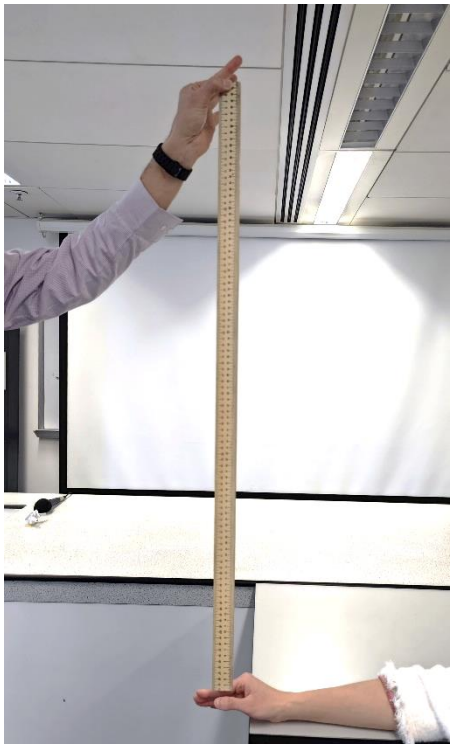
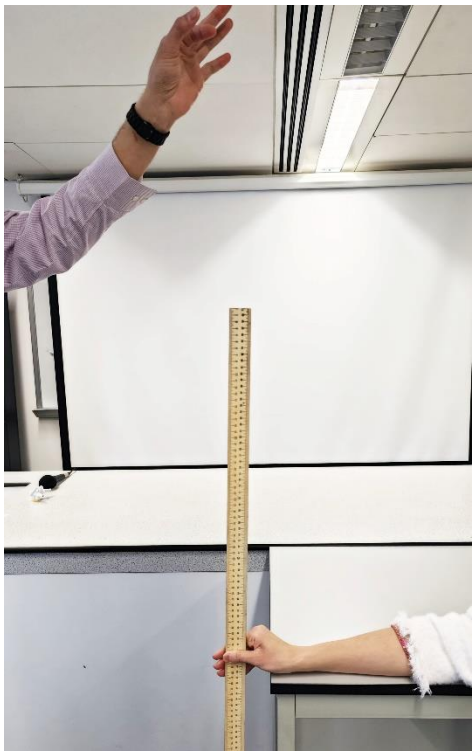
Practical Task: **Perform practical work to find out one's reaction time**

Curriculum Link: **Unit 11: Healthy Body**

Two students are investigating reaction time.

Student A drops a 1m ruler. Student B catches the ruler between her thumb and fingers, as shown in the diagram below. The distance the ruler fell before being caught is recorded.





Perform the experiment in pair, and record the results in the following table.

Trial	Distance the ruler dropped before being caught (mm)
1	115
2	113
3	109
4	111
5	112
6	107
7	109
8	108
9	109
10	108

(a) Calculate the mean distance the ruler dropped. Give your answer to 3 significant figures.

Mean distance = 110 mm (correct to 3 s.f.)

Relevant scientific inquiry skills

- Using scientific notation, significant figures, ratio and rate for presenting scientific data **(D1)**

(b) Write as many as you can the factors that need to be kept constant when carrying out the experiment.

	Factor	(Different Approaches)
1	Example : Same size/length ruler	
2	Same people/roles ✓	[Experimenter]
3	Same (catching) hand ✓	[Experimenter]
4	No practice ✓	[Experimenter]
5	Same influence/lack of influence of caffeine ✓	[Environment]
6	Same place/environment or light level ✓	[Environment]
7	Same time of day ✓	[Time]
8	Dropped, not thrown/pushed down ✓	[Procedure]
9	Same catching position ✓	[Procedure]
10	Same release point/position ✓	[Procedure]
11	Same measuring point ✓	[Measurement]
12	(Accept other reasonable answers)	

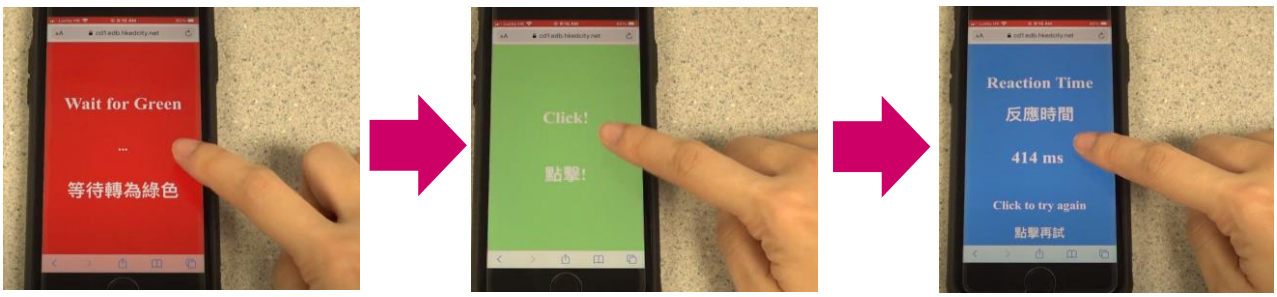
Relevant scientific inquiry skills

- Setting up a control experiment to avoid confounding factors and identify causation **(E5)**

Rubrics (Teachers' reference – AI Marking)

Quantity / Fluency	Diversity	Originality
Counting the number of all separate responses (Regardless of the quality)	Counting the number of different approaches or areas of the responses	Counting the number of unrepeated / scarce responses
_____ marks (@1 mark for each separate response)	_____ marks @1 mark for each different approach	_____ marks @2 marks: for each response that appears in less than 5% of the total student responses
Total mark		_____

(c) The following shows a mobile application which could test the reaction time of individuals using mobile devices:
https://cd1.edb.hkedcity.net/cd/science/games/ortt.html



A scientist designed an experiment using the mobile application to investigate the effects of alcohol on reaction time.

The Scientist investigate the reaction times of two groups of adults. The adults belonged to either a control group or an experimental group. Before conducting the reaction time test, both groups of adults were given a different drink, as shown in the table below:

Ingredient used to make the drink	Volume of ingredient in the drink (cm^3)	
	Control group	Experimental group
Coke	300	240
Alcohol	0	60

(i) What is the independent and dependent variable in this experiment?

Independent variable: The presence or absence of alcohol in the drink.

Dependent variable: The reaction time of the individuals.

(ii) Suggest one reason why coke was added to both groups' drinks.

Any one from :

- Same colour ／ To ensure that they tasted the same taste / To ensure it was a blind test / To ensure that the tester could not tell the difference

(iii) Suggest one reason why 300 cm^3 of the drink was given for both groups.

Any one from :

- To ensure volume of the drink does not affect the results / To ensure that the tester could not tell the difference ／ To ensure it was a blind test

Not accept – "It was a fair test"

(iv) Give one reason why this method of measuring reaction times gives improved results when compared to using a ruler.

Any one from :

- The mobile app is random ／ The reaction time can be directly measured / No need to convert lengths into times ／ Greater accuracy (of mobile device timer) ／ Reduced human error ／ Improved repeatability / Less chance of mistakes

Relevant scientific inquiry skills

- Choosing appropriate design for a scientific investigation and assessing its reliability **(E6)**