Part 3: Why have a classification system for living things?

PART 3

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Activity 3.1 How confusing!

Activity type

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There are tens of millions of different animals on Earth and even more plants and microbes. How can all people be sure they are talking about the same organism?

Perhaps an animal or plant has been given a different name in different places or by different people? Perhaps different animals or plants have been given the same name?

Is there a way to sort out the confusion?

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Names of organisms

What to use:

The GROUP will require:

- a set of 8 photos with the name of each plant or animal (***Activity sheet 3.1 Named organism cards*** (in Teachers Guide)).

Each STUDENT will require:

- ***Notebook.***

What to do:

Step 1
Your teacher will provide each group with a set of photos.

Step 2
When your teacher names a plant or animal, see if you have one with the same name.

Step 3
If you do, nominate one person to describe it to the class.

Step 4
Other groups listen carefully to see if the description fits one of their plants or animals. Sometimes your plant or animal will have the same name but will look different. Sometimes your photo will have a different name but will look the same.

Step 5
Arrange all the photos from all of the sets into groups on a table or pin board. Put them into groups with the same name or groups that all look the same. Some groups of plants or animals with the same name will all look alike but some may look very different. Some groups of animals that all look alike may have different names.

Discussion:

1. Give an example of different organisms with the same name.
2. Give an example of several different names for the same plant or animal.
3. Is this a problem? Why?
4. Can you think of any way to overcome these problems? Explain.

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Activity 3.2 Classification based on observed characteristics

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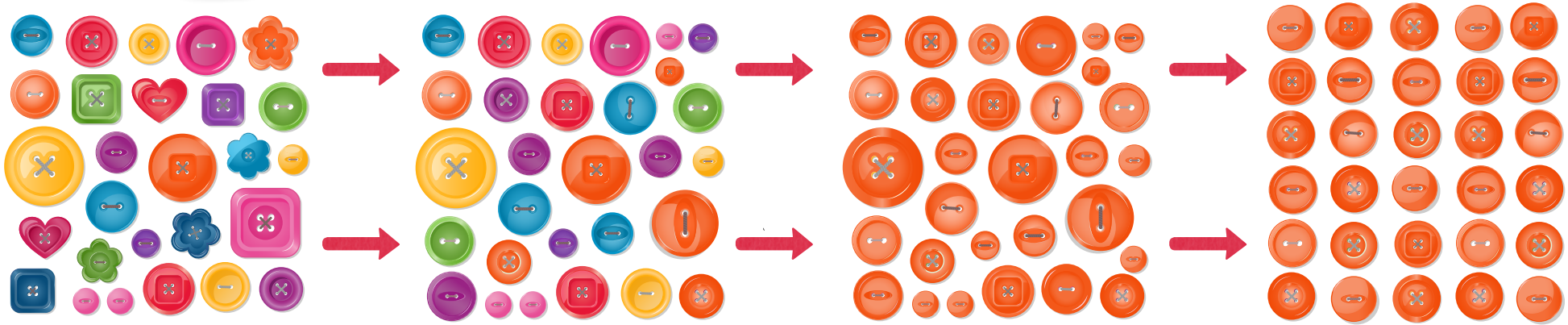
Why do scientists use a common scientific system of classification?

How could you sort these buttons?



In each group the buttons share certain characteristics.

Click here to learn about taxonomic groups.

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Activity 3.3 Binomial naming of species

Activity type

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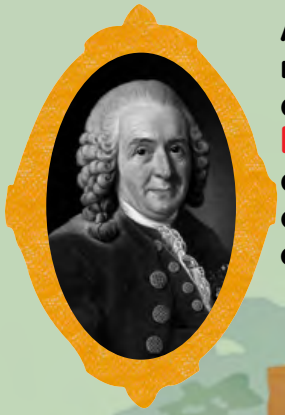

A Swedish biologist Carl Linnaeus (1707-1778) was the person most responsible for the classification system we use today. He devised a hierarchical system with different classification levels: **KINGDOM**, **PHYLUM**, **CLASS**, **ORDER**, and **FAMILY.** He also came up with a way of adding two lower levels to the classification system, providing a unique naming system for each organism on Earth. These were **GENUS** and **SPECIES**.

You can remember the order using a mnemonic –
King Paul cried out for good soup.

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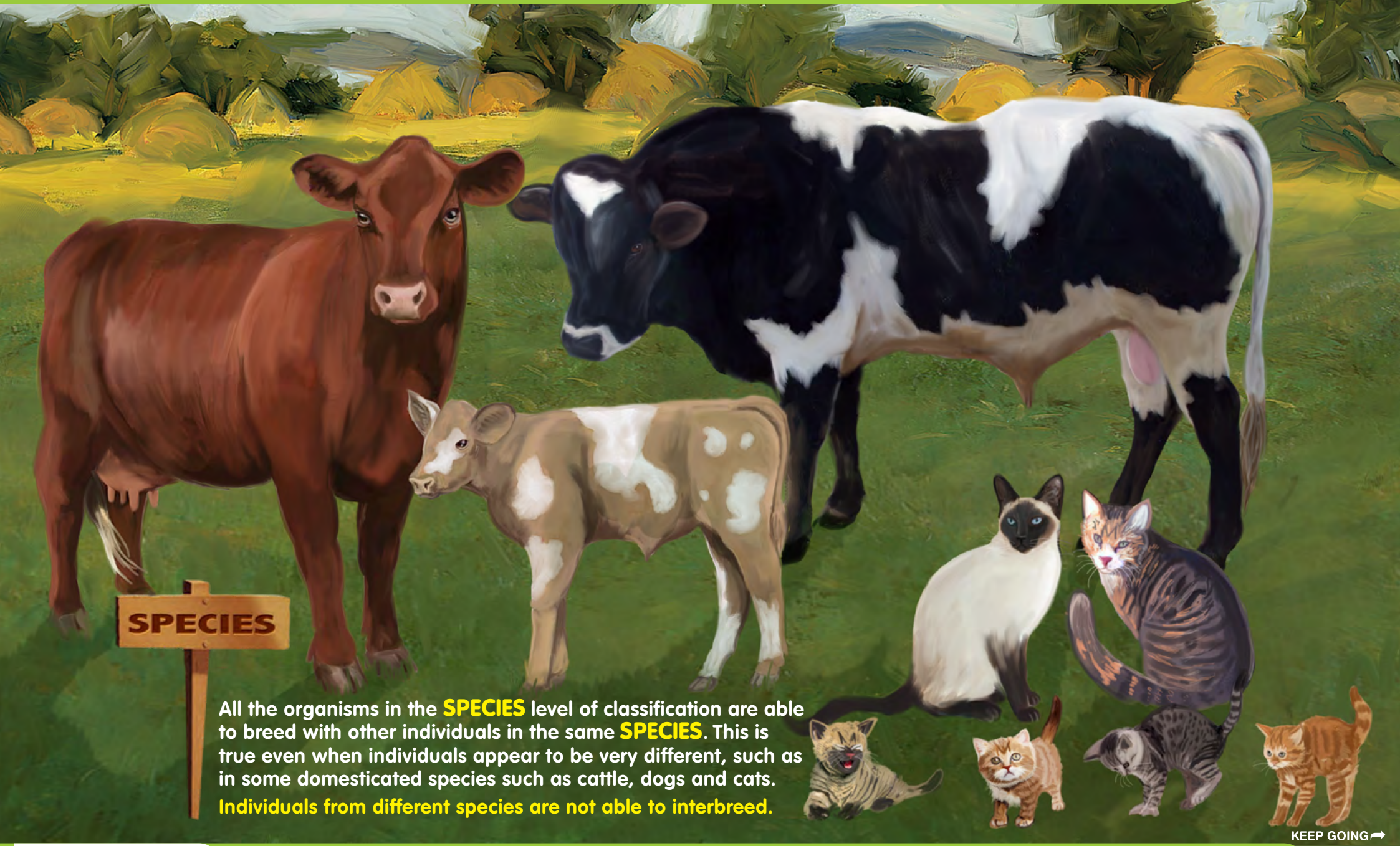

All the organisms in the **SPECIES** level of classification are able to breed with other individuals in the same **SPECIES**. This is true even when individuals appear to be very different, such as in some domesticated species such as cattle, dogs and cats.

Individuals from different species are not able to interbreed.

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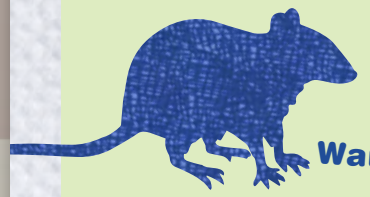
Once a scientific name has been given to an organism it cannot be used for naming any other organism. This is quite different from the way we give each other names. Try searching your name on Google and see if anyone else shares it.



Anna Smith
Nguyen Van Pham
Wang Xiao Li
Muhammad Haddad

By stating both the genus and species name you can separate one organism from the millions of others on Earth. People all over the world, in all languages, use this same system. You can communicate with a person on the other side of the world about a particular organism and that person will know exactly which organism you are referring to.

Under the Linnaeus system every living organism is given a unique, binomial (two-part) scientific name. The first part is the genus name and is written with a capital letter. The second part is the species name and is written in lower case.

e.g. Humans have the scientific name

Homo sapiens

(Note – The convention is to italicise scientific names in printed text – e.g. *Homo sapiens*. When you write scientific names the convention is to underline the whole scientific name – e.g. <u>Homo sapiens</u>).

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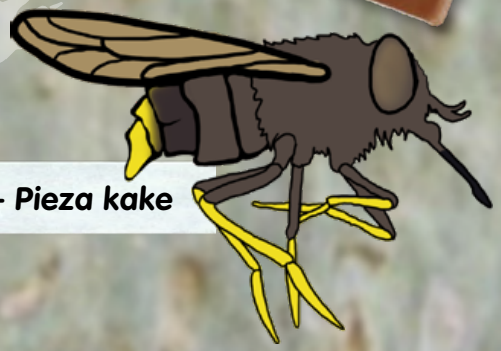
Tom Rich, leading a dig at Dinosaur Cove, Australia, offered a reward of a cubic metre of chocolate to anyone discovering a mammal fossil. When one was found it was named *Kryoryctes cadburyi* after the company that provided the reward. It lived during the time of the dinosaurs, was the size of a cat, was covered in quills and was toothless.

Scientists are sometimes imaginative in naming species.

The US president, vice-president and defence secretary in the early 2000s each had a slime-eating beetle (Agathidium bushi, Agathidium cheneyi, Agathidium rumsfeldi) named after them.

Click here to learn how our classification system is always changing and how to name new species.



Try saying the name of this organism out loud – *Pieza kake*

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Activity 3.4 What's in a name?

Activity type

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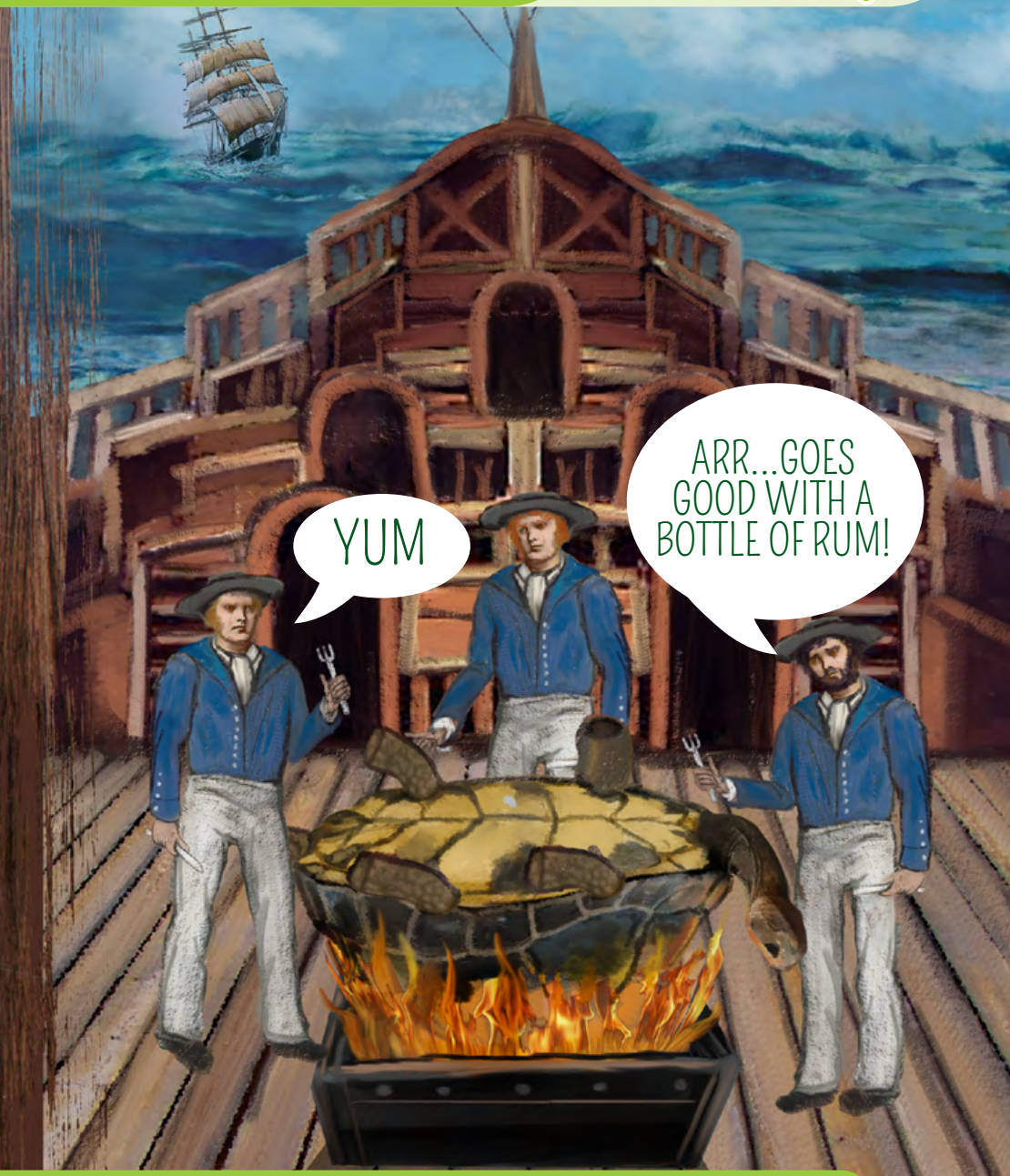
It took 100 years to give the giant tortoise of the Galapagos Islands a scientific name. The tortoises were so delicious that on each sea journey to London in order to be classified and named, they were eaten!

Pick one of the following topics to research:

- What information does the scientific name tell you about a particular organism you have chosen?
- The work of a scientist who found and named a new Australian or Asian species.
- An example of a recent reclassification of a species because new information was discovered about it.



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What's in a name?

What to use:

The PAIR will require:

- access to the internet or the articles provided by teacher.

Each STUDENT will require:

- ***Notebook***.

What to do:

Step 1
Decide on your research topic. You may use the ones on the page before or, with the permission of your teacher, choose one of your own.

Step 2
Read relevant resources and note the significant pieces of information.

Step 3
Draft a newspaper article telling classmates what you have found out.

Step 4
Ask your teacher for feedback on your draft.

Step 5
Produce a final report (including a suitable headline and illustration or photo).

Discussion:

- Share your newspaper story with the class.

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Activity 3.5 What am I?

Activity type

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When biologists go into the field to observe and classify plants or animals they often use a classification key. In this activity you will play reverse celebrity heads to identify some key defining characteristics that can be used to identify different animals. You will then use these to construct your own classification key.

Different defining characteristics are used to identify animals and plants in their appropriate groups at different levels of classification, such as phylum, class, order or family.

A sample classification key has been provided on the next page to show how a classification key might be used to identify certain groups of plants.

What Am I?

One student stands in front of the class and the teacher gives the student one of the ten animal cards. The student does not show this card to the class.

Students in the class may ask questions with 'Yes' or 'No' answers until the animal is successfully identified.

Note that all the organisms in this game are animals. That is they belong to the Animal Kingdom.

Designing a classification key

What to use:

The GROUP will require:

- ***Activity Sheet 3.6 Animal cards***
- scissors
- butcher paper and pens.

Each STUDENT will require:

- ***Notebook***
- *Student Guide.*

What to do:

Step 1
The teacher selects a student, or pair of students, to be the first subjects. They choose one card but do not show it to the rest of the class.

Step 2
Each group, in turn, is given the opportunity to ask a question related to the possible characteristics of the animal, to help them identify it. The question must require only a 'yes' or 'no' answer. The questions should start from more general and proceed to more specific examples. The student/s must only answer 'yes' or 'no'.

Step 3
After each question each group separates out from their cards any animals that are excluded by the questioning process. This procedure continues until someone asks a question which leaves the group with one card left. Any group may then ask the student/s at the front if they are holding that animal card.

Step 4
Repeat this activity for the other 9 animals, with different pairs of students acting as subjects.

Step 5
Once the class has successfully identified all the animals each group should design a classification key with a series of questions that would lead to the successful identification of all ten animals in the game. Each key should be drawn on a large piece of paper, such as butchers paper, and stuck up on the wall.

Note:

When you construct your key you need to decide which questions were useful and which ones were not useful in identifying the different animals. Only the useful questions should be used in your key. The plant classification key on the next page provides a model.

Discussion:

Compare all the different keys. Which characteristics were most useful in identifying the different animals?

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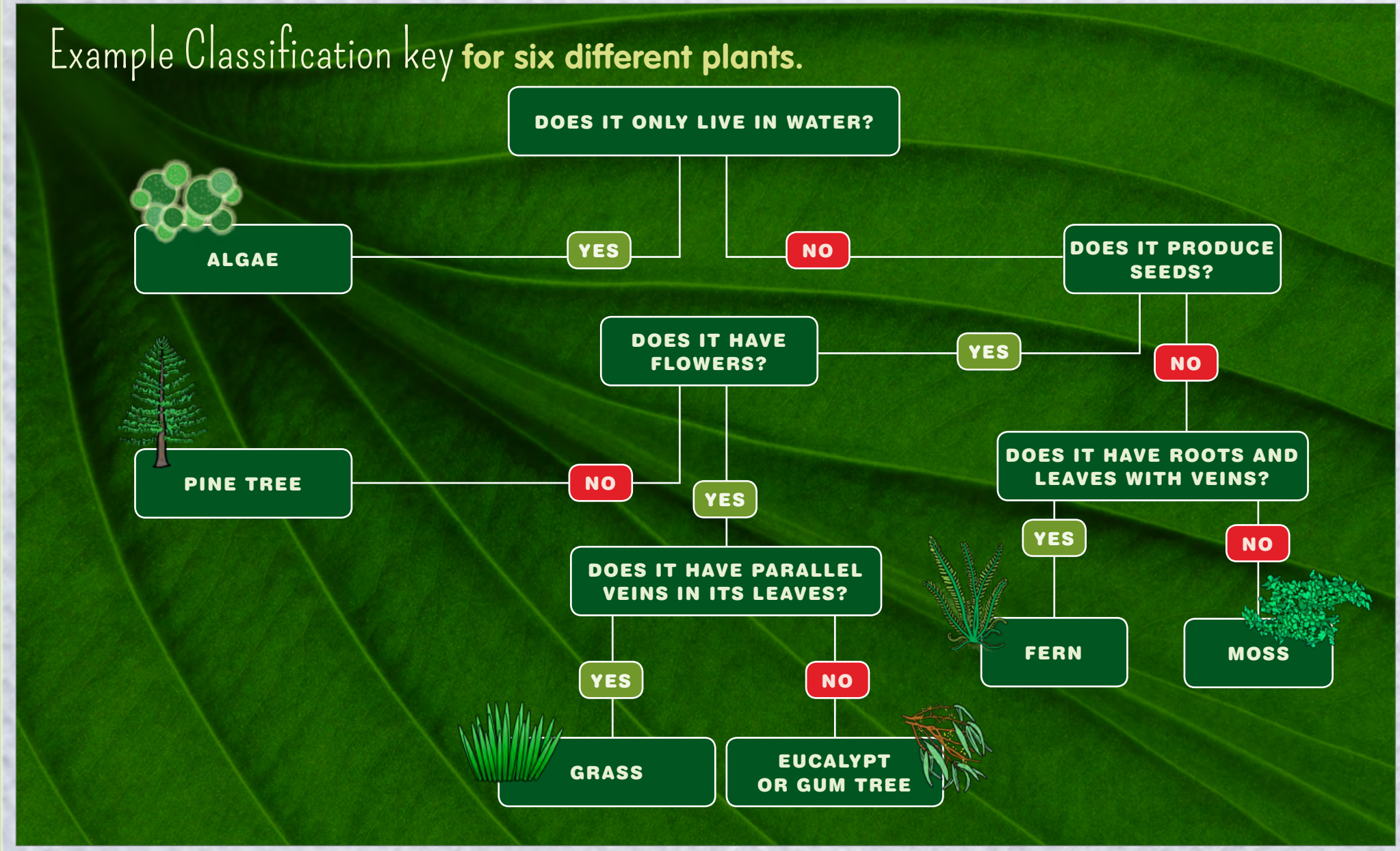
Example Classification key for six different plants.



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Activity 3.6 Can you convince others that using a common classification system is helpful?

Activity type

This activity will help you consider your answer to this question.

? Is using a formal classification scheme, like the one you have been using in this unit for all living things, a good idea?

Is a common, formal classification system a good idea?

What to use:

Each GROUP will require:

- materials needed to make one or two posters to illustrate their arguments.

Each STUDENT will require:

- ***Notebook*** containing all the notes about classification made so far in this unit.

What to do:

Step 1
Working in a group make a list of all the arguments or points of view about classification that you have met so far.

Step 2
Choose three or four points that the group considers to most strongly support your answer – yes or no – to the question on this page.

Step 3
Discuss and write a short script to be presented to the class by a member of your group. The student should outline which arguments supported the idea that formal classification was or was not a useful tool.

Step 4
Prepare one or two posters to use during the presentation to clearly explain what you mean by one or more of your points.

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Summary

PART 3

Living things are classified into groups according to what they have in common. At the top of the **classification system** (e.g. Kingdom) the organism might only have one or a few things in common with other organisms in the group. At the bottom of the classification (e.g. Genus) the organism will have many things in common with other members of the group. The classification groups from top to bottom are **Kingdom, Phylum, Class, Order, Family, Genus** and **Species**.

The Swedish biologist **Carl Linnaeus** created a system where every living organism is given a unique, binomial (two-part) scientific name. The first part is the **genus name** and is written with a capital letter. The second part is the **species name** and is written in lower case. E.g. *Homo sapiens*

A **classification key** (or **dichotomous key**) is a means of categorizing living organisms by identifying and sorting them according to **common characteristics**. The key presents a series of hierarchical and specific identification questions. The answer you choose leads to the next two-answer-choice question, which then continues in a sequential order that further narrows down the organism's characteristics and ultimately leads to its final categorization.

Today biologists have a powerful new tool to explore how living things are related. This is the **DNA** present in every cell of your body. Studying the DNA tells us a lot more about where an animal or a plant fits into the family tree than their physical characteristics do. As biologists study the DNA of different plants and animals they are forced to change their ideas about how living things are related and hence their classifications.

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