

Apparatus and the Tortoise Game

Level: S1

Topic: Using common laboratory equipment (Section 1.3 of Unit 1)

Introduction:

This set of ELA materials is designed to consolidate what students have learned about the uses of common laboratory apparatus in English. It consists of three ELAs. They are:

ELA1 Apparatus (Part 1)

ELA2 Apparatus (Part 2)

ELA3 The Tortoise Game

ELA3 is a revision game, which is included to help students revise the key terms and key points in a fun way. Students can also have the opportunity to practise speaking and listening while playing the game.

Each ELA is designed to last for one single period. A lesson plan and a worksheet or a set of game cards are prepared for each ELA.

ELA1 Lesson Plan – Apparatus (Part 1)

Description: This ELA covers part of Section 1.3—proper use of apparatus—of the CDC Science syllabus. It assumes that the English names of the apparatus were introduced together with the Chinese terms when the subject content was taught in Chinese. In the ELA, after students have learned the subject content, they have to work in pairs to complete a worksheet which requires them to apply their knowledge and understanding of common laboratory apparatus and their usage. The key terms (apparatus names and action verbs) are listed at the top of each page of the worksheets and glossed with Chinese terms to help students complete them. After that, the teacher discusses with students the answers and explains any difficult words.

Content Objectives: After completing the activity, students should be able to:

- identify the following laboratory apparatus: beaker, test tube, test-tube rack, glass rod, dropper, spatula, Bunsen burner, tripod, wire gauze and heat-proof mat
- choose the proper apparatus for carrying out a science activity

Language Objectives: After completing the activity, students should be able to:

- understand and use the English terms of the apparatus (*e.g., beaker, test tube, test-tube rack, glass rod, dropper, spatula, measuring cylinder, Bunsen burner, tripod, wire gauze and heat-proof mat, and electronic balance*);
- use an appropriate action verb (*e.g., heat, hold, measure, protect, stir, support and transfer*) to describe the use of an apparatus, *e.g.,*
 - *We use a beaker/test tube to hold a liquid.*
 - *We use a glass rod to stir a liquid in a beaker.*
 - *We use a dropper to transfer a small amount of liquid.*
 - *We use a spatula to transfer a small amount of solid.*
 - *We use a Bunsen burner to heat water in a beaker.*
 - *We use a heat-proof mat to protect the bench during heating.*
 - *We use an electronic balance to measure weight.*
 - *We use a measuring cylinder to measure the volume of a liquid.*
- comprehend the instructions and choose the proper apparatus for carrying out science activities, *e.g.,*
 - *What apparatus do we need in order to measure 200ml of water and boil the water?*
 - *We need a measuring cylinder, a beaker, a Bunsen burner, a tripod, a wire gauze and a heat-proof mat.*

Activities:

1. Naming the apparatus in English – individual work and whole class (10 minutes)
2. Identifying the use of each apparatus – pair work (15 minutes)
3. Choosing the proper apparatus for science activities – pair work (15 minutes)

Materials: Worksheet 1

Steps:

Naming the apparatus in English – Individual work and whole class (10 minutes)

1. The English names of common laboratory apparatus were introduced together with the Chinese terms when the subject content (Section 1.3) was taught in Chinese.
2. The teacher distributes Worksheet 1 to the class and asks them to complete Part I of the worksheet.
3. The teacher checks the answers by asking the class to pronounce the names of the apparatus. He/she may help them to remember the pronunciation by breaking down the words that contain more than one syllables into syllables and marking the stress on the blackboard:

ap/pa/ra/tus

• • ● •

Bun/sen burn/er

● • ● •

bea/ker

● •

tri/pod

● •

drop/per

● •

tri/ple-beam bal/ance

● • ● ● •

mea/sur/ing cyl/in/der

● • • ● ••

Identifying the use of each piece of apparatus – Pair work (15 minutes)

4. The teacher asks students to work in pairs to complete Part II of the worksheet.
5. The teacher checks the answers and explains any difficult words in the sentences.
6. The teacher asks each student in the pair to take turns to read aloud to each other the uses of the apparatus.
7. The teacher monitors the class while students work in pairs and provide guidance where necessary.

Choosing the proper apparatus for science activities – Pair work (15 minutes)








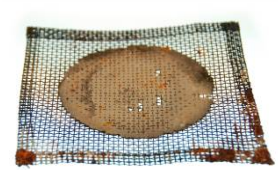

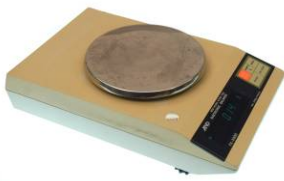
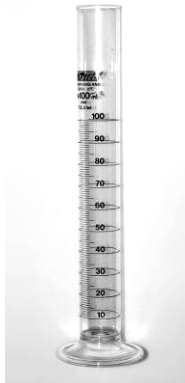
8. The teacher asks students to complete Part III of the worksheet. Depending on students' ability, the teacher may work together with the class using Q1 as an example. Simple diagrams for the set-ups can be drawn on the board so that students can visualize the set-ups and understand why those apparatus are needed.
9. The teacher should encourage students to compare answers with their partner before checking them with the whole class. Simple diagrams for the set-ups can be drawn on the board while checking the answers.
10. The teacher may end the lesson by asking students to suggest some other science activities that can be carried out using the apparatus provided. Where necessary, they should give the safety rules for the activities listed in the worksheet.

Apparatus 儀器 – Worksheet 1

I. Name the apparatus

Write the English names under each picture.

beaker 燒杯	Bunsen burner 本生燈	dropper 滴管	glass rod 玻璃棒
heat-proof mat 隔熱板	measuring cylinder 量筒	spatula 藥匙/刮勺	test tube 試管
test-tube rack 試管架	electronic balance 電子天平	tripod 三腳架	wire gauze 鐵絲網



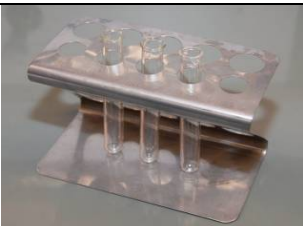
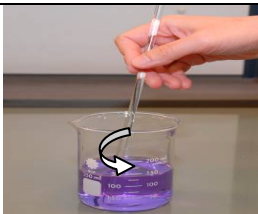
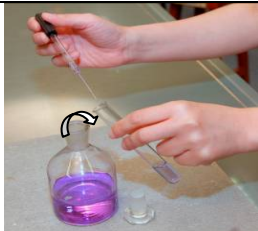

			
(1)	(2)	(3)	(4)
			
(5)	(6)	(7)	(8)
			
(9)	(10)	(11)	(12)




(Worksheet 1)

II. What do we use the apparatus for?

Fill in the blanks with the following verbs.

heat 加熱	hold 盛載	measure 量度	protect 保護
stir 攪動	support 支撐	transfer 移送	

	1. We use a beaker to _____ a liquid.
	2. We use a test tube to _____ a liquid.
	3. We use a test-tube rack to _____ test tubes in place.
	4. We use a glass rod to _____ a liquid in a beaker.
	5. We use a dropper to _____ a small amount of liquid.
	6. We use a spatula to _____ a small amount of solid.

	<p>7. We use a Bunsen burner to _____ water in a beaker.</p> <p>8. We use a tripod and a wire gauze to _____ the beaker during heating.</p> <p>9. We use a heat-proof mat to _____ the bench during heating.</p>
	<p>10. We use an electronic balance to _____ weight.</p>
	<p>11. We use a measuring cylinder to _____ the volume of a liquid.</p>

III. What apparatus do we need in order to carry out the following steps in an experiment?

1. Measure 200ml of water and boil the water.

Apparatus needed: _____

2. Take out 10 drops of liquid A from bottle A and 10 drops of liquid B from bottle B. Mix A and B.

Apparatus needed: _____

3. Measure 5g of salt and 100ml of water. Dissolve the salt in water by mixing and stirring them.

Apparatus needed: _____




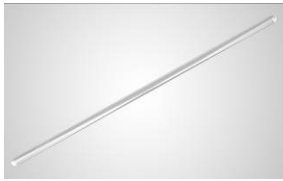






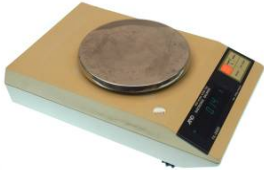
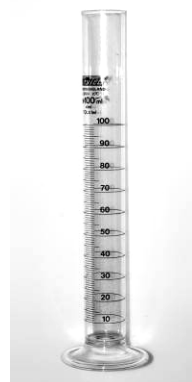
Apparatus 儀器 – Worksheet 1

Answers

I. Name the apparatus

Write the English names under each picture.

beaker 燒杯	Bunsen burner 本生燈	dropper 滴管	glass rod 玻璃棒
heat-proof mat 隔熱板	measuring cylinder 量筒	spatula 藥匙/刮勺	test tube 試管
test-tube rack 試管架	electronic balance 電子天平	tripod 三腳架	wire gauze 鐵絲網




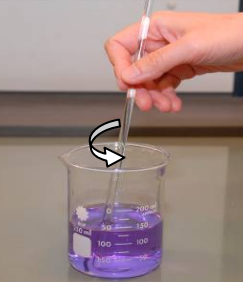


			
(1) <i>beaker</i>	(2) <i>test tube</i>	(3) <i>test-tube rack</i>	(4) <i>glass rod</i>
			
(5) <i>dropper</i>	(6) <i>spatula</i>	(7) <i>Bunsen burner</i>	(8) <i>tripod</i>
			
(9) <i>wire gauze</i>	(10) <i>heat-proof mat</i>	(11) <i>electronic balance</i>	(12) <i>measuring cylinder</i>

(Worksheet 1)


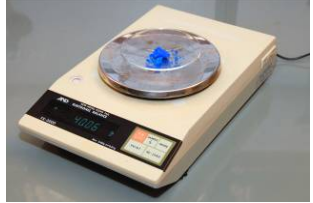

II. What do we use the apparatus for?

Fill in the blanks with the following verbs. You may use the verbs more than once.

heat 加熱	hold 盛載	measure 量度	protect 保護
stir 攪動	support 支撐	transfer 移送	

	1. We use a beaker to <u>hold</u> a liquid.
	2. We use a test tube to <u>hold</u> a liquid.
	3. We use a test-tube rack to <u>hold</u> test tubes in place.
	4. We use a glass rod to <u>stir</u> a liquid in a beaker.
	5. We use a dropper to <u>transfer</u> a small amount of liquid.
	6. We use a spatula to <u>transfer</u> a small amount of solid.

(Worksheet 1)

	<ol style="list-style-type: none">1. We use a Bunsen burner to <u>heat</u> water in a beaker.2. We use a tripod and a wire gauze to <u>support</u> the beaker during heating.3. We use a heat-proof mat to <u>protect</u> the bench during heating.
	<ol style="list-style-type: none">4. We use an electronic balance to <u>measure</u> weight.
	<ol style="list-style-type: none">5. We use a measuring cylinder to <u>measure</u> the volume of a liquid.

III. What apparatus do we need in order to carry out the following steps in an experiment?

1. Measure 200ml of water and boil the water.

Apparatus needed: measuring cylinder, beaker, Bunsen burner, tripod, wire gauze, heat-proof mat

2. Take out 10 drops of liquid A from bottle A and 10 drops of liquid B from bottle B. Mix A and B.

Apparatus needed: dropper, test tube

3. Measure 5g of salt and 100ml of water. Dissolve the salt in water by mixing and stirring them.

Apparatus needed: (electronic) balance, measuring cylinder, beaker, glass rod

ELA2 Lesson Plan – Apparatus (Part 2)

Description: This ELA covers part of Section 1.3—proper use of apparatus—of the CDC science syllabus. The English names of the apparatus were introduced together with the Chinese terms when the subject content was taught in Chinese. After students have learned the subject content, they have to work in pairs to complete a worksheet which requires them to apply their knowledge and understanding of laboratory apparatus and its usage. The key terms (apparatus names and action verbs) are listed at the top of each page of the worksheets and glossed with Chinese terms to help students complete them. After that, the teacher discusses with students the answers and explains any difficult words.

Content Objectives: After completing the activity, students should be able to:

- identify the following laboratory apparatus: metre-rule, thermometer, stop-watch, stand, clamp, safety goggles, flask, boiling tube, test-tube holder, watch glass, evaporating dish and reagent bottle
- choose the proper apparatus for carrying out a science activity

Language Objectives: After completing the activity, students should be able to:

- understand and use the English terms for naming the apparatus (*metre-rule, thermometer, stop-watch, stand, clamp, safety goggles, flask, boiling tube, test-tube holder, watch glass, evaporating dish and reagent bottle*);
- use an appropriate action verb (e.g., heat, hold, measure, protect, store) to describe the use of an apparatus, e.g.,
 - *We use a metre rule to measure length.*
 - *We use a thermometer to measure temperature.*
 - *We use a stop-watch to measure time.*
 - *We use a stand and a clamp to hold an apparatus at a required height.*
 - *We wear safety goggles to protect our eyes.*
 - *We use a flask to hold liquids.*
 - *We use a boiling tube to hold a liquid.*
- comprehend the instructions and choose the proper apparatus for carrying out the science activity, e.g.,
 - *What apparatus do we need in order to measure 20g of salt and 100 ml of water?*
 - *We need a balance, a balance, a spatula, a measuring cylinder, a watch glass and a beaker.*

Activities:

1. Naming the apparatus in English – individual work and whole class (10 minutes)
2. Identifying the use of each piece of apparatus – pair work (15 minutes)
3. Choosing the proper apparatus for science activities – pair work (15 minutes)

Materials: Worksheet 2

Steps:

Naming the apparatus in English – Individual work and whole class (10 minutes)

1. The English names of common laboratory apparatus were introduced together with the Chinese terms when the subject content (Section 1.3) was taught in Chinese.
2. The teacher distributes Worksheet 1 to the class and asks them to complete Part I of the worksheet.
3. The teacher checks the answers by asking the class to pronounce the names of the apparatus. He/she may help them remember the pronunciation by breaking down the words that contain more than one syllables into syllables and marking the stress on the blackboard:

me/tre rule ther/mom/e/ter safe/ty gog/gles boil/ing tube re/a/gent bot/tle
● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●

Identifying the use of each piece of apparatus – Pair work (15 minutes)

4. The teacher asks students to work in pairs to complete Part II of the worksheet.
5. The teacher checks the answers and explains any difficult words in the sentences.
6. The teacher asks the pairs to take turns to read aloud to each other the uses of the apparatus.
7. The teacher should monitor the class while they are doing the pair practice and provide help where necessary.

Choosing the proper apparatus for science activities – Individual work (15 minutes)

8. The teacher then asks students to complete Part III of the worksheet. Depending on students' ability, the teacher may work together with the class using Q1(a) as an example. Simple diagrams for the set-ups can be drawn on the board so that students can visualize the set-ups and understand why those apparatus are needed.
9. The teacher should encourage students to compare answers with their partner before checking them with the whole class. Simple diagrams for the set-ups can be drawn on the board while providing feedback to the answers.
10. The teacher may end the activity by asking the students to suggest any other science activities that can be carried out using the apparatus provided or to give the safety rules for the activities listed in the worksheet.

Apparatus 儀器 – Worksheet 2

I. Name the apparatus

Write their names under each picture.








boiling tube 大試管	clamp 夾子	flask 燒瓶	metre rule 米尺
reagent bottle 試劑瓶	safety goggles 安全眼鏡	stop-watch 秒錶	stand 支架
test-tube holder 試管夾	thermometer 溫度計	watch glass 錶面玻璃	




 (1)	 (2)	 (3)	 (4)
 (5)	 (6)	 (7)	 (8)
 (9)	 (10)	 (11)	

(Worksheet 2)

II. What do we use the apparatus for?

Fill in the blanks with the following verbs.

heat 加熱	hold 盛載；夾住	measure 量度	protect 保護	store 貯存
	1. We use a metre rule to _____ length.			
	2. We use a thermometer to _____ temperature.			
	3. We use a stop-watch to _____ time.			
	4. We use a stand and a clamp to _____ an apparatus at a required height.			
	5. We wear safety goggles to _____ our eyes.			
	6. We use a flask to _____ liquids.			
	7. We use a boiling tube to _____ a liquid.			

	8. We use a test-tube holder to _____ a test tube during heating.
	9. We use a watch glass to _____ a small amount of solid.
	10. We use a reagent bottle to _____ a liquid.

III. What apparatus do we need in order to carry out the following steps in an experiment?

The apparatus listed in the worksheet of Apparatus (Part 1) may also be required.

1. (a) Measure 7ml of water and boil the water.

Apparatus needed: _____

- (b) Measure the temperature of the boiling water.

Apparatus needed: _____

2. (a) Measure 20g of salt and 100ml of water.

Apparatus needed: _____

- (b) Add the salt to the water in a beaker and stir it. Measure the time taken for all the salt to dissolve in water.

Apparatus needed: _____

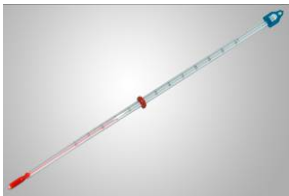
Apparatus 儀器 – Worksheet 2

Answers

I. Name the apparatus

Put down their names under each picture.








boiling tube 大試管	clamp 夾子	flask 燒瓶	metre rule 米尺
reagent bottle 試劑瓶	safety goggles 安全眼鏡	stop-watch 秒錶	stand 支架
test-tube holder 試管夾	thermometer 溫度計	watch glass 錶面玻璃	

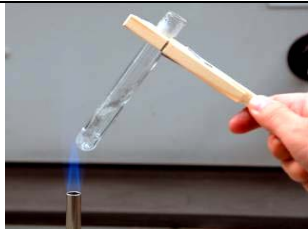
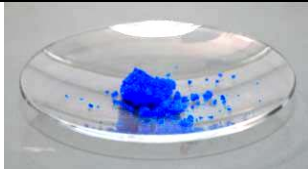

			
(1) <i>metre rule</i>	(2) <i>thermometer</i>	(3) <i>stop-watch</i>	(4) <i>stand</i>
			
(5) <i>clamp</i>	(6) <i>safety goggles</i>	(7) <i>flask</i>	(8) <i>boiling tube</i>
			
(9) <i>test-tube holder</i>	(10) <i>watch glass</i>	(11) <i>reagent bottle</i>	

(Worksheet 2)

II. What do we use the apparatus for?

Fill in the blanks with the following verbs. You may use the verbs more than once.

heat 加熱	hold 盛載；夾住	measure 量度	protect 保護	store 貯存
		1. We use a metre rule to <u>measure</u> length.		
		2. We use a thermometer to <u>measure</u> temperature.		
		3. We use a stop-watch to <u>measure</u> time.		
		4. We use a stand and a clamp to <u>hold</u> an apparatus at a required height.		
		5. We wear safety goggles to <u>protect</u> our eyes.		
		6. We use a flask to <u>hold</u> liquids.		
		7. We use a boiling tube to <u>hold</u> a liquid.		

	8. We use a test-tube holder to <u>hold</u> a test tube during heating.
	9. We use a watch glass to <u>hold</u> a small amount of solid.
	10. We use a reagent bottle to <u>store</u> a liquid.

III. What apparatus do we need in order to carry out the following steps in an experiment?

The apparatus listed in the worksheets of Apparatus (Part 1) may also be required.

1. (a) Measure 7ml of water and boil the water.

Apparatus needed: measuring cylinder, boiling tube/ test tube, test-tube holder, Bunsen burner, heat-proof mat (safety goggles)

- (b) Measure the temperature of the boiling water.

Apparatus needed: thermometer

2. (a) Measure 20g of salt and 100ml of water.

Apparatus needed: (electronic) balance, spatula, measuring cylinder, (watch glass, beaker)

- (b) Add the salt to the water in a beaker and stir it. Measure the time taken for all the salt to dissolve in water.

Apparatus needed: beaker, glass rod, stop-watch

ELA 3 Lesson Plan – The Tortoise Game

Description:	ELA3 is a revision activity based on what students have learned in ELA1 and ELA2. It is a game in which students are required to match a piece of laboratory apparatus with its use. The game is called the Tortoise Game.
Content Objectives:	After completing the activity, students should be able to describe the uses of common laboratory apparatus.
Language Objectives:	After completing the activity, students should be able to: <ul style="list-style-type: none">• name common laboratory apparatus (<i>e.g., beaker, test tube, test-tube rack, glass rod, dropper, spatula, measuring cylinder, Bunsen burner, tripod, wire gauze and heat-proof mat, and electronic balance, metre-rule, thermometer, stop-watch, stand, clamp, safety goggles, flask, boiling tube, test-tube holder, watch glass, evaporating dish and reagent bottle</i>) describe their uses verbally in English (<i>e.g., We wear safety goggles to protect our eyes. We use a spatula to transfer a small amount of solid. We use a Bunsen burner to heat water in a beaker. We use a heat-proof mat to protect the bench during heating.</i>)• follow English instructions on how to play the tortoise game, e.g.<ol style="list-style-type: none">1. <i>Take away one card from the set of cards and hide it.</i>2. <i>One student deals all the cards to the players, one at a time.</i>3. <i>Each player takes turns to discard a matching pair of Apparatus card and Use card from his/her hand. At the same time, the player should say what the apparatus does with the help of the two cards. For example, if a player discards these two cards: he/she should say: We use a stop-watch to measure time.</i>4. <i>When there are no more matching pairs to discard, players take turns to draw one card from the person next to them.</i>5. <i>If this card matches one of the player's cards, he/she can discard the pair and say what the apparatus does as in #3.</i>6. <i>Finally, there will be only one card left, the Tortoise card. The player who has this card loses the game.</i>
Activities:	<ol style="list-style-type: none">1. Revision – whole-class activity (10 minutes)2. Playing the tortoise game:<ol style="list-style-type: none">a. Introduction – whole-class activity (5 minutes)b. Playing the game – group work (20 minutes)c. Round-up activity – whole-class activity (5 minutes)
Materials:	Tortoise Game sheet, Game cards, Score sheet and the 23 pieces of apparatus (for revision)

Steps:

Revision – Whole-class activity (10 minutes)

1. The teacher shows one by one the 23 apparatus that students have learned in ELA1 and ELA2 and asks them for the names of the apparatus and their uses. The teacher may use actions to remind students the action verbs that are associated with the use of each apparatus.

Playing the tortoise game: Introduction – Whole-class activity (5 minutes)

2. The teacher asks students whether they have played the card game Tortoise, and invites some students to explain to the class the rules of the game. They may explain the rules in Cantonese.
3. The teacher tells the class that they are going to play a tortoise game using the game cards which show some common laboratory apparatus and their uses, and distribute the Tortoise Game sheet.
4. Depending on the language ability of the students, the teacher may need to explain the rules in Cantonese.
5. As a demonstration, the teacher uses a visualizer to display a few matching pairs of cards and asks the class to tell him/her which two cards match and state the use of the apparatus.

Playing the tortoise game: Playing the game – Group work (20 minutes)

6. After students are familiar with the rules of the game, the teacher divides them into groups of four or five and gives each group a score sheet and a set of cards. Students are asked to record the score each student obtains after completing each round.
7. While the groups are playing the game, the teacher provides guidance to individuals or groups where necessary.

Playing the tortoise game: Round-up activity – Whole-class activity (5 minutes)

8. The teacher awards the winner of each group.
9. The teacher may go through the common mistakes that the class made when they were playing the game.

Note:

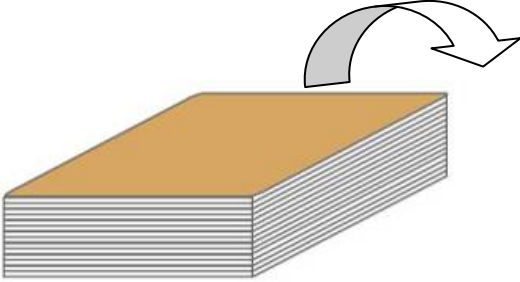
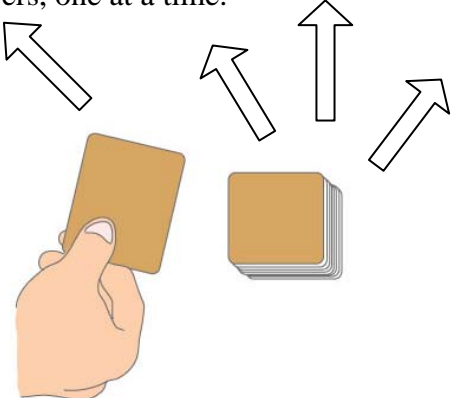

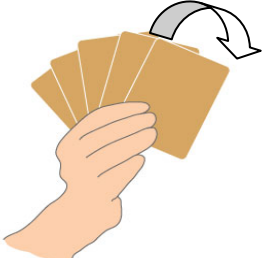
- If students are likely to make mistakes and discard the wrong pairs of card, you may ask them to end the round and record the scores once the first group member has got rid of all his cards. The scores for the round can be recorded as follows:
 - First place (no card left) — 5
 - Second place (fewest cards left) — 4
 -
 - Fifth place (most cards left) — 1In this way, the scenario where there will be two or more Tortoise cards can be avoided. The time for each round can also be shortened with this scoring method.
- If students have difficulty in matching the cards, you may consider removing several pairs of card from the set before giving it to each group of students. It will be easier for students to match the correct pairs if fewer cards are used.

Apparatus 儀器 – *The Tortoise Game* (潛烏龜)

You are going to play a card game, the tortoise game, with your group members. This game is about the uses of the various apparatus in the laboratory.

Your teacher will give you a set of cards: 21 Apparatus cards and 21 Use cards. Play the game according to the rules below.

Rules:

<p>1. Take away one card from the set of cards and hide it.</p> 	<p>2. One student deals (發牌) all the cards to the players, one at a time.</p> 
<p>3. Each player <i>takes turns</i> (輪流) to discard (擲出) a matching pair (相配的一對) of Apparatus card and Use card from his/her hand. At the same time, the player should say what the apparatus does with the help of the two cards.</p> <p>For example, if a player discards these two cards: he/she should say:</p> <p>We use <u>a stop-watch</u> to measure time.</p>	 <p>a stop-watch</p> <p>&</p> <div style="border: 1px solid black; padding: 10px; width: fit-content; margin-left: auto; margin-right: auto;"> <p>We use <u>it</u> to measure time.</p> </div>
<p>4. When there are no more matching pairs to discard, players take turns to draw (抽) one card from the person next to them.</p>  <p>If this card matches one of the player's cards, he/she can discard the pair and say what the apparatus does as in #3.</p>	<p>5. Finally, there will be only one card left, the Tortoise card.</p> <p>The player who has this card loses the game.</p>

Note: Some Use cards can match more than one Apparatus card.

The Tortoise Game – Score Sheet**Group:** _____



Name	Score for Round 1 (第一回合)	Scores for Round 2 (第二回合)	Scores for Round 3 (第三回合)	Total score

Scores (得分) for each round:

- First place — 5**
- Second place — 4**
- Third place — 3**
- Fourth place — 2**
- Fifth place — 1**

Cards for the tortoise game:

Note: You can add colour backing paper to the cards before laminating them.

 <p>beaker</p>	 <p>a test tube</p>	 <p>a test-tube rack</p>
<p>We use <u>it</u> to hold a liquid.</p>	<p>We use <u>it</u> to hold a liquid.</p>	<p>We use <u>it</u> to hold test tubes in place.</p>
 <p>a glass rod</p>	 <p>a dropper</p>	 <p>a spatula</p>

We use it to stir a liquid in a beaker.

We use it to transfer a small amount of liquid.

We use it to transfer a small amount of solid.



a Bunsen burner



a tripod and a wire gauze



a reagent bottle

We use it to heat water in a beaker.

We use them to support a beaker during heating.

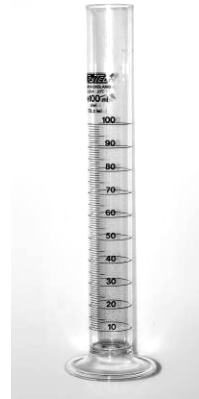
We use it to store a liquid.



a heat-proof mat



an electronic balance



a measuring cylinder

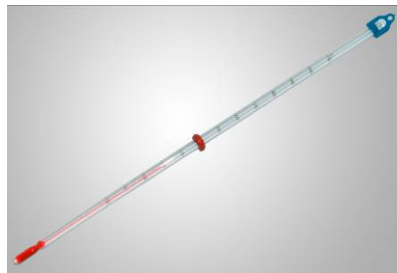
We use it to protect the bench during heating.

We use it to measure weight.

We use it to measure the volume of a liquid.



a metre rule



a thermometer



a stop-watch

We use it to measure length.

We use it to measure temperature.

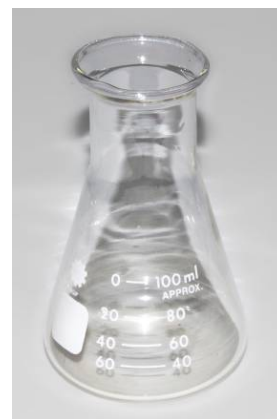
We use it to measure time.



a stand and a clamp



safety goggles

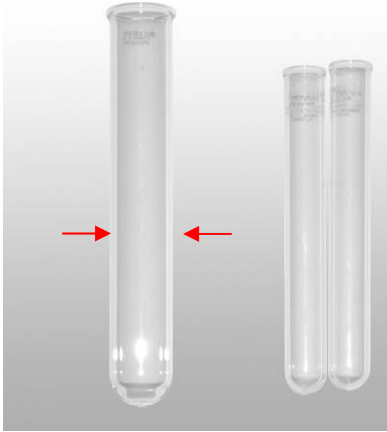




a flask

We use them to hold an apparatus at a required height.

We wear them to protect our eyes.

We use it to hold a liquid.

 <p>a boiling tube</p>	 <p>a test-tube holder</p>	 <p>a watch glass</p>
<p>We use <i>it</i> to hold a liquid.</p>	<p>We use <i>it</i> to hold a test tube during heating.</p>	<p>We use <i>it</i> to hold a small amount of solid.</p>