Why are plants important?

DID YOU KNOW?

Around our homes we rely on lots of different plants from all around the world, from exotic fruits to vegetables and cereals. Trees give us wood for furniture and buildings. However, plants can get sick too, and if they die, we lose our source of food and wood.

TO THE RESCUE!

What do you want to do when you grow up? Perhaps you want to help protect plants? There are four different plant health careers to choose from: Let's learn about the work of plant health workers!

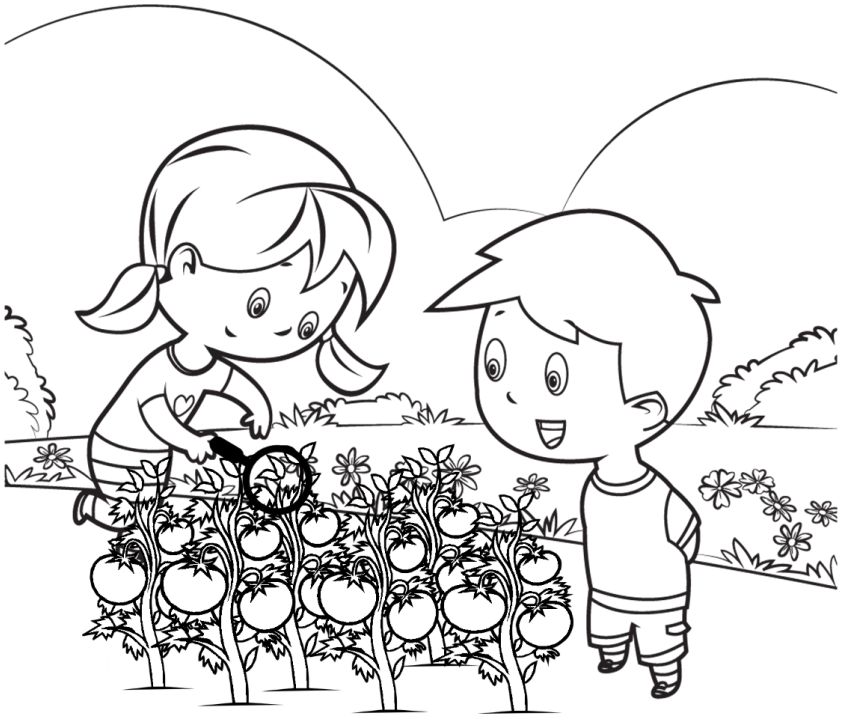
Farmer: in order to grow delicious fruits and vegetables, a farmer is always on the lookout for plant diseases. They try to choose plants to grow that do not easily get sick, and take steps to protect their crops from diseases.

Plant doctor: a scientist who researches plant diseases and how to prevent them. Plant doctors work to understand of the causes of plant diseases and come up with new ways to find and treat them.

Forester: a person who looks after trees and forests. They work to protect trees from pests and diseases, and ensure dying trees are felled and replaced so they don't spread diseases or cause accidents.

Plant inspector: a scientist who looks at plants in garden centres and plants, fruit and vegetables arriving at airports and seaports to check if they are healthy so that they don't spread pests and diseases to other plants.

Plants in danger



WATCH CAREFULLY

Just like us plants can get sick too! If you catch a cold you might have a runny nose or a cough. Plants can also show signs of being unwell and we call these symptoms. Plant symptoms can range from spots on the leaves to oozing sores on the trunk and branches. Dutch elm disease, which is also called DED, is caused by a fungus that is so tiny you cannot see it with your own eyes. Therefore, farmers, foresters and plant inspectors often rely on plant symptoms to determine if a plant is sick! Don’t worry, plant diseases are mostly harmless to humans.

The fungus that causes DED is carried from tree to tree by a beetle that lays its eggs under the bark, so plant inspectors can also look for signs of the beetle.

Go on an expedition!

FIRST, GET YOUR PENCILS OUT 

Have a look around your home, look for 5 things that are made out of trees. See if you can find out what kind of trees they are made of and where these trees grow. What do the trees we use to make things in our homes look like? Draw these trees or their leaves here:

Use all your senses

There is a lot more to plant health than looking for disease symptoms. For instance, some scientists, farmers and plant health inspectors rely on smell to identify plant diseases, so they can find out whether there is a rotten potato in a bag of potatoes without looking at every potato. If you can find any rotten fruits or vegetables try comparing the smell of the rotten fruit or vegetable to a healthy one.

Foresters can even use sound to find diseased trees. Try knocking on a solid wall or a door and listen to how different it sounds. Some tree diseases will make a tree hollow in the middle. Foresters use a method called tomography in which they tap the tree trunk to make a sound and use electronic sensors to detect the sound and find out whether the tree is hollow and needs to be felled.

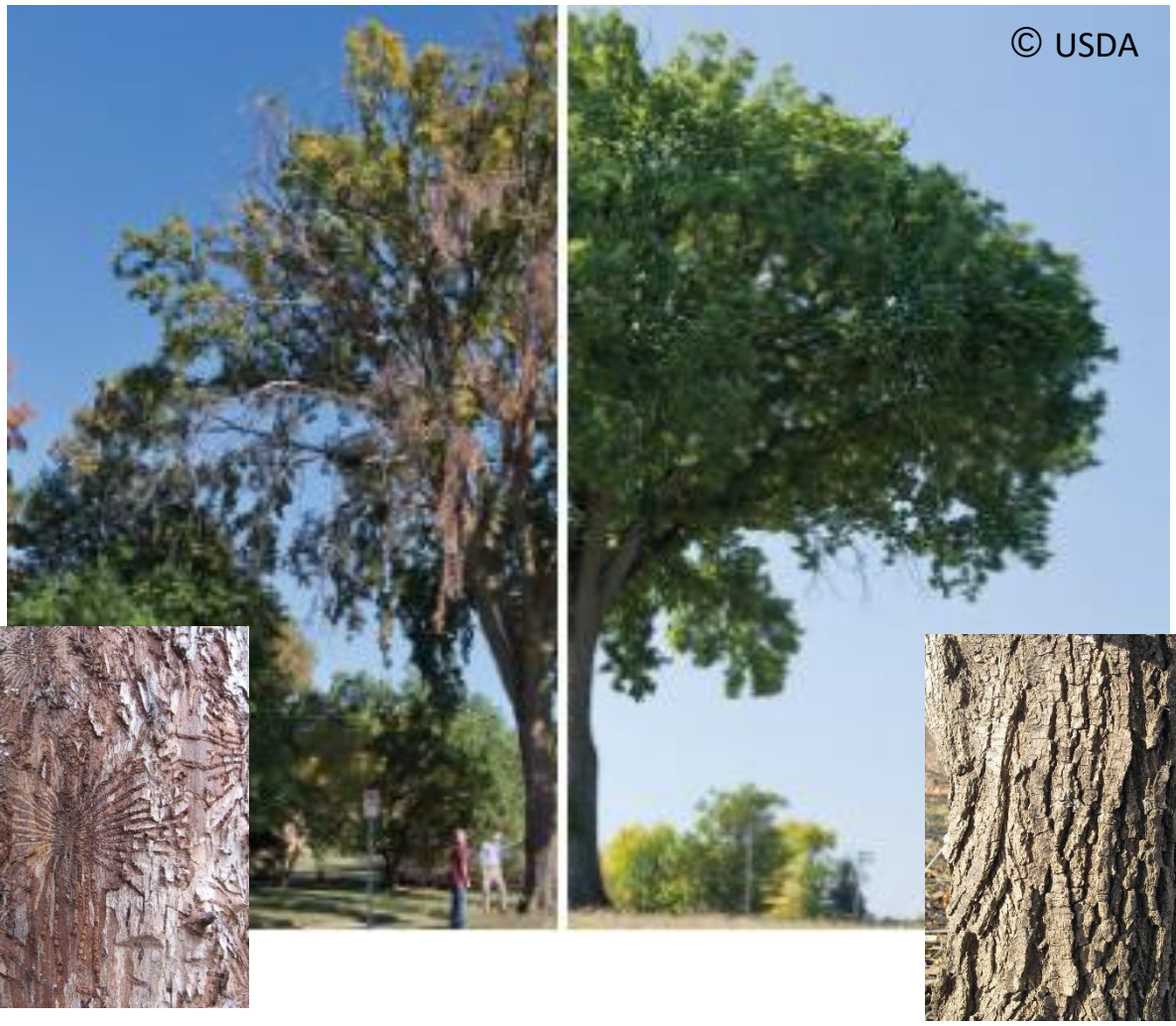
In the case of trees, the feel of the bark can be important to recognise tree species. English elm has a particularly rough, textured bark. A diseased or damaged tree may produce a sticky liquid, or have patches on their trunk or branches that are different in colour or appearance.

Can you think of information you could use to describe trees and their diseases to someone who is visually impaired? Perhaps you can think of new ways to find sick plants that do not require your eyes. Write them down!

How to recognise DED

This is what a tree with Dutch elm Disease (DED) looks like:

This is what a healthy elm tree looks like normally:



SPOT THE DIFFERENCE!

Can you spot these characteristic symptoms of Dutch Elm Disease and the presence of the elm bark beetle? Circle them in the image on the left.

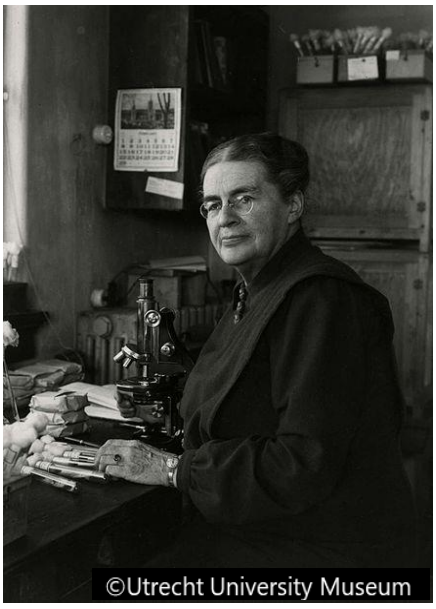
- ☐ wilted browning leaves
- ☐ wilting and/or leaf-less branches
- ☐ galleries (network of holes) in the bark caused by the bark beetle

Meet Plant Heroes

DID YOU KNOW?

Dutch elm disease is not actually Dutch! It was called that because it was discovered by a team of Dutch researchers, many of whom were women! These plant doctors were true plant health heroes!

Here are two of them: on the left is Dr Marie Beatrice Schol-Schwarz and on the right is Professor Johanna Westerdijk using a microscope.



Scientists often use microscopes to determine what makes a plant sick because many diseases are caused by microscopic organisms that are so small they cannot be seen without the help of a microscope, including bacteria, viruses and fungi.

Become a plant health hero!

LET'S GO ON A WALK!

Perhaps you'll also one day discover a new disease or pest of trees! You can practice by looking out for disease symptoms. Here is a list of a few common tree diseases you may encounter outdoors in the UK and their symptoms. On your walks outdoors, if you notice unusual patterns on plants, you can add them to this list!

Plant Disease	Symptoms
Downy mildew on oak	Leaves covered in white powdery mold
Leaf blotch on horse chestnut	Irregular brown spots with yellow margin on leaves
Ash dieback	Black wilted branches of leaves
Needle blight on scots pine	Pine needles turn red before falling off
Chestnut bleeding canker	Bark and branches ooze red, brown or black gummy liquid

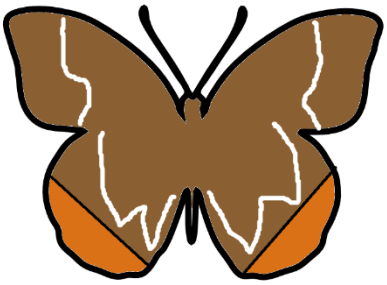
Alert at the seaport!

Oh no! Something stowed away in a shipment of logs! From witness descriptions, I think it might be a pest. Help me track it down by connecting the dots.

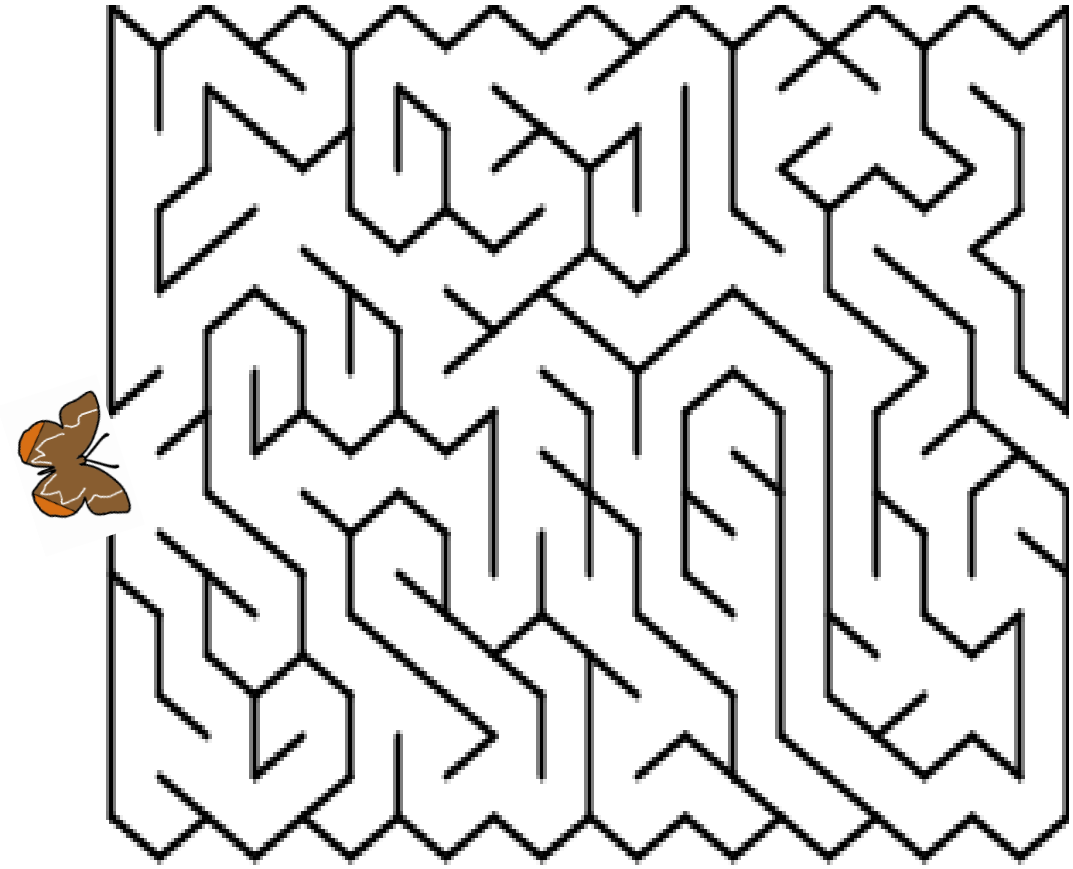
Can you guess what it is?

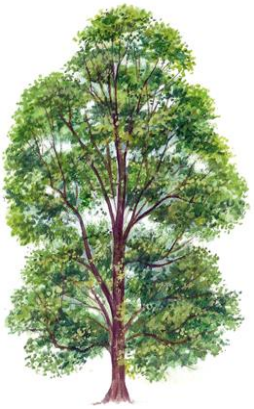
Did you work it out? Thanks to your help, I was able to identify this insect: it's a large elm bark beetle! While harmless to humans, this beetle spreads Dutch Elm Disease by carrying the fungus from tree to tree and drilling holes into the bark. We caught it before it found its way into the countryside! Phew! Thank you for your help champion!

Help a lost butterfly



On a walk in the park, a forester came across this lost white letter hairstreak butterfly. The butterfly is lost because it needs to find an elm tree to lay its eggs and feed its caterpillars, but there are very few elm trees left due to the elm disease. Fortunately, they recently planted some new types of elm that are resistant to Dutch Elm Disease. Help guide the butterfly through the maze to a healthy elm tree:





Let's recap

Well done for all that reading! There were a lot of new words. Can you remember them all? Let's see if you can find them below:

Dutch Elm Disease Crossword

T R E E F S O A X Q U Z U Z O
D T Z E C W B G W Z S F N B X
F C U E G C A M W L V T X W F
L P I I H P X G Y H E V E J B
P L A N T H E A L T H R D O O
H P J T B E E T L E B R E E D
C X D S H A S W B T I Q F L A
S K M E G O U F G E Y O Q U M
G V W Q D K G P I F C W T Q R
J V J P C M R E N S S P K H R
Y M I C R O F U N G U S N F L
G A L L E R Y O Y X M T T F L
Q D M L L Z J E N A O F Y Q W
W X H M A W Y R Q O W I W O T
I H L O Y I V F W B P T P R R

KEY:

Elm

Plant health

Microfungus

Gallery

Beetle

DED

Tree

Were there any words that you didn't know? You can ask an adult to help you look them up. You can also look up Izzy, the Plant Health Inspector's adventures at https://planthealthaction.org/izzy-inspector-book .

Thank you for downloading this activity booklet. We hope you enjoyed it. If you finished it, please do send us a photo or a scan of your booklet and/or drawings related to plant health and Dutch Elm Disease at planthealth@plants.ox.ac.uk. You may even get featured on our website at https://preston.web.ox.ac.uk/dutch-elm-disease !

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