Classification

Activity Pack for Primary Teachers

LinneanLearning

Discovery Kits

Discovery Kits

Incorporating practical activity into science lessons can be tricky at a primary level, particularly for non-specialist teachers. A recent SCORE (Science Community Representing Education) report found that many schools lack sufficient resources for teaching practical science. These Discovery Kits not only provide some of the equipment necessary for practical lessons, but also provide ideas and guidance for teachers - we hope you find them useful!

The activities suggested in the packs are by no means an exhaustive list of the possible lessons you could carry out using the kit provided. We have tried to provide a variety of indoor and outdoor practical activities, suitable for pupils in Key Stages 1&2. Many of the activities are cross-curricular, providing opportunities to develop skills in literacy, mathematics, art and ICT.

If you have an idea for using the equipment in this kit, we would love to hear about it! If you'd like your idea added to this activity pack then full credit will of course be given to you.
Email us with your suggestions: learning@linnean.org.

Please check at our website for full details of other available kits, covering topics such as **plants**, **life cycles**, **habitats** and **evolution** - www.linnean.org/discovery-kits.

ALSO! We love seeing your pictures. Tweet us @LinneanLearning #DiscoveryKits

Disclaimer: The Linnean Society is pleased to lend these kits to schools, and believes each kit to be suitable for its suggested use. However, we recommend that teachers thoroughly examine and check each kit to make sure it is fit for the purpose intended, making any risk assessment that is appropriate. The Linnean Society excludes any liability for injury or damage howsoever caused by the use of the kits, is not responsible for the standard of development or safety of any of the products used in the kits, and makes no warranty against errors and omissions in any kit or accompanying material.

Objectives & Links

The activities in this pack encourage students to:

- Observe and recognise some simple characteristics of a variety of living things
- Develop curiosity and interest by exploring their surroundings using their senses
- Treat animals in the environment with care and sensitivity
- Work together in pairs or groups, taking turns and sharing fairly
- Communicate through conversation by sharing experiences, ideas and information
- Develop scientific and research skills, either individually or in groups

We've designed the pack to help teachers cover the following curriculum areas:

Year 1

- Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
- Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals

Year 4

- Recognise that living things can be grouped in a variety of ways
- Explore and use classification keys to help group, identify and name a variety of living things in the local and wider environment

Year 6

- Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- Give reasons for classifying plants and animals based on specific characteristics

What's in the Kit?

Flexi-Scope (& Software CD/USB)

6x Pond Nets

5x Pooters

5x Bug Viewing Chambers

5x Magnifying Glasses

2x 'Linnaeus Says' Card Packs

2x 'Who Am I' CardsPacks

2x Clever Catch Balls

10x Specimens in Acrylic

11x Identification Keys

Activity ideas

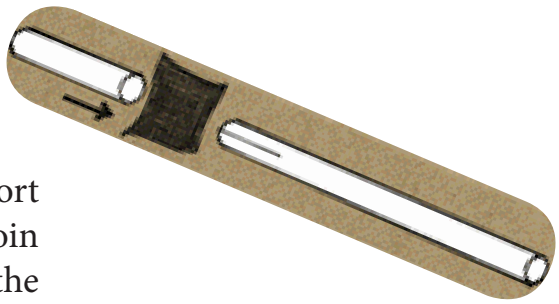
Make your own pooter

Although it has a funny name, and doesn't sound very scientific, the pooter is an incredibly easy and safe way to collect minibeasts. Students will make their own pooter using basic equipment. There are two simple methods shown here - why not make both types with your class and test which works best?

You need to provide:
A large diameter drinking straw
Fabric: a square of muslin, j-cloth or nylon (old tights are good!)
Masking tape
Scissors

Let's go!

Option 1:
Cut the straw across, one third away from the end. Cut a 2cm slit into the longer piece of straw and place the fabric over the end. Push the short piece of straw into the slit end of the long piece, trapping the fabric between them. You may need to gently squeeze the short straw to get started. Once you are happy with the join cover the area with masking tape. If you look through the straw you will see that the fabric has formed a net across it.



Option 2:
Cut the tube into two pieces, one 50cm long and the other 25cm long. Cover one end of the short tube with the scrap of fabric and secure tightly with an elastic band.

Cut the card to the shape of the top of the jar and cut two holes in it to push the tubes through.

Tape the card firmly to the top of the jar. Push the tubes into it. Fix the tubes in place with the plasticine or blu-tack, making sure any gaps are sealed.

You need to provide:
A small jar
75cm of thin plastic tubing
Fabric: a small square of muslin, j-cloth or nylon
An elastic band
A piece of card
Scissors
Sticky tape
A blob of plasticine or blu-tack

Make your own pooter

Using the pooter:

First, find a creature to examine. Make sure it is smaller than the opening of the pooter or it'll get stuck! Put one end of the pooter in your mouth - use the end furthest from the join if you are using the straw pooter, and use the tube with the mesh over it if you are using a jar pooter. Place the other end of the pooter a centimetre or two from the creature you are studying. Gently suck, so that the creature is trapped against the mesh or falls into the jar. If you are using a straw pooter, put your finger over the opening to keep the insect safe, then place the pooter over a container and gently tap the straw to encourage the insect to come out. If you are using a jar pooter the insect is safely trapped and you don't need to do anything else!

Take it further:

Ask the students to make a drawing of the creature, remembering to include all the legs, wings, antennae and the correct number of body segments. They could use an identification key, a book about invertebrates or look on the internet. Some species of invertebrates can look very similar.

To find minibeasts try looking among the leaves on the woodland floor. If students put some of the leaves on a sheet of paper and watch patiently they may see some movement. They could use a hand lens to look closer. They should find beetles, ants, worms, spiders and many other creatures.

Find a log or branch lying in the park. Look carefully around the log and you may see signs of life. Try rolling it over - underneath is likely to be teeming. Try pulling off a small piece of loose bark (don't do this to a living tree as you will harm it).

Remember that pooters should be sterilised between use by different pupils, or each pupil should use only their own pooter. If you wish to do this in school, use Milton fluid or similar. When the kit is returned to us all pooters are sterilised before it goes to another school - you do not need to do this. Remind students that they should not blow into the pooters, it's both unhygienic and can cause condensation which will prevent students from viewing their catch.

Pond dipping

Students will have the opportunity to hunt for minibeasts living in a pond, and may be able to identify these creatures.

In the Kit:
Pooters
Identification keys

You need to provide:
Pond net or fine kitchen sieve (don't use for food afterwards!)
Containers - old ice cream tubs or washing up bowls are ideal
Bug viewer or magnifying glass
Spoon or tea strainer
Sketchbook or camera

Let's go!

Ponds are fascinating, with many different plants and animals to be discovered.

Once you get to the pond, half fill your containers with pond water and set them down well away from the edge of the pond. Use the net to sweep a figure of eight pattern in the water. Try to avoid the sediment at the bottom of the pond, and the weeds at the top, as these will make it difficult to find the minibeasts in your net! Try sheltered spots - near the edge for example - as these areas will have more bugs to find. Sweep for 10-15 seconds, then bring the net out of the water and take it to your large container. Turn the net inside out into the water - you may need to swish the net under the water to remove particularly stubborn bugs!

Put the net to one side and begin to examine your catch. At this point you could use the spoons, pooter or tea strainer to move interesting minibeasts into your smaller container or bug viewer for further investigation. If you are planning to use these in the classroom remember to provide plenty of water and keep the bugs cool or they will die. Keep an eye out for carnivorous bugs in your selection – these should be housed individually or they will eat your catch. Identification can be carried out by the pond, using a field guide, identification key or chart. It can also be done later in the classroom using microscopes, magnifying glasses and some research.

Take it further:

If you ran your pond dipping as an experiment, students could draw tables and charts, write reports and draw conclusions. Students may wish to make labelled sketches or drawings, or label photographs taken during the pond dip. Your class could investigate the food chains or life cycles of the minibeasts they found, carry out another dip in a different pond.

Pond dipping

Teacher tips:
For a successful pond dip you will need to make sure the students understand what is expected of them before you head to the pond. Familiarise them with the equipment, and get them thinking about what you might find. If you have time you could show a short video (try YouTube) or explain the techniques and get everyone to have a 'practice' session. You may wish students to wear disposable gloves whilst handling bugs and pond water - make sure you check for latex allergies first, or use latex free gloves. You'll need the smallest size you can find.

Have a go yourself before you try pond dipping with your students. This will allow you to get used to the technique, and you'll easily be able to help solve any problems that crop up on the day. Pond dipping is very exciting for young children. You might need to gently remind them to examine their catch rather than just playing by the pond! It is common for children to be carried away by large minibeasts that they find, often to the exclusion of smaller creatures that can be much more interesting. It is also likely that tree buds, catkins and the like will be incorrectly identified as minibeasts! It is worth factoring in enough time to look at what everyone else caught, or planning a follow up lesson for more in depth identification of your bugs.

Health and Safety:
Always ensure there is adequate supervision. A ratio of 1:6 is suggested for young children and a ratio of 1:10 for older children. Before you go pond dipping you should ensure that students are suitably dressed for both the weather and the environment you will be taking them into. Sensible shoes are a must, as pond edges can be slippery and muddy - wellies or trainers are a safe bet. If it's really wet, consider some waterproof trousers or roll up trouser bottoms and tuck them into socks - not very stylish but students won't have wet trousers for the rest of the day. Bring some towels just in case! Excited little ones may spill water from observation containers or splash in muddy puddles.

Pond dipping can be hazardous, but as long as you take care and explain these rules clearly to the students it should be a fun experience for all involved.

- Don't fall in! Kneel at the edge of the pond to dip nets, and move away from the edge to look at their specimens.
- Don't get water in your mouth! Pond water can carry a number of diseases, as well as containing many bugs and beasties. Everyone should keep hands away from mouths, eyes and noses. Carry some alcohol based hand wash.
- Treat the animals with respect! They can be very small and delicate, so handle them carefully.

Fascinating flexiscope

Students will use the Flexi-Scope to look at a variety of materials, trying to spot important features, patterns and making comparisons where possible.

In the Kit:
Flexi-scope

You need to provide:
Computer, laptop or interactive whiteboard
Red onions
Butterfly wings
Hook and loop tape (Velcro) - link to seed distribution
Leaves
Fruit and veg - try peppers, tomatoes and peaches
Sand

Let's go!

As there is only one Flexi-Scope provided, this is best run as a whole class activity. The Flexi-Scope works particularly well when connected to an interactive whiteboard, as it's easy for everyone to see.

Make sure there's a good range of materials available, then allow students to come to the computer, select a material and focus on it using the Flexi-Scope. The closer it is to the lens, the higher the magnification will be. To adjust the focus, turn the focus wheel slowly until the image is clearly displayed on the screen. If the image is too dark, switch on the LED lights by pressing the white button (but remember that they will reflect off of any specimens that are encased in acrylic). If you want to take a still image of the specimen press the green button - you'll need to be careful not to disturb the Flexi-Scope or your image will not be in focus! Have a group discussion about the features you can see, or try making some sketches.

Take it further:
Look for ways to extend beyond science when using the Flexi-Scope - the captured images could be the foundation for an excellent art or creative writing activity.

Teacher tips:

Install the accompanying software on a Windows PC (for computers running Windows 7 please chose the Vista option). This process takes around five minutes and will install two programs; 'Flexi Scope' for viewing and recording images and 'Flexi Measure' for image analysis and manipulation. Then plug in the Flexi-Scope unit, open the viewer and off you go! You can also download software at http://bit.ly/29JS1Dw
The Flexi-Scope is very easy to use, but it can take a bit of practice to focus well.

Clever catch

In the Kit:
Clever catch ball
Question bank

These inflatable balls are a fun way to test students' knowledge before starting a topic, or to sum up and evaluate learning during or at the end of a topic. The ball can be used in the classroom for organised games, or for fun in the playground, and is suitable for both large and small groups, as well as paired play. Questions are provided on a wide range of biological topics, or you can write your own!

Let's go!

Two or more players throw the ball to one another, reading and answering the question under their left thumb at each catch. Each question is numbered, and an answer sheet is provided. You can also play in a competition format, where pairs of students try to answer the most questions within a time limit - you'll need to appoint another student as time and score keeper.

Another variation is suitable for whole class play - divide the class into two equal lines, with students facing one another. You will need a time and score keeper. At the time keeper's signal, the first student should throw the ball to the next player in the opposite line; continue until all players have had a turn. When the last student has answered, record the time taken and the number of correct answers. Next time, try to beat your class score!

Take it further:

Ask students to write their own questions for use with the clever catch ball, based around the topic you have been studying. You could divide the class into small groups to write the questions and then take turns using each question set to test the other groups.

Teacher tips:

We ask that you do not write on the blank ball, as some ink colours can stain. Instead, we have provided sets of possible questions - simply look up the appropriate number in the question list and you'll find both the question and answer. You may want to appoint one student to be the question master when playing with the blank ball.

Linnaeus' says

A variation on 'Simon says' - the aim of the game is for 'Linnaeus' to give commands that uniquely identify one of the other players, thus removing that player from the game.

In the Kit:
Pack of 'Linnaeus' Says' Cards

Let's go!

One student is chosen to be Linnaeus - they will give the commands to the other players. Linnaeus stands at the front, with everyone else sitting on the floor facing him/her. Hand out the cards to the other players and give them a minute or two to familiarise themselves with their animal.

Linnaeus gives instructions in the conventional 'Simon says' format: 'Linnaeus says: if you have six legs stand up'; 'Linnaeus says: if you live in the desert do a star jump' etc. If Linnaeus gives a command that applies to only one student, that student is eliminated from the game. If Linnaeus gives a command, but doesn't begin the instruction with 'Linnaeus says' any student who follows that command is removed from the game. Carry on until there is only one player left - they are the winner and take on the role of Linnaeus for the next round.

Take it further:

You could ask students to carry out some research into other animal species and make their own cards to use in play. Students may also wish to take the information from the back of the card, combine it with their own research and create a set of 'Top Trumps' style cards.

Teacher tips:

The information given on the back of each card may help players decide if a command applies to them. You may need to circulate among the children and ensure that they are correctly following Linnaeus' commands - especially with regards to number of legs! Younger groups may wish to focus on colour, habitat or ability to fly, swim etc. For older and more able classes, encourage Linnaeus to use more technical scientific language - if you are a mammal stand up, if you're an invertebrate wave your arms etc.

Who am I?

Students use their questioning and reasoning skills to discover which animal they have been given.
Note: This game requires an even number of players.

In the Kit:
A Pack of 'Who Am I' cards

Let's go!

Each player is allocated a card with an image of an animal - they are not allowed to see the image. Ensure that cards are allocated in matching pairs, or the game will not work!

The card should either be stuck to the player's back, or attached to a headband for them to wear. Players then circulate among the group, asking questions about their animal. Each player can only ask another player one question - and they cannot ask 'What animal am I?' Players might wish to ask about colours, habitats, number of legs, ability to fly etc.

Once the player has discovered which animal they are, they should find their matching partner - the first pair is the winner.

Take it further:

As the animals provided in the pack of cards are well known with quite distinctive features, you could develop a slightly more difficult version of the game with your class. Students could research a range of more unusual animals and then play the same game with their own cards.

You could try a version of the game with no images to help - simply write the animals you've chosen on stickers and stick them to each student's back. This is trickier for students, as it relies on them remembering the features of the animal in question, not just checking on the picture!

A bug hunt!

Students carry out a 'bug hunt' around their school grounds or in the local park, then classify the creatures using identification keys.

In the Kit:
Magnifying glasses
Pooters & Bug viewers

You need to provide:
Large tray or large sheet (white is best)

Let's go!

Start by looking around bushes, at the base of trees and among the flowers. Place your sheet or tray under a bush or tree and shake a branch - the bugs will fall off of the branches and on to your sheet or tray. You might find shield bugs, spiders and ladybirds. If you are in a woodland area, try turning over any small rocks or logs, you may be able to find some centipedes, spiders or woodlice. Always put rocks and logs back exactly where you found them. Have a look at some flowers - can you see any bees, hoverflies or butterflies?

Take it further:

If you have time, you could set up some pitfall traps around the school grounds. Make sure the traps are checked every day for any minibeasts that have fallen in. If you are taking the minibeasts into the classroom for further investigation, make sure you provide them with some damp earth and leaves and don't keep them too long or they will become stressed. This activity can be on going, but remember to remove the pitfalls completely once you have finished.

Teacher tips:

Most children are familiar with the rhyme 'We're going on a bear hunt,' so why not use this variation as an introduction to an outdoor bug hunting adventure with your class. You could use the rhyme to start a discussion about what students know about minibeasts, where you might find them and why they are important to us. Try looking around the classroom for signs of minibeasts activity. Can you find spider webs, dead flies or holes in the leaves of the houseplants?

Oh my! A grasshopper! A big, green grasshopper,
hopping around the tree, BOING, BOING
Refrain
Oh my! A ladybird! A red, spotted ladybird,
crawling through the grass, SHHH, SHHH
Refrain

Refrain:
We're going on a bug hunt!
We're going to catch some big bugs.
What a sunny day.
Are you ready? OK!

I'm thinking of...

The object of the game is for players to guess the name of an animal using clues provided.

You need to provide:
Imagination!

Let's go!

One player silently thinks of an animal without telling other players. He then says, "I'm thinking of an animal, and it has… (say one of its characteristics, for example, six legs)". The other players take turns guessing which animal he/she is thinking of.

After each incorrect guess players get another clue. The player who guesses the animal correctly will decide the next animal for other players to guess. Alternately, children can take turns so each person gets a chance to choose the animal.

Take it further:
This game can be adapted for older children by making the clues more complex. For younger children, clues should be visual concepts such as colours and size, or whether the animal has wings, scales, or fur. For older children, include abstract clues such as where the animal lives, what it eats, or its behaviour.

Teacher tips:

Depending on the age and behaviour of your class, you may wish to ask the player who is thinking of the animal to tell you which animal they are going to use before you begin the game. This prevents players from changing their mind half way through when someone is close to guessing the correct answer!

Sort and share

Students will sort items choosing their own categories and then share their thinking with others.

You need to provide:
A selection of items to sort - these could be rocks, shells, shapes, pictures or anything else that comes to mind.
Individually wrapped sweets work very well!

Let's go!

Ask the students to sort the items into categories of their own choosing. After a minute or two, stop and ask a few students to share their sorting strategy.

Tell students that this time they have to use a different strategy. Again, after a minute or two ask another few pupils to share their ideas. Carry on until everyone has had a turn at sharing their thoughts, or you have run out of ways to categorise.

Take it further:

This leads well into a discussion about how scientists categorise and identify plants and animals. Students will have noticed that there were a variety of thoughts on how best to categorise the items they were given - you could use this idea to explain the variety of classification systems which have been used over time, and how they are always changing as new knowledge emerges.

It's also a nice start to discussion about Carl Linnaeus and the development of his binomial classification system.

Teacher tips:

If you do decide to use sweets for sorting, make sure the students know they are not allowed to eat the sweets until the end of the activity! You should also check for any allergies or dietary issues beforehand.

Classifying classmates

Student will observe, measure and record a range of variables among the class, including height, shoe size, hand span, hair colour, eye colour and age.

You need to provide:
Pencil
Paper
Graph paper
Measuring tapes
Metre sticks

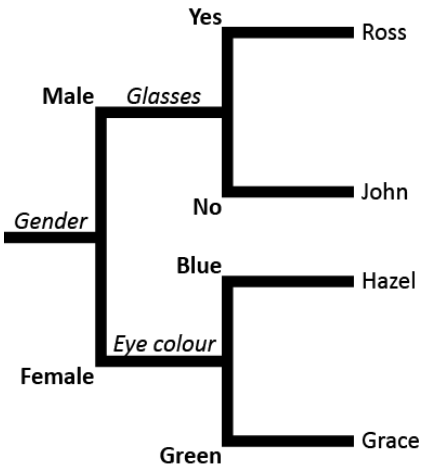
Let's go!

Divide the class into groups of 4-5 students and explain that they will be measuring some differences between themselves and then creating a classification key. Ask them to carefully carry out the measuring and record all of their results - they'll need to do this clearly.

Collate a class data set on the board, and ask students to use the data to produce the following:

- a bar graph showing hair colour
- a line graph showing height
- a pie chart showing shoe size

In their groups, students should work together to create a dichotomous branching key (like the example shown) that will identify each student within the group. They should use their measurements from earlier in the lesson.



Take it further:

With an advanced class you could use the height line graph to talk about variation among populations, distribution curves and even statistical outliers.

Teacher tips:

Remember that you may not get a normal distribution curve (bell curve) due to the age of your students - it's likely that many are fairly similar in terms of height and shoe size!

To measure hand span it can be easier for students to draw around their hand on squared paper and then measure the span with a ruler.

Crazy creatures

Students create a crazy creature by playing the well known drawing game 'Consequences'. They then have to decide where their creature lives and attempt to classify their creature based on the physical characteristics that can be seen.

You need to provide:
Paper & pencils

Let's go!

Everyone sits in a circle with a piece of paper and a pencil. Fold the paper in four, so that the folds run widthways. On the top panel draw an animals head, making the two lines of the neck carry over into the second panel. Players fold the panel so it cannot be seen, and pass it to the person on their left. The next player draws the top of the animal's body and passes the paper on. The third player draws the rest of the body, and the fourth draws the legs and feet.

The last player opens up the creature and decides where it might live based on the physical characteristics that can be seen. Does the animal have feet, wings, flippers? What does it eat and how? Does another animal hunt it? Once they've made their decisions, give the crazy creature a binomial name (e.g. Homo sapiens). Share with the rest of the class.

Take it further:
Try constructing a food chain or web from the collection of crazy creatures. You'll need to add in some plants and possibly a few real animals! Construct a key to identify each creature.

Teacher tips:

Students use their knowledge of variation and classification to design a new creature that is uniquely adapted to its environment. First, think about the environment the creature lives in – is it hot or cold, wet or dry? Are there trees, plants, other animals? Next they'll need to decide whether the creature is a mammal, reptile, fish, bird or insect. Think about the features the creature will need to survive – for example fins or flippers for swimming, fur or feathers for warmth, wings for flying, legs for walking etc. What does the creature eat and how does it get its food? Once students have decided on their creature, they can try drawing a picture of it – they might change their mind about some of its features once they see it on paper!

Unnature trail

Students will investigate camouflage in the natural environment by attempting to find a variety of objects. This activity can lead onto discussions of mimicry and adaptation.

You need to provide:
Manmade objects (~20)

Let's go!

Hide the objects in a small area outdoors. Ensure they are not totally obscured and arrange some of them to blend into the background. Allow all players to wander around the area, a few at a time. They should try to spot as many objects as possible. When they think they've found all the hidden objects, they should list them. Tell them if they haven't found them all, and allow participants the chance to look again.
When all the objects have been discovered, discuss which were the most difficult to spot and why. Talk about camouflage and colour in the natural world.

Take it further:

Cut up lots of short lengths of wool (around 5cm long), in a variety of both bright and dull colours. Set up by scattering the wool around a diverse area, at different heights if possible.

Tell the students that you are a baby bird and that they are all parent birds who need to feed you with woolly worms. They must look for worms in the area and stick them onto a strip of Velcro or sticky tape that you are holding. Because you are a only a baby bird, you can only eat one worm at a time - so students can only pick up and bring back one worm at a time.

Allow students time to collect the woolly worms. As they bring them back to the baby bird, they can stick them onto the Velcro or sticky tape, but make sure they are stuck on in the order that they are found.

Once all the worms are found, gather the students so that they can see your strip of Velcro or sticky tape with woolly worms on. Ask them what the differences are between the colours of the first worms they found compared to the colour of the last worms they found - they should be bright first, then getting more dull.

Wriggly wormery

Students will create a classroom wormery, which they can study over time. They'll be able to observe changes in soil structure and worm behaviour.

You need to provide:
Large transparent bowl - plastic is a good idea if you can find one!
Sand
Soil
Leaves
Worms

Let's go!

Fill the bowl with alternating layers of sand and soil - the layers should be about 2.5cm deep. Put a small layer of leaves on top, these will be the food source for your worms you could also feed your worms vegetables, fruit or shredded paper. Add enough water to damp the soil, but be careful - you don't want the worms to drown!

Next you need to find the worms. To encourage them to come to the surface, pour water gently from a watering can, or try sticking a garden fork into the ground and wiggling it. If neither of these work you'll need to dig for them! Add the worms to your wormery. Keep the wormery someplace cool and dark. It's best to keep it under a slightly damp cloth, worms don't like bright light and it can make them inactive. If the wormery begins to look dry sprinkle a little water on to it, but not too much.

Check every day - you'll see the worms moving around, and tunnels will begin to appear. Eventually the layers of sand and soil will begin to mix together, and leaves will get pulled into the tunnels. You could take a photographic record of the changes in your wormery over time, or make scientific sketches. Once you've finished with the wormery you should return the worms to where you found them.

Teacher tips:

Worms are most active in warm moist conditions, ideally between 18-25°C (64-77°F).

A wormery should be kept in a cupboard or a sheltered area of the classroom where it gets neither too cold in the winter nor too hot in the summer - remember when keeping wormeries indoors, that they can sometimes produce odours if they are neglected.

Worms prefer well-ventilated conditions to live in, and they dislike being waterlogged.

Picture those plants

Students will draw a plant, looking closely at the structure of the plant and its features. They will compare a range of plants and begin to classify them based on what has been observed.

You need to provide:
A range of flowers or plants (preferably still growing)
A pencil
Paper

Let's go!

Draw a picture of your plant. Don't forget to include the leaves. You might want to look at the roots too, but be careful you don't snap them. In Linnaeus' time there was no photography, so botanists had to carefully document the plants they were studying by drawing them. It was important to be as accurate as possible - you don't want to get two different plants mixed up because of rushed drawing.

Write out the key features of your plant. Look at the overall shape and height first, then start looking at the details. It might help to ask yourself questions like:

- How tall is the plant?
- What colour is it?
- Does it have a smell?
- What shape are the leaves?
- Are there veins visible on the leaves? What patterns do they make?
- How many petals are on each flower?

As a class, have a look at the different features you have picked out as being important. Do all of the plants have all of the features? Can students put them into groups based on these features?

Take it further:

Why not try studying the seeds of different plants and have a discussion about seed dispersal mechanisms. Ask students about different types of plants that they know. Explain that flowering plants are only one of the groups of plants that we know. Have a look at mosses, algae and ferns - these all belong to other plant groups.

Find that specimen!

Students will look at a range of specimens encased in acrylic resin, then use their observation and deductive skills to decide which clue card belongs to which specimen.

You need to provide:
Resin specimens
Clue cards

Let's go!

Lay the specimens out on a table. Divide the students into five small groups and distribute the clue cards among the groups. Each group must take it in turn to come to the specimen table and decide which specimen their clue applies to. Once they've done so, they should put the clue next to the specimen. Once all the clues are done, get together as a class and discuss the specimens. Are there other features that could be used as clues? Students may wish to look at them using the Flexi-Scope or handheld magnifying glasses.

Take it further:
In small groups ask students to research the specimens further, either in books or on the internet. Then, ask them to write new clues to challenge the class. They should try to use less obvious features (that may require appropriate magnification) or things that cannot be seen at all. Try the game again - is the outcome different?

Teacher tips:

The specimens are encased in a very strong acrylic resin. There is very little risk of damage occurring to the specimen, however, that does not mean they can be thrown around! Remind students that they need to be careful not to drop the specimens on hard surfaces, and if they are using magnification, the specimen should be on the table. Students may wish to place a sheet of white paper under the specimen to make features clearer.

Some of your students may be slightly timid around the specimens - particularly the centipede, spider and scorpion. You may need to gently remind students that the specimens are dead, and have been preserved in this way so that they are safe to handle. There is no risk to the student from touching the specimen, and the creatures cannot escape from the acrylic!

It's all relative

Students find pictures of living things and arrange them in collages, categorizing them according to which they think are most closely related.

You need to provide:
Scissors
Paper
Glue
Lots of magazines

Nature magazines have many pictures of living things. Most pictures will probably be of arthropods and vertebrates, but if you collect enough magazines you should have a reasonable range of images.

Let's go!

The idea behind this activity is to encourage students to look closely at a wide variety of animals and compare their appearances. It's important that students understand that one of the first steps in classification is to look at the appearance of an organism.

Each student should cut out 10 images of different living things and group them according to how closely related he/she thinks they are. As this is going on, circulate around the room, asking students how they made their decisions. They may surprise you with how reasonable their thinking is, even if their conclusions do not conform to modern scientific thought!

Have students glue their creations to large sheets of paper and label the groups in any way they choose.

Take it further:
Students could carry out some research into modern classification systems and try to determine the validity of their decisions.

Teacher tips:

While deciding which organisms they think are related, students may make decisions that you disagree with. Use your discretion when deciding how much correction you wish to give them.

Keep in mind that this exercise is about students learning a process, so the product doesn't need to be perfect in order for the lesson to be a success. However, glaring errors may require some further explanation!

The Linnean Society of London

This education resource was developed by Linnean*Learning*, the Education Team at the Linnean Society of London. The Linnean Society is the oldest active biological society in the world. Founded in 1788, the Society continues to provide a forum for the discussion and the advancement of the life sciences.

Our name is taken from the Swedish naturalist Carl Linnaeus who helped to shape our understanding of the natural world through his work in taxonomy and classification of living things. We're proud of our unique collections and of our history. Did you know it was at a meeting of the Society in 1858 that Charles Darwin and Alfred Russel Wallace outlined the theory of evolution?

Linnean*Learning* is working hard to bring brilliant biology alive in the lives of people of all ages and walks of life. We'd love to hear from you if you have any ideas, or would like to collaborate on a project, or just want to give us some feedback.
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Discover more at www.linnean.org/learning