# Supporting Materials for Updated Science (S1-3) Curriculum

# Part II

# Sample Practical Tasks

**[Version 1.0]**

**Example 1**

## Identifying the key features of different groups of animals (Suggested Learning and Teaching Activity)

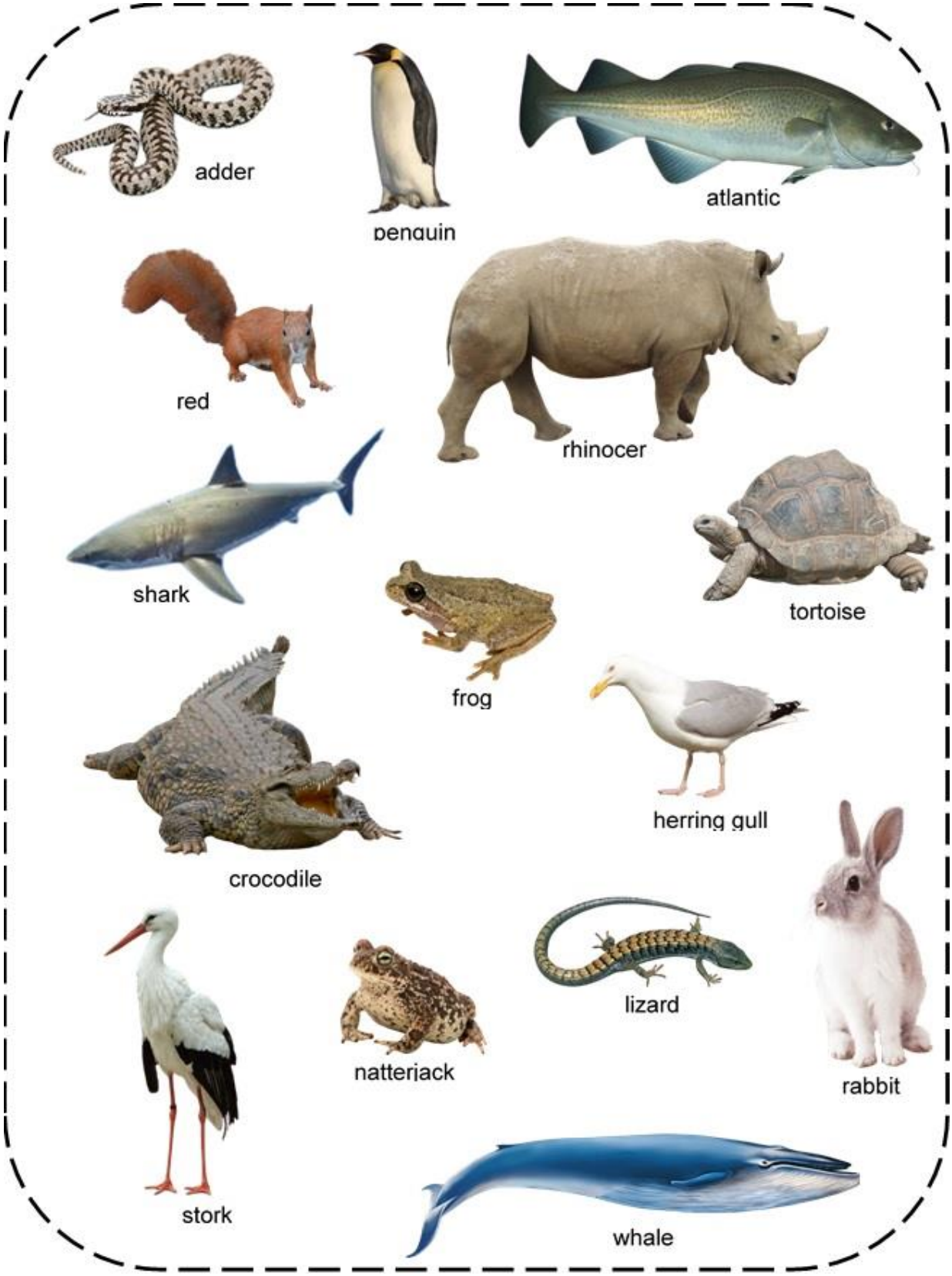
| | |
|---|---|
| **Curriculum Link** | Unit 2 Looking at Living Things (2024)<br>[Unit 3 Looking at Living Things (2017)] |
| **Major Content Area** | 2.1 Classification of living things |

Look at the pictures of animals in the next page. These animals share at least one characteristic: They all have backbones. Now conduct the following activity:

- Sort these animals into three or four groups.
- Each group must have at least two animals.
- The members of a group must share at least one characteristic.
- Each group must be different from every other group.

After the activity, discuss with other groups:

- Are other groups' classifications the same as yours?
- In what way are they the same?
- In what way are they different?




**(Drawings are not to scale and are for illustrative purposes only.)**

**Example 2**

**Perform practical work to investigate effervescence**
**(Suggested Learning and Teaching Activity)**

**Curriculum Link** Unit 8 Atomic World (2024)
[Unit 9 Common Acids and Alkalis (2017)]

**Major Content Area** 8.4 Acids and Alkalis

Effervescent tablets contain both acidic and alkaline chemicals. When the tablet is placed in water, the two chemicals in the tablet react with each other. A "hissing" sound could be heard during the course of the reaction. A stop watch could be used to measure the duration of sound produced to find out whether the reaction has completed. In this experiment, students will be divided into 5 groups to investigate the effervescence under different conditions :

| Student Group | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Effervescent Tablets |  |  |  |  |  |
| Water Temperature | 25 $^{o}$C | 25 $^{o}$C | 25 $^{o}$C | 10 $^{o}$C | 60 $^{o}$C |
| Time required for the effervescence | | | | | |

Complete the following task:

| Statement | Whether the statement is supported by experimental data |
|---|---|
| 1. Using hot water to perform the experiment can speed up the production of bubbles. | ☐ Yes. Data collected by Group(s) ____ are relevant.<br>☐ No. |
| 2. Increasing the surface area of the effervescent tablet can speed up the production of bubbles in the experiment. | ☐ Yes. Data collected by Group(s) ____ are relevant.<br>☐ No. |
| 3. The bubbles released in the experiment are found to be $CO_2$. | ☐ Yes. Data collected by Group(s) ____ are relevant.<br>☐ No. |

Discuss with your classmates, and check appropriate box(es) below for the best combination to produce the shortest duration of effervescence in the experiment.

| | | | |
|---|---|---|---|
| **Forms of Tablets** | ☐ Whole piece | ☐ Crushed into 5-10 pieces | ☐ Crushed into granular form |
| **Water Temperature** | ☐ 10°C | ☐ 25°C | ☐ 60 °C |

**Example 3**

## Investigate the factors affecting the strength of an electromagnet (Key Practical Task)

**Curriculum Link** Unit 10 Making Use of Electricity (2024)
[Unit 8 Making Use of Electricity (2017)]

**Major Content Area** 10.2 Magnets

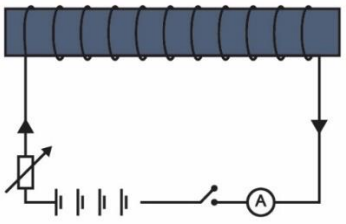
### Materials and Apparatus

| | |
|---|---|
| • Connecting wires | a few |
| • Switch | x 1 |
| • 1.5 V dry cell | x 4 |
| • Battery holder | x 1 |
| • Crocodile clip | x 2 |
| • Paper clip | x 50 |
| • Iron rod or nail | x 2 |
| • Ammeter | x 1 |
| • Rheostat (可變電阻器) | x 1 |

### Pre-Lab Exercise

You will conduct a practical to investigate how the strength of an electromagnet is affected by the current.

1. The following diagram shows an experimental set up for the practical. Label the diagram.




2. Write a hypothesis for the experiment.

### Procedures

1. Make an electromagnet by winding 50 turns of wire around an iron rod.
2. Connect the electromagnet to a 6V power supply, a rheostat, a switch and an ammeter.
3. Close the circuit. Adjust the rheostat to start with a small current. Record the ammeter reading.
4. Test the number of paper clips attracted by the electromagnet by varying the current of the circuit. Record your result.

**Safety precautions: Open the switch whenever you are not obtaining results. Otherwise, the copper wire and the dry cells may become very hot.**

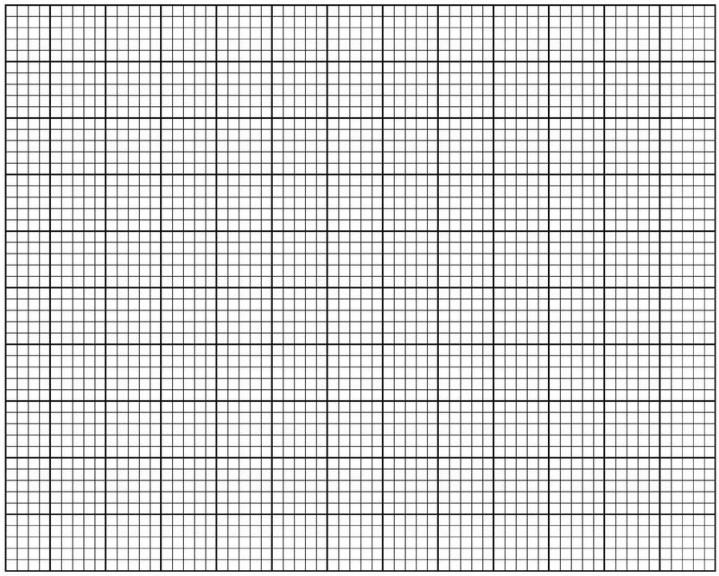
**Result**

| Current (A) | Number of paper clips attracted |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |

**Questions**

1 With the aid of a graph, find the correlation, if any, between current of the circuit (A) and the number of paper clips attracted by the electromagnet.

Title: _____



There is _____ correlation between _____ and _____.

2 Suggest one source of error in the measurements and propose an improvement to the setup.

**Exercise**

Another experiment about electromagnet is shown below :

**Procedures**

1. Make an electromagnet by winding 10 turns of wire around a 7.5 cm length iron rod.
2. Close the circuit. Adjust the rheostat with the current is 2A. Test how many paper clips one end of the electromagnet picks up. Switch off again and record your result.
3. Repeat steps 1 and 2 for different numbers of coils of wire, keeping current as 2 A.

**Result**

| Number of coils packed in a 7.5 cm length iron rod | Number of paper clips picked up |
|---|---|
| 10 | |
| 20 | |
| 30 | |
| 40 | |
| 50 | |

**Questions**

1. What is the independent variable, dependent variable and the control variable(s) of the experiment?

| | |
|---|---|
| **Independent variable** | |
| **Dependent variable** | |
| **Control variable(s)** | |

2. Suggest TWO ways to make the experiment more reliable.

**Example 4**

**Investigate the changes in atmospheric pressure at different altitudes using mobile devices (Key Practical Task)**

**Curriculum Link** Unit 9 Force and Motion (2024)
[Unit 6 Matter as Particles (2017)]

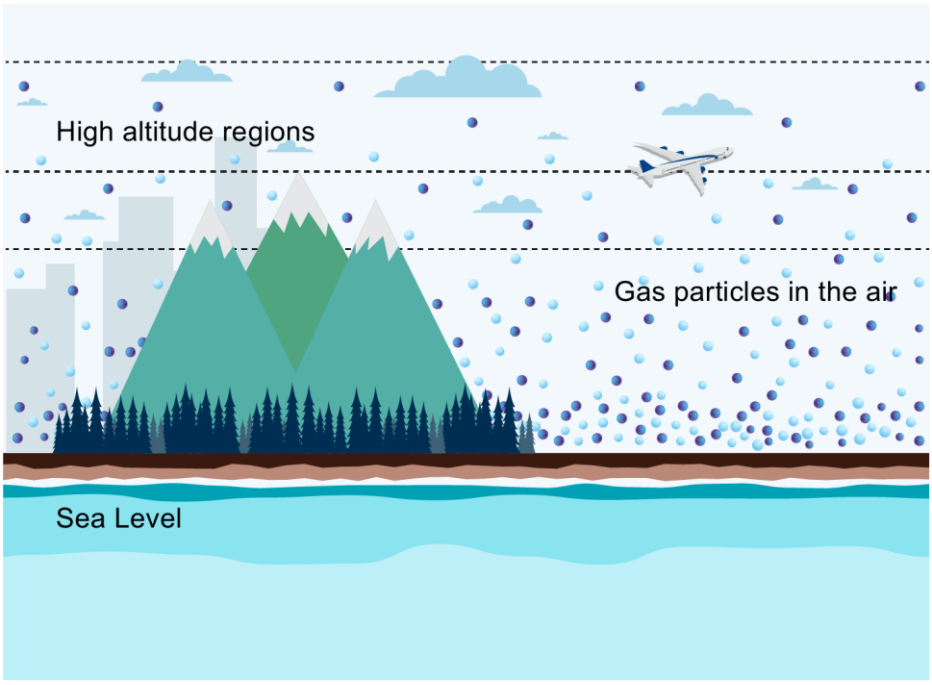
**Major Content Area** 9.3 Pressure

**Materials and Apparatus**

- Mobile device x 1

**Introduction**

When gas particles in the atmosphere are colliding on object surfaces, air pressure exists. At higher altitude regions, the amount of gas particles in the air becomes less, the air density is lower and the atmospheric pressure is lower. On the contrary, the atmospheric pressure will be higher at regions near sea level.

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**Procedures**

The procedures for the experiment are accessible via the QR code
https://youtu.be/6P4ebmee41E

**Hypothesis**

A hypothesis is a statement that is testable by experiment. Write a hypothesis for this experiment.

**Result**

| **Floor** | G/F | 1/F | 2/F | 3/F | 4/F |
|---|---|---|---|---|---|
| **Measured atmospheric pressure (hPa)** | | | | | |

**Data Treatment**

The difference in pressure measured between :

G/F and 1/F =_____ hPa
1/F and 2/F =_____ hPa
2/F and 3/F =_____ hPa
3/F and 4/F =_____ hPa

The average change in atmospheric pressure by floor = _____ hPa.

**Questions**

1. Write a conclusion based on the result of your experiment.

2. Predict the value of measured atmospheric pressure when student is located on 6/F.

   Answer: _____ hPa