Chapter 1

Characteristics and classification of living organisms

THE INVESTIGATION IN THIS CHAPTER WILL:

- review the main characteristics of different organisms
- help you to construct a dichotomous key
- enable you to practise your biological drawing skills
- help you to identify different groups of organisms based on the organisms' external features.

Practical investigation 1.1: Construct a dichotomous key

KEY WORDS

biological drawing: used to represent the visible features of an organism, in the correct size, shape and proportion

dichotomous key: a way of identifying an organism, by working through pairs of statements that lead you to its name

feature: parts of an organism that you can see; also known as characteristics, e.g. the fur of a mammal

magnification: how many times larger an image is than the actual object. If an object is drawn smaller than its actual size, then the magnification is less than 1.

IN THIS INVESTIGATION YOU WILL:

- construct a dichotomous key that is relevant to your local area
- make a biological drawing and use the drawing to identify an organism.

YOU WILL NEED:

- range of specimens of leaves (provided for you)
- paper and pencil
- if collecting organisms yourself: any other items, such as, small tray / box / container, forceps / tweezers, latex gloves, insect pooters, etc. Your teacher will provide these dependent on your local environment.

Safety

- Ensure that the leaves are free from other organisms.
- Wash your hands after handling any organisms.
- Think about the safety requirements for *your* chosen environment. What do you need to look out for, or be aware of?

Getting started

Think about the main features of the organisms that you are looking at. What should you be looking for? For example, when you are looking for suitable specimens, you might choose to consider the different structure of leaves.

Method

1 If you are collecting organisms yourself, gather the equipment required (if you are collecting invertebrates then you may require equipment such as a pooter). Otherwise, use the organisms provided for you by your teacher.

2 Search for, and collect, at least three organisms that have different features. Use the equipment provided that is most suitable for organisms that you intend to collect.

3 Return to the laboratory or classroom with your organisms. Identify the different features that might help you to put the organisms into different groups.

4 Draw a draft dichotomous key in the space below. You should begin by looking for features that might distinguish one organism from another. Try to keep your answers simple, using 'yes' and 'no'. Sometimes, this takes a bit of trial and error so use a pencil at first and do not be afraid to change your questions or answers at any point.

TIP

When constructing a dichotomous key, use the most obvious features that you can actually *see*.

5 When you have completed your key, work with a partner to test the key with your chosen organisms.

6 Once you are happy that your key works, you can construct your final dichotomous key and ask other people in the class to use it.

Recording data

1 Make a large drawing of one of your organisms in the space below. Label the drawing.

2 State the features of your organism that help you to identify which group the organism belongs to.

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3 State the group that your organism belongs to.

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Handling data

4 Use a ruler to measure the length of the actual organism. Then use the ruler to measure the length of your drawing of that organism. Use this information to calculate the magnification of your drawing.

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TIP

Try to use millimetres as your unit of measurement as millimetres are much easier to convert into other units if required.

Remember, the magnification is the image size, divided by the actual size.

TIP

When you are finished, organisms should be returned back to their habitat to ensure they are not harmed and to limit the impact of the investigation.

Analysis

5 Analyse your drawing skills. How many of the skills below have you used when drawing your specimen? Tick the ones that you have used correctly. These are important skills when making a biological drawing.

Drawing skills	I have done this
I used a sharp pencil.	
I drew smooth, single lines.	
I drew the specimen in the correct shape and proportion.	
The drawing is larger than the actual specimen (where possible).	
I have drawn all observable features.	
I used a ruler to draw neat lines from the labels to the drawing. Each line touches the feature that the line identifies.	
I have not shaded the diagram, or used colours.	

Evaluation

6 Suggest why it is important you follow the 'rules' when making a biological drawing.

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REFLECTION

Using the checklist above, how could you improve your biological drawings?

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EXAM-STYLE QUESTIONS

1 The adult housefly (*Musca domestica*) is found in many countries around the world.

a Make a larger drawing of the adult housefly in the space provided. **[5]**

b Measure the actual size of the length of one of the wings in the figure.

…… **[1]**

c **Calculate** the magnification of the same wing on your drawing of the figure. Give your answer to three significant figures.

……

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…… **[2]**

d **State** the binomial name of the adult housefly.

…… **[1]**

e **Identify** the features of the housefly that would place it in the insect group.

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…… **[2]**

[Total: 11]

COMMAND WORDS

calculate: work out from given facts, figures or information

state: express in clear terms

identify: name/ select/recognise