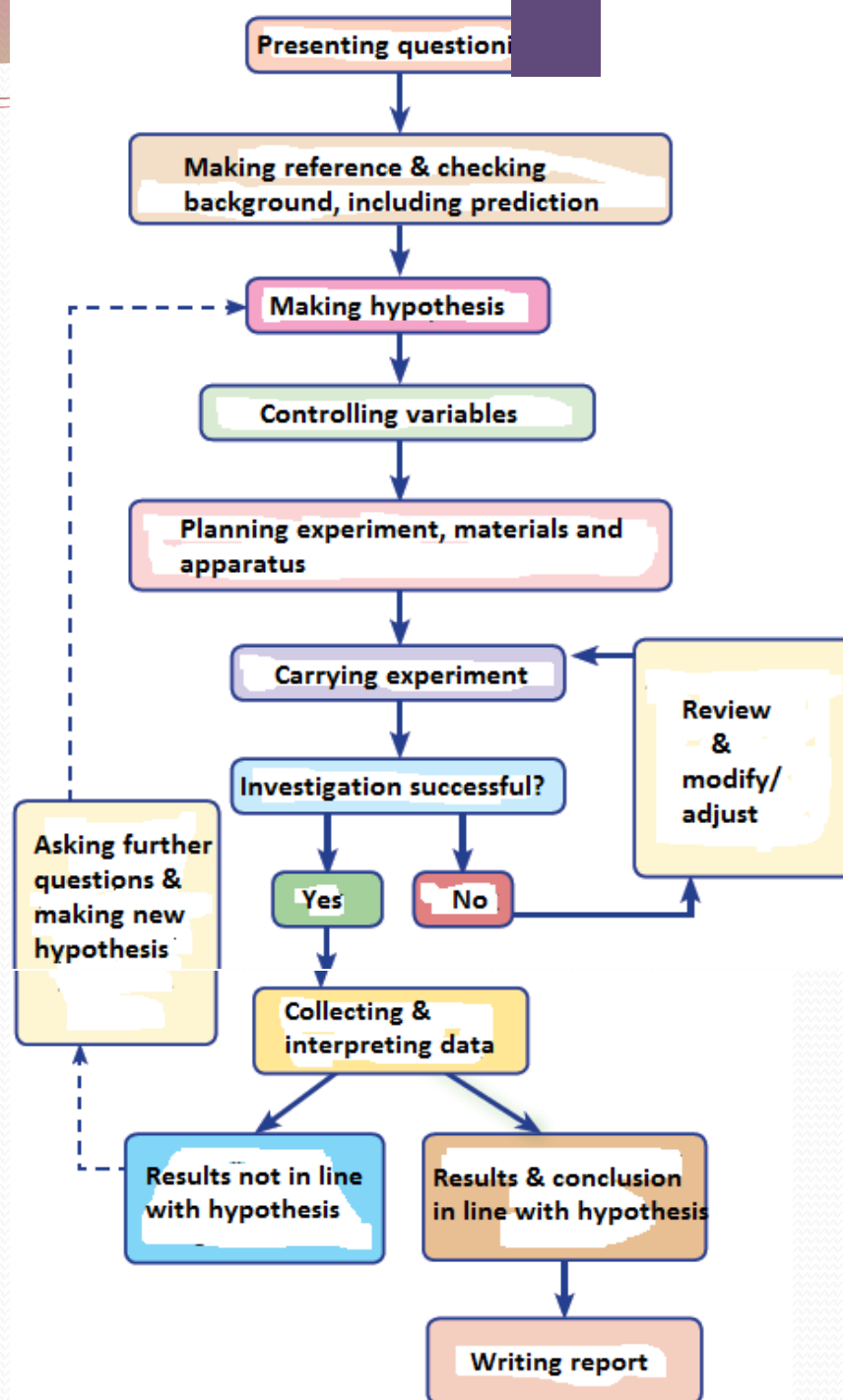


Question & hypothesis

Plan

Collect & interpret data

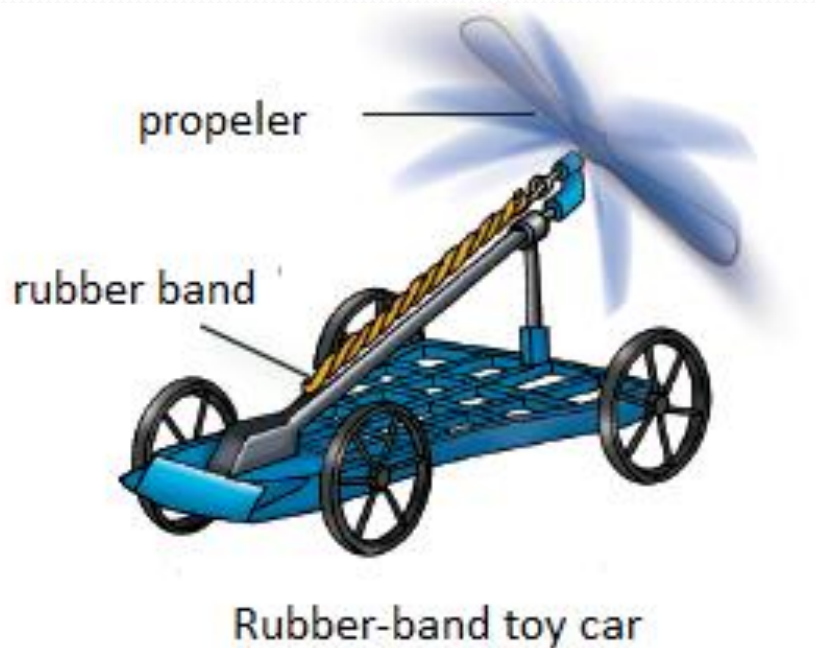
Conclusion & report



# Using effervescent tablets?



## Activity 6 Constructing rubber-band toy car



- **Aim** (Relationship between the number of times the propeler (rubber band) is turned to the distance the car moves.)
- **Hypothesis**
- **Materials (and apparatus)**
- **Variables**
- **Procedure** (including tract- width & starting point)
- **Results**
- **Conclusion**
- **Questions** (inference- rubber tension & movement; other measurement; distance prediction)

No. of times the propeler was turned	5	10	15	20
Distance moved by toy car (cm)				



# Manipulative skills





# What manipulative skills?

(a)



**Fixing & dismantling apparatus**

(b)



**Specimen management**

(c)



**Drawing & recording**

(d)



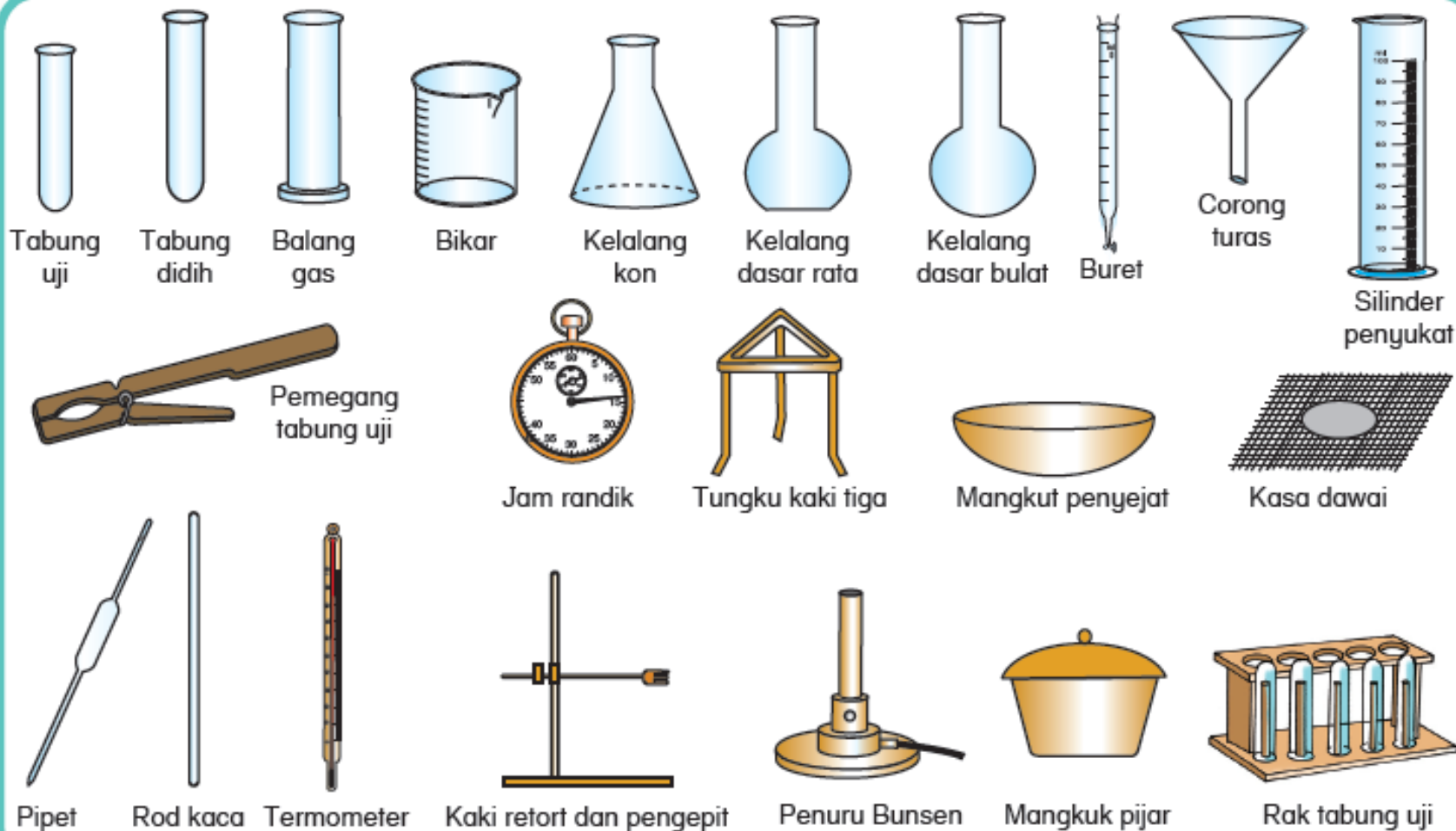
**Cleaning & washing**

(e)

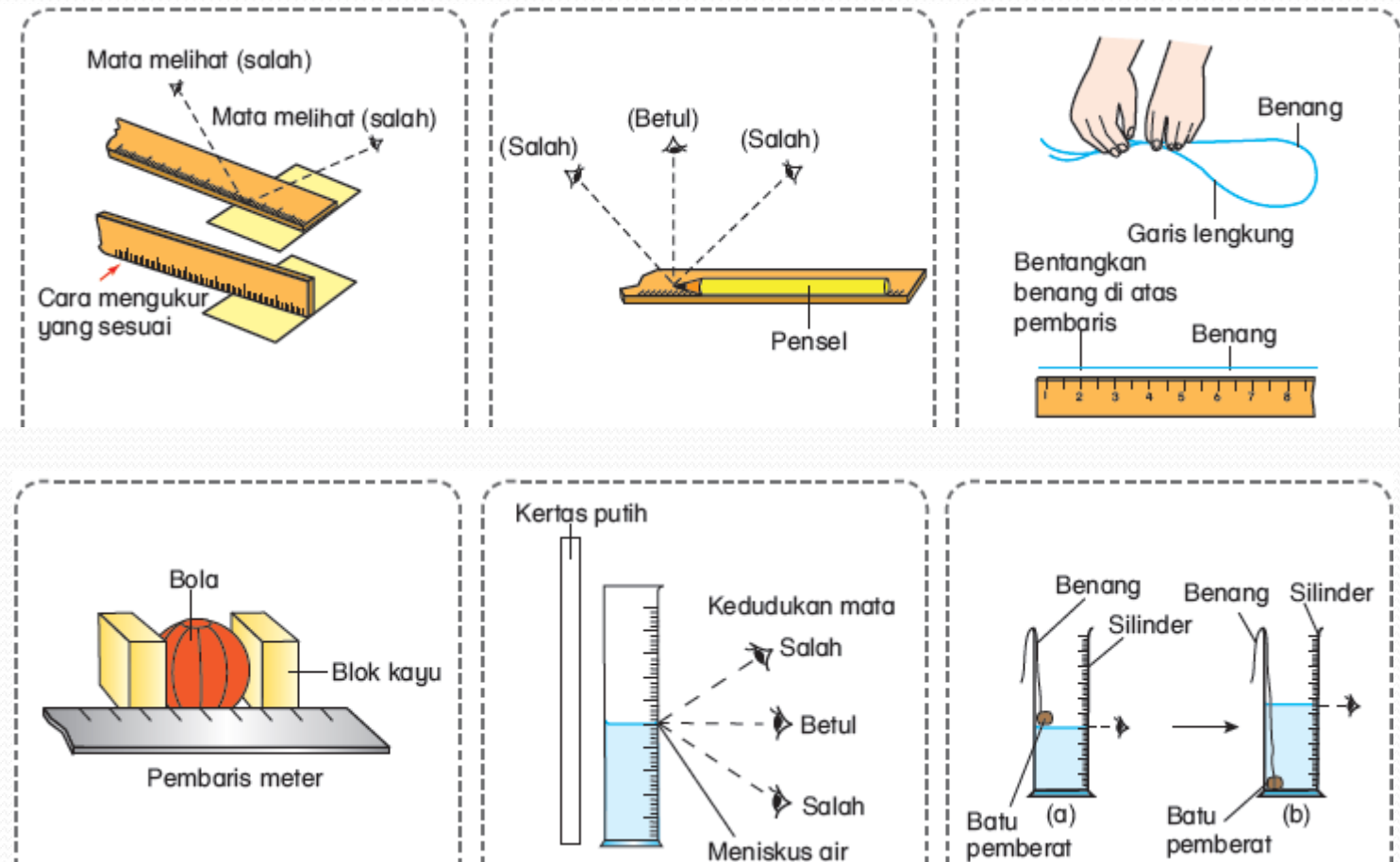


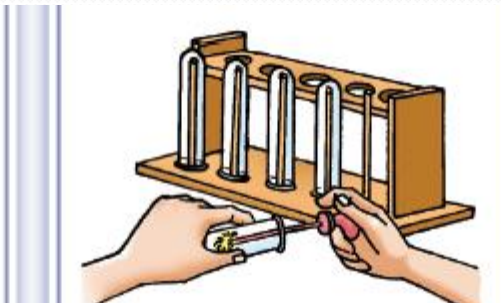
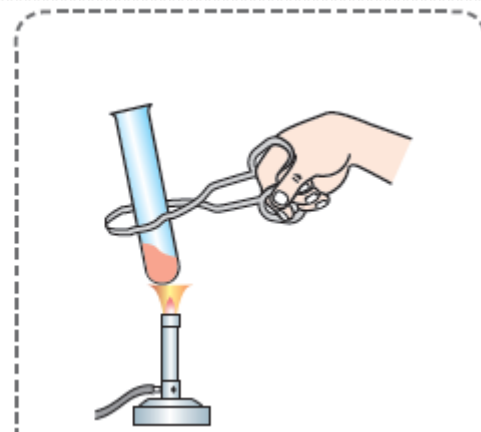
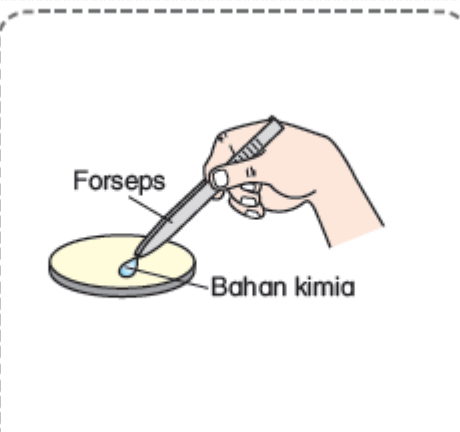
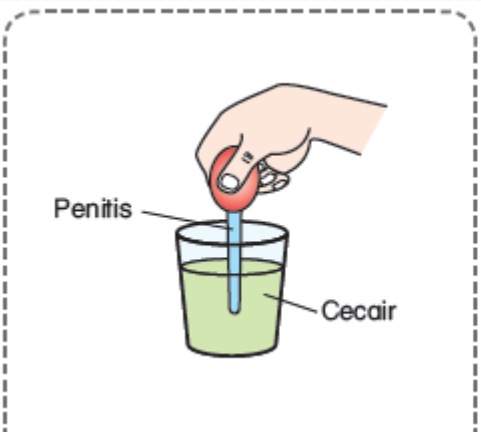
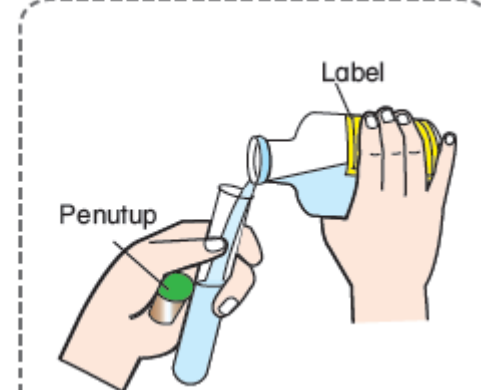
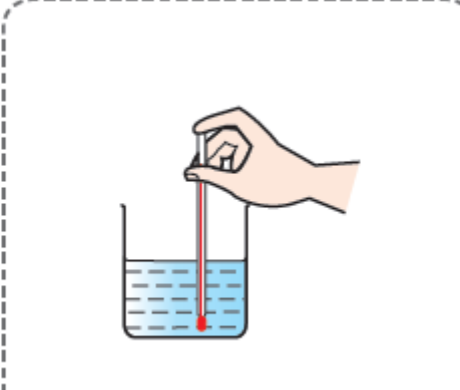
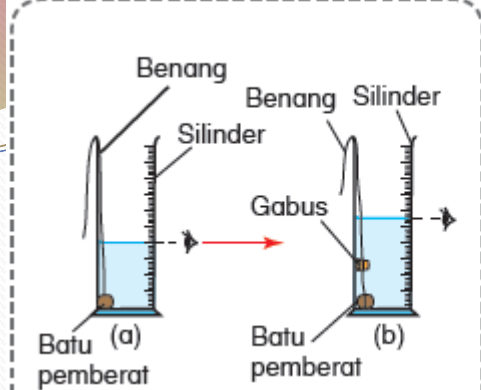
**Storage arrangement**

# Common apparatus



# Techniques & skills





# Reference

Source:

Lee Shok Mee. ( 2016). Buku sumber Sains KSSR Tahun 4.5.6. Petaling Jaya: Ilmu Bakti.

ISBN 978-967-454-458-4

Pages: 1-25



# Thank you

