Following instructions

Using Flowcharts to give instructions and analyse processes

Resource

Primary

7-11 years

Contents

Noteable Activities for Schools: Following instructions

These resources are a guide for teachers to use with the whole class or direct individual students as appropriate. The activities below can be directly distributed to pupils.

For instructions on how to install and use Noteable resources, please look at our guides for teachers in GLOW: GLOW guidance for teachers to start using Noteable.

Content and Curriculum links

Level	Context	Indicators
7-11	Using basic flowcharts to give instructions	Directions, Decision, Action

Knowledge	Using bullet point lists to give instructions
Curriculum links (England) Computing KS2	• use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.
Scottish Curriculum for Excellence	**Experiences and Outcomes:** • I can create, develop and evaluate computing solutions in response to a design challenge. **TCH 2-15a** **Benchmark:** o Creates programs in a visual programming language including variables and conditional repetition. o Identifies patterns in problem solving and reuses aspects of previous solutions appropriately for example, reuse code for a timer, score counter or controlling arrow keys.
All: Cross-curricular opportunities	The activities have identified opportunities for Science and Numeracy.

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Noteable

What is a flowchart?

A flowchart is like a picture that helps us understand how something works. It's a special kind of drawing that shows the steps of a process or a plan. In simple words, it's like a map that guides you through a journey.

Imagine you're drawing a map for a robot to follow. Well, a **flowchart** in Python is like that map! It helps the computer understand what steps to take in a program. Here's how it works:

1. **Start**: The robot (or program) begins at the top of the flowchart.

2. **Decision Diamonds**: These are like crossroads. The robot checks something (like "Is it raining?"). If it's true, it goes one way; if false, it goes another.

3. **Rectangles**: These represent actions. For example, "Walk forward" or "Add two numbers."

4. **Arrows**: Connect the steps. They show the robot's path.

Let's create a simple Python flowchart for making a sandwich:

1. **Start**

2. **Decision**: Is there bread? If yes, go to step 3; if no, stop.

3. **Action**: Spread peanut butter.

4. **Action**: Spread jelly.

5. **Decision**: Is there another slice of bread? If yes, go to step 6; if no, stop.

6. **Action**: Put slices together.

7. **End**

And voilà! You've made a sandwich using a flowchart!

Why are Flowcharts Helpful?

Flowcharts are super useful for a few important reasons:

Making Programs: Imagine you want to tell a computer what to do. You need to create a set of instructions called a program. A flowchart helps you plan those instructions step by step, just like a recipe for baking cookies.

Explaining Ideas: Sometimes, we have great ideas or plans in our head, but it's tricky to explain them to others. A flowchart makes it much easier to show your ideas to your friends or teachers.

Flowchart symbols

The basic symbols you will find in a flowchart are outlined below:

Start/end

A flowchart always starts with a shape that looks like an oval, and it ends with another oval shape. It's like saying, "This is where we begin, and this is where we finish."

Arrows and Lines: In between the start and end, you'll see arrows and lines connecting different shapes. These arrows show the order of the steps or actions.
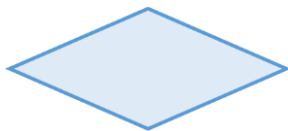
Parallelogram: This shape is used for input or output, like reading information or showing results.

Rectangle: This shape represents an action or a task. It's like a command telling the computer (or someone reading it) what to do.
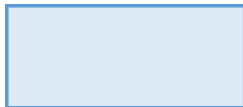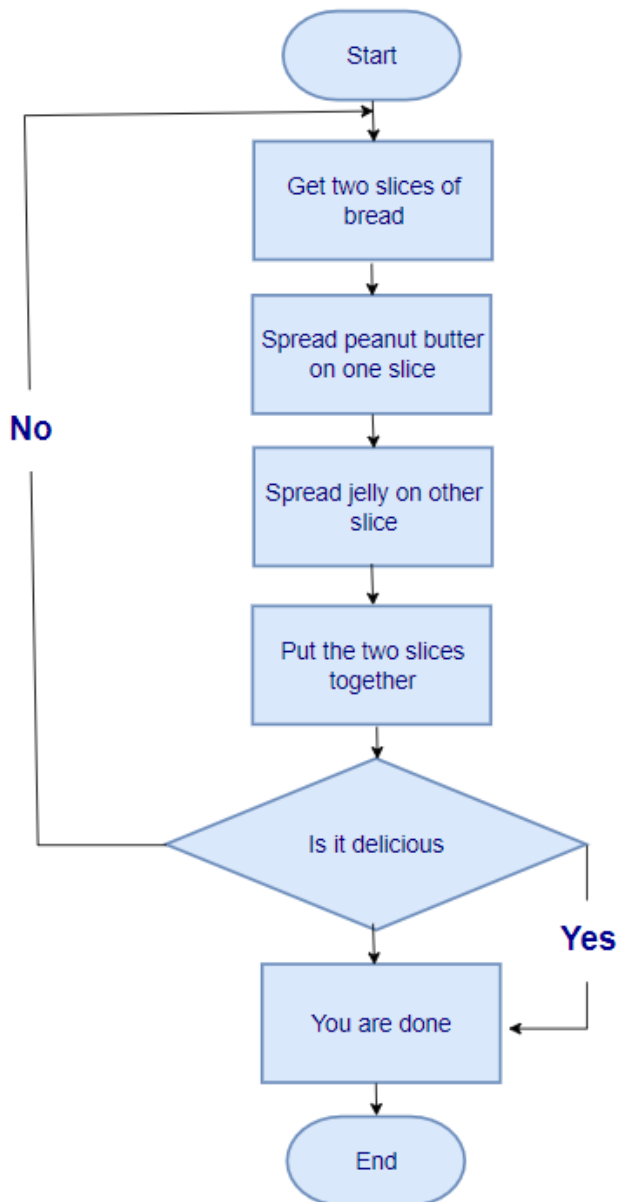
Diamond: This shape represents a decision point. It's like asking a question, and depending on the answer, you go in different directions.

How to Use a Flowchart?

Example: Making a Peanut Butter and Jelly Sandwich

Let's create a simple flowchart to explain how to make a peanut butter and jelly sandwich using these shapes:

```
                    ┌─────────────┐
                    │    Start    │
                    └─────────────┘
                           │
        No                 ▼
    ┌──────────┐    ┌─────────────────┐
    │          │    │ Get two slices  │
    │          │    │    of bread     │
    │          │    └─────────────────┘
    │          │           │
    │          │           ▼
    │          │    ┌─────────────────┐
    │          │    │ Spread peanut   │
    │          │    │ butter on one   │
    │          │    │     slice       │
    │          │    └─────────────────┘
    │          │           │
    │          │           ▼
    │          │    ┌─────────────────┐
    │          │    │ Spread jelly    │
    │          │    │ on other slice  │
    │          │    └─────────────────┘
    │          │           │
    │          │           ▼
    │          │    ┌─────────────────┐
    │          │    │ Put the two     │
    │          │    │ slices together │
    │          │    └─────────────────┘
    │          │           │
    │          │           ▼
    │          └──► ◄ Is it delicious ►
    │                      │         │ Yes
    │                      ▼         │
    │              ┌─────────────┐   │
    │              │ You are done│◄──┘
    │              └─────────────┘
    │                      │
    │                      ▼
    │              ┌─────────────┐
    │              │    End      │
    │              └─────────────┘
```

This flowchart helps you follow the steps one by one to make your yummy sandwich!

So, remember, flowcharts are like magical maps that help us understand and explain processes, like making a sandwich or even writing a computer program. They make everything clearer and more fun!

Another Flowchart Example

An example flowchart is shown in the image below. You want to determine NAAS' size in relation to the apple and the tree.

If NAAS is taller than the apple and smaller than the tree, then his size is between the apple and the tree.
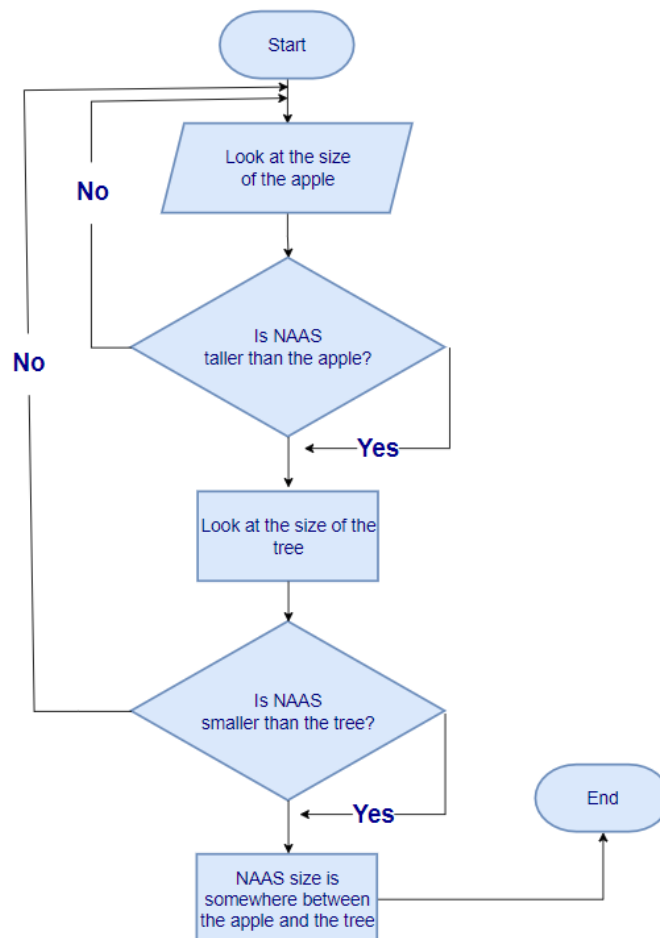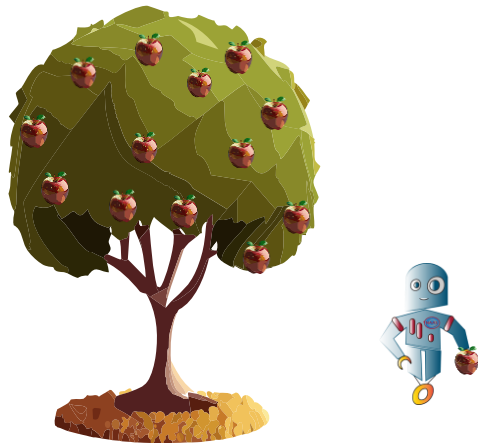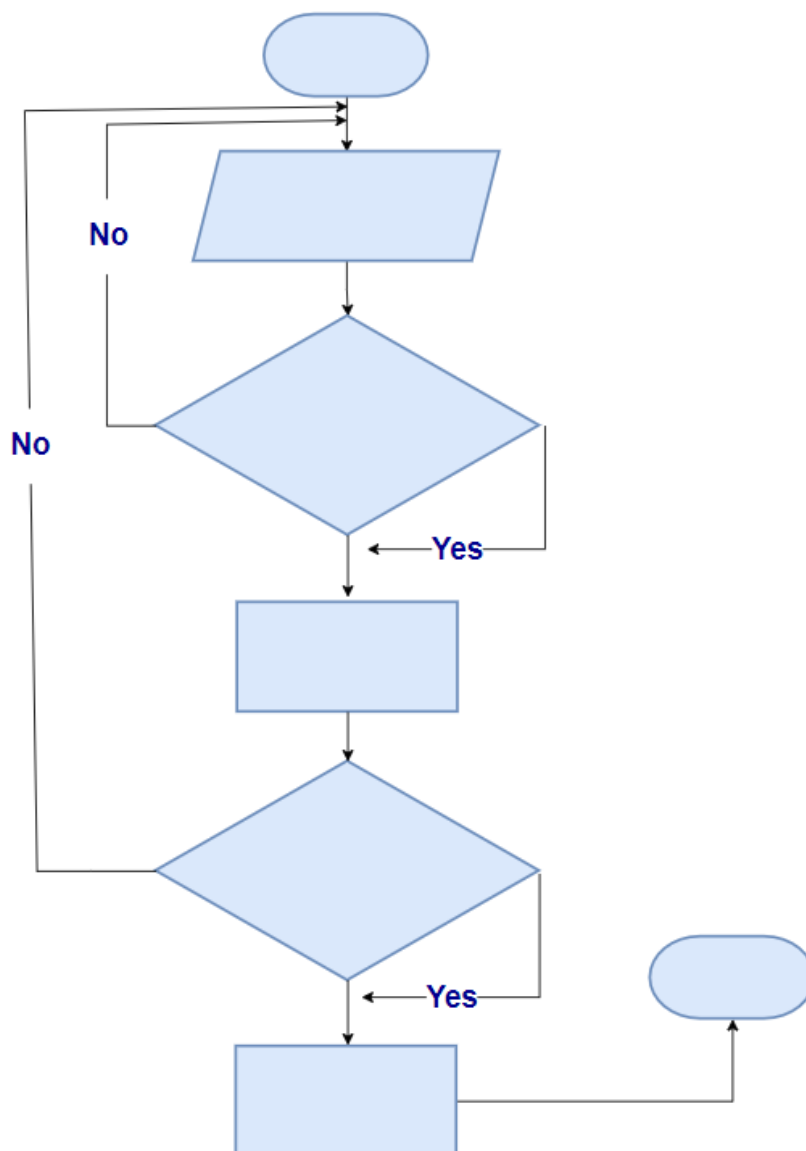
Activity 1

You want to check your school email, but, as the school computer is used by more than one student, you will need to add your username and password to be able to access your computer. Using the model flowchart from above, draw the steps for logging in to the school's computer.

You can use sentences like: Enter the password / Is the logging correct? / Is the password correct? / Enter the password.

If you want to make the game more challenging, work in pairs. Try to guess your friend's two-digit pin using determiners like 'Too big' and ' Too small'. Take turns guessing each other numbers. You can use

Activity 2

You want to teach NAAS to sort the rubbish in the house. He has an empty box of cereal on his hand and wants to know in which bin it goes.
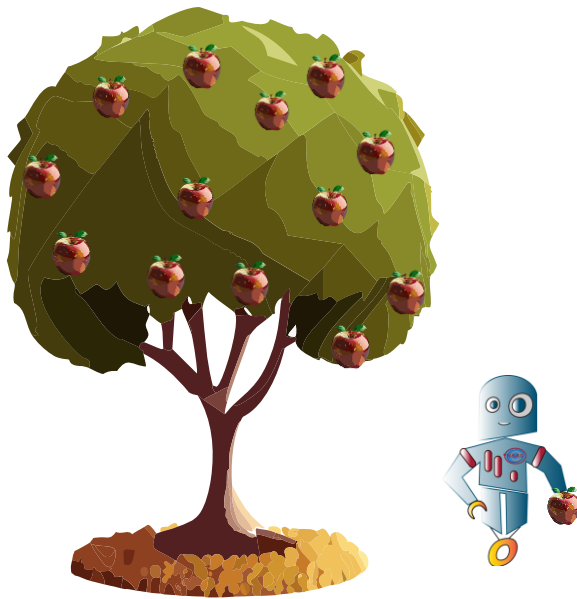
No

No

Yes

Combustible

Yes

Recyclable
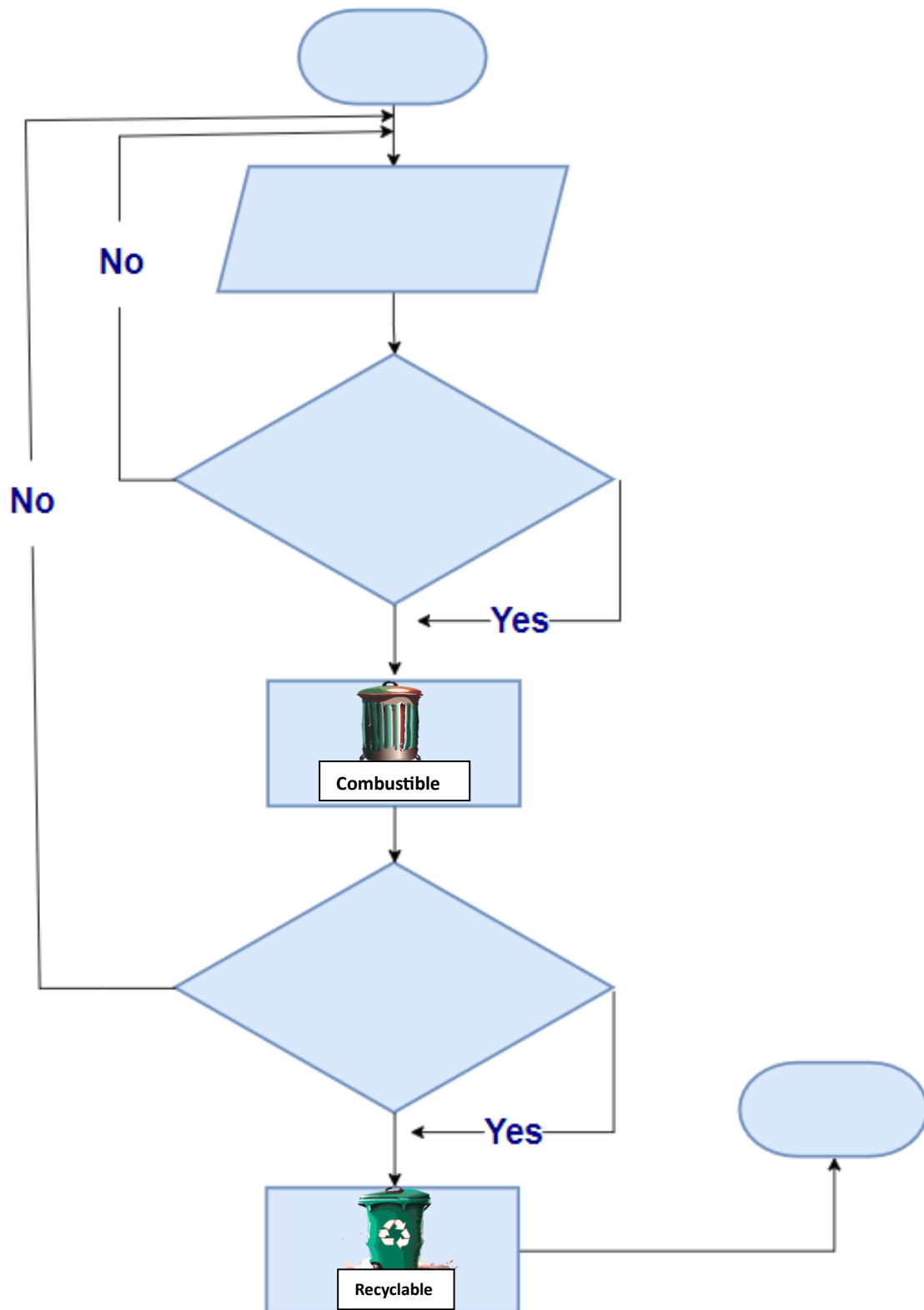
Activity 3

NAAS wants to play a game with you. He wants you to guess his hight in metrical units. From the picture, you can see that he is way taller than the apple, but way smaller than the tree.
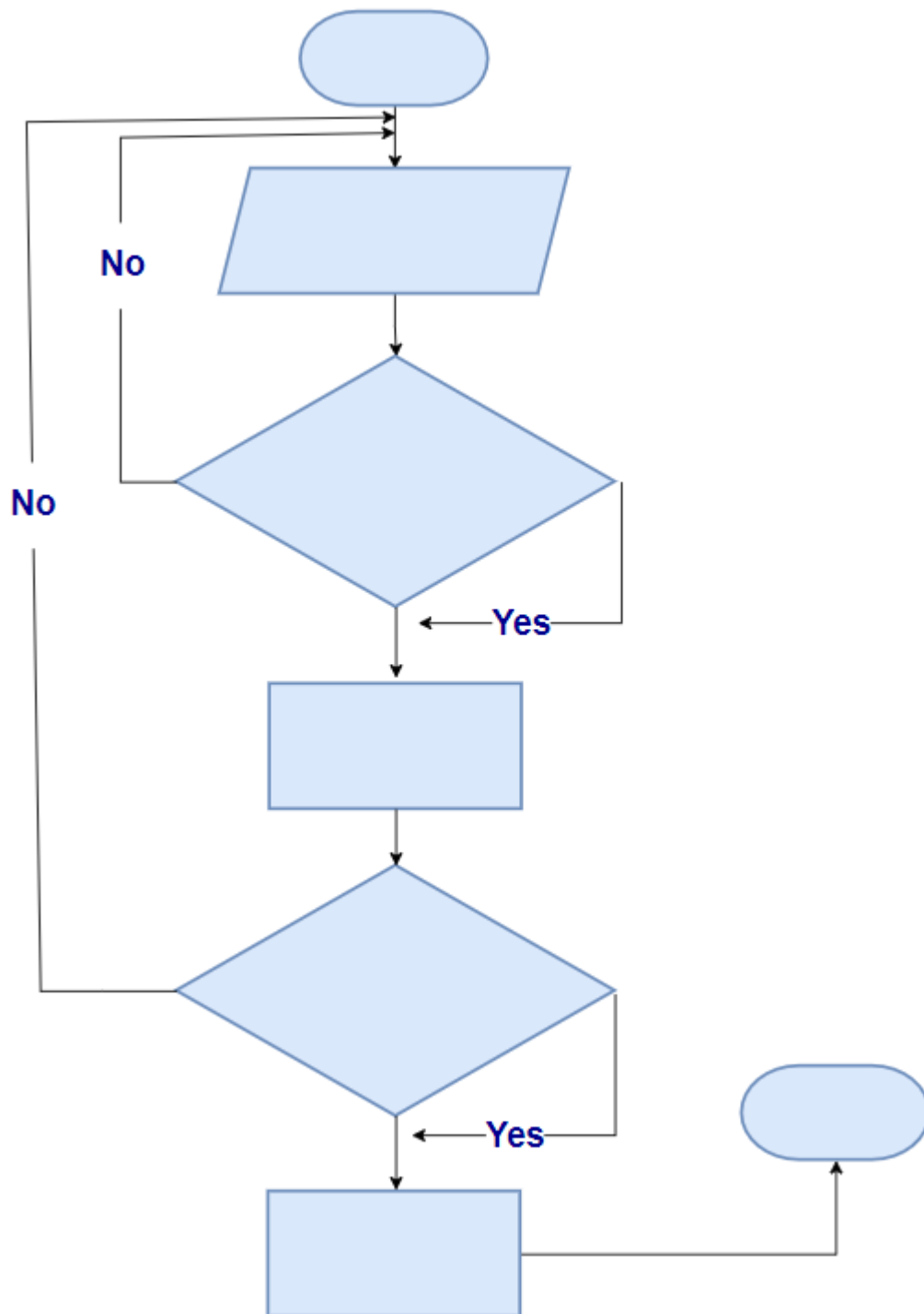
The tree is 1.8 metres tall.

Using the flowchart in the example above, guess how tall NAAS is.

Naas will draw the chart for you.

Tips:

1. The apple tree is as tall as 18 apples on top of each other.
2. The apple tree is the size of two NAAS on top of each other.

Cross-curricular opportunities

Science: You can add an extra challenge to the lesson. Your students can work on sustainability projects such as the one on Activity 2 or describe more complex processes such as photosynthesis, osmosis, or butterfly metamorphosis.

Numeracy: Depending on what you are teaching in Numeracy and Maths, you can use the flowchart as a starting point, you can create a number of activities. For example, you can use a flowchart to describe how to solve numeracy problems as in activity 3.

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