# Leaf identifier



## Overview

This activity fulfills **Stage 2, Requirement 2** of the **Digital Maker Staged Activity Badge** (Create a simple computer program to help with a Scouting activity and try it out). Young people will finish a Scratch program to aid in the identification of different types of leaves. Scratch is a block-based programming language that uses drag-and-drop instructions.

30–60 minutes

Up to 4 young people per computer (pairs are ideal)

If you're running this activity without access to WiFi, you'll need to download Scratch and the activity to the laptops you'll be using; you may also wish to print handouts and gather some leaves.

Flexible

## You will need:

- Laptops or desktop computers (tablets like iPads do not work with this activity)
- Leaves from as many different trees as possible (e.g. beech, horse chestnut, ash, willow, sycamore, elder); you can either collect these, or make some artificial ones out of paper
- Activity handouts

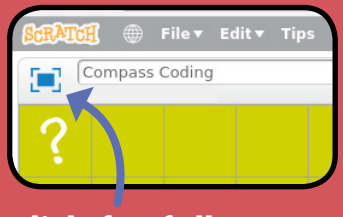
**If your meeting place has WiFi**

Run Scratch online in a web browser with an internet connection and open this link: **rpf.io/leaf-id.** You may get a message to launch Adobe Flash player. Click on this. If you get a pop up, click 'Allow'.

**If your meeting place doesn't have WiFi**

You'll need to download the project ahead of time. When you have internet access, open this link: **rpf.io/leaf-id**. Click the icon to exit full-screen mode, then click 'See inside'. Go to the File menu and select the option to 'Download to your computer'. To run the program, you'll also need to download Scratch to the machine you're using from the **Scratch download page**.

When you're ready to run the activity, open Scratch. Then open the project and go into full-screen mode.




Click for full-screen

## Key messages

- Computers can receive inputs.
- Computers can select instructions to follow based on these inputs.
- Scratch is a simple drag-and-drop programming language that you can use to make a computer carry out instructions.

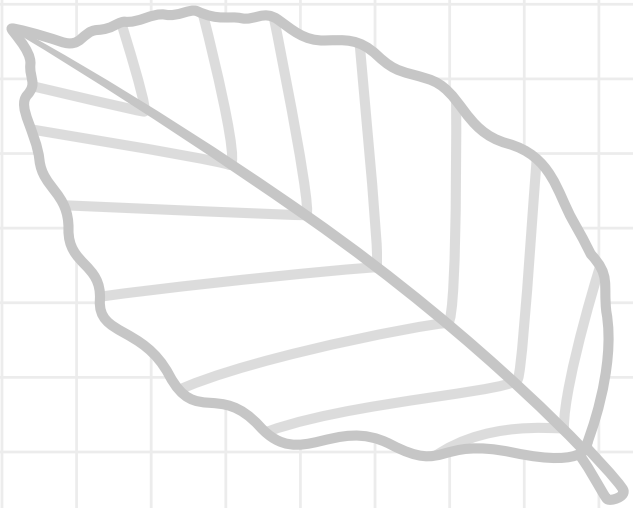
## Safety

**If working online, tell young people to ask for permission before viewing any other websites.**

# Leaf identifier



## Leader instructions

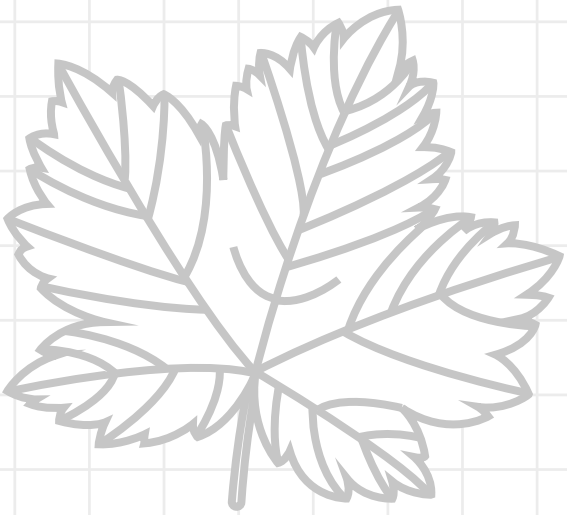


**1** Explain that computer programs can help us with Scouting activities. In this activity, young people are going to complete a leaf identification Scratch project that will help them identify different leaves.

**2** Show your group how a leaf identification guide can help them identify a leaf by answering yes/no questions. Choose one leaf as an example. Now is a good opportunity to introduce some leaf terminology.

**3** Run a demo of the Scratch program at: rpf.io/leaf-id-complete. Explain that you can use a Scratch program to help us identify leaves. It works in the same way as the game 'Guess Who', which your group may have played before. Show that when you answer a yes/no question in Scratch, the program will hide all of the leaves that don't match your criteria. For example, if you answer 'no' to the question 'Is it a single leaf?', all of the leaves that are compound (multiple leaves) will disappear. You can click on each leaf to find out what it is.

**4** Look at the code that this program uses by clicking on the 'full-screen' icon and then clicking on 'See inside'.



**5** Find the 'when green flag clicked' block on the right-hand side. Read the code out loud and work together to understand it. The program will ask you the question 'Is it a single leaf?'. If you answer 'yes', all the compound leaves will hide. Otherwise, all the simple leaves will hide. Run the program a few times and make sure you understand how it works.

**6** Notice that the layout of the finished code matches the layout of the leaf identification guide. Each script corresponds to a question.

**7** Now it's time for the young people to have a go by themselves. Present them with a version of the leaf identifier project that isn't finished: rpf.io/leaf-id. They should work in pairs to follow the instructions on the 'Wildlife identifier handout' and complete the project (see activity instructions below). If they get stuck, they can ask to take a look at the finished code, but they should make sure they try to work the answer to their question out first.

## Activity

1. Young people should use their leaf identifier to identify some leaves.

2. One partner takes a leaf but doesn't show it. The other partner asks questions and types in the answers to identify the leaf.

3. Together, they should check if the leaf picture matches their chosen leaf, then swap.

4. Remind your group that computer programs can help us with everyday activities: making useful projects is a key part of being a digital maker.

5. Discuss the other types of wildlife identifier could you make. Could you make an identification guide of different birds? What problems might you face?

## Adaptability

- A leader can guide a group of six to work collaboratively to complete the project.
- Use the completed code handout with any young people who get stuck to show them what their code should look like.
- The answers can be found in the completed project at: **rpf.io/leaf-id-complete.**
- Consider pairing young people who have no knowledge of Scratch with those that do.

## Alternatives

- You could complete this program outdoors, using collected leaves and some paper to write questions on. There are printable instruction cards available, or you can write instructions on paper.
- You could complete this program using other forms of wildlife, such as insects, or natural items, such as rocks and minerals. Young people could even collect and photograph their own images to use in the program.

## Community and Sharing

Young people should have the opportunity to explain their code, or to explain how they found or fixed a bug, to the rest of their team.

# Instructions

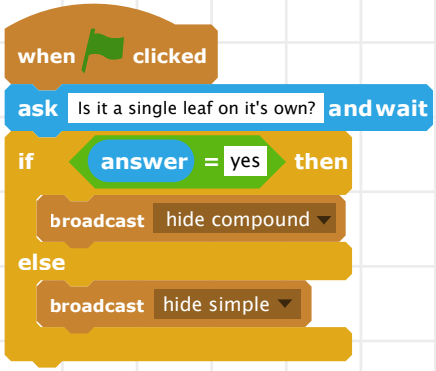


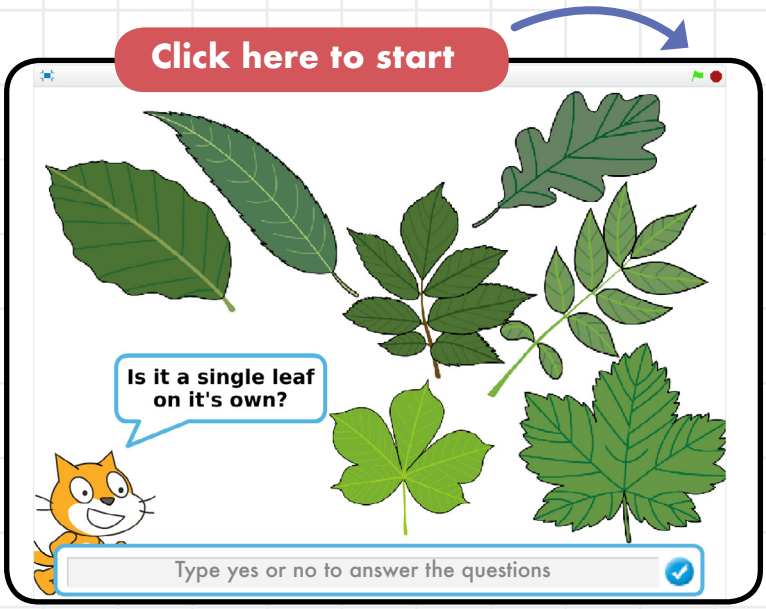
**Have a look at the printed leaf identification guide (page 3). You can answer the questions, to help identify different leaves. In this activity, you are going to make a digital version of the guide.**

**1** Open the project at rpf.io/leaf-id or the one provided for you offline.

**2** Click the green flag to start the script, and then answer the question. What happens?

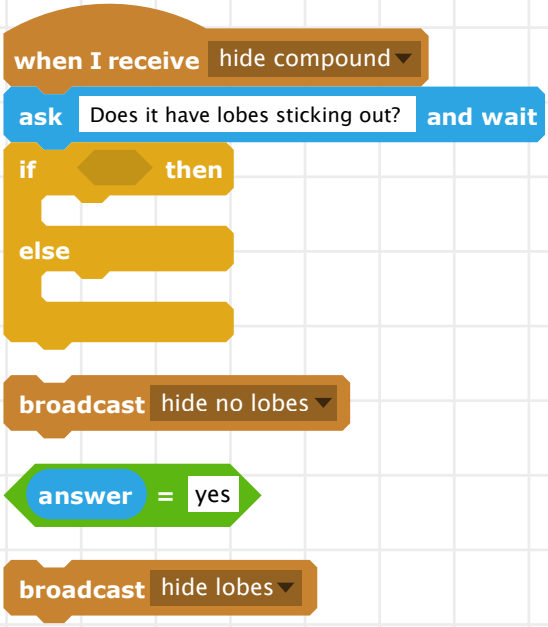
**3** Find the script that looks like this.




**4** It does the same job as the first question on your printed chart. If you answer **yes**, then it will hide all the leaves that are compound, and if you answer **no**, it will hide all the leaves that are simple.

**5** Now find the set of blocks shown below. Try and arrange the blocks so that the program can hide the leaves without lobes, or the leaves with lobes.




## Tip

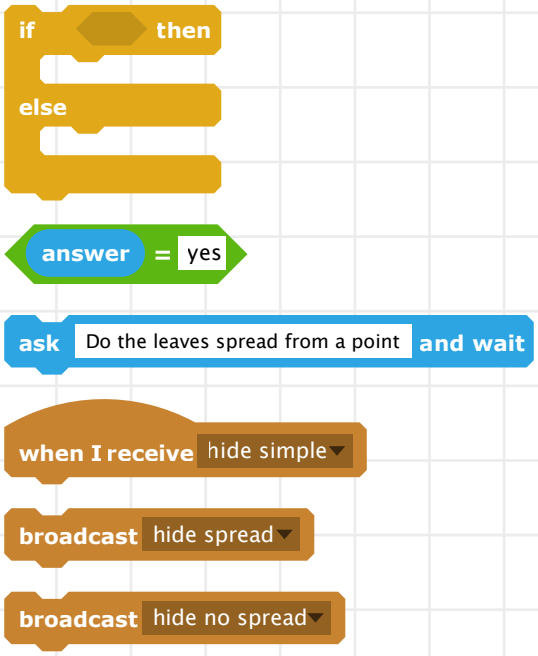
The only scripts you need to play with are on the Scratch Cat sprite.

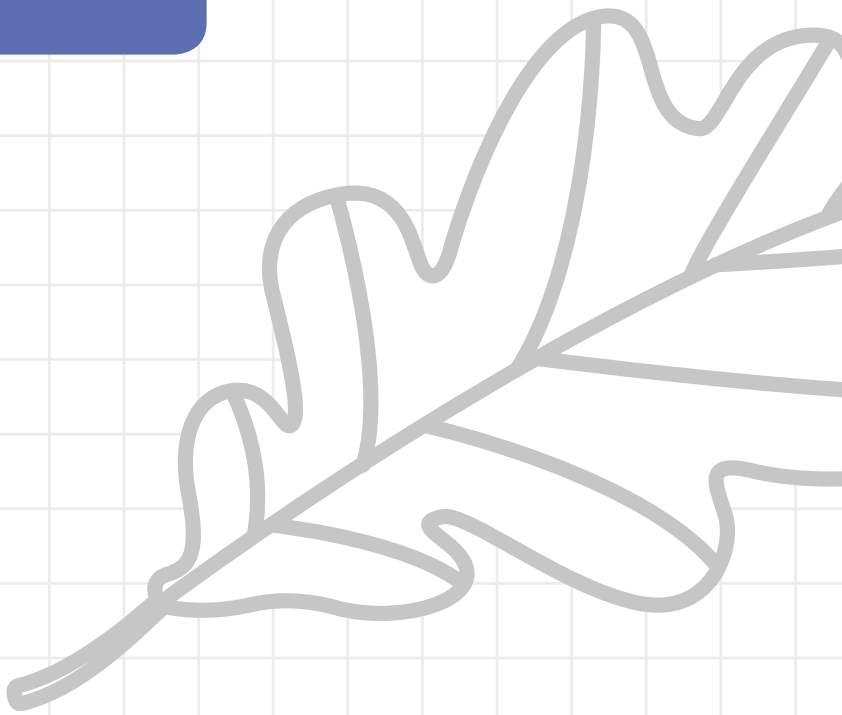
# Instructions



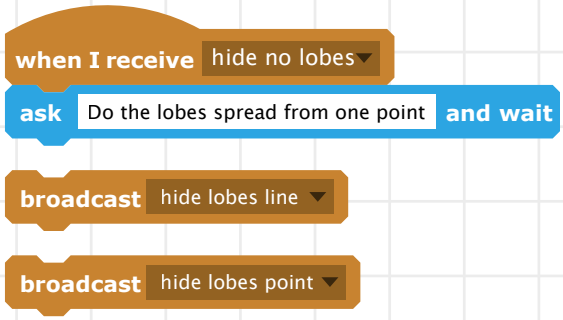
**6** Test your program by clicking the green flag.

**7** Now arrange these blocks to make a third script. Test your program when you have finished.



**8** To complete the next script, you will need to find some extra blocks from the Script menu. Click the green flag to test your program when you have made it.




## Trivia

Did you know that as recently as 2014, a popular web-comic made a joke about how hard it is to make a computer recognise whether a photo contains a bird (**rpf.io/xkcd-tasks**)?

Today we have computer programs that can even tell you what species of bird is in a photo. Technology has moved on very quickly!

**9** Finish off the last two scripts below. You'll have to choose the correct broadcasts for the very last one.

# Leaf identification guide

Is it a single leaf on it's own?

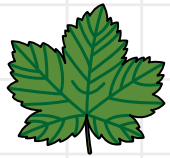
Yes

Does it have lobes sticking out?

Yes

Do the leaves spread from one point?

Yes



Sycamore

No

Oak

No

Is it long and thin?

Yes

Willow

No

Beach

No

Do the leaves spread from a point?

Yes

Horse Chestnut

No

Are there just a few leaves?

Yes

Elder

No

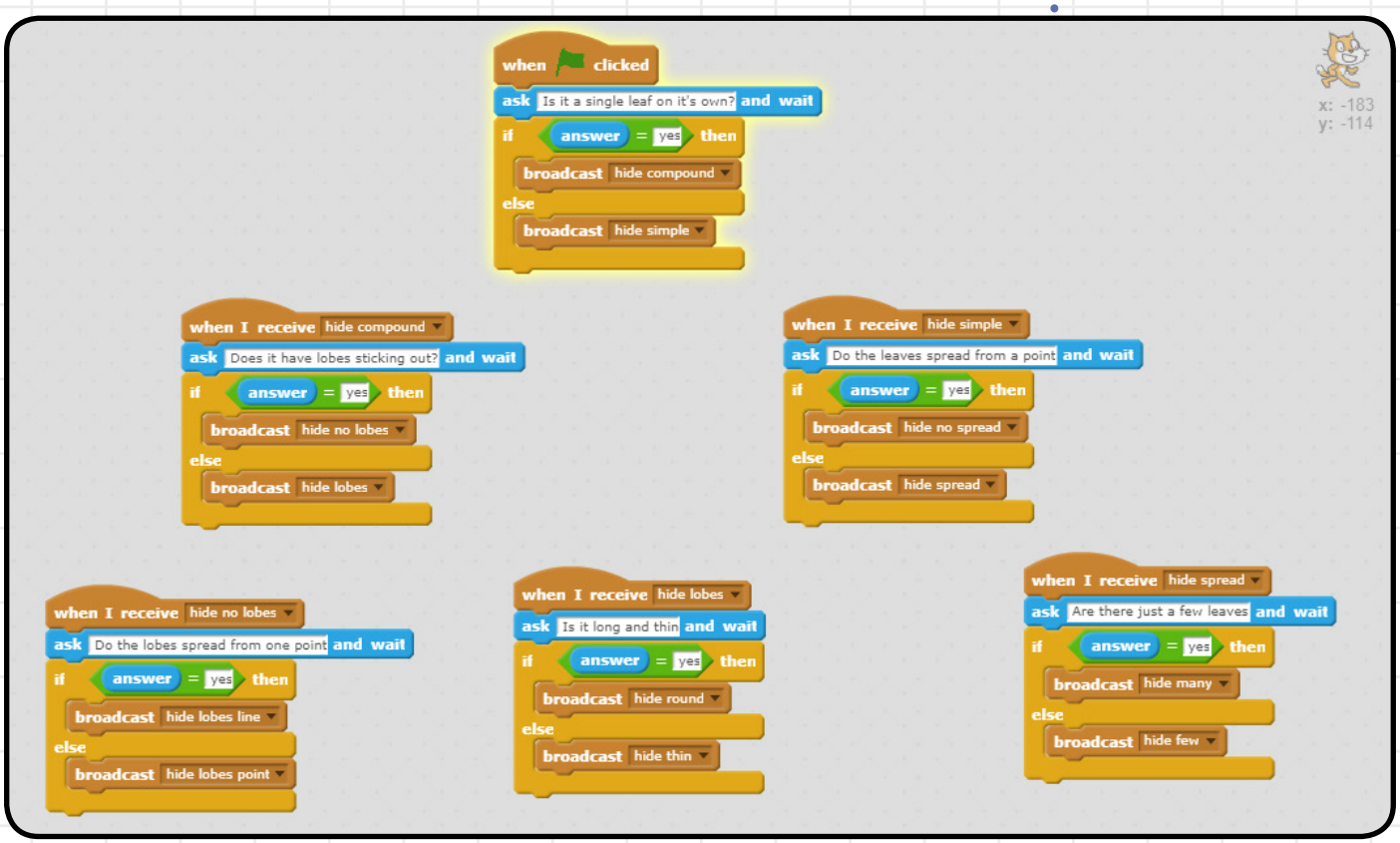
Ash

Note — leaf lobes are small or large bumps around the edge of a leaf

# Instructions



## Finished code



# Leaves (printable)

**Use these images if you can't collect real leaves.**