

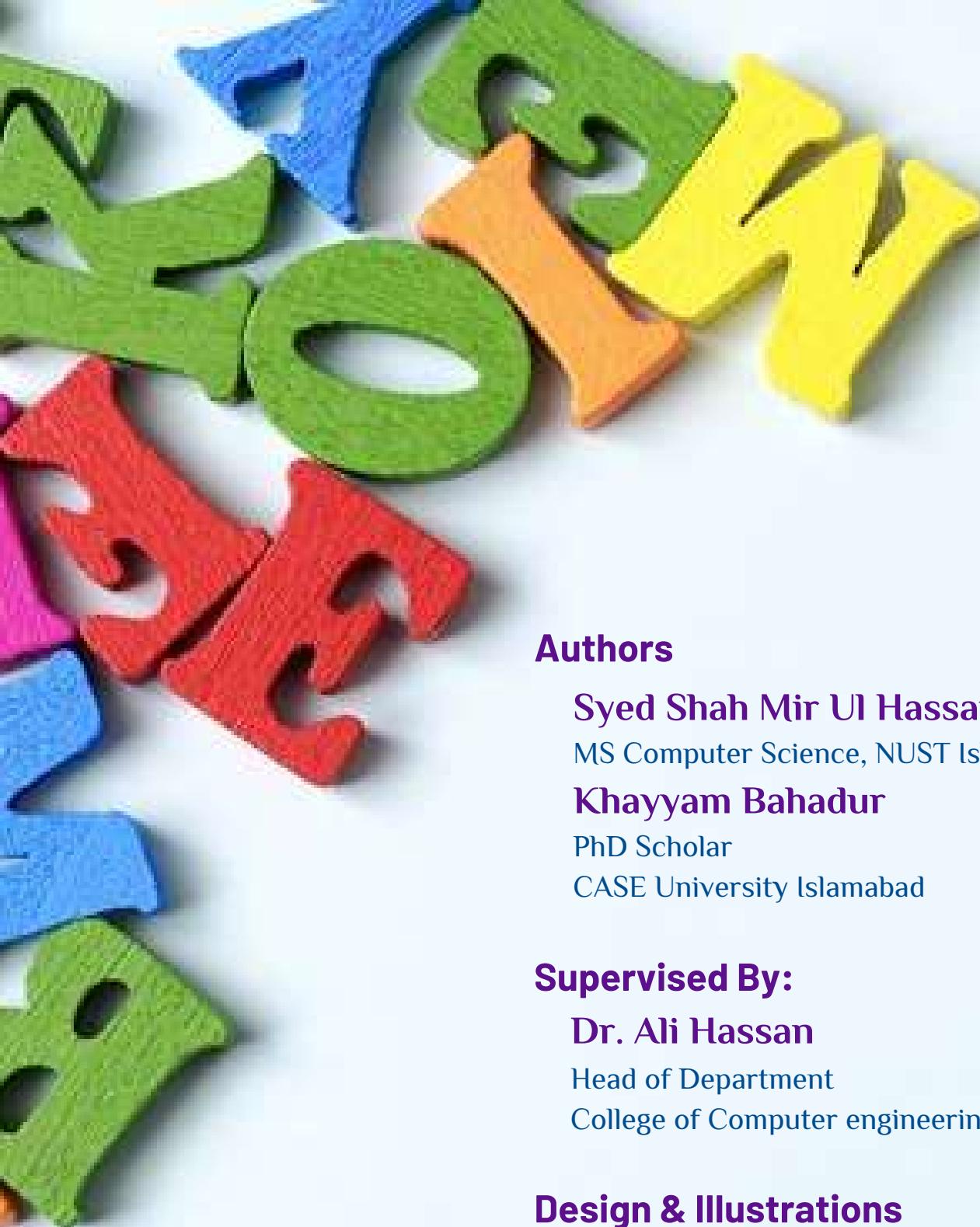
Book

2

KODER KIDS

Coding Explorations





Authors

Syed Shah Mir Ul Hassan

MS Computer Science, NUST Islamabad.

Khayyam Bahadur

PhD Scholar

CASE University Islamabad

Supervised By:

Dr. Ali Hassan

Head of Department

College of Computer engineering, NUST

Design & Illustrations

Syed Murtaza Mehdi

Senior Graphic Designer

Taiq Mohsin

Graphic Designer

Powered by:

KoderKids

Preface

Welcome again to **Koder Kids Book 2!**

Building on the foundational skills you developed in Book 1—such as exploring computers and hardware, introductory Scratch Jr coding, basic VEXcode VR movements, simple Python programs, PowerPoint presentations, web browsing, Canva designs, AI concepts, and electronics—this book takes you deeper into creative digital tools, advanced coding, robotics, and artificial intelligence. You will master pixel art with Pixilart, train AI models using Google Teachable Machine, create interactive games in Scratch, navigate obstacle courses with VEXcode VR, program with Python variables and input, generate AI images and audio, organize files in Google Drive, enhance designs in advanced Canva, build basic Arduino projects, automate tasks with n8n, and control physical robots using Scratch.

In Book 2, you will learn to plan and execute more interactive and complex projects, such as animated pixel stories, AI-trained recognition models, multi-scene games, sensor-based robot challenges, and automated workflows. You will practice problem-solving, logical thinking, and creativity, gaining the confidence to innovate and iterate on ideas. Each chapter includes class activities, home tasks, and mini-projects that empower you to bring concepts to life in engaging, hands-on ways.

We are thrilled to guide you through this next phase of your tech adventure.

Prepare for stimulating challenges and imaginative discoveries as you expand your expertise in coding, robotics, AI, and digital creation!



Table of Contents

Chapter 1: Mastering Pixel Art with Pixel Art

- 1.1 Understanding Pixel Art Basics
 - Class Activity 1 - Draw a Pixel Festival Icon
 - Home Activity 1
- 1.2 Making Pixel Art Move: Simple Animations
 - Class Activity 2 - Animate Your Pixel Icon
 - Home Activity 2
- 1.3 Building Pixel Scenes and Characters
 - Class Activity 3 - Create a Pixel Scene
- 1.4 Designing a 5-Panel Pixel Story
 - Class Activity 4 - Build a 5-Frame Pixel Story
- Chapter 1 Summary and Pixel Art Challenge!

Chapter 2: Teaching AI with Google Teachable Machine

- 2.1 Understanding How AI "Learns"
 - Class Activity 1 - Collect Examples for AI
 - Home Activity 1
- 2.2 Training and Testing Your AI
 - Class Activity 2 - Train and Test Your AI Model
 - Home Activity 2
- 2.3 Using Sound and Pose for AI
 - Class Activity 3 - Create a Sound or Pose Model
- 2.4 Building Your Own AI Invention Plan
 - Class Activity 4 - Plan Your AI Invention
- Chapter 2 Summary and AI Challenge!

Chapter 3: Scratch: Beginning to Code

- 3.1 Introduction to Scratch Interface
 - Class Activity 1 - Move the Scratch Cat
 - Home Activity 1
- 3.2 Creating Simple Animations
 - Class Activity 2 - Make the Cat Dance
 - Home Activity 2
- 3.3 Adding Interactions with Events
 - Class Activity 3 - Build a Clickable Greeting Card
 - Home Activity 3
- 3.4 Building a Mini-Game
 - Class Activity 4 - Create a "Catch the Mango" Game
- Chapter 3 Summary and Final Home Activity

Chapter 4: VEXcode VR: Exploring Obstacle Courses

- 4.1 Navigating an Obstacle Course
 - Class Activity 1 - Program a Robot Path
 - Home Activity 1
- 4.2 Using Loops to Repeat Actions
 - Class Activity 2 - Loop a Robot Movement
 - Home Activity 2
- 4.3 Using Sensors to Avoid Obstacles
 - Class Activity 3 - Avoid Obstacles with Sensors
 - Home Activity 3
- 4.4 Creating a Robot Challenge
 - Class Activity 4 - Code a Maze Challenge
- Chapter 4 Summary and Final Home Activity



Table of Contents

Chapter 5: Python: Variables and Input

- 5.1 Introduction to Variables in Python
 - Class Activity 1 - Create a Number Variable
 - Home Activity 1
- 5.2 Using input() to Get User Input
 - Class Activity 2 - Ask for a Name
 - Home Activity 2
- 5.3 Writing Programs with Variables and Input
 - Class Activity 3 - Create a Food Program
 - Home Activity 3
- 5.4 Creating a Simple Quiz Program
 - Class Activity 4 - Build a Quiz Game
 - Home Activity 4

Chapter 5 Summary and Final Home Activity

Chapter 7: Getting Started with Google Drive

- 7.1 Exploring Google Drive
 - Class Activity 1 - Create a School Folder
 - Home Activity 1
- 7.2 Creating File in Google Drive
 - Class Activity 2 - Make a Story File
 - Home Activity 2
- 7.3 Organizing File in Folders
 - Class Activity 3 - Organize a File
 - Home Activity 3
- 7.4 Editing Files in Google Drive
 - Class Activity 4 - Edit Your Story File
 - Home Activity 4
- 7.5 Deleting Files Safely
 - Class Activity 5 - Delete a Test File
 - Home Activity 5
 - Class Activity 6 - Delete and Restore a file
 - Home Activity 6

Chapter 7 Summary and Final Home Activity

Chapter 6: AI for Image Creation

- 6.1 Exploring AI Image Tools
 - Class Activity 1 - Create a Camel Image
 - Home Activity 1
- 6.2 Adding Details to Prompts
 - Class Activity 2 - Create a Bird Image
 - Home Activity 2
- 6.3 Creating Scenes with AI
 - Class Activity 3 - Create a Festival Scene
 - Home Activity 3
- 6.4 Complex Prompts for Big Ideas
 - Class Activity 4 - Create a Superhero Scene
 - Home Activity 4

Chapter 6 Summary and Final Home Activity

Chapter 8: Advanced Digital Art with Canva

- 8.1 Revisiting Canva Basics
 - Class Activity 1 - Create an Art Show Poster
 - Home Activity 1
- 8.2 Exploring Advanced Canva Features
 - Class Activity 2 - Create an Invitation Card
 - Home Activity 2
- 8.3 Creating Animations in Canva
 - Class Activity 3 - Design an Animated Post
 - Home Activity 3
- 8.4 Designing Presentations
 - Class Activity 4 - Create a 3-Slide Presentation
 - Home Activity 4
- 8.5 Collaborative Design Projects
 - Class Activity 5 - Design a Newsletter

Chapter 8 Summary and Final Home Activity



Table of Contents

Chapter 09: Introduction to Arduino Basics

- 9.1 Exploring Arduino Hardware
 - Class Activity 1 - Explore the Arduino Kit
 - Home Activity 1
- 9.2 Setting Up the Arduino Software
 - Class Activity 2 - Setup the Software
 - Home Activity 2
- 9.3 Making an LED Blink
 - Class Activity 3 - Blink an LED
 - Home Activity 3
- 9.4 Building a Simple Circuit
 - Class Activity 4 - Build an LED Circuit
 - Home Activity 4

Chapter 09 Summary

Chapter 10: AI for Audio Creation

- 10.1 Exploring AI Audio Tools
 - Class Activity 1 - Create a Simple Melody
 - Home Activity 1
- 10.2 Designing Sound Effects
 - Class Activity 2 - Create a Kite Sound Effect
 - Home Activity 2
- 10.3 Creating a Short Song with AI
 - Class Activity 3 - Create a Festival Song
 - Home Activity 3
- 10.4 Building an Audio Project
 - Class Activity 4 - Create a Market Sound Story
 - Home Activity 4
- 10.5 Create a Podcast Intro
 - Class Activity 5 - Design a Podcast Intro
 - Home Activity 5

Chapter 10 Summary and Final Home Activity

Chapter 11: Making Computers Work Together with n8n

- 11.1 Understanding "Triggers" and "Actions"
 - Class Activity 1 - Identify Triggers and Actions
 - Home Activity 1
- 11.2 Building Simple Computer Chains (Workflows)
 - Class Activity 2 - Draw Your First Computer Chain
 - Home Activity 2
- 11.3 Connecting Different Computer "Tools" (Apps)
 - Class Activity 3 - Imagine Connecting Your Favorite Apps
- 11.4 Planning a 5-Step Computer Automation Project
 - Class Activity 4 - Plan Your Automation Invention

Chapter 11 Summary and Automation Challenge!

Chapter 12: Getting Started with M3D GO Robotics

- 12.1: Exploring the M3D GO Kit
 - Class Activity 1: Unpack, Identify, and Attach Kit Parts
 - Home Activity 1
- 12.2: Setting Up and Connecting the Robot
 - Class Activity 2 - Connect and Verify Your Robot Setup
 - Home Activity 2
- 12.3 Introduction to Basic Robot Activities
 - Class Activity 3: Free Robot Movements and Exploration
 - Home Activity 3

Chapter 12 Summary and Final Home Activity



CHAPTER 1:

Mastering Pixel Art with Pixilart

Welcome to Pixel Art Magic!

Get ready to create awesome digital art!

In Book 1, you learned simple drawing using paint.

Now, you'll learn how to make amazing pictures and even animations using tiny colored squares called pixels. We'll use a cool website called Pixilart to make your art shine.

Let's get started!

What is Pixel Art?

It's a special kind of digital drawing where you use tiny squares of color.

Why Learn Pixel Art?

You can make fun characters, cool scenes, and even animations, just like in your favorite video games

Chapter Preview:

You'll draw with pixels, make art move, create scenes, and tell a story with your pixel art.

Instructions:

Ask an adult to open www.pixilart.com in a web browser on your computer.



1.1 Understanding Pixel Art Basics

Great pixel art looks neat and clear! You'll learn about pixels (the tiny squares!), choose your drawing size, and pick colors to make your art pop, just like the bold designs on a Pakistani truck art painting. Understanding these basics helps people understand your pixel art ideas.

Why Focus on Pixel Basics?

It makes your art interesting and easy to see.

Key Tip

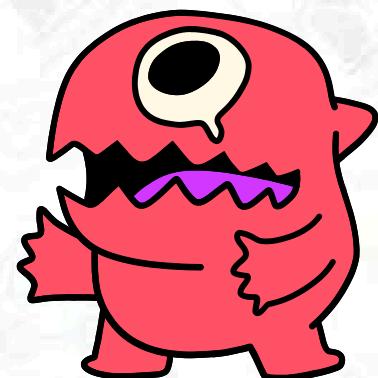
- Start with a small drawing area.
- Choose bright, clear colors.
- Every tiny square matters!

Fun Fact:

Many classic video games, like Super Mario were made with pixel art!



S U P E R



Class Activity Preview:

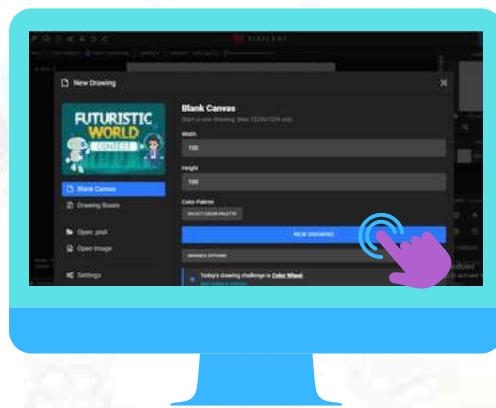
You'll create your first pixel drawing next.

Class Activity 1: Draw a Pixel Festival Icon

Let's make a tiny pixel drawing for a Pakistani festival! You'll choose a small drawing area and use colors to create a simple pixel icon.

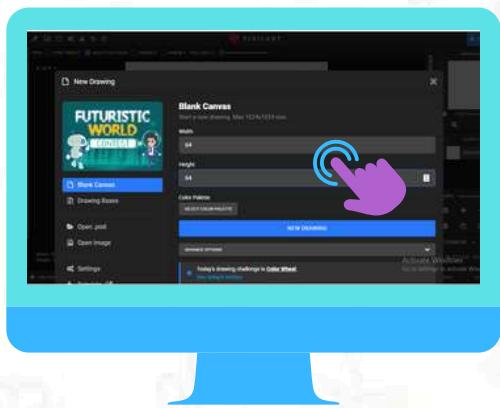
1 Step

Open Pixilart: Go to www.pixilart.com and click "Start Drawing" at the top of the page.



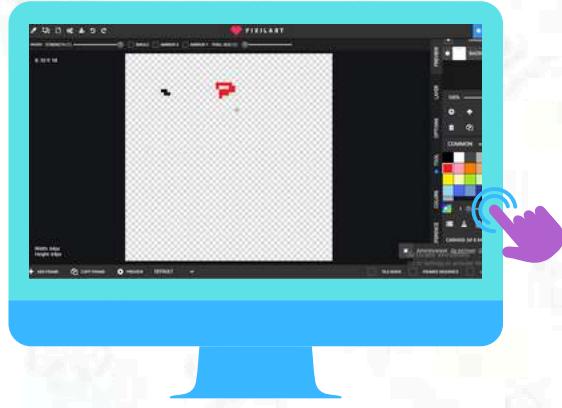
2 Step

Start a New Drawing: On the pop-up, choose a small size like 64x64 pixels (or a similar small size if 64x64 isn't a direct option, e.g., 50x50 or 32x32), then click "New Drawing."



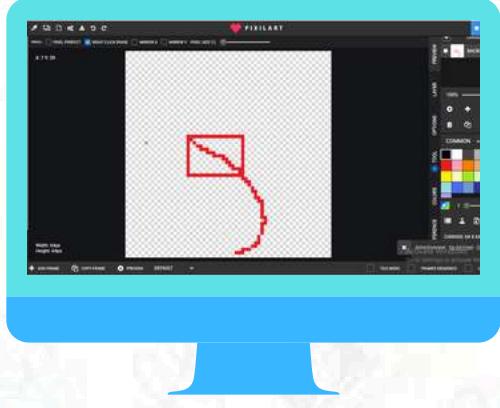
3 Step

Find Your Tools:
Look for the Pencil tool on the left side.
Choose a color from the right side (the color palette) similar to Paint.



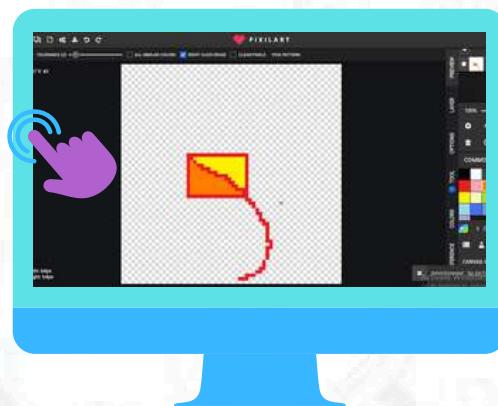
4 Step

Draw Your Icon: Carefully click tiny squares to draw a simple picture of a kite. Remember, it's pixel art, so it will look blocky!



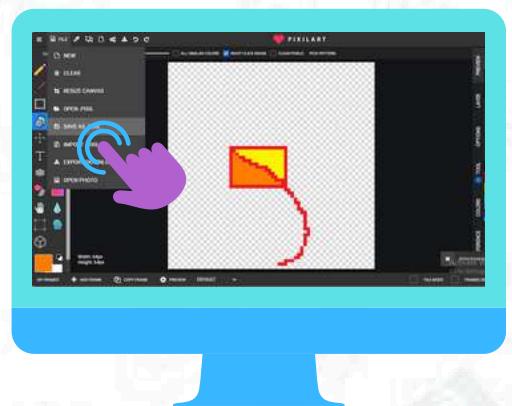
5 Step

Color It In: Select the Paint Bucket tool (it looks like a spilling bucket) and click inside your kite drawing to fill it with color.



6 Step

Save: Click the "File" menu (usually at the top left, a small floppy disk icon or similar) and select "Save As .pixil". Name it "MyKite.pixil" and save it to your computer.



Challenge:

Change the color of your kite, or add a tiny string to it.

Home Activity 1:

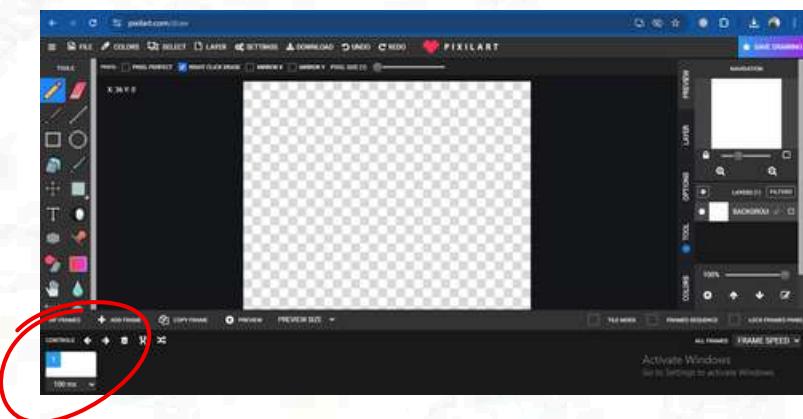
Design a pixel art icon for your favorite food (e.g., a small pixel biryani plate, a pixel samosa) with custom colors.

1.2 Making Pixel Art Move: Simple Animations

Animations make your pixel art come alive, like a dancing kite! In Pixilart, you create a series of drawings called frames, each slightly different. When you play them fast, it looks like movement! These tricks make your pixel art fun, like coding animations in Scratch (Chapter 3).

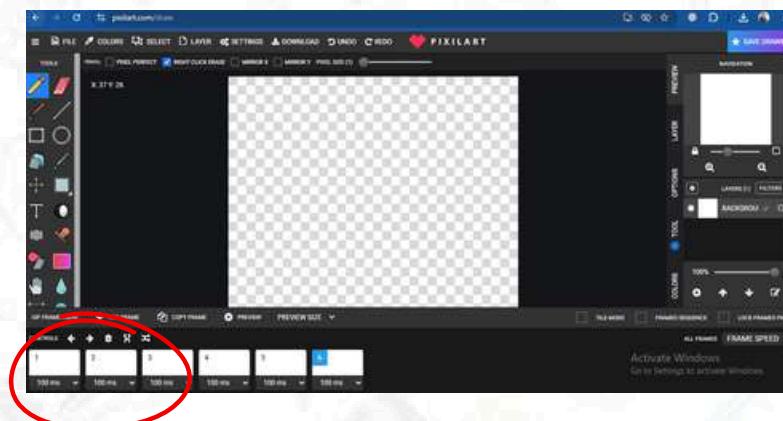
What's Frame?

It's one single picture in a sequence that makes up an animation.



What's Animation in Pixilart?

Drawing a little bit differently on each frame to show something moving or changing.



Class Activity Preview:

You'll animate your pixel art next.

Parent Tip:

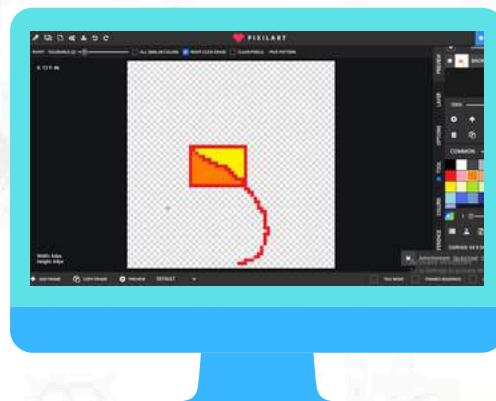
Watch your child's pixel animations and cheer them on!

Class Activity 2: Animate Your Pixel Icon

Let's make your pixel kite dance! You'll add frames and make small changes to create a simple animation, building on your festival icon.

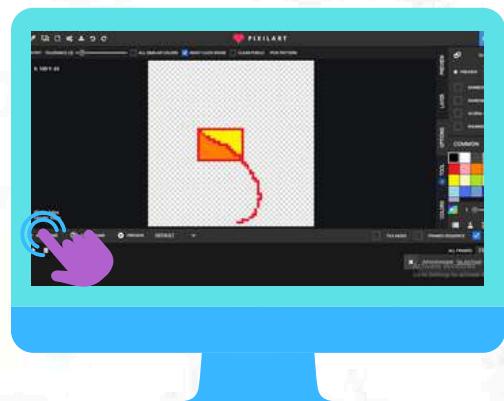
1 Step

Open your Pixilart project. Go to www.pixilart.com. Click "File" > "Open .pixel" and open your "MyKite.pixel" file.



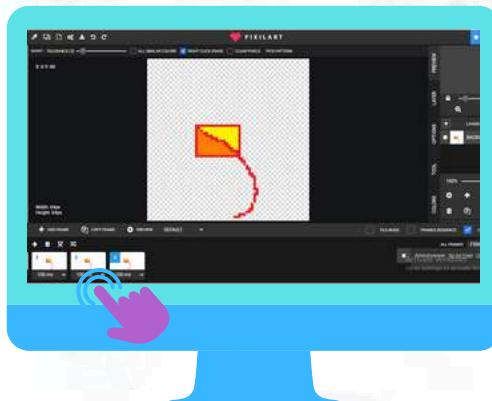
2 Step

Go to the Gif Frames file at bottom of the screen



3 Step

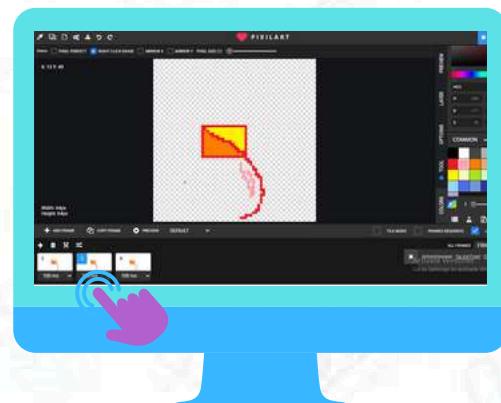
Duplicate Frames: You'll see "Frame 1." Click the "+" button or "Duplicate Frame" icon to add "Frame 2" that looks exactly like Frame 1. Do this a few times until you have 3 or 4 frames.



4 Step

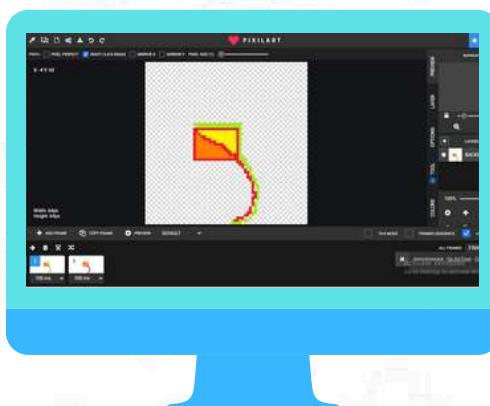
Make Changes:

- Click on Frame 2. Use the Pencil tool or Eraser to make a tiny change to your kite (e.g., make the string wiggle a little, or change a color slightly).
- Click on Frame 3. Make another tiny change.



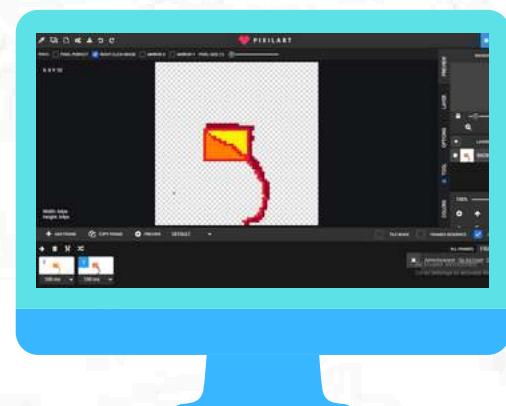
5 Step

Play Animation: Click the "Preview" button to see your kite move!



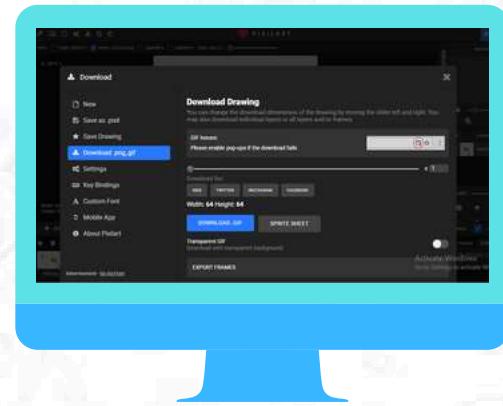
6 Step

Adjust Speed: If it's too fast or too slow, change the "FPS" (Frames Per Second) number bottom of the frame. A smaller number (like 100ms) makes it slower.



7 Step

Save as GIF: Click the "File" menu again, then "Export". Choose "Animated GIF" and click "Download." Name it "Animatedkite.gif" and save it.



Challenge:

- Make your kite animation loop smoothly by making the last frame almost match the first frame.

Home Activity 2

Copy a paint drawing file to a new folder called "My Art."

1.3 Building Pixel Scenes and Characters

Keyboard shortcuts make organizing faster, like a magic trick! Instead of right-clicking, use keys to cut, copy, or undo, speeding up your work like in PowerPoint (Chapter 1).

Why Build Scenes/Characters?

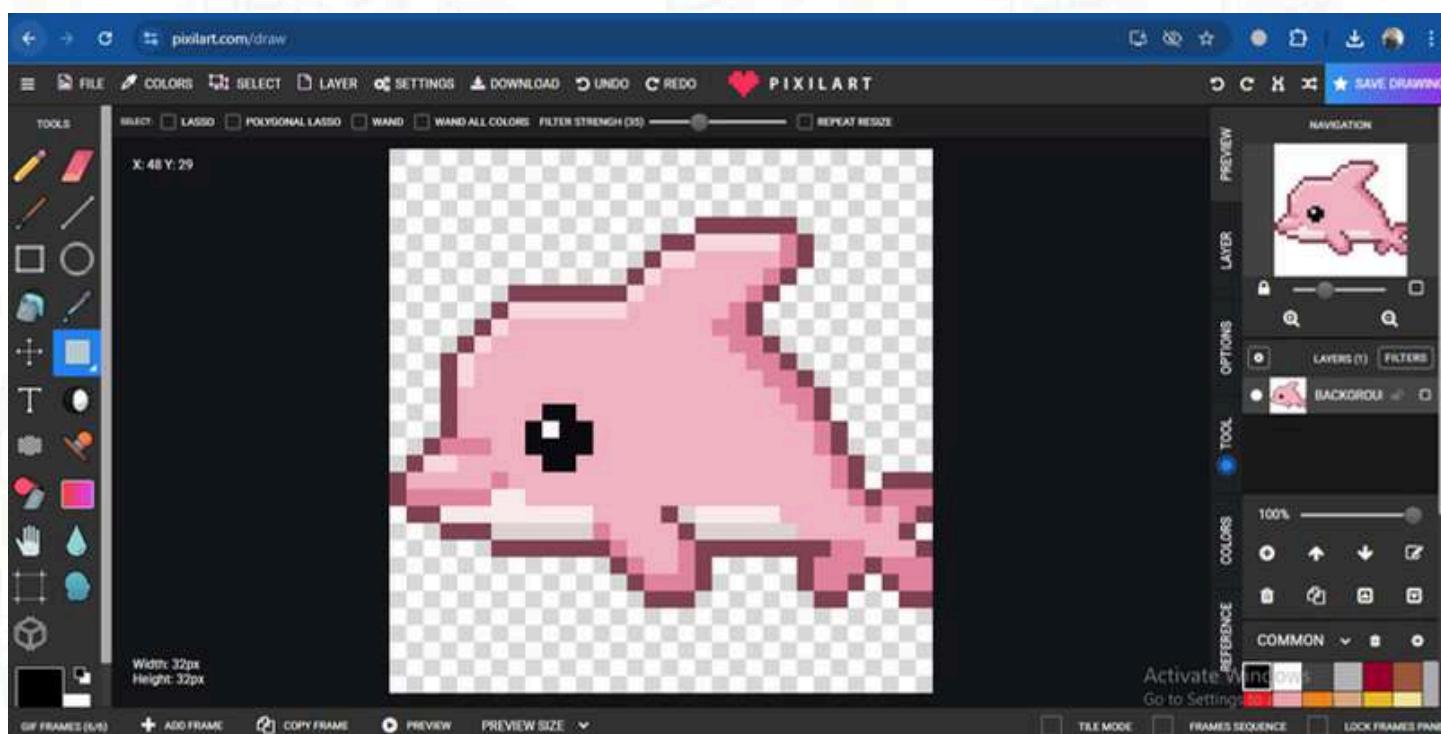
It makes your pixel art lively and fun, like designing your own game world!

Example:

You can draw a pixelated version of your school, or a tiny pixel robot exploring a city.

Class Activity Preview:

You'll draw a small pixel scene or character next.



DIY Idea:

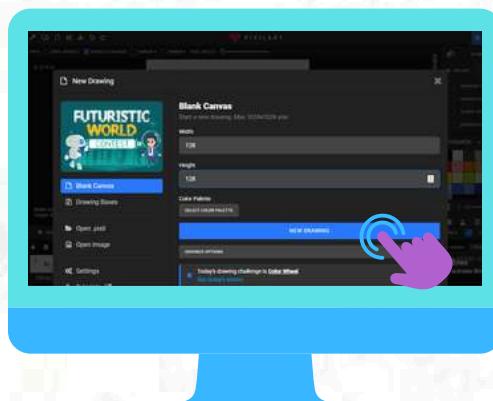
Draw a pixelated version of your own house or favorite street of village.

Class Activity 3 - Create a Pixel Scene

Let's make your pixel art world bigger! You'll draw a small scene or a simple character, combining different pixel art elements.

1 Step

Open Pixilart: Go to www.pixilart.com and click "Start Drawing."



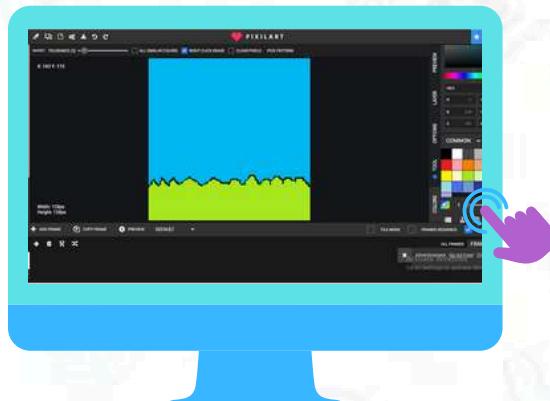
2 Step

Start a New Drawing: Choose a slightly larger canvas size, like 128x128 pixels. Click "New Drawing."



3 Step

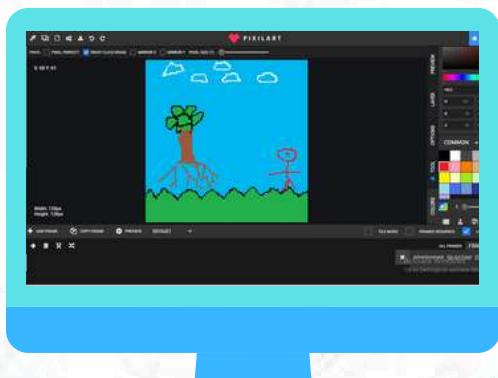
Draw a Background: Use the Pencil and Paint Bucket tools to create a simple background, like a blue sky and green grass.



4 Step

1. Add Elements:

- Draw a pixelated tree (a brown trunk and green leaves).
- Draw a small pixel cloud in the sky.
- Try drawing a simple pixel character (like a stick figure or a small robot).



5 Step

Use Different Colors: Experiment with different colors from the palette to make your scene vibrant.



6 Step

Save: Click "File" > "Save As .pixel" and name it "MyPixelScene.pixel."



Challenge:

Can you add your animated pixel kite from Activity 2 into this scene? (You might need to copy and paste parts of your kite or redraw it here!)

1.4 Designing a 5-Frame Pixel Story

Now combine all your amazing pixel art skills to tell a short story! You'll create 5 different pixel art pictures, like a mini-comic book or storybook, using your designs and maybe even little animations. This is like planning a whole story.

What's a Pixel Story

It's a series of pixel art drawings that tell a simple tale or show a sequence of events.

Example:

A story about a pixel character meeting a friend, or a day at a pixel festival!

Class Activity Preview:

You'll build a 5-panel pixel story next.

Parent Tip:

Tell a pixel story with your child at home!

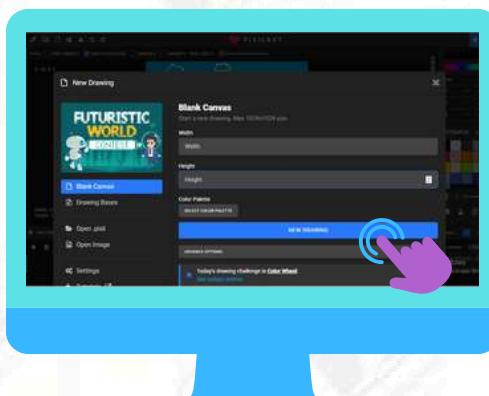


Class Activity 4 - Build a 5-Panel Pixel Story

Let's create a 5-panel story about a topic you like! You'll use all your Pixilart skills to make it awesome.

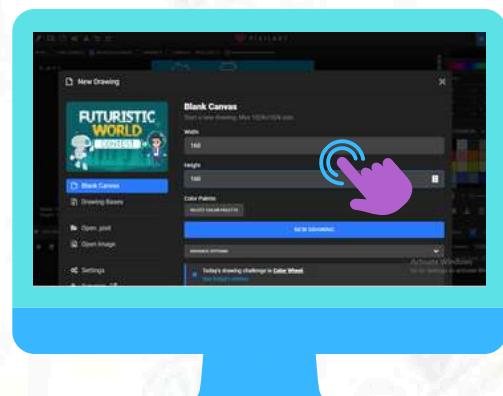
1 Step

Open Pixilart: Go to www.pixilart.com and click "Start Drawing."



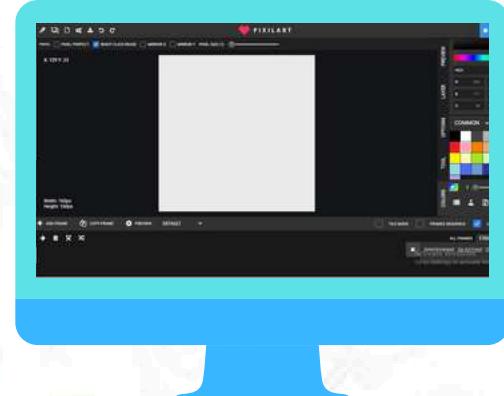
2 Step

Start a New Drawing: Choose a canvas size like 160x160 pixels.



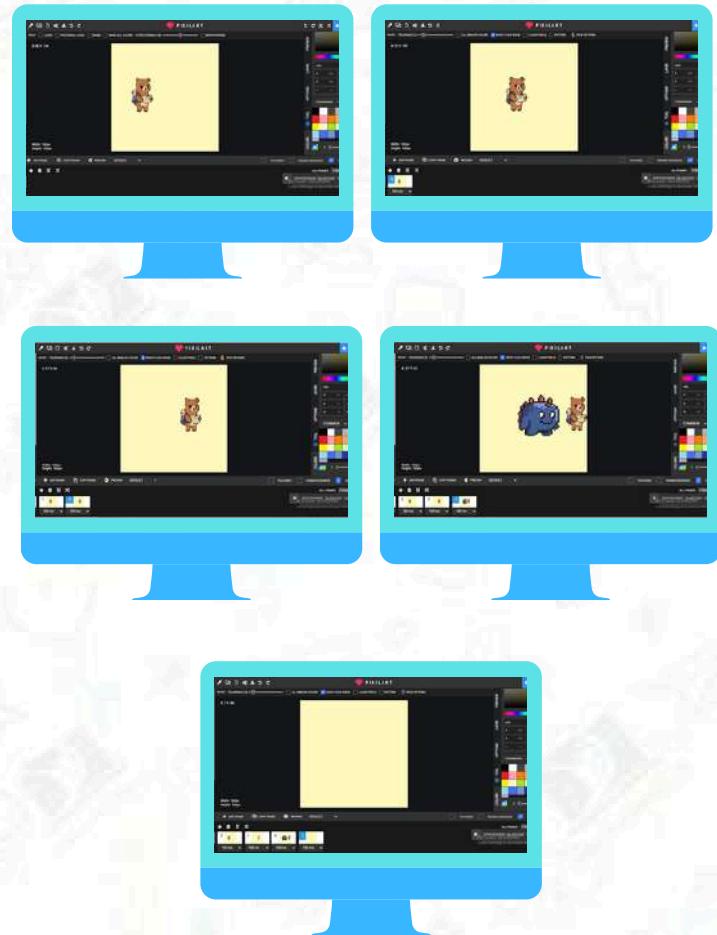
3 Step

Plan Your Story: Think of a simple story with a beginning, middle, and end.

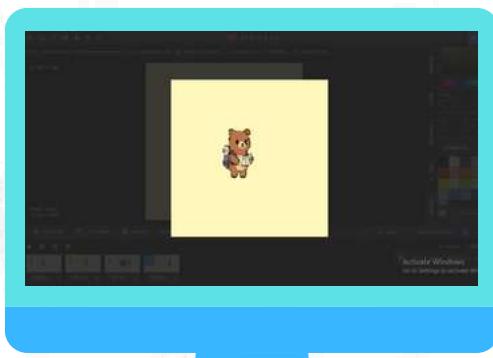


4**Step****1. Create Your Panels:**

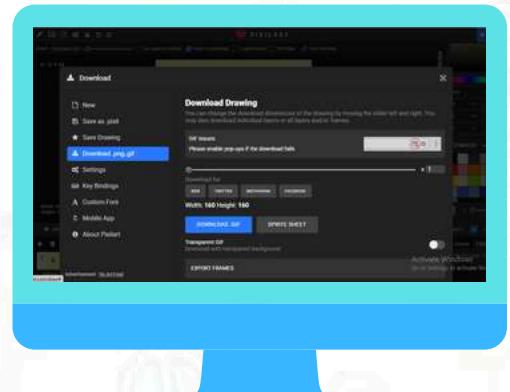
- Panel 1 (Frame 1): Draw the beginning of your story (e.g., a character standing in a field).
- Panel 2 (Frame 2): Click the "copy frame" button in the animation section to duplicate the frame. Draw the next part of your story (e.g., the character starting to walk).
- Panel 3 (Frame 3): copy frame. Draw the middle part (e.g., the character sees something interesting).
- Panel 4 (Frame 4): Copy frame. Draw a new event or a challenge (e.g., a pixel monster appears!).
- Panel 5 (Frame 5): Copy frame. Draw the ending (e.g., the character runs away or solves the problem).

**5****Step**

Play Your Story: Click the "Play" button in the animation section to see your story unfold! Adjust the FPS if needed.

**6****Step**

Save as GIF: Click "File" > "Export" > "Animated GIF." Name it "MyPixelStory.gif" and save it.

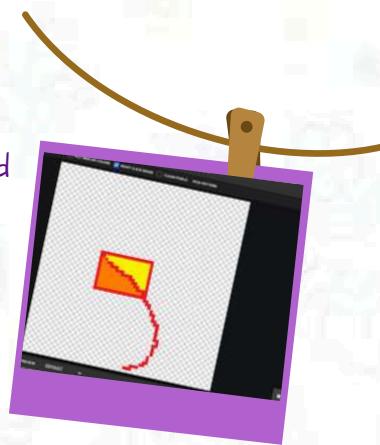
**Challenge:**

Add a tiny pixel detail related to Pakistan in your story, like a small pixel flag or a pixel chai cup.

Chapter 1 Summary and Pixel Art Challenge!

You're a Pixel Art Pro! You:

- 1.1** Understood pixel art basics and drew your first icon.



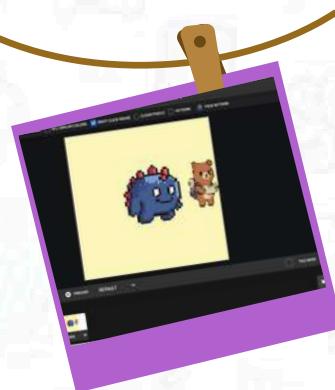
- 1.2** Added animations to make your pixel art move.



- 1.3** Built pixel art scenes and characters.



- 1.4** Created a 5-panel pixel story!



Home Activity 3: Make a Festival Folder

Create a pixel art picture about your family or a pixelated scene of your favorite family activity (e.g., a pixel picnic, a pixel game night, or a pixel picture of your family in traditional Pakistani clothes). Save it as a .pixil file or export it as a .png image.

Homework:

Present your family pixel art to your parents and tell them the story behind it!

CHAPTER 2:

Teaching AI with Google Teachable Machine

Welcome to AI Magic!

Get ready to meet Artificial Intelligence (AI)!

In Book 1, you learned how to code simple games. Now, you'll learn how to teach computers to be smart using a tool called Google Teachable Machine.

You'll teach machine to recognize things, sounds, or even your movements, just like a smart robot!

- **What is AI?**

- It's like making computers smart so they can learn and do amazing things, like recognize faces or understand your voice.

- **Why Learn AI?**

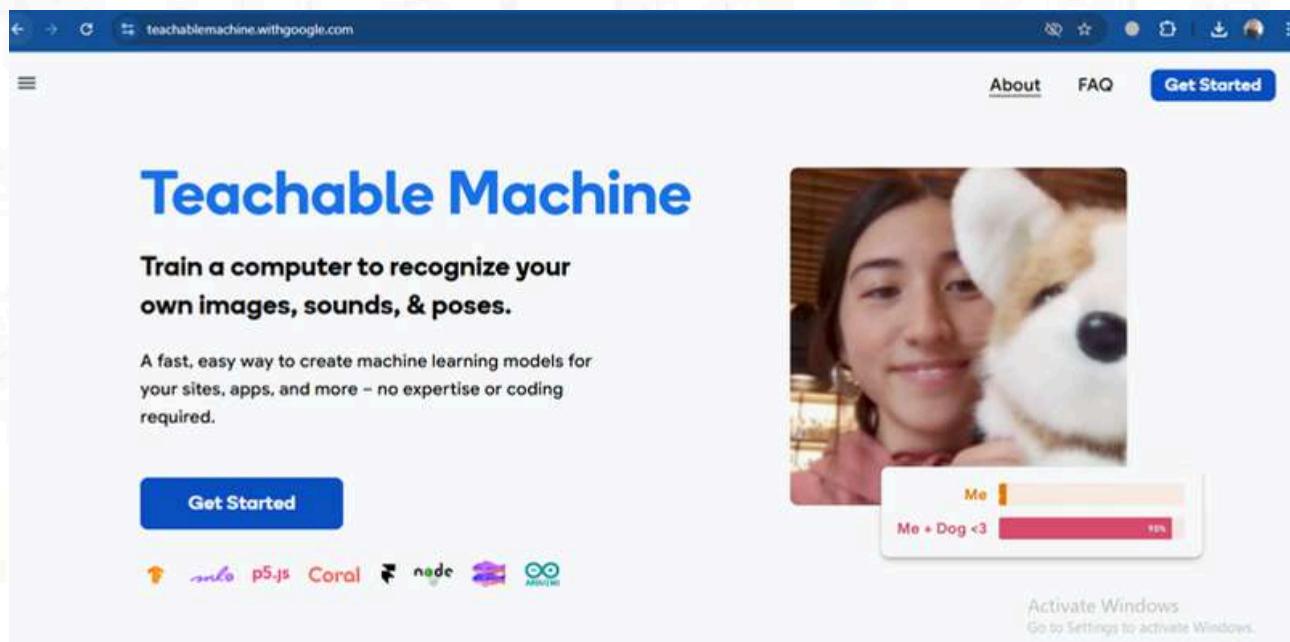
- Create exciting projects, like a festival story!

- **Chapter Preview:**

- You'll collect examples, train AI, try different types of AI, and plan your own AI project

- **Instructions:**

- Ask an adult to open Google Teachable Machine in a web browser on your computer. (Search for "Google Teachable Machine").



2.1 Understanding How AI "Learns"

Great AI models learn from good examples! Imagine teaching a new trick to a pet - you show them what to do clearly. AI works similarly: you give it many examples so it can learn patterns. We call these examples "data." The better your examples, the smarter your AI will be, like preparing all the right ingredients for a delicious Pakistani dish! Good examples help AI understand your ideas.

Great slides look neat and professional! You'll customize layouts, add colors, and choose fonts to make your slides pop, like a poster for a festival. Good design helps people understand your ideas.

Why Focus on Examples?

It makes your AI smart and accurate.

Key Tips:

Use clear, different examples for what you want the AI to learn.

Fun Fact:

AI helps recommend videos or songs you might like online!



Class Activity Preview:

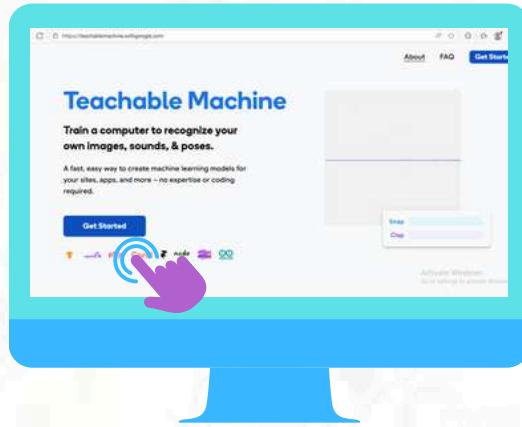
You'll collect examples for AI next.

Class Activity 1- Collect Examples for AI

Let's teach our AI to recognize something! You'll collect different examples to help your AI understand what you want it to learn, just like teaching it new words.

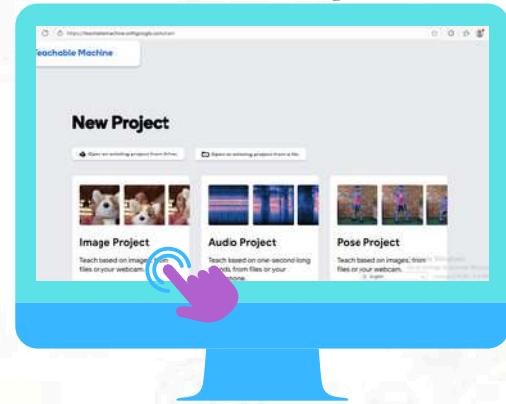
1 Step

Open Teachable Machine: In your web browser, go to teachablemachine.withgoogle.com and click "Get Started."



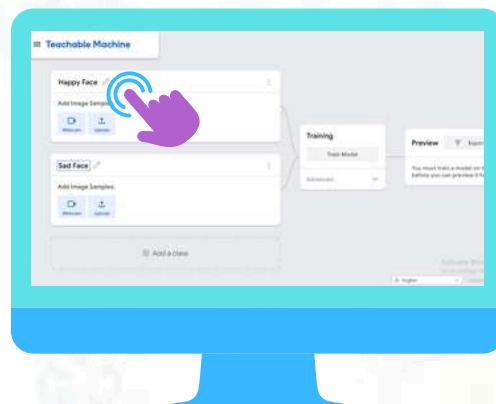
2 Step

Start a New Project: Click "Image Project." Select Standard Image Model.



3 Step

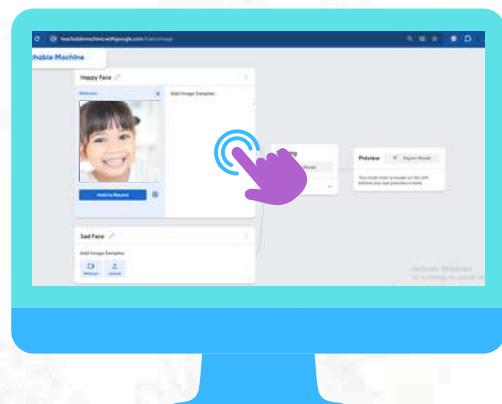
Create Classes: You'll see "Class 1" and "Class 2." Rename "Class 1" to "Happy Face" and "Class 2" to "Sad Face."



4 Step

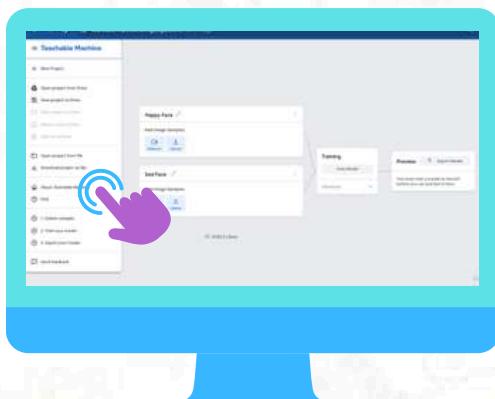
Add Examples:

- Click "Webcam" under "Happy Face." Make a happy face and click "Hold to Record" many times to capture at least 20 pictures.
- Click "Webcam" under "Sad Face." Make a sad face and click "Hold to Record" many times to capture at least 20 pictures.



5 Step

Save: Click the "File" menu (usually a small icon like three lines or a gear) and then "Download project." Name it "MyFacesAI" and save it. (You'll load it next time!)



Challenge:

Add a third class called "Surprised Face" and collect examples for it!

Home Activity 1:

Open your model, Add a third class called "Surprised Face" and collect examples for it!



2.2 Training and Testing Your AI

Once you have examples, it's time to train your AI! Training is when the computer looks at all your examples and learns from them. It's like studying for a big test! Then, you test your AI to see if it understood correctly. These steps make your AI smart and fun, just like practicing your coding in Scratch (Chapter 3).

What's Training?

AI looks at your examples again and again to find patterns and learn. AI looks at your examples again and again to find patterns and learn.

What's Testing?

You show new things to your AI to see if it can guess what they are based on what it learned.

Class Activity Preview:

You'll train your AI and test it next.

Parent Tip:

Watch your child train their AI and help them test it with different examples!

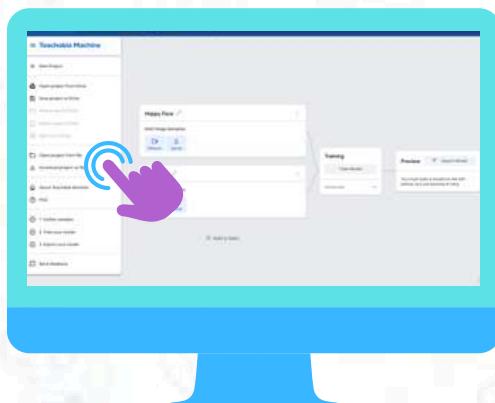


Class Activity 2: Train and Test Your AI Model

Let's make your AI smart! You'll train the model you created and then test it to see if it can guess correctly.

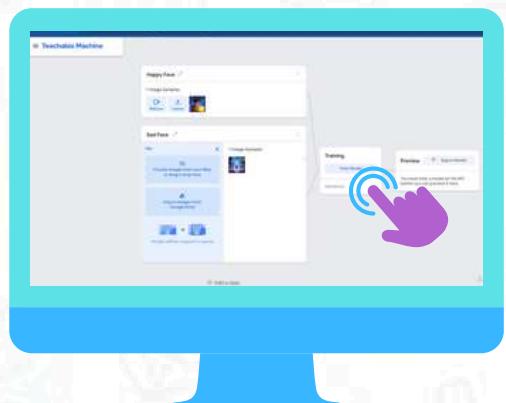
1 Step

Open your project: Go to teachablemachine.withgoogle.com, click "Get Started," then "Image Project." Click the "File" menu (top left) and "Open project from computer" to load your "MyFacesAI" file.



2 Step

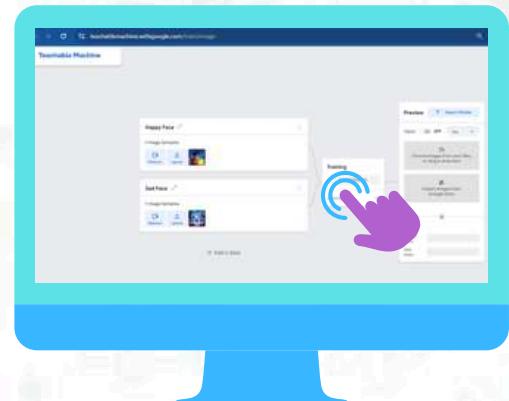
Train your AI: Click the big blue button that says "Train Model." Wait for it to finish - it might take a minute!



3 Step

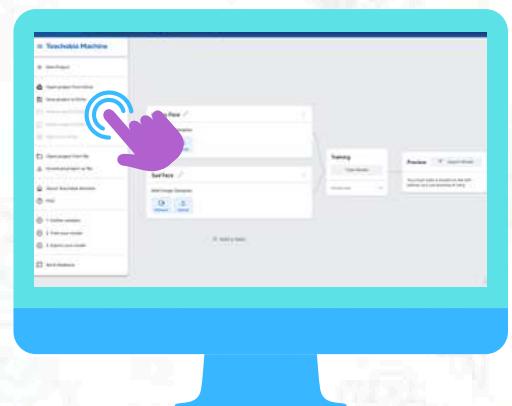
Test your AI:

- Once training is done, look at the "Preview" section on the right. Make a happy face. Does the "Happy Face" bar go up?
- Now make a sad face. Does the "Sad Face" bar go up?
- Try a silly face! What does the AI guess?



4 Step

Save: Remember to save your project again by clicking "File" > "Download project" to update your changes.



Challenge:

Test your AI with a very serious face or a confused face. What does it guess? Can you make it guess wrong on purpose?



Home Activity 2:

Use your "MyFacesAI" project from before. Can you train it even better by adding more examples of happy and sad faces? Test it with new family members!

2.3 Using Sound and Pose for AI

AI isn't just about pictures! It can also learn from sounds and body movements (called "poses"). Adding different types of information makes your AI super exciting and engaging, like adding sounds in Scratch (Chapter 3) or Tynker (Chapter 9)! You'll try this next!

Why Add Different Media?

AI can understand and react to different kinds of information around us.

Example:

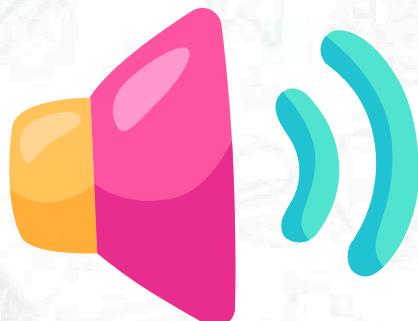
Make an AI that recognizes if you clap your hands or if your arms are raised.

Class Activity Preview:

You'll create a sound or pose model next.

DIY Idea:

Record your own short sound, like a "hello" or a funny noise, for the AI to recognize!

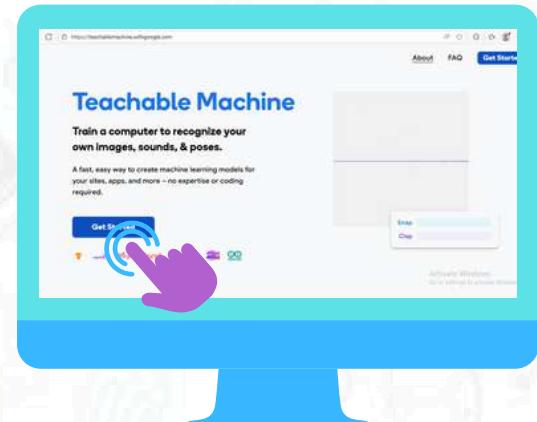


Class Activity 3- Create a Sound or Pose Model

Let's make your AI listen or watch your movements! You'll add an audio clip or teach a pose to your AI, building on your learning.

1 Step

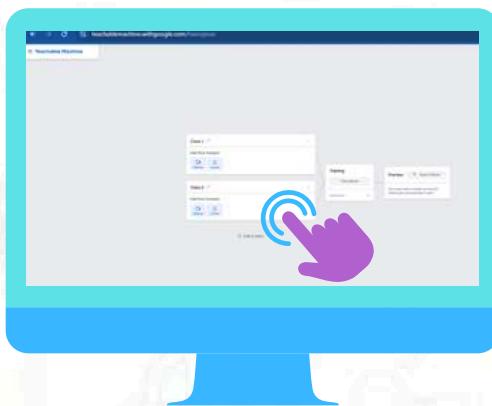
Open Teachable Machine: Go to teachablemachine.withgoogle.com and click "Get Started."



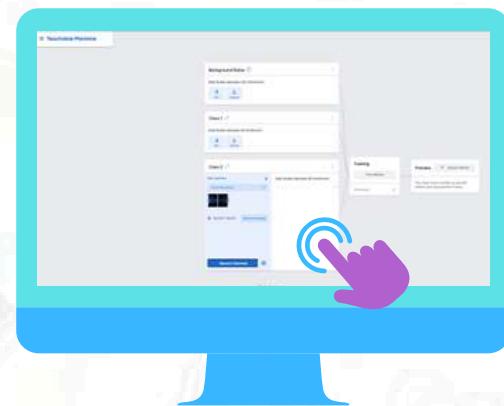
2 Step

Choose a New Project Type:

- Sound: Click "Audio Project." Rename "Class 1" to "Clap" and "Class 2" to "No Sound." Record many claps for "Clap" and record quiet sounds for "No Sound."
- Pose: Click "Pose Project." Rename "Class 1" to "Arms Up" and "Class 2" to "Arms Down." Stand up and use your webcam to capture pictures with your arms up and arms down.



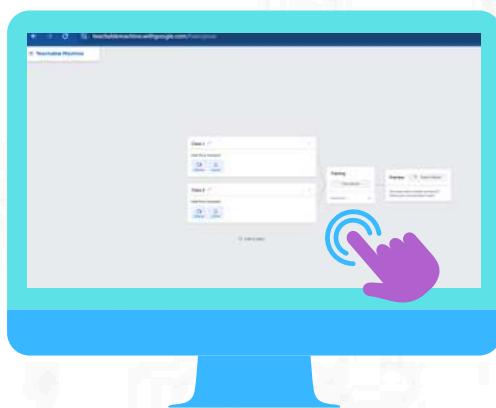
For Pose



For Sound

3 Step

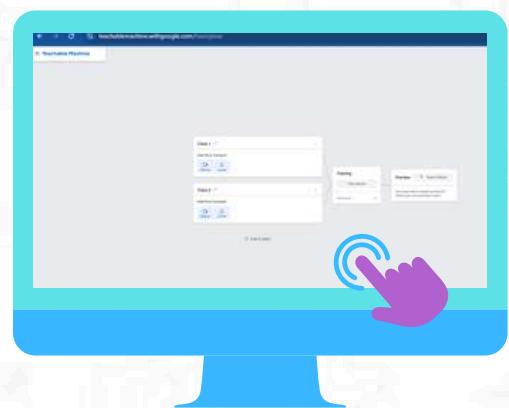
Train Model: Click "Train Model."



4 Step

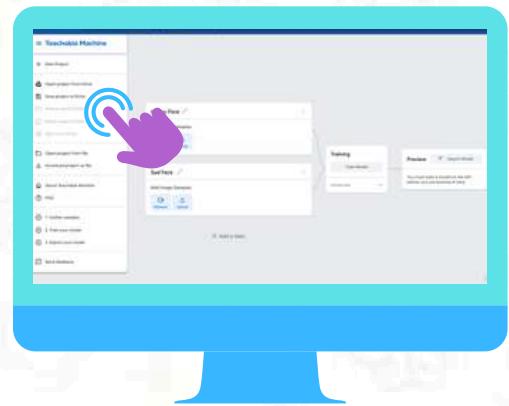
Test Model:

- If Audio: Clap your hands! Does the "Clap" bar go up?
- If Pose: Put your arms up or down! Does the AI guess correctly?



5 Step

Save: Click "File" > "Download project." Name it "MySoundAI" or "MyPoseAI."



Challenge:

Add a third sound (e.g., a "Whistle") or a third pose (e.g., "Sitting") to your project.

2.4 Building Your Own AI Invention Plan

Now it's time to combine your skills and plan your own AI invention! You'll create a simple plan for an AI project about a topic you love, using ideas about examples, training, and different types of AI data. This is like outlining a story before you write it, especially for sharing your ideas on Google Drive (Chapter 7).

What's an AI Project?

It's a creative way to use AI to solve a small problem or make something fun and interactive.

Example:

An AI that guesses if you're holding a fruit or a vegetable, or an AI that reacts to a specific sound you make!

Class Activity Preview:

You'll build a 5-step plan for your own AI invention next.



Parent Tip:

Brainstorm cool AI ideas with your child at home!

Class Activity 4 : Plan Your AI Invention

Let's create a 5-step plan for an amazing AI invention you can build! You'll use all your Teachable Machine skills to make it awesome.

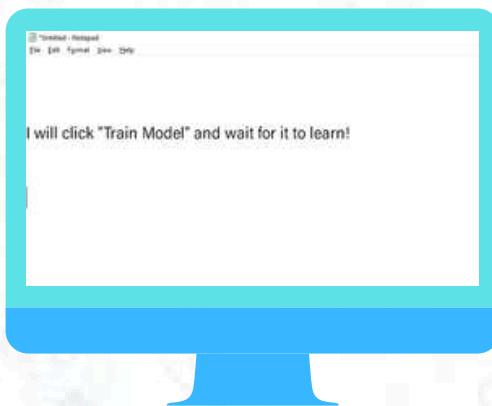
Get Ready:

Open a blank document (like Google Docs or a simple text editor) or grab a piece of paper and a pencil.

1 Step

The Idea! What will your AI guess or do? Write down your cool idea!

- Example: My AI will guess if I am holding a red object or a blue object.



2 Step

The Examples! What examples (pictures, sounds, or poses) will you give your AI so it can learn?

- Example: I will show it many red toys and many blue toys.



3 Step

The Teach! How will you teach your AI? (Hint: Think about "Train Model"!)

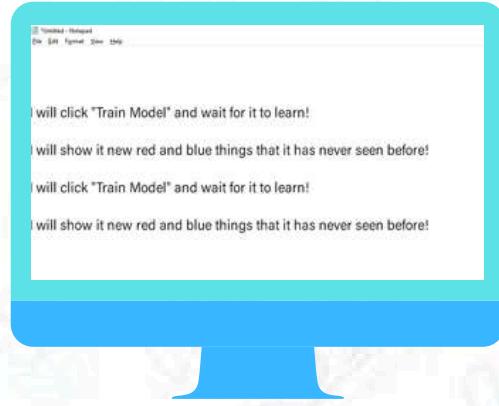
- Example: I will click "Train Model" and wait for it to learn!



4 Step

The Test! How will you know if your AI is smart and guesses correctly?

- Example: I will show it new red and blue things that it has never seen before!



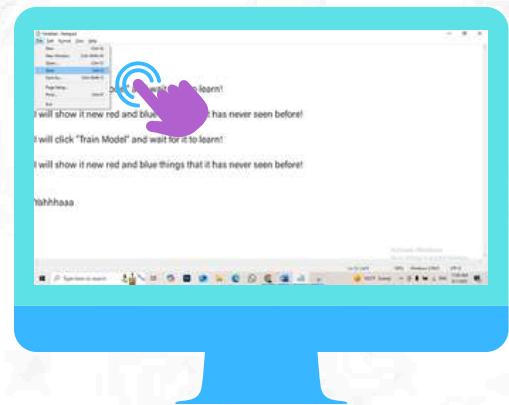
5 Step

The Fun! What cool thing can your AI do once it's smart?



6 Step

Save your document as "MyAIPlant.txt" or keep your paper safe!



“

Challenge:

Add a detail about how your AI could help someone or make a game even more fun! Example: "My AI could help sort recycling by guessing if an item is plastic or paper!"

”

Home Activity 3:

Create a simple Teachable Machine project to recognize something fun related to your family!

- Idea 1: An AI that guesses if it sees a picture of a "Toy Car" or a "Book" from your house.
- Idea 2: An AI that recognizes two different sounds you and a family member can make (e.g., your clap vs. your parent's snap).
- Idea 3: An AI that recognizes two different poses you and a sibling can do.

Chapter 2 Summary

You're a PowerPoint pro! You:

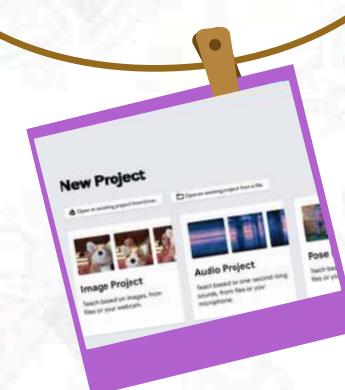
- 1.1** Learned how AI "learns" from examples.



- 1.2** Trained and tested your very first AI models.



- 1.3** Explored different types of data like sound and pose.



- 1.4** Planned your own awesome AI invention!



Homework:

Show your family AI project or your AI invention plan to your parents and explain how it works!

CHAPTER 3:

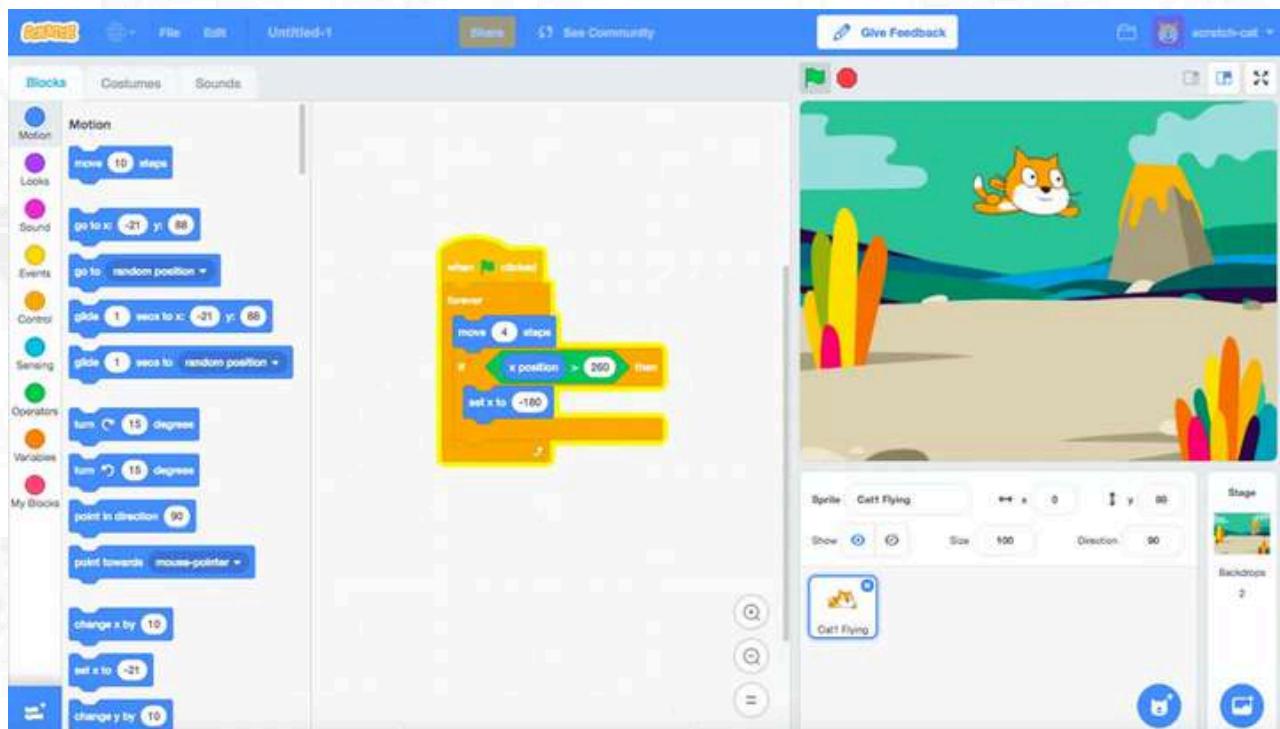
Scratch: Beginning to Code

Welcome to Scratch!

Scratch is a fun way to create stories, games, and animations by coding!

Unlike Scratch Jr from Book 1, Scratch 1 has more blocks for bigger projects. Let's start your coding adventure with the Scratch Cat!

- What is Scratch?
A free website where you drag blocks to code, like building with LEGO.
- Why Scratch? It helps you think like a coder and create cool projects!
- Chapter Preview: You'll learn the Scratch interface, animate a cat, make an interactive card, and build a game.



3.1 Introduction to Scratch Interface

The Scratch workspace is your coding playground! The Stage shows your project. Sprites are characters, like the Scratch Cat. The Blocks Palette has coding blocks to drag. Let's explore!

Key Parts:

Stage: Where your project plays.

Sprite List: Shows your characters.

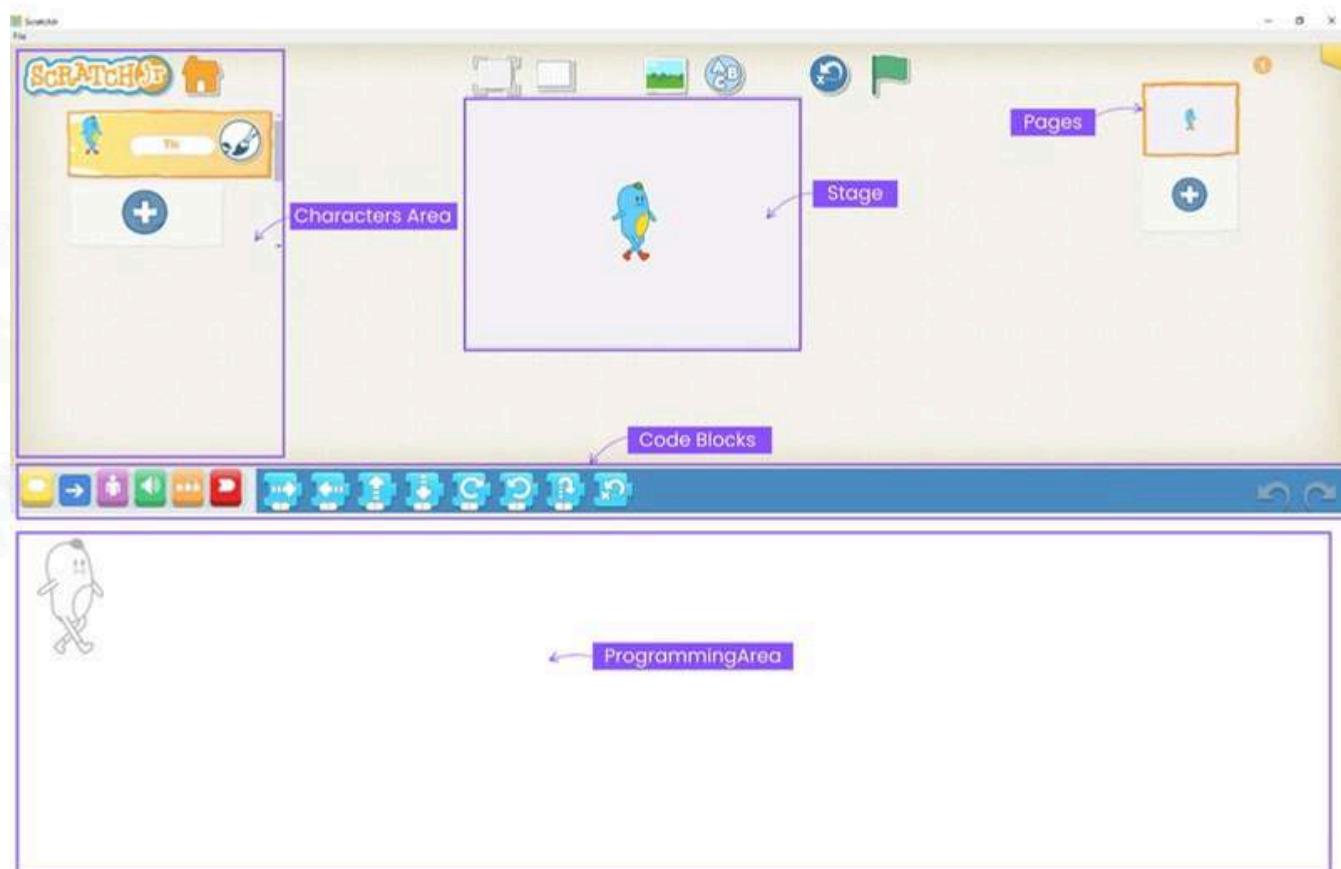
Blocks Palette: Has Motion, Looks, Events blocks.

Fun Fact

Scratch was made at MIT for kids like you!

Class Activity Preview:

You'll make a moving cat next!

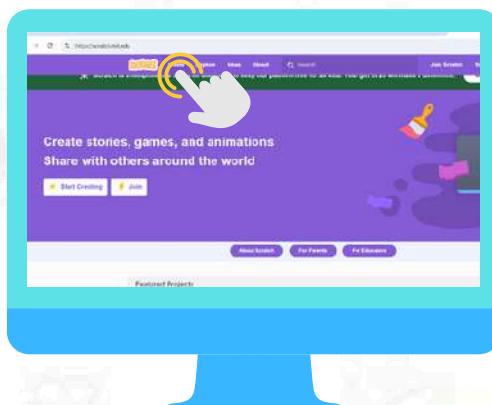


Class Activity 1 - Move the Scratch Cat

Let's code the Scratch Cat to move! You'll use Motion blocks to create your first project, like moving files in Chapter 2.

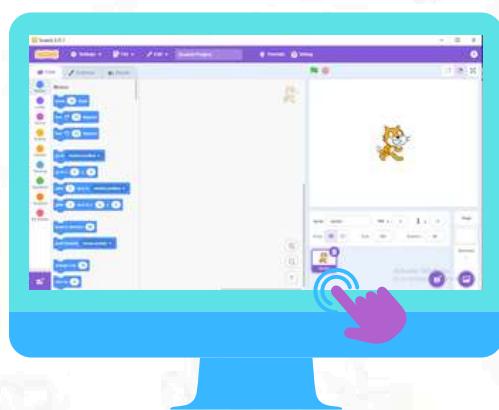
1 Step

Open scratch.mit.edu and click "Create."



2 Step

Click the Scratch Cat in the Sprite List (bottom).



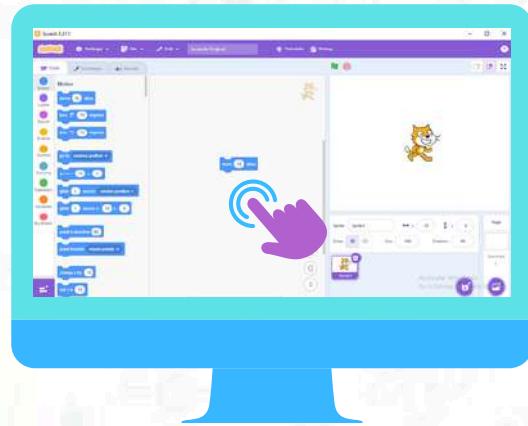
3 Step

Drag "move 10 steps" (Motion) to the coding area (middle).



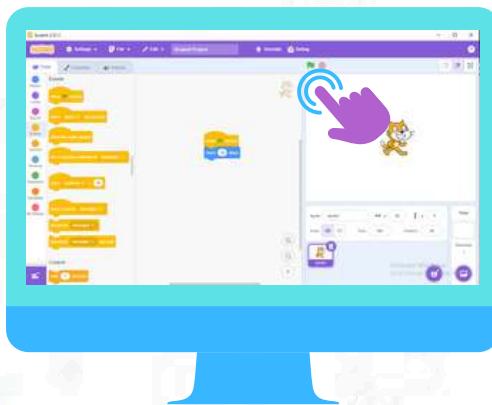
4 Step

Click the block to test-it moves!



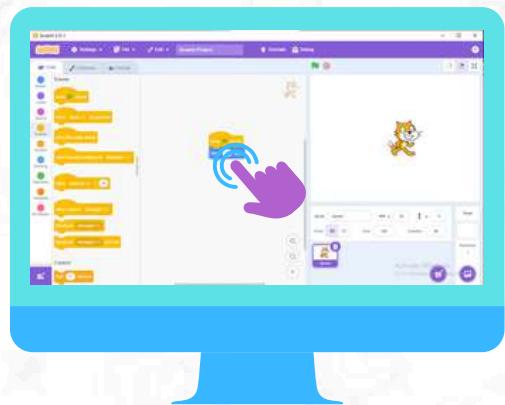
5 Step

Add "when green flag clicked"
(Events, yellow) above "move 10
steps."



6 Step

Click the green flag on the Stage
to run.



Challenge:

Make the cat move
backward (use "-10").



Home Activity 1:

Make the Scratch Cat move in a new project and save it.

3.2 Creating Simple Animations

Animations make sprites come alive! Use Motion and Looks blocks to make the Scratch Cat dance, like a cartoon. Motion moves the cat, and Looks changes its appearance or adds words.

What's an Animation?

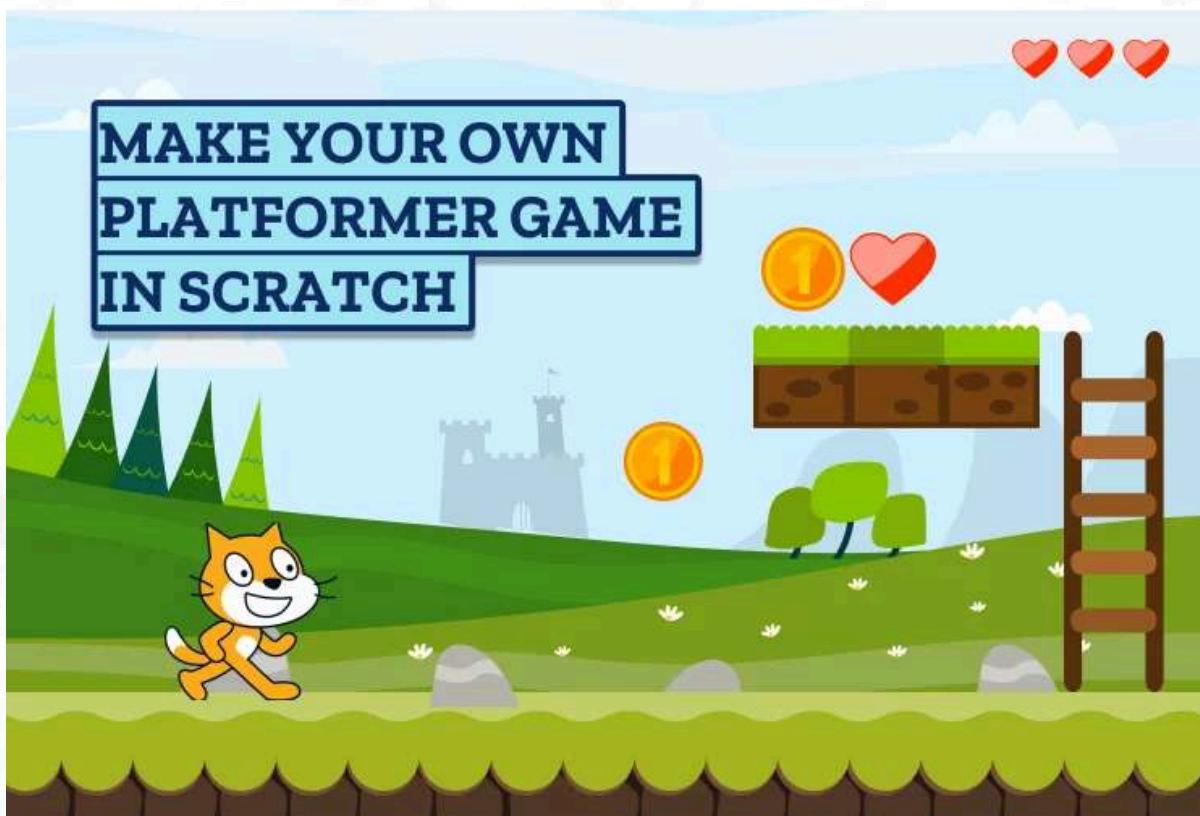
- A moving picture with actions, like a dance.

Example:

- The cat spins and says "Hello!"

Activity Preview

- You'll code a dancing cat next.

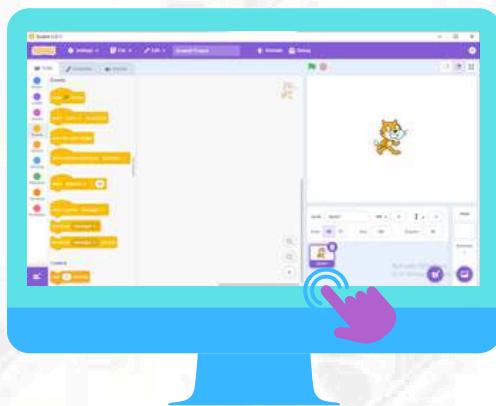


Class Activity 2 : Make the Cat Dance

Let's create a dancing animation! You'll combine blocks to make the Scratch Cat move and talk, building on your moving cat.

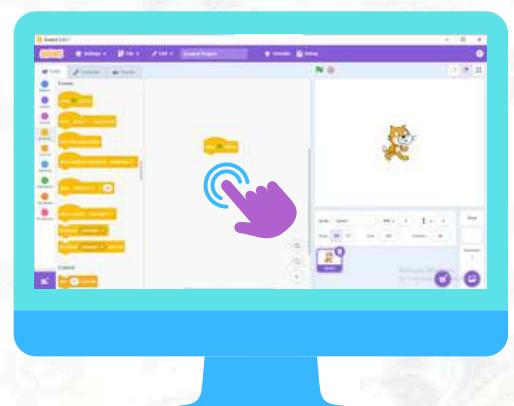
1 Step

Open a new Scratch project and select the Scratch Cat.



2 Step

Drag "when green flag clicked" (Events) to the coding area.



3 Step

Add "move 10 steps" (Motion Block)
Add "turn 15 degrees" (Motion Block).



4 Step

Add "say Assalam Alaikum! for 2 secs" (Looks).



5 Step

Repeat steps 3-4 twice for more dance moves.



6 Step

Click the green flag to test.



Challenge:

Change the message to "Happy Eid!"



Home Activity 2:

Create an animation where the Scratch Cat says a Pakistani greeting.

3.3 Adding Interactions with Events

Events make projects interactive! Event blocks, like "when this sprite clicked," let users control actions.

You'll make a clickable greeting card.

What's an Event?

- A trigger, like clicking, that starts code.

Example:

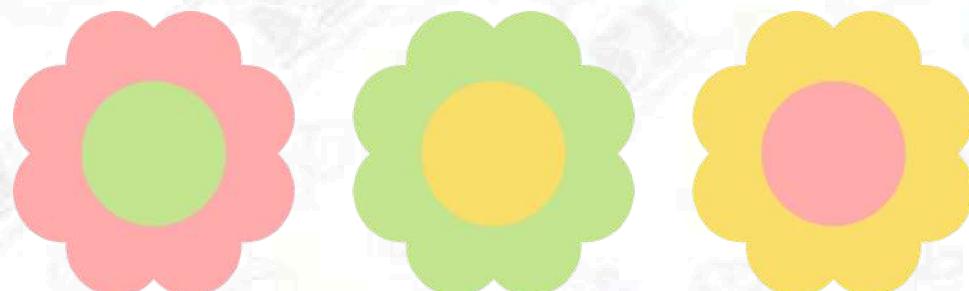
- Click the cat, and it talks!

Activity Preview

- You'll create a card next.

DIY Idea:

- Draw a paper card to match your Scratch one!

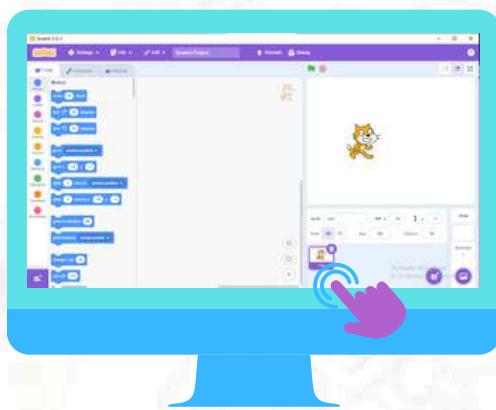


Class Activity 3 - Build a Clickable Greeting Card

Let's make an interactive card! When you click the Scratch Cat, it says a special message, perfect for celebrations.

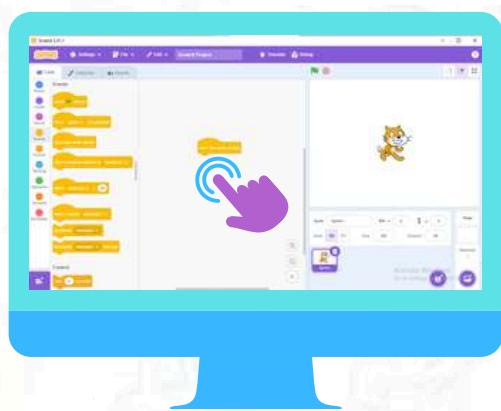
1 Step

Open a new Scratch project with the Scratch Cat.



2 Step

Drag "when this sprite clicked" (Events) to the coding area.



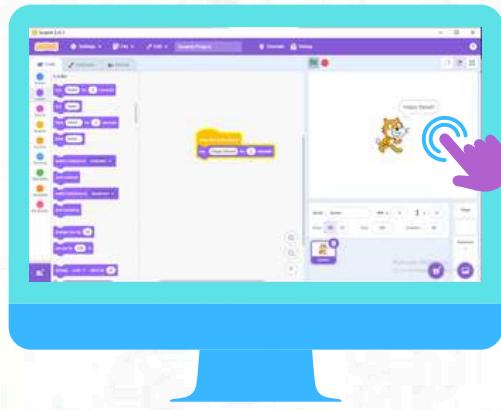
3 Step

Add "say Happy Basant! for 2 secs" (Looks).



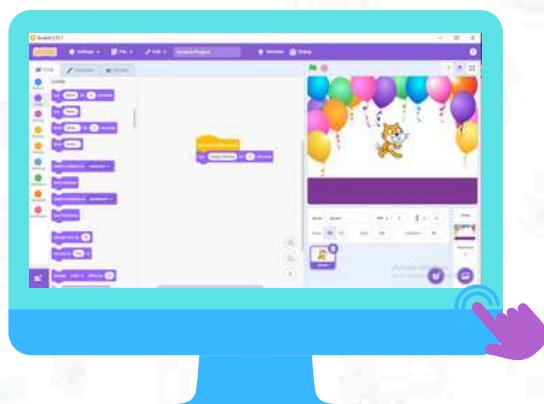
4 Step

Click the cat on the Stage to test -it talks!



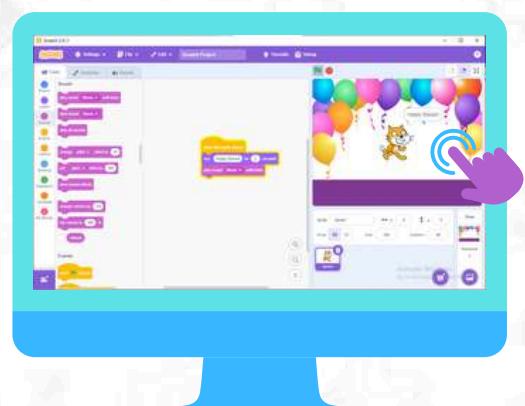
5 Step

Change the Stage: Click "Backdrops" (bottom left) and pick a festive one (e.g., party).



6 Step

Add "play sound meow until done" (Sound).



Challenge:

Change to "Happy Birthday!" for a friend.

Happy
Birthday

Home Activity 3:

Make a greeting card for a Pakistani festival like Eid.

3.4 Building a Mini-Game

Games are super fun to code! You'll make a "Catch the Mango" game, like Chapter 4's robot challenges, where the Scratch Cat catches falling mangoes (a Pakistani favorite).

What's a Game?

- A project where players do tasks, like collecting items.

Example:

- Move the cat to grab mangoes!

Activity Preview

- You'll code your game next.

Parent Tip:

- Play the game with your child!

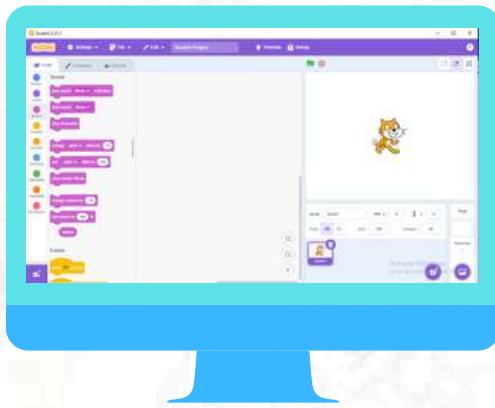


Class Activity 4 : Create a “Catch the Mango” Game

Let's build a game! The Scratch Cat moves with arrow keys to catch falling mangoes, using skills from earlier sections.

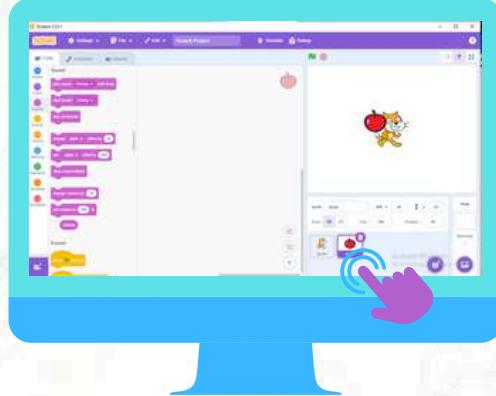
1 Step

Open a new Scratch project.



2 Step

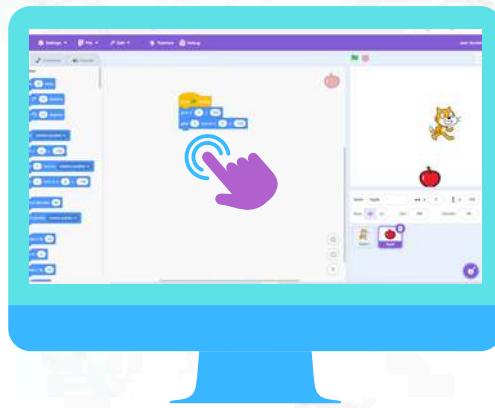
Add an Apple sprite:
Click "Choose a Sprite" and pick an Apple.



3 Step

For Apple:

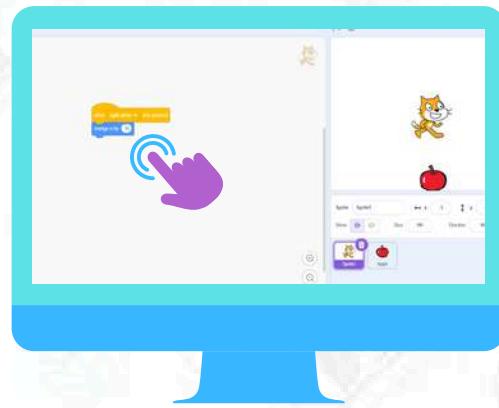
- Add "when green flag clicked" (Events)
- Add "go to x: 0 y: 100" (Motion)
- Add "glide 3 secs to x: 0 y: -150" (Motion).



4 Step

For Scratch Cat:

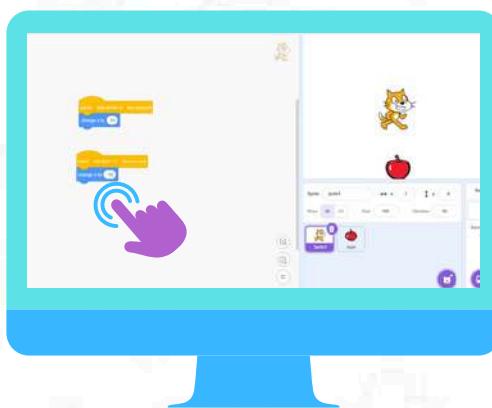
- Add "when right arrow key pressed" (Events)
- Add "change x by 10" (Motion).



5 Step

For Scratch Cat:

Add "when left arrow key pressed,"
"change x by -10" (Motion).



6 Step

Click the green flag and use arrows to catch the Apple



Challenge:

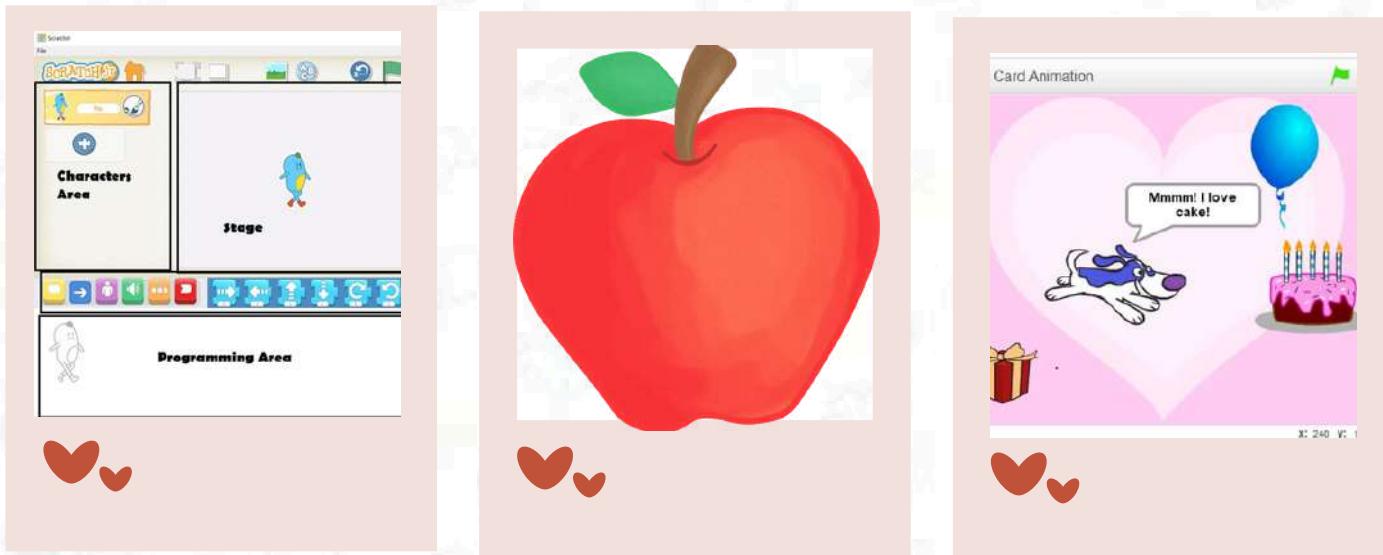
Add "say Yum! for 2 secs"
(Looks) when cat touches
Apple (use "touching" from
Sensing).



Chapter 3 Summary and Final Home Activity

You're a Scratch coder! You:

- 3.1: Explored the Scratch interface and moved the cat.**
- 3.2: Created a dancing animation with Motion and Looks.**
- 3.3: Made an interactive greeting card with Events.**
- 3.4: Built a "Catch the Apple" game.**



Home Activity 4:

Code a new game where the Scratch Cat catches kites.

Homework:

Share your "Catch the Apple" game with your family!

CHAPTER 4:

VEXcode VR: Exploring Obstacle Courses

Welcome to VEXcode VR!

VEXcode VR lets you code virtual robots to explore mazes! In this chapter, you'll program robots to move, loop actions, use sensors, and complete challenges, like robot games in Tynker (Chapter 9). It's like being a robot explorer!

What's VEXcode VR?

- A free website to code robots in virtual worlds.

Why Code Robots?

- Learn problem-solving and have fun!

Chapter Preview:

- You'll navigate courses, use loops, avoid obstacles, and build a challenge.

Instructions:

- Ask an adult to open vr.vex.com.

Front Eye + Distance Sensor



4.1 Navigating an Obstacle Course

Robots can follow paths in VEXcode VR, like avoiding walls in a maze. You'll give commands to move your robot.

Why Navigate?

- Teaches robots to make decisions, like in real life.

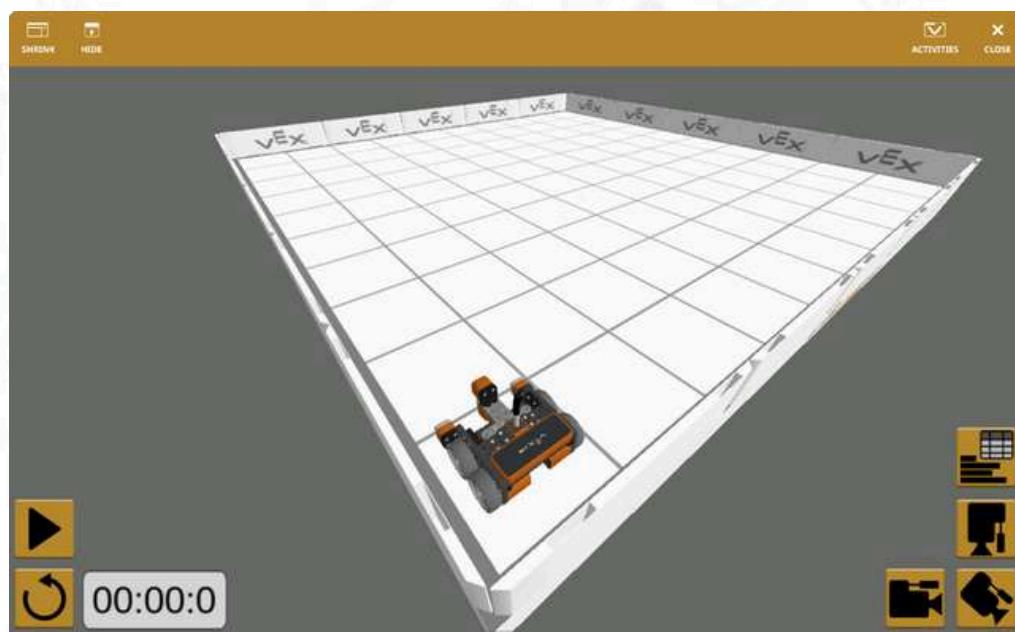
Key Tip:

- Use Drive and Turn blocks carefully.



Class Activity Preview:

- You'll program a robot path next.



Class Activity 1 - Program a Robot Path

Let's code a robot to navigate a maze! You'll use Motion blocks to create a simple path.

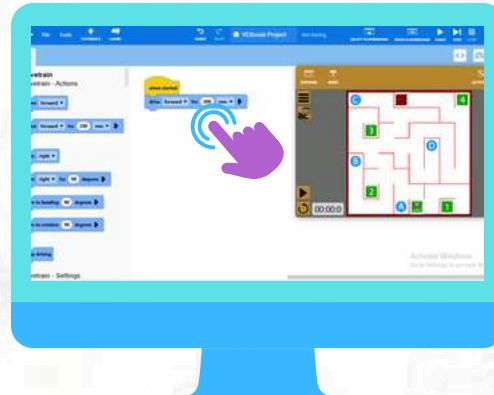
1 Step

Open vr.vex.com and click "Playground" > "Wall Maze."



2 Step

Drag "Drive Forward for 200mm" (Motion) to the coding area.



3 Step

Run the program by clicking the play button!



4 Step

Add "Turn Left for 90 degrees" (Motion) after Drive Forward.



5**Step**

Add Move Left for 90 degree, Move Right for 90 degree and Move Forward Block to move the robot.
Test and adjust the distance to avoid walls.

**6****Step**

Complete till End Point.
Save your code as a screenshot.
Use Snipping tool for saving screenshot.
We will use it in Google Drive (Chapter 7).

**Challenge:**

Make the robot point 1, 2 and 3 instead of finish point.

**Home Activity 1:**

Program a robot to move in a straight line in a new playground.

4.2 Using Loops to Repeat Actions

Loops repeat code to make it efficient, like repeating moves in Scratch (Chapter 3). You'll use loops to shorten your robot's path.

What's a Loop?

- A block that repeats actions, e.g., "repeat 4 times."

Why Loops?

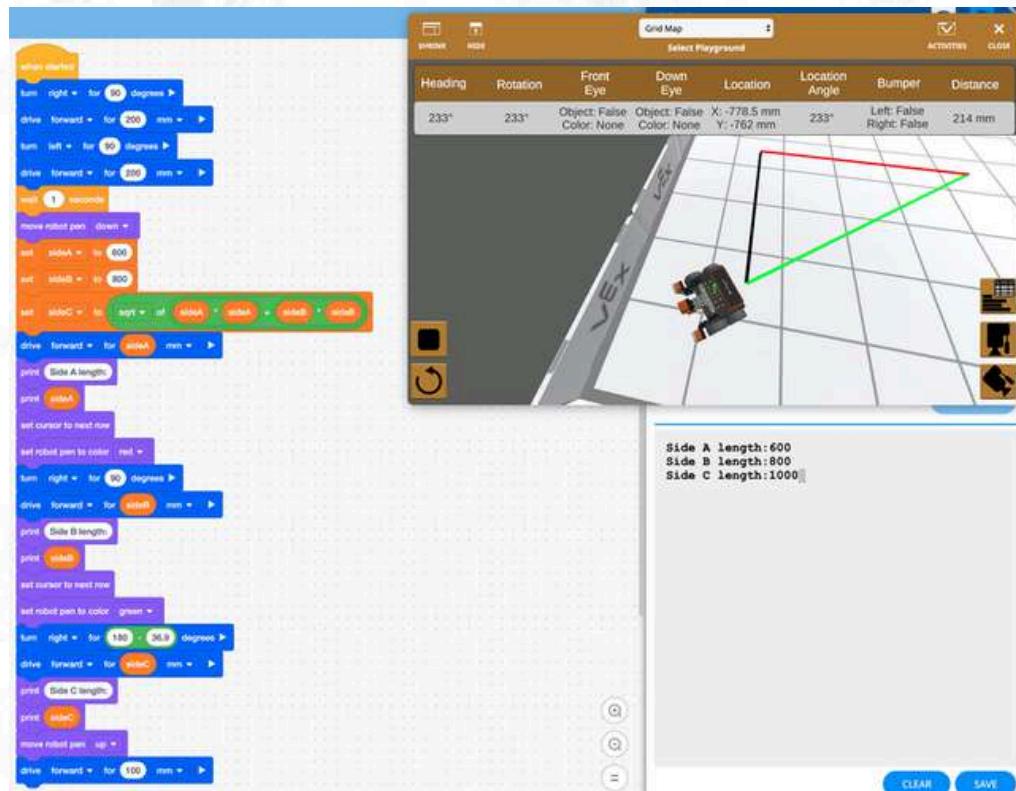
- Save time for complex paths.

Class Activity Preview:

- You'll loop a robot movement next.

Parent Tip:

- Count the repeats with your child!

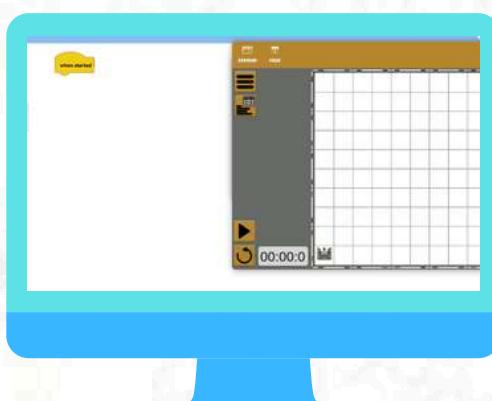


Class Activity 2 - Loop a Robot Movement

Let's make your robot repeat actions! You'll use a loop to create a square path in the maze.

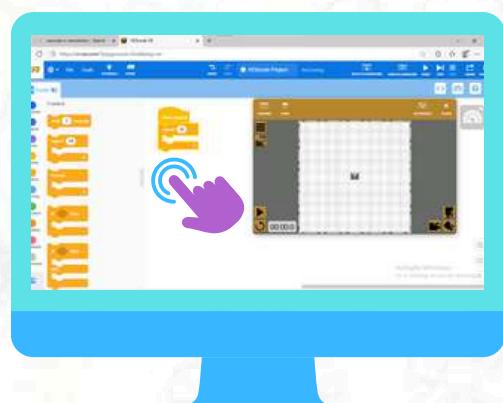
1 Step

Open vr.vex.com and select "Grid Maze" from the Playground options.



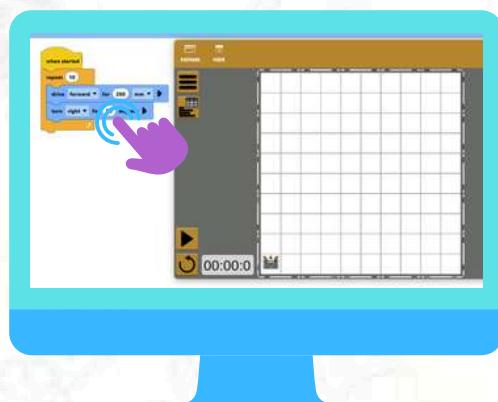
2 Step

Drag the "Repeat Block" from (Logic - Control) to the coding area.



3 Step

Inside the loop, add "Drive Forward for 200 mm" and "Turn Right 90 degrees" from Drivetrain category



4 Step

Before the loop from Drawing category add the following:

- "move pen down" to start drawing.
- "set pen color to black" for the line color.
- "set pen width to thin" for the line thickness.



5 Step

Set the loop to "4 times" and click play-the robot draws a square!

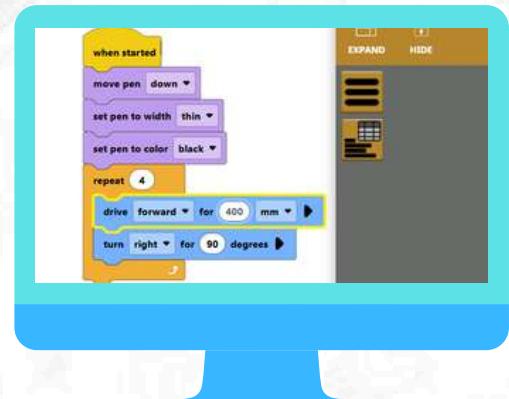
Increase the distance. See moving in a bigger square.



6 Step

Save your code as a screenshot. Use Snipping tool for saving screenshot.

We will use it in Google Drive (Chapter 7).



Challenge:

Change the loop to "3 times" for a triangle path.



Home Activity 2:

Use a loop to make the robot turn in a circle.

4.3 Using Sensors to Avoid Obstacles

Sensors let robots "see" obstacles, like eyes! You'll use sensor blocks to make your robot turn when it detects something, like in Tynker (Chapter 9).

What's a Sensor?

- A tool to detect walls or objects, e.g., Distance Sensor.

Why Sensors?

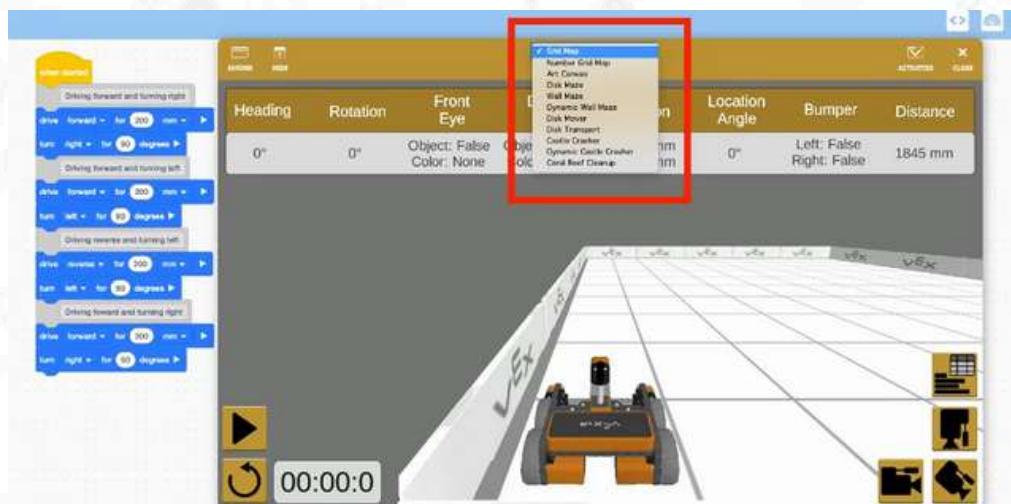
- Help robots change paths automatically.

Class Activity Preview:

- You'll code sensor avoidance next.

DIY Idea:

- Pretend to be a robot avoiding toys at home!

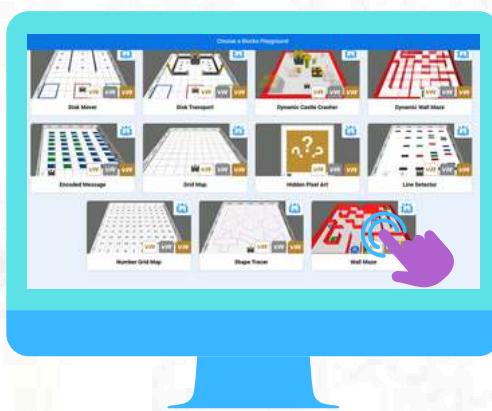


Class Activity 3 - Avoid Obstacles with Sensors

Let's make a smart robot! You'll use the Front Distance sensor from the Sensing category to measure how close obstacles are and help the robot turn to avoid them in the maze. The Front Distance sensor gives a number in millimeters (mm) that shows the distance, so you can set a rule like "turn if closer than 50mm."

1 Step

Open vr.vex.com and select "Wall Maze" from the Playground options.



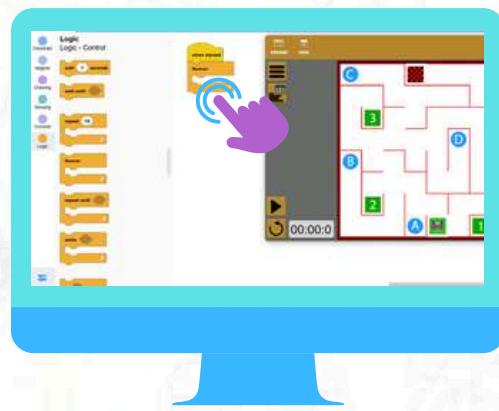
3 Step

Inside the loop, add "Drive Forward for 50mm" (from the Drivetrain category) so the robot advances in small steps to allow time for sensing.



2 Step

Drag a "forever" loop (from the Logic category) to the coding area to keep the robot moving continuously.



4 Step

After the drive block, add an "if then" block (Logic category). On empty coding area:

- Drag the "Front Distance in mm" block (Sensing - Distance category). This is a round block that measures how far an object is.
- Drag the "<" comparison operator (from the Operators category under Logic - Math). This creates a diamond-shaped condition to check if the distance is less than a number.



5 Step

Combine both blocks into one.

- Place the "Front Distance in mm" on the left side of diamond.
- use the "<" operator in the middle,
- set the right side to "50"

(see image)

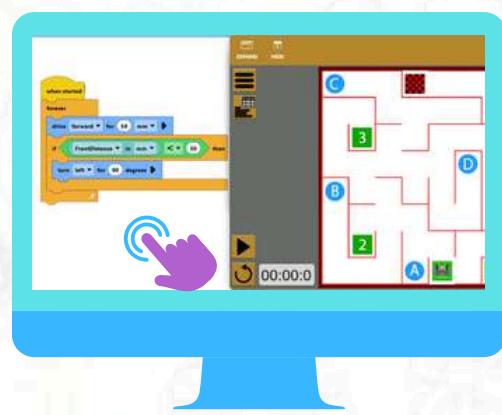
(this checks if the obstacle is closer than 50mm).



6 Step

Drag your new combined condition block directly into the diamond slot of the "if then" block.

Inside the "If then" block (from Logic), add "Turn Left for 90 degrees" (from the Drivetrain category) to make the robot change direction when an obstacle is closer than 50mm.



7 Step

Run the code.

Robot will now avoid walls.

It will move to left when a Wall is detected at 50mm.

8 Step

Change the distance from 50mm to 10mm, 20mm, 70mm and 100mm
What difference do you see.

Challenge:

use other Playground for same code.

4.4 Creating a Robot Challenge

Combine your skills for a full challenge! You'll program a robot to complete a maze, using loops and sensors, like a Pakistani adventure quest.

What's a Challenge?

- A complete program to solve a puzzle.

Example:

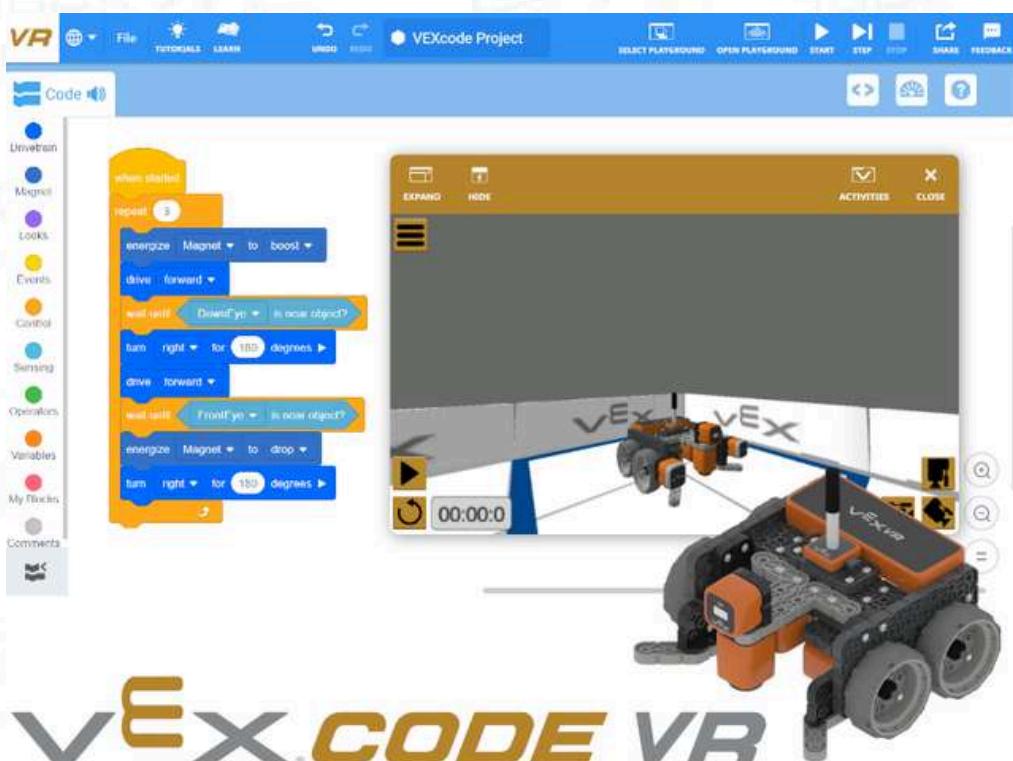
- Navigate a maze to the finish!

Class Activity Preview:

- You'll code a maze challenge next.

Parent Tip:

- Cheer your child as the robot wins!



4.5 Code a Maze Challenge

Let's build a robot to complete the maze! You'll use Motion, loops, and sensors for a winning path.

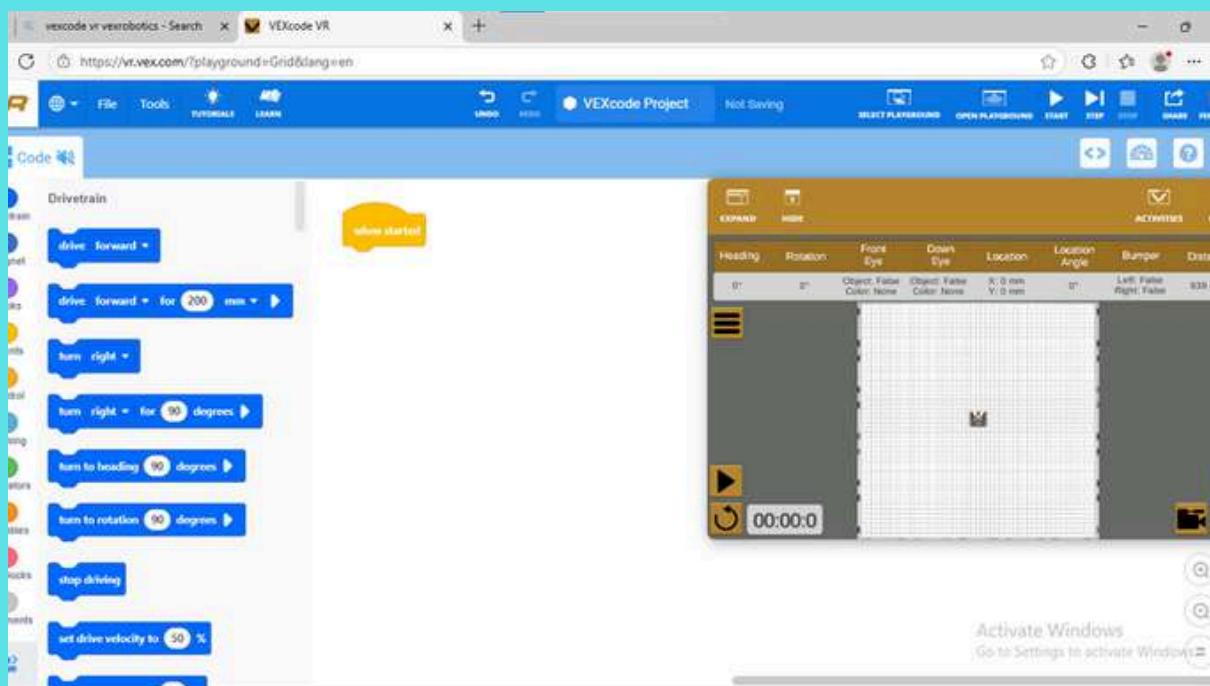
Class Activity 4: Complete a Maze Challenge

1 Step

Open vr.vex.com and select "Wall Maze."

2 Step

Plan your path: Add "Drive Forward" and "Turn" blocks for turns.



3 Step

Add a loop for repeated moves (e.g., "repeat 3 times").

4 Step

Insert sensor blocks to avoid walls (e.g., "if close, turn").

5 Step

Click play and adjust until the robot finishes the maze.

6 Step

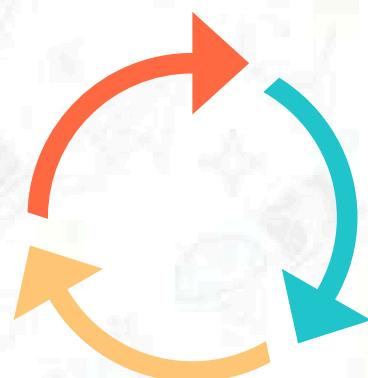
Save your code screenshot for Google Drive.

Your code should include:

1. Loops
2. Distance Sensors

Challenge:

Use the fewest blocks possible with loops.



Chapter 4 Summary and Final Home Activity

You're a VEXcode VR expert! You:

4.1: Navigated obstacle courses with Motion blocks.



4.2: Used loops to repeat actions.



4.3: Avoided obstacles with sensors.



4.4: Created a robot maze challenge.

Home Activity 3:

Code a robot to explore a new playground / maze.

Homework:

Share your maze challenge screenshot with your teacher!

CHAPTER 5:

Python: Variables and Input

Welcome to Python!

Python is a fun coding language to create programs! In this chapter, you'll use Google Colab to store information with variables and make interactive programs, like asking someone's name. It's like telling a computer your story!

What's Python?

- A language to give instructions to computers.

Why Python?

- It's easy and used by coders worldwide!

Chapter Preview:

- You'll store data, ask questions, make programs, and build a quiz.

Instructions:

- Ask an adult to open colab.google.com.



5.1 Introduction to Variables in Python

Variables are like boxes that hold information, such as numbers or names. You give the box a name and put data inside, like in Scratch's blocks (Chapter 3). Let's try it in Google Colab!

</>

What's a Variable?

- A named box for storing data, e.g., "score = 10."

Why Use Variables?

- Save data to use later, like a game score.

Fun Fact:

- Python is named after a funny TV show, not a snake!



Class Activity Preview:

- You'll create a variable next.

Class Activity 1 - Create a Number Variable

Let's make a variable to store a number! You'll use Google Colab to create and show it, like storing a score in a game.

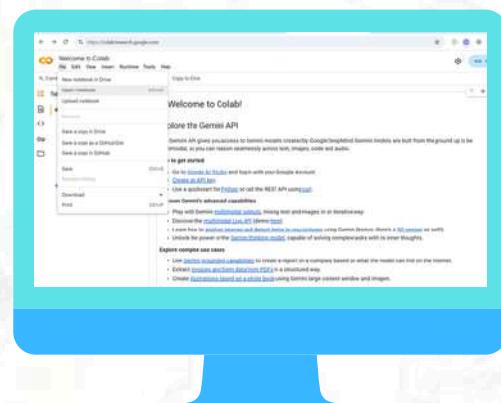
1 Step

Open colab.google.com and sign in (with teacher help).



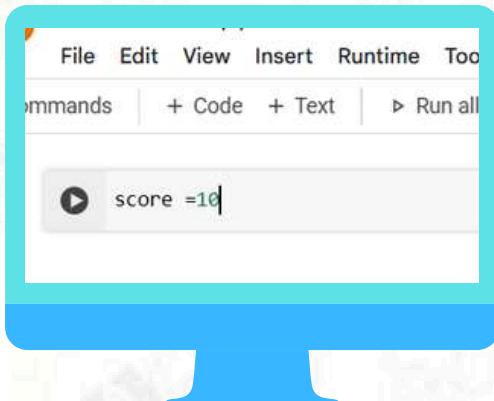
2 Step

Click "File" > "New notebook" to start a project.



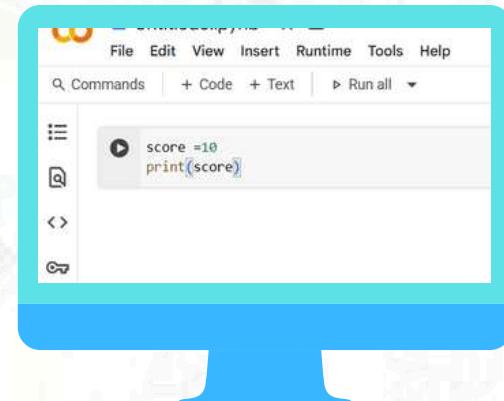
3 Step

In the code cell, type: `score = 10`



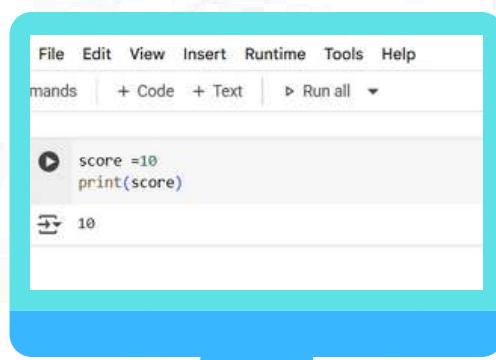
4 Step

Below, type: `print(score)` to show the number.



5 Step

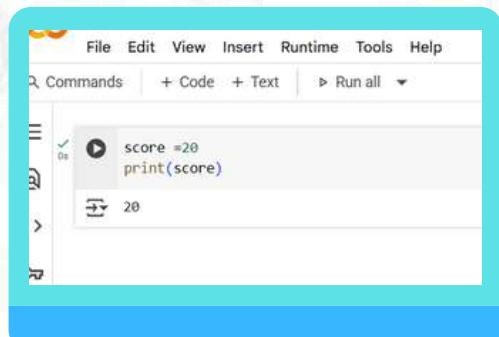
Click the "Play" button (triangle) next to the cell to run.



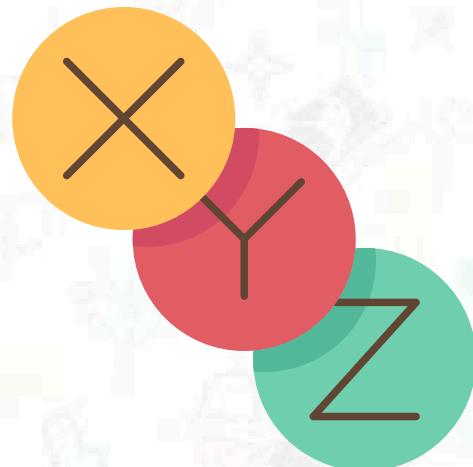
```
File Edit View Insert Runtime Tools Help  
Commands + Code + Text Run all  
  
score =10  
print(score)  
10
```

6 Step

Change 10 to 20 and run again.



```
File Edit View Insert Runtime Tools Help  
Commands + Code + Text Run all  
  
score =20  
print(score)  
20
```



Challenge:

Make a variable age = 8 and print it.

Home Activity 1:

Create a variable for your roll number and print it.

(x)

5.2 Using input() to Get User Input

The `input()` function lets you ask users for information, like their name, and store it in a variable. It's like asking a friend a question! This makes programs interactive.

What's `input()`?

- A way to get answers from users, e.g., "What's your name?"

Why Use It?

- Make programs talk to people, like a chat.

Class Activity Preview:

- You'll ask for a name next.

Parent Tip:

- Type your name when your child runs the program!

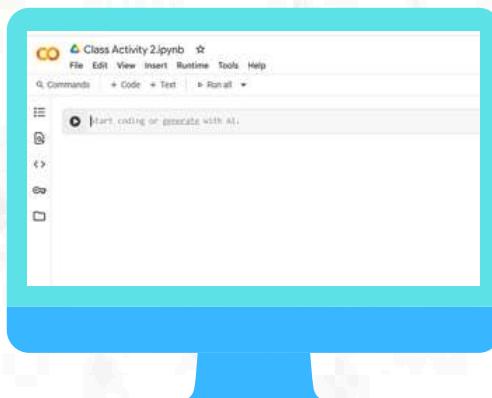


Class Activity 2: Ask for a Name

Let's ask for a name and say hello! You'll use `input()` in Google Colab to make an interactive program, building on variables.

1 Step

Open a new notebook on colab.google.com.



2 Step

In a code cell, type:
`name = input("What is your name?")`

```
name = input("what is your name?")
```

3 Step

Below, type:

```
print("Hello, " + name + "!")
```

```
name = input("What is your name?")
print("Hello, " + name + "!")
```

4 Step

Click the "Play" button, type your name (e.g. "Ayesha") in the box, and press Enter.

```
name = input("What is your name?")
print("Hello, " + name + "!")
```

What is your name? Ayesha
Hello, Ayesha!

5 Step

See the output, like "Hello, Ayesha!"

Google colab automatically saves your notebook

6 Step

You can rename the notebook name.
Double click the name (above File Menu).



```
File Ed Rename notebook Runtime Tools Help
Commands + Code + Text Run all
Class Activity 2.ipynb
name = input("What is your name? ")
print("Hello, " + name + "!")
What is your name? Ayesha
Hello, ayesha
```

Challenge:

Add `age = input("How old are you? ")`
and print "You are [age]! years old"

Home Activity 2:

Make a program that asks for your favorite color and prints it.

5.3 Writing Programs with Variables and Input

Combine variables and input() to make fun programs! You'll ask for more information, like favorite foods, and create messages, like mixing Scratch's stories (Chapter 3). Let's code in Colab!

What's a Program?

- Code that does something, like making a greeting.

Example:

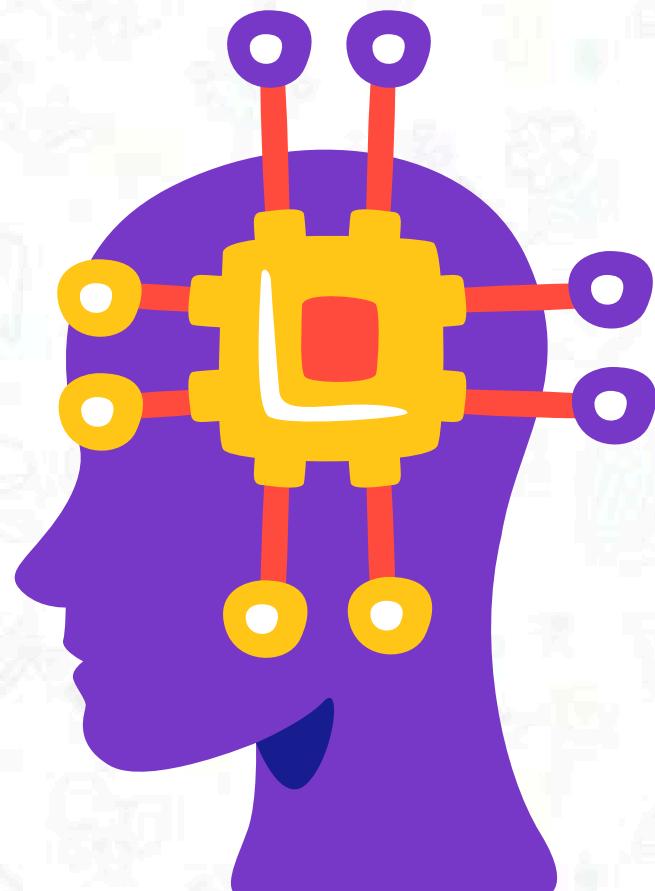
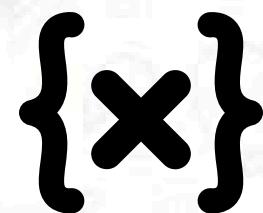
- Ask for a food and say "Yum!"

Class Activity Preview:

- You'll make a food program next.

DIY Idea:

- Write a list of your favorite foods to inspire your code!

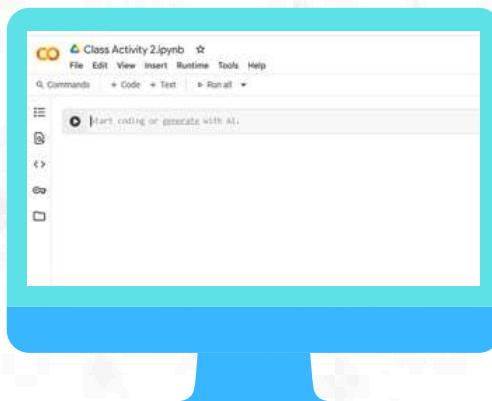


Class Activity 3: Create a Food Program

Let's make a program that asks for a name and favorite food! You'll use variables and `input()` in Google Colab to create a fun message.

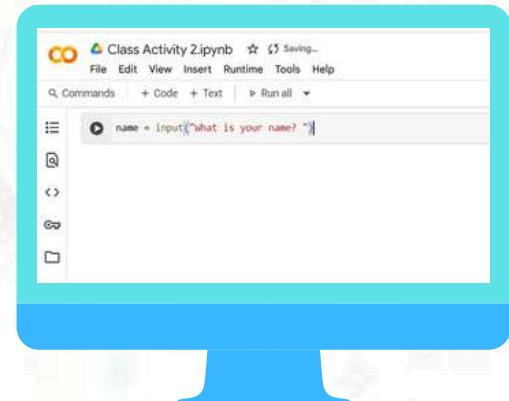
1 Step

Open a new notebook on colab.google.com.



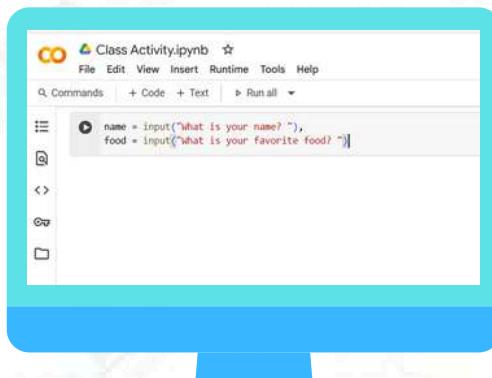
2 Step

In a code cell, type:
`name = input("What is your name? ")`



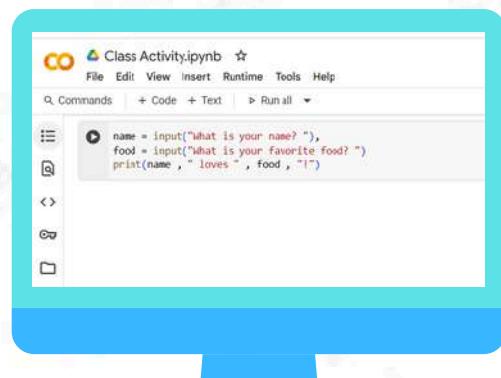
3 Step

Type: `food = input("What is your favorite food? ")`



4 Step

Type: `print(name , " loves ", food , "!")`



5 Step

Click "Play," enter a name (e.g., "Bilal") and food (e.g., "biryani"), press Enter.

6 Step

See "Bilal loves biryani!"

The screenshot shows a Google Colab interface with a teal header bar. The title of the notebook is "Class Activity.ipynb". The menu bar includes File, Edit, View, Insert, Runtime, Tools, and Help. Below the menu is a toolbar with icons for Commands, Code, Text, and Run all. A code cell contains the following Python code:

```
name = input("What is your name? ")
food = input("What is your favorite food? ")
print(name , " loves " , food , "!")
```

The output of the code cell is:

```
What is your name? Bilal
What is your favorite food? Biryani
Bilal loves Biryani !
```

Challenge:

Add `color = input("Favorite color? ")`
and print it with food.

Home Activity 3:

Create a program that asks for a favorite animal and prints a sentence about it.

5.4 Creating a Simple Quiz Program

Quizzes are exciting programs! You'll use variables, `input()`, and "if" conditions (like Tynker's conditions in Chapter 9) in Google Colab to ask questions and check answers.

What's a Quiz?

- A program that asks questions and tells you if you're right.

Example:

- Answer the quiz with your child for fun!

Class Activity Preview:

- You'll build a quiz next.

Parent Tip:

- "What's the capital of Pakistan?"

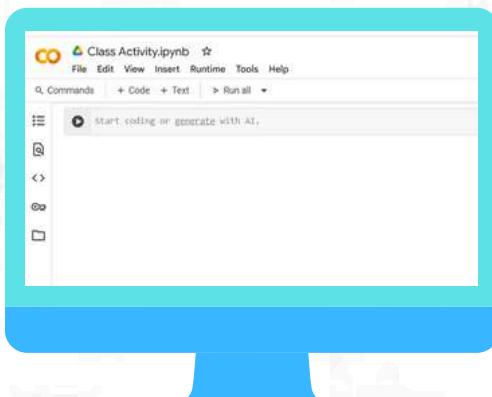


Class Activity 4: Code a Quiz Game

Let's create a quiz! You'll ask a question, check the answer, and say if it's right, using all your Python skills in Google Colab.

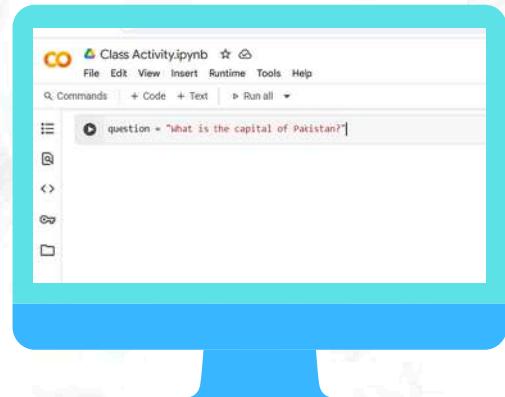
1 Step

Open a new notebook on colab.google.com.



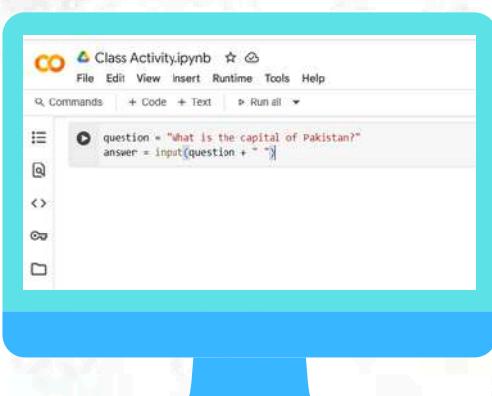
2 Step

In a code cell, type:
`question = "What is the capital of Pakistan?"`



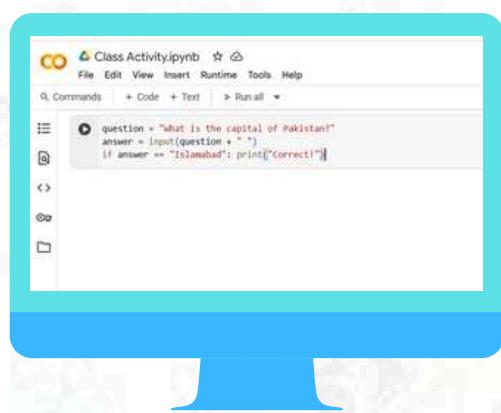
3 Step

Type: `answer = input(question + "")`



4 Step

Type: `if answer == "Islamabad": print("Correct!")`



5 Step

Type: else: print("Oops, it's Islamabad.")

```
question = "What is the capital of Pakistan?"  
answer = input(question + "?")  
if answer == "Islamabad": print("Correct!")  
else: print("Oops, it's Islamabad.")
```

6 Step

Click "Play," answer the question, see the result.

```
question = "What is the capital of Pakistan?"  
answer = input(question + "?")  
if answer == "Islamabad": print("Correct!")  
else: print("Oops, it's Islamabad.")
```

What is the capital of Pakistan? Islamabad
Correct!

Challenge:

Add a second question, like "What is $5 + 5$?"
(answer: "10").

10

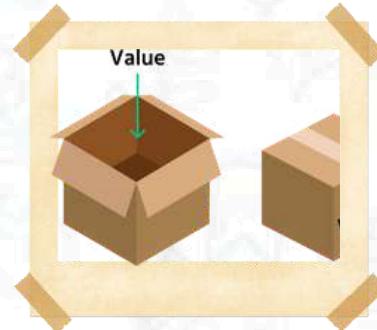
Home Activity 4:

Make a quiz program with a question about a Pakistani festival.

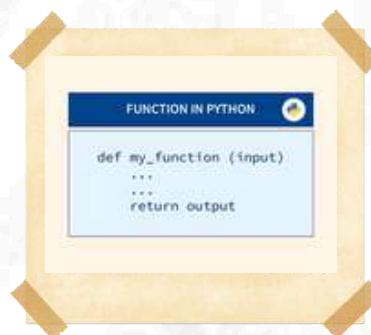
Chapter 5 Summary and Final Home Activity

You're a Python coder! You:

5.1: Created variables to store data.



5.2: Used input() to ask questions.



5.3: Made interactive programs with name and food.



5.4: Built a quiz game with conditions.

Home Activity 5:

Code a program that asks for your favorite city in Pakistan and prints a fact about it.

Share your quiz game with your family!

CHAPTER 6:

AI for Image Creation

What is AI and How Does It Work?

AI (Artificial Intelligence) is like a smart computer brain that learns from examples to do tasks, like drawing pictures or answering questions.

In this chapter, we'll use prompts with Grok and ChatGPT to create images, and Google Colab to code prompts. AI is fun and safe with adult help, like coding in Python (Chapter 5)!

What is Prompt?

A prompt is a sentence you type to tell AI what to do, e.g., "Draw a camel."

AI Tip:

Good prompts are clear and detailed.



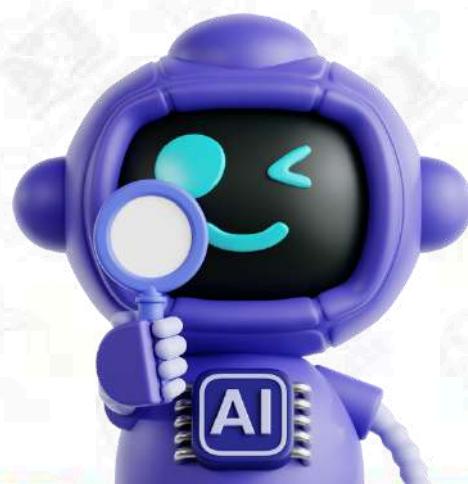
Fun Fact:

AI helps in games and stories, like Scratch (Chapter 3).



Preview:

- Let's start with simple images!



Welcome To AI Image Magic!

AI turns your words into pictures! In this chapter, you'll use Grok and ChatGPT to create images, like a camel or a festival scene. You'll type prompts to make art, and explore Google Colab for AI coding. It's like painting with words!

What is AI Image Creation?

- AI makes pictures from your prompts.

Why Use AI?

- It's fun and creates art without drawing!

Tools:

- Grok (grok.com), ChatGPT (chat.openai.com), and Google Colab for prompts.

Chapter Preview:

- You'll explore tools, add details, create scenes, and use complex prompts.

Instructions:

- Ask an adult to open grok.com or chat.openai.com.



6.1 Exploring AI Image Tools

Let's meet our AI tools! Grok and ChatGPT create images from prompts. Grok uses a chat, ChatGPT's DALLE makes art fast. We'll use Colab for coding prompts later. Start simple!

Key Tools:

- Grok: Type prompts in a chat for images.
- ChatGPT: Ask for pictures via DALLE.
- Colab: For coding AI tasks.



Class Activity Preview:

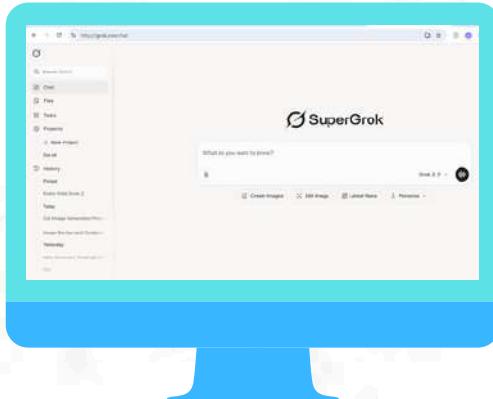
- You'll make a camel next.

Class Activity 1: Generate a Camel Image

Let's make a camel with a simple prompt! You'll use Grok or ChatGPT to generate your first AI picture.

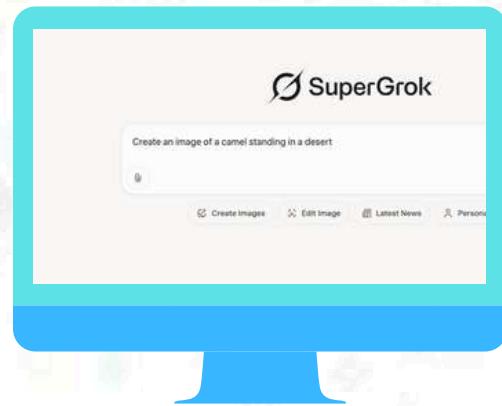
1 Step

Open grok.com or chat.openai.com (with adult help).



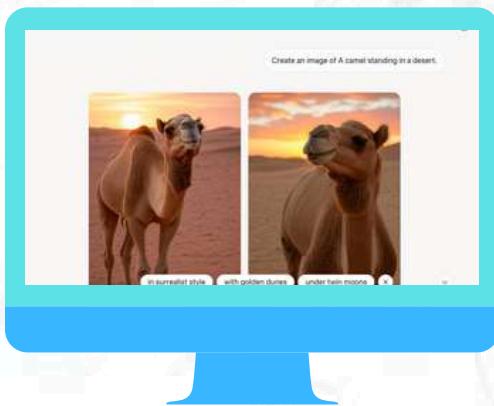
2 Step

Type: "Create an image of A camel standing in a desert."



3 Step

Press enter and wait for the image.



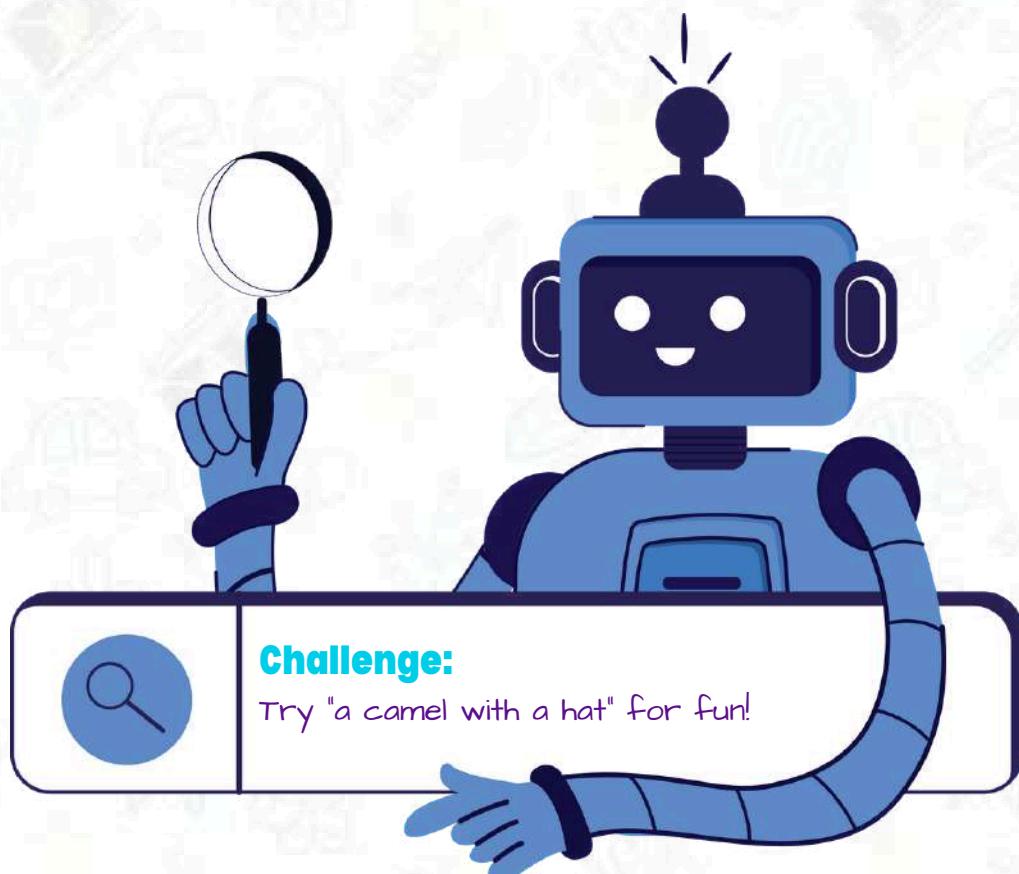
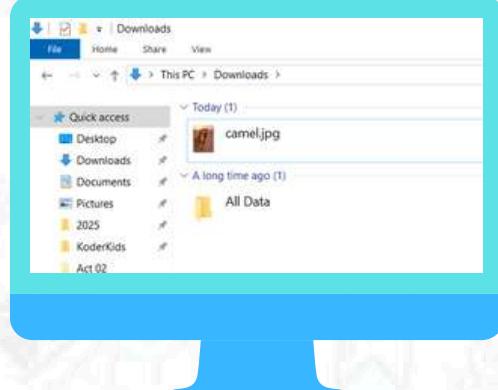
4 Step

Check the camel—does it have humps?



5 Step

Download the image and rename to camel.jpeg



Home Activity 1:

Create an AI image of a Pakistani animal like a Markhor.
Add details like in Jungle, in Woods, On mountains etc

6.2 Adding Details to Prompts

Detailed prompts make AI images better! Add colors or places, like "a green bird on a mango tree." This is like Scratch's animations (Chapter 3). Let's get creative!

Why Details?

- They make your picture unique, like a story.

Example:

- A bird in a Pakistani garden!

Class Activity Preview:

- You'll create a bird next.

Parent Tip:

- Ask your child what colors they love!



Class Activity 2: Generate a Bird

Let's use a detailed prompt to make a bird picture! You'll tell AI exactly what you want with Grok or ChatGPT.

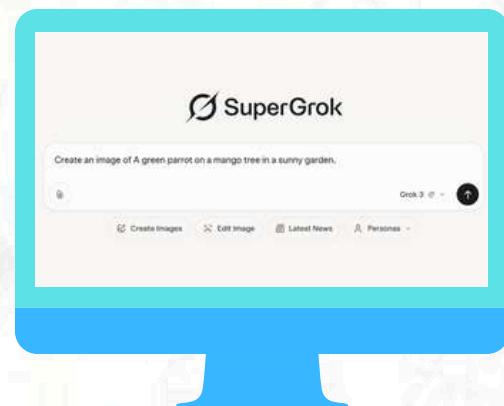
1 Step

Open grok.com or chat.openai.com.



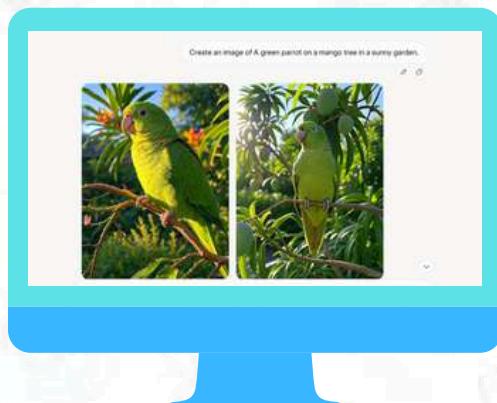
2 Step

Type: "Create an image of A green parrot on a mango tree in a sunny garden."



3 Step

Press enter to see the image.



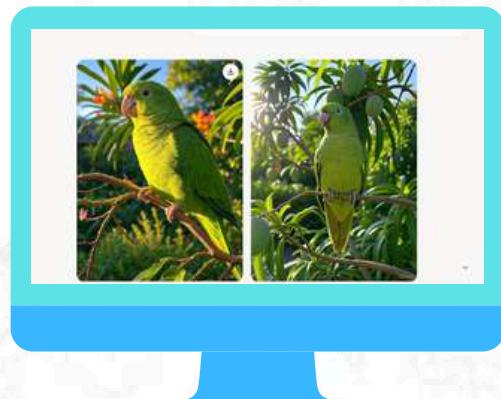
4 Step

Check the parrot—does it look happy?



5 Step

Download the image,
Rename as "MyParrot.jpg"



Challenge:

Add more details to your image.
Add a detail, like "near a Rickshaw, flying above Rickshaw etc"



Home Activity 2:

Make an AI image of a fruit like a mango tree. Add more details to prompt..

6.3 Creating Scenes with AI

AI can make whole scenes, like a festival! Use prompts with places and actions, like "kids at a fair." You'll try this with Grok or ChatGPT, and Colab for AI coding later.

What's a Scene?

- A picture with many things, like people and objects.

Example:

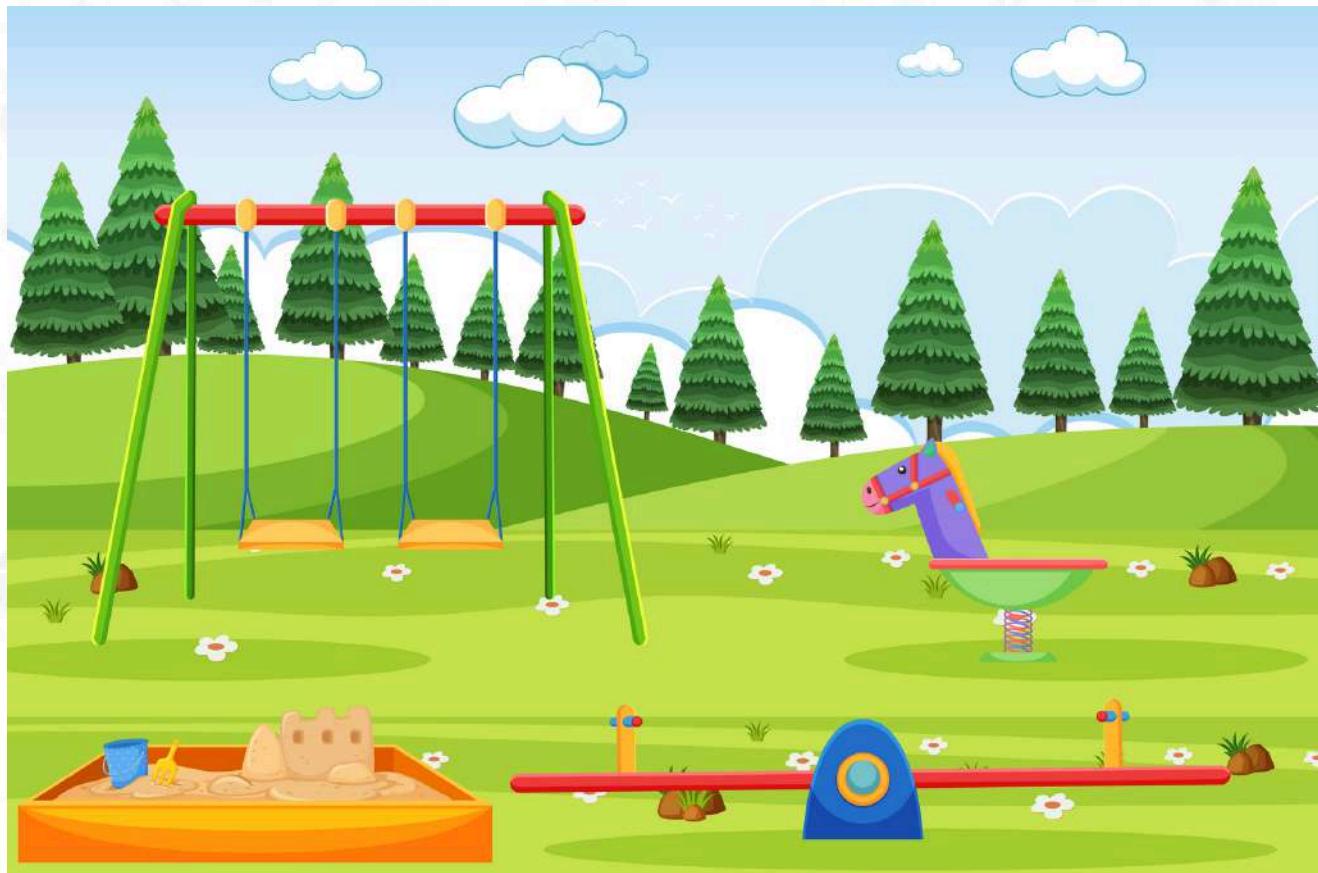
- A Basant festival with kites!

Class Activity Preview:

- You'll make a festival scene next.

DIY Idea:

- Draw your scene on paper first!



Class Activity 3: Generate a Festival Scene

Let's make a Basant festival picture! You'll use a scene prompt in Grok or ChatGPT for a lively image.

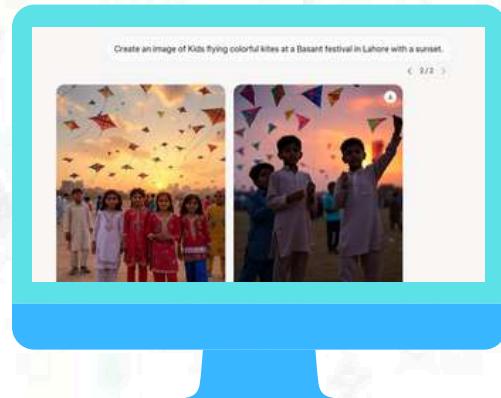
1 Step

Open grok.com or chat.openai.com.



2 Step

Type: "Create an image of Kids flying colorful kites at a Basant festival in Lahore with a sunset."



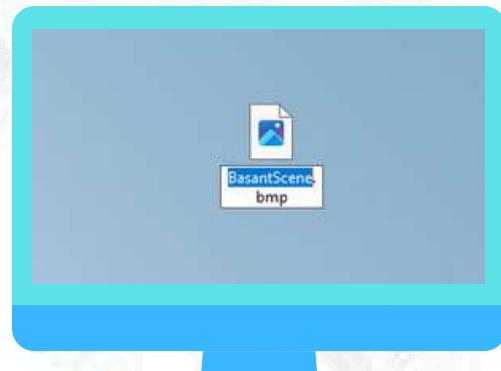
3 Step

Press enter-see the kites?



4 Step

Save as "BasantScene.jpg"



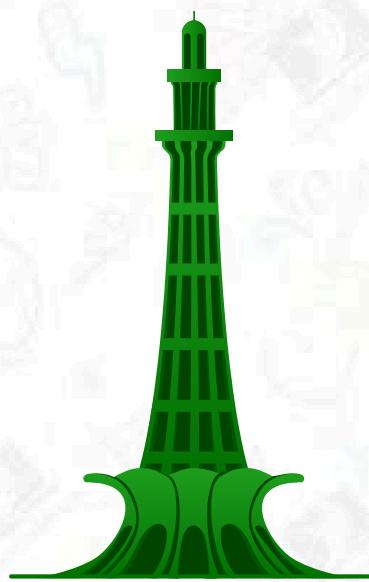
5 Step

Try a new prompt: "Create an image of A Mela Chiraghan fair with lamps."



Challenge:

Add "near Minar-e-Pakistan" to your prompt.



Home Activity 3:

Create an AI scene of a Pakistani landmark like the Badshahi Mosque.

6.4 Complex Prompts for Big Ideas

Complex prompts mix many ideas, like "a superhero flying over Karachi in a comic style." You'll use Grok or ChatGPT, and try a Python script in Colab to code prompts. Get ready for big dreams!

Why Complex?

- Create special art, like a movie poster.

Example:

- A Pakistani superhero adventure!

Class Activity Preview:

- You'll make a superhero and code a prompt next.

DIY Idea:

- Draw your superhero on paper after AI makes it!



Class Activity 4: Generate a Superhero Scene

Let's design a superhero with a complex prompt! You'll use Grok or ChatGPT to make a big picture.

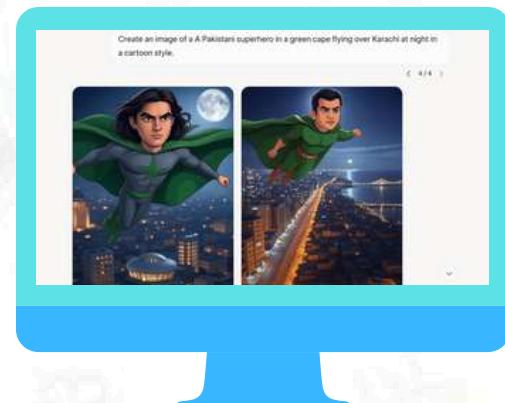
1 Step

Open grok.com or chat.openai.com.



2 Step

Type: "Create an image of a Pakistani superhero in a green cape flying over Karachi at night in a cartoon style."



3 Step

Press enter to see the superhero.

ENTER



4 Step

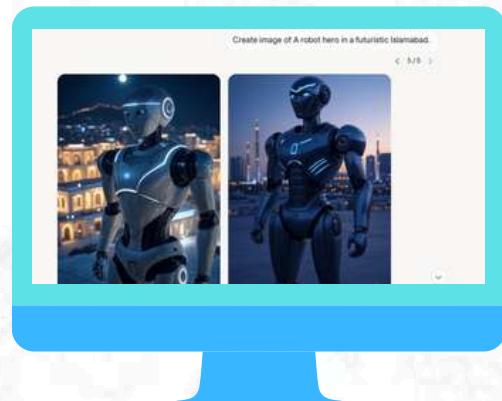
Save as "MySuperheroScene.jpg"

SAVE



5 Step

Try another: "Create image of A robot hero in a futuristic Islamabad."



Challenge:

Name your superhero, like "Jinnah Super"!



Home Activity 4:

- Make an AI image of a Pakistani story scene.

Home Activity 5:

- Code a prompt in Colab for a family picnic image.

HomeWork:

- Share your superhero image with your family!

CHAPTER 7:

Getting Started with Google Drive

Welcome to Google Drive!

Google Drive is like a magic backpack in the cloud! You can store files, share them, and work with friends online. In this chapter, you'll create files, folders, and more, just like you organized files on your computer!

What is Google Drive?

- A free online place to save and share files.

Why Use It?

- Keep your schoolwork safe and work with others anywhere!

Activity Preview:

- You'll make a folder today!



Instructions:

- Ask an adult to help you sign into drive.google.com.



7.1 Exploring Google Drive

Google Drive looks like a big shelf for your files! You'll see folders, documents, and buttons to create new things.

It's like the File Explorer from Chapter 2, but online!

Key Parts:

- My Drive: Where your files live.
- New Button: To create files or folders.
- Share Button: To send files to others.



Fun Fact:

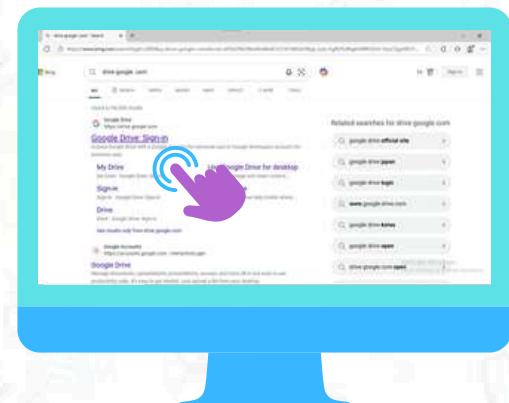
Google Drive saves your work so you never lose it!

Pre Class Activity:

- Look around Drive.

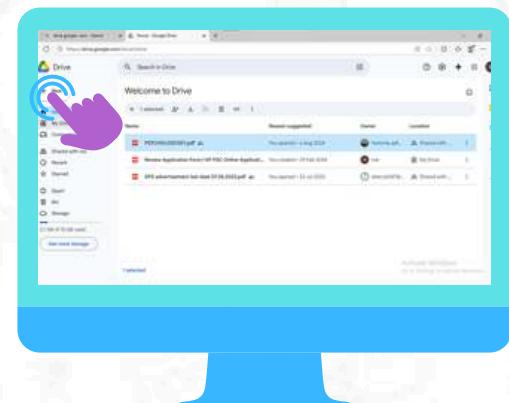
1 Step

Open drive.google.com (with adult help).



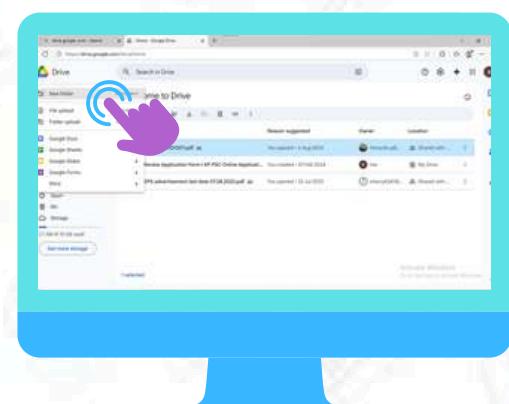
2 Step

Find the "My Drive" section on the left.



3 Step

Click the "New" button (top left) to see options.

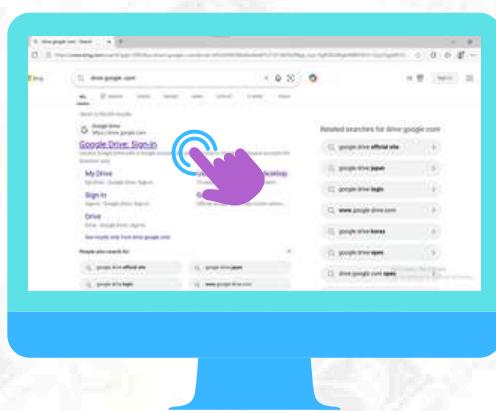


Class Activity 1: Create a School Folder

Let's make a folder to organize your files, like you did on your computer! Folders help you keep schoolwork neat.

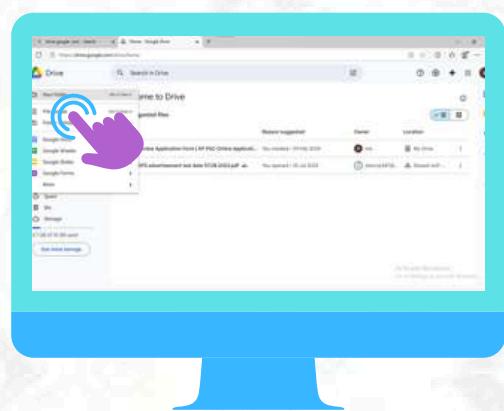
1 Step

Open drive.google.com.



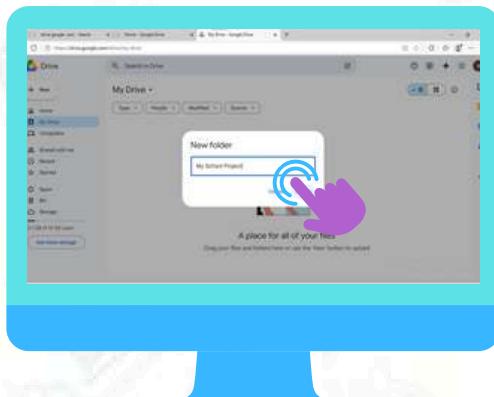
2 Step

Click "New" > "Folder."



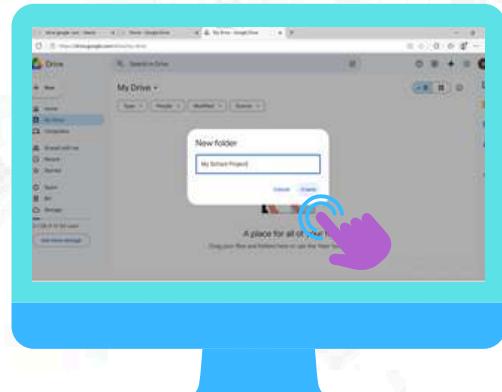
3 Step

Type a name, like "My School Projects."



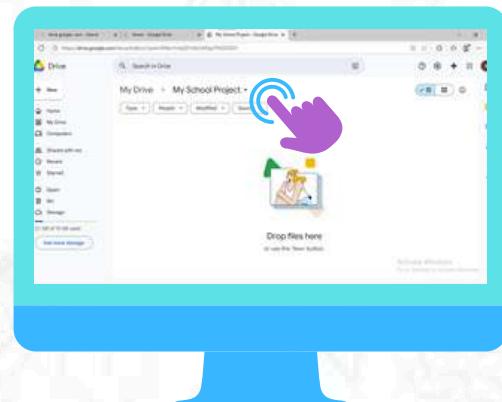
4 Step

Click "Create" to Upload your folder.



5 Step

Double-click the folder to open it-
it's empty now!



Challenge

Make another folder called "My Drawings."



Home Activity 1:

Create a folder for family photos online

7.2 Creating Files in Google Drive

You can create files in Google Drive, like stories or drawings, without leaving the website! Google Docs is for writing, like Microsoft Word from Chapter 2. Let's make a file next!

What's a File?

- A document, like a story or list, saved in Drive.



Why Create Files?

- Write homework or notes and save them online.



Activity Preview:

- You'll write a story file.

Parent Tip:

- Read your child's story with them!

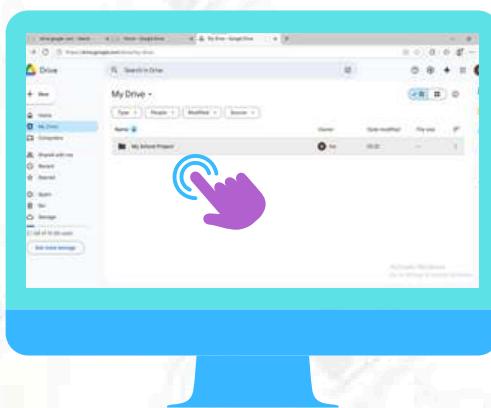


Class Activity 2 : Make a Story File

Let's write a short story in Google Docs! You'll create a file and type in it.

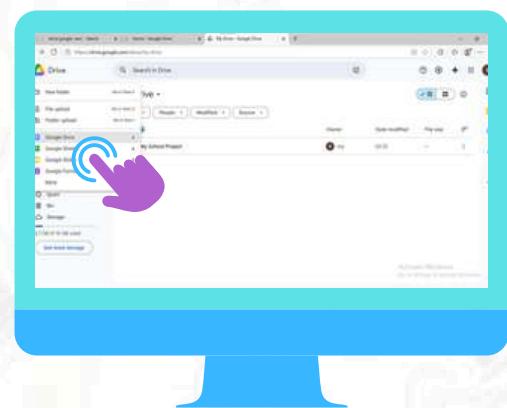
1 Step

Open drive.google.com and go to "My School Projects" folder.



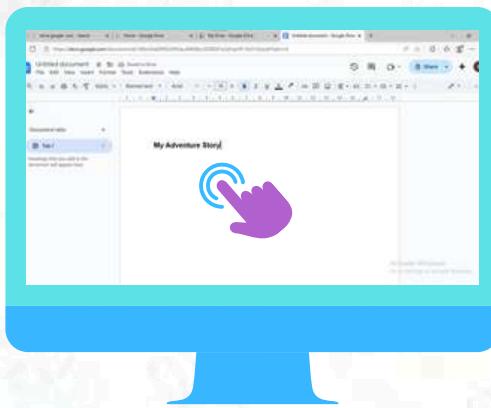
2 Step

Click "New" > "Google Docs."



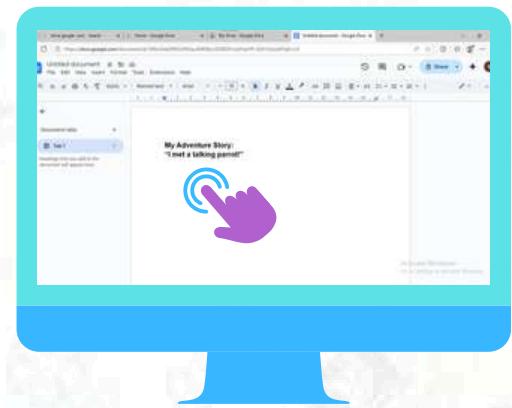
3 Step

Type a title, like "My Adventure Story."



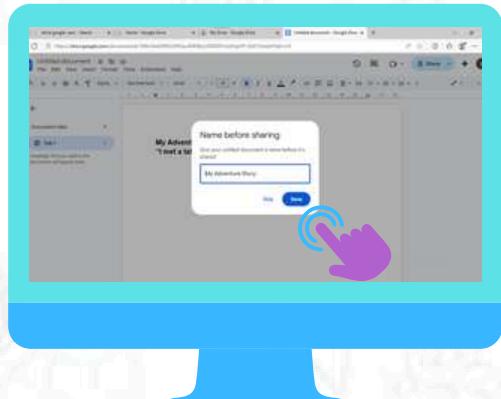
4 Step

Write one sentence, e.g., "I met a talking parrot!"



5 Step

Click the blue "Share" button to save (it autosaves too).



Challenge:

Add a second sentence about a Pakistani place, like "in Lahore's park."



Home Activity 2:

Write a short online note about your favorite animal.

7.3 Organizing Files in Folders

Just like moving files on your computer, you can move files into folders in Google Drive to stay organized. Let's practice moving your story!

Why Organize?

It's easier to find files for school or fun.

Example:

Put all homework in a "School" folder.

Activity:

Move your story file.

- Go to "My Drive" in drive.google.com.
- Find your story file (e.g. "My Adventure Story").
- Drag it into "My School Projects" folder.

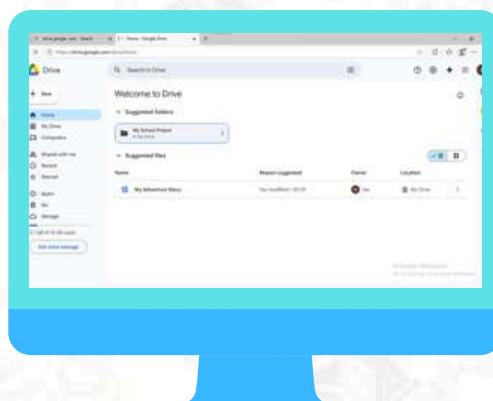


Class Activity 3: Organize a File

Let's practice organizing! You'll move another file and rename it to make it clear.

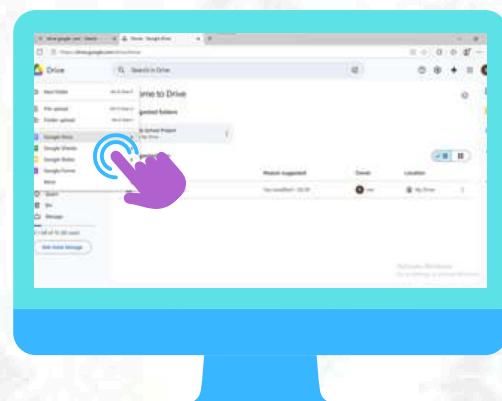
1 Step

Open drive.google.com.



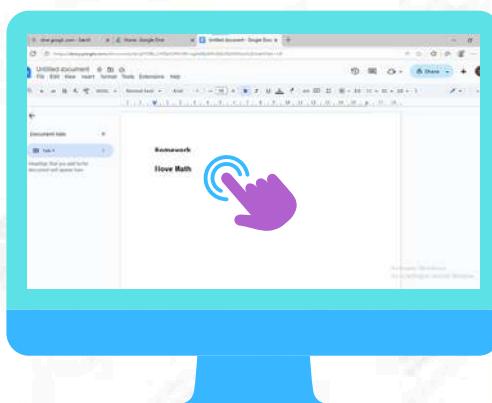
2 Step

Click "New" > "Google Docs" to create a new file.



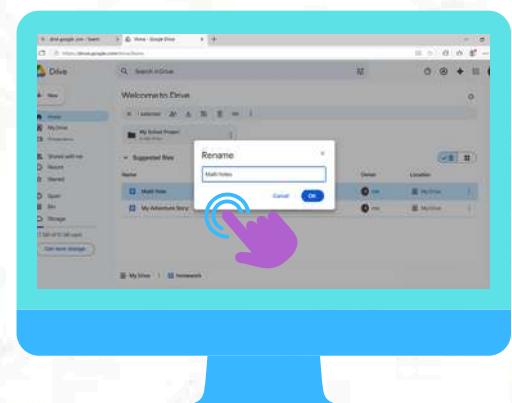
3 Step

Name it "Homework" and type one sentence, e.g., "I love math!"



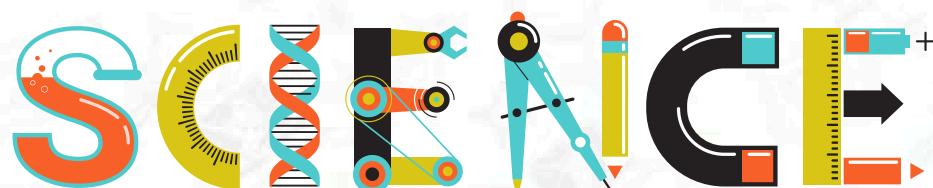
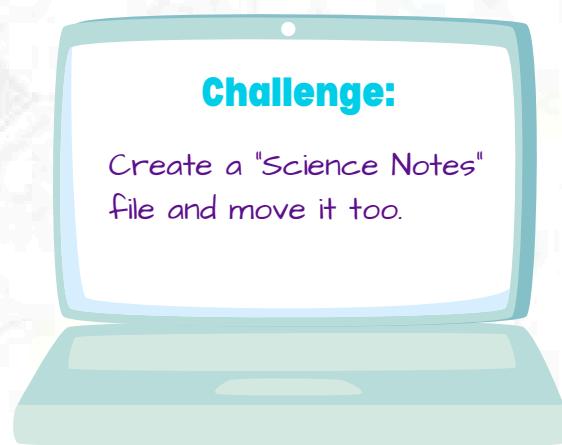
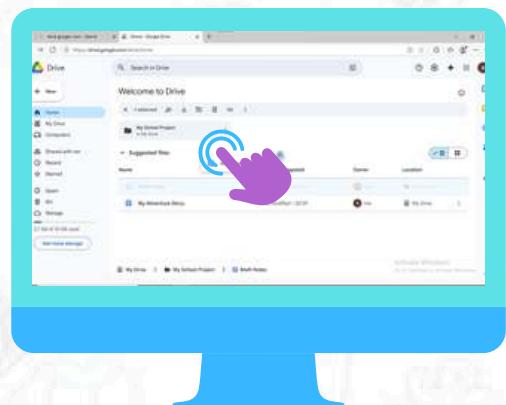
4 Step

Right-click the file, select "Rename," and change it to "Math Notes."



5 Step

Drag "Math Notes" into "My School Projects" folder.



Home Activity 3:

Move a file to a new online folder for drawings

7.4 Editing Files in Google Drive

Editing means changing a file, like adding words to your story. Google Docs lets you edit anytime, and changes save automatically!

What's Editing?

Fixing or adding to your work, like in Chapter 2's Word files.

Why Edit?

Make your files better for school or sharing.

Activity Preview:

You'll edit your story next.

DIY Idea:

Print your story to show your teacher!



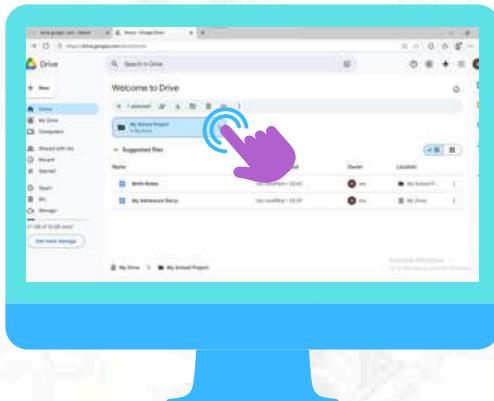
Google Drive

Class Activity 4 : Edit Your Story File

Let's make your story longer! You'll open your story file and add more sentences.

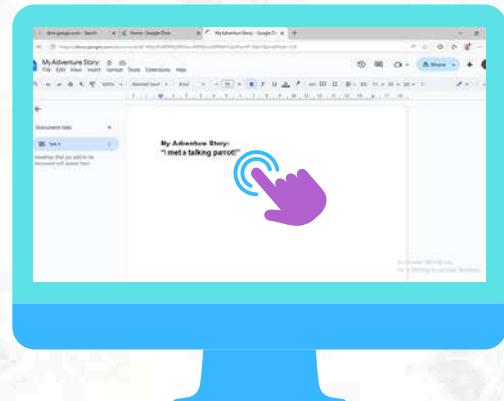
1 Step

Open drive.google.com and go to "My School Projects."



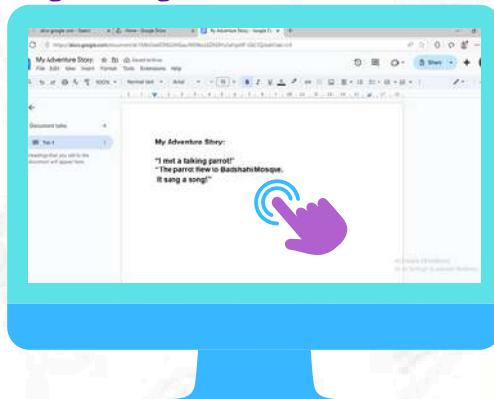
2 Step

Double-click "My Adventure Story" to open it.



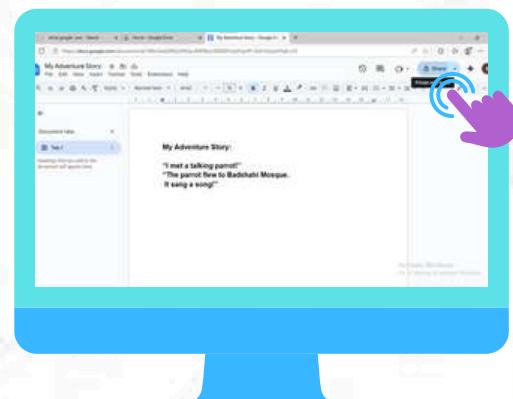
3 Step

Add two new sentences, e.g., "The parrot flew to Badshahi Mosque. It sang a song!"



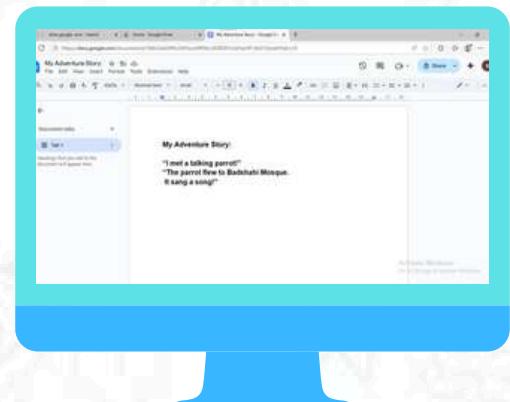
4 Step

Click anywhere—it autosaves!



5 Step

Check your story—does it sound fun?



Challenge:

Add a sentence about a Pakistani festival, like "We saw Basant kites!"



Home Activity 4: Edit an online story with a new sentence about a festival.

7.5 Deleting Files Safely

Sometimes you don't need a file anymore, like an old note. In Google Drive, deleting is like moving files to the Recycle Bin in Chapter 2. Let's learn to delete safely!

Why Delete?

To keep your Drive tidy and free up space.

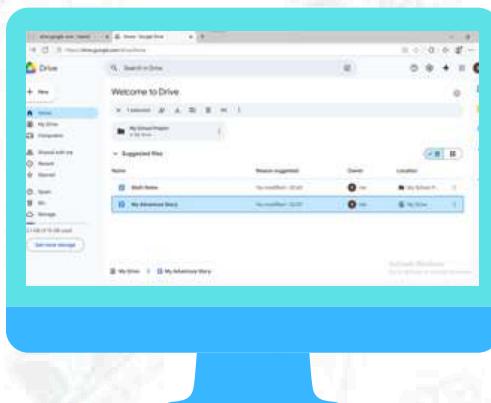
Tip:

Deleted files go to Trash, so you can get them back if needed.

Class Activity 5 : Delete a Test File

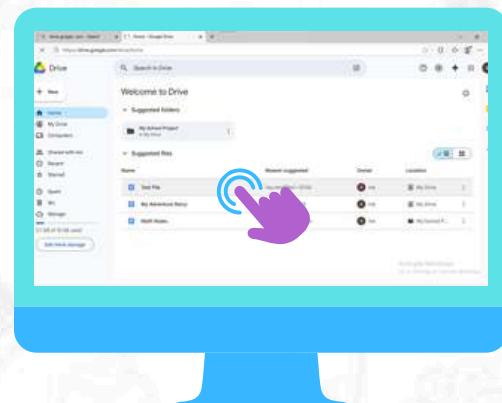
1 Step

Open drive.google.com.



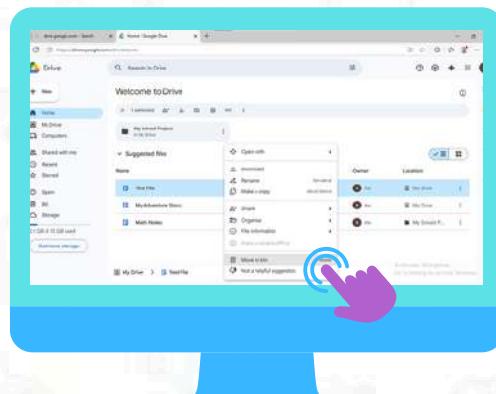
2 Step

Click "New" > "Google Docs" and name it "Test File."



3 Step

Right-click "Test File" and select "Move to Trash."



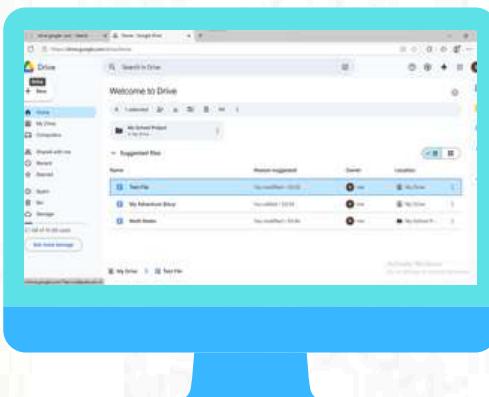
Home Activity 5: Create and delete another file in presence of family.

Class Activity 6 : Delete and Restore

Let's practice deleting and bringing back a file! This helps you clean Drive without losing important work.

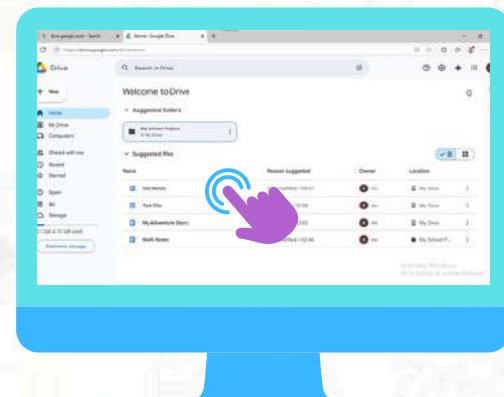
1 Step

Open drive.google.com and go to "My Drive."



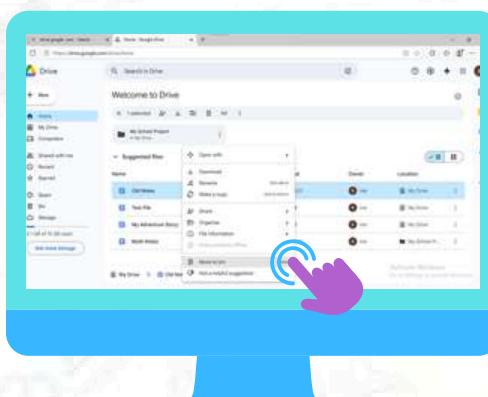
2 Step

Create a new Google Doc named "Old Note."



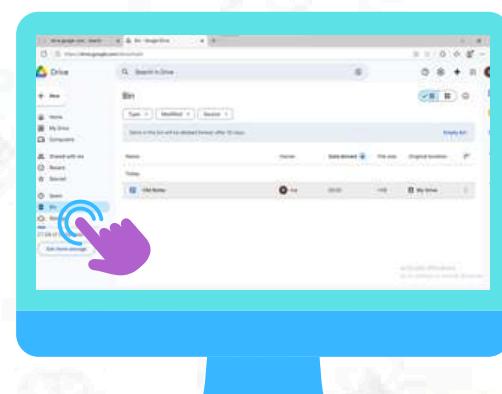
3 Step

Right-click "Old Note" and click "Remove" to delete it.



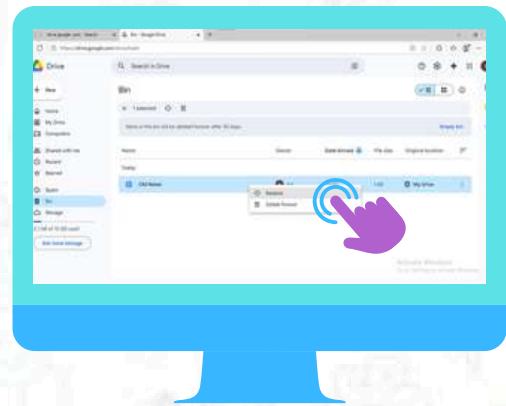
4 Step

Click "Trash" on the left to see deleted files.



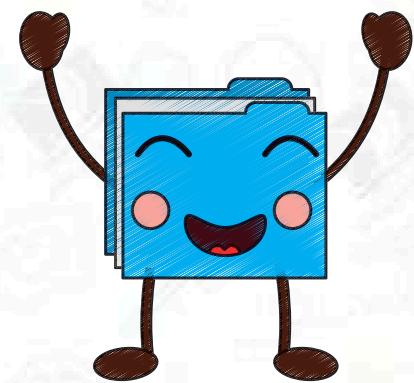
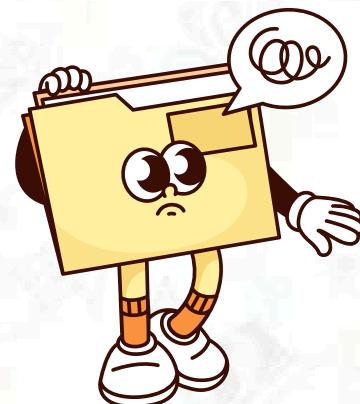
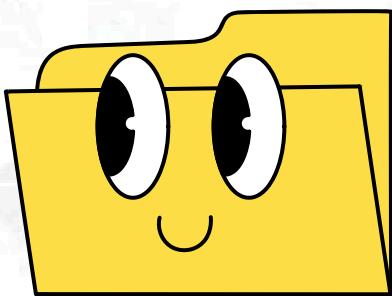
5 Step

Right-click "Old Note" in Trash and select "Restore."



Challenge:

Delete "Old Note" again and empty Trash (ask an adult).



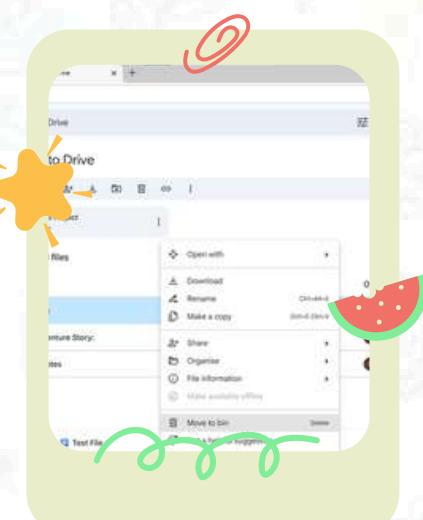
Home Activity 6:

Delete an old online note and restore it

Chapter 7 Summary and Final Home Activity

Great job, cloud explorer!

You:



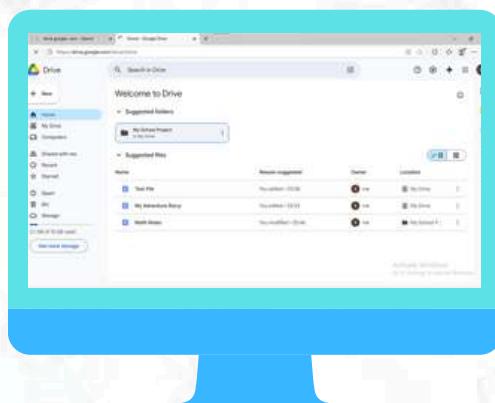
- **Created and organized folders and files in Google Drive.**

- **Moved, renamed, edited, and deleted files.**

Final Activity: Make a Festival Folder

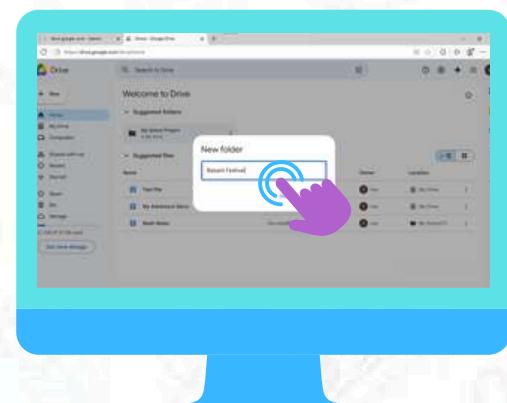
1 Step

Open drive.google.com.



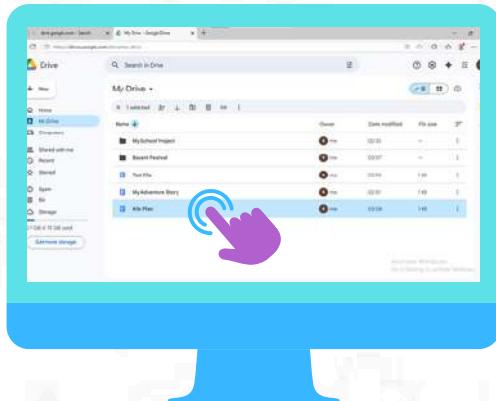
2 Step

Click "New" > "Folder" and name it "Basant Festival."



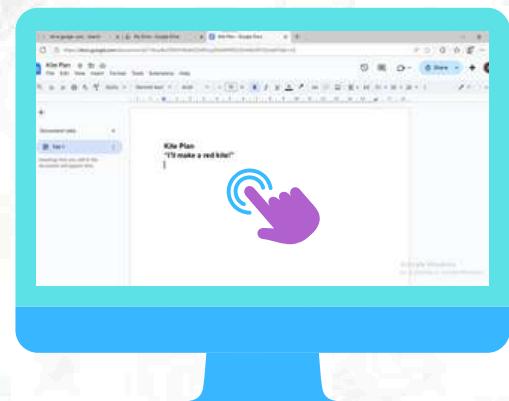
3 Step

Create a Google Doc inside it called "Kite Plan."



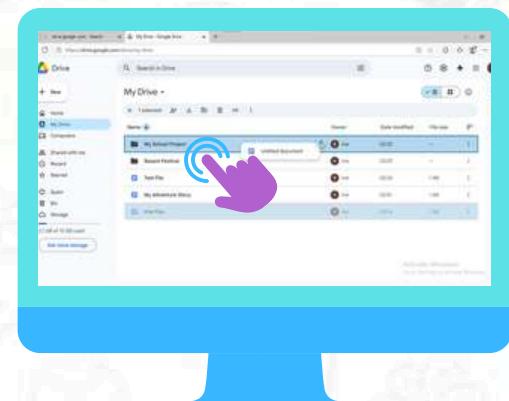
4 Step

Write one sentence, e.g., "I'll make a red kite!"



5 Step

Move "Kite Plan" to "My School Projects" if you want!



Homework:

Add a sentence to "Kite Plan" about your favorite festival.



CHAPTER 8:

Advanced Digital Art with Canva

Welcome to Advanced Canva!

Canva is your art studio! In Book 1, you opened and edited templates. Now, you'll create fancier designs with layers, animations, and teamwork, like posters or moving graphics. Get ready to shine!

What's Advanced Canva?

Using cool tools to make pro-level art.

Why Learn More?

Design for school, festivals, or fun with friends!

Activity Preview:

You'll review Book 1 skills first!

Instructions:

Ask an adult to help you sign into www.canva.com.



8.1 Revisiting Canva Basics (Book 1 Review)

Let's refresh Book 1! You learned to open templates (ready-made designs) and edit them by changing text or images. This helps us start our advanced journey.

Key Skills:

- Open a template: Pick a design to start.
- Edit: Change words, colors, or pictures.

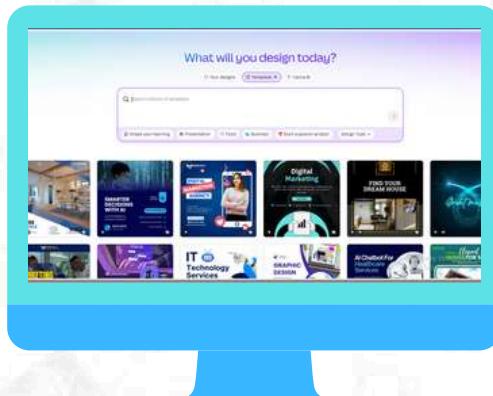


Activity:

Review with a template.

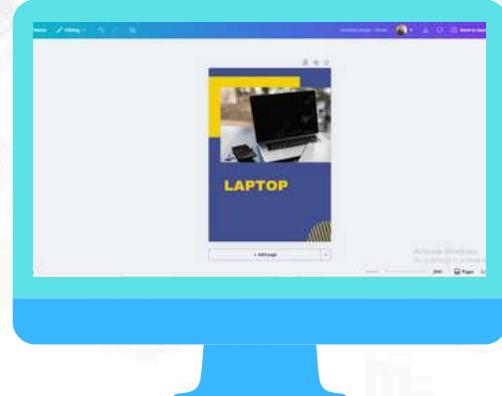
1 Step

Open www.canva.com and sign in (with adult help).



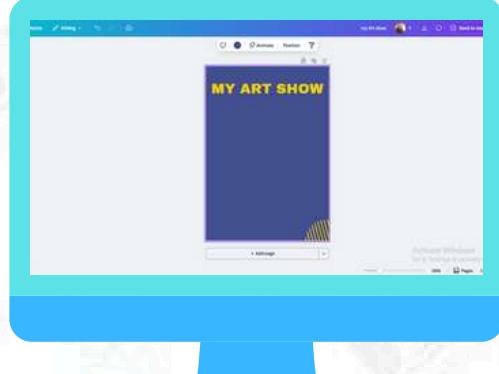
2 Step

Search "poster" and pick a template.



3 Step

Change the text to "My Art Show!"

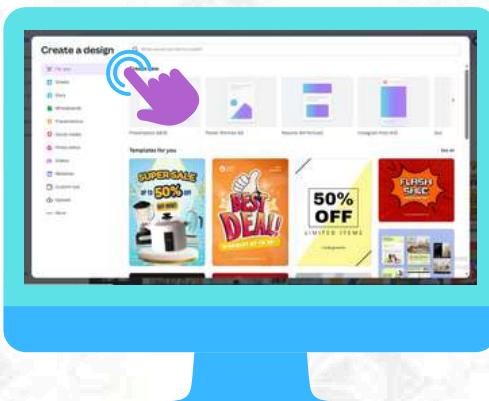


Class Activity 1: Create an Art Show Poster

Let's practice Book 1 skills! You'll open and edit a template to make a quick poster, warming up for advanced Canva.

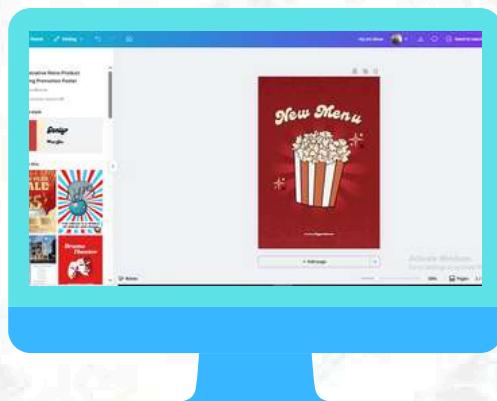
1 Step

Go to www.canva.com and click "Create a design" > "Poster."



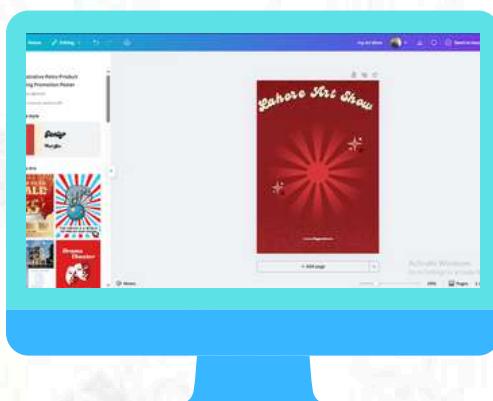
2 Step

Choose a colorful poster template (search "art").



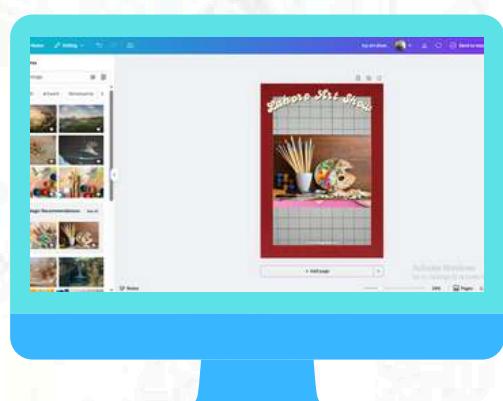
3 Step

Change the title to "Lahore Art Show."



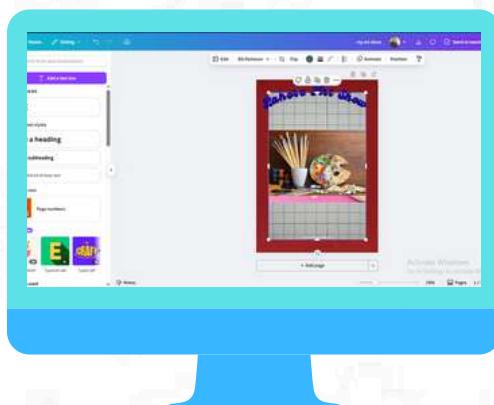
4 Step

Replace an image with a new one (search "painting" in "Elements").



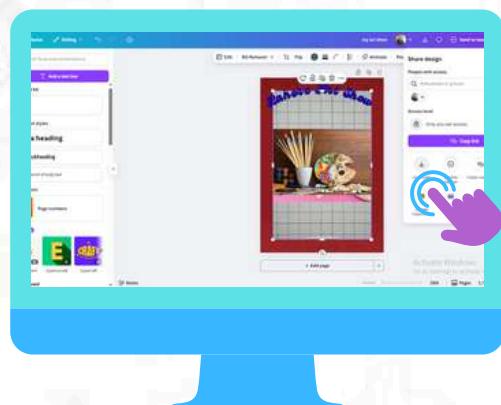
5 Step

Change the text color to blue or red.



6 Step

Download it as "ArtPoster.png".



Challenge:

Add "By [Your Name]" to the poster at the end.



Home Activity 1:

Edit a family poster online.

8.2 Exploring Advanced Canva Features

Advanced Canva lets you use layers (stacking images/text) and grids (organizing designs). These make your art look neat and professional, like a real designer!

What's a Layer?

Each part (text, image) sits on its own level, like stacking papers.

What's a Grid?

Lines to align your design perfectly.

Activity Preview:

You'll design with layers next.

Parent Tip:

Ask your child to explain their design!

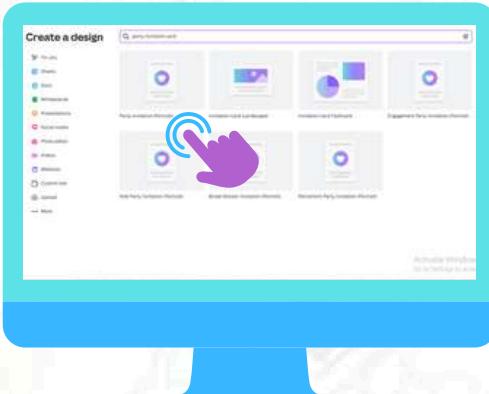


Class Activity 2: Create an Invitation Card

Let's stack layers to make a cool invitation! You'll place text and images on different levels for a neat look.

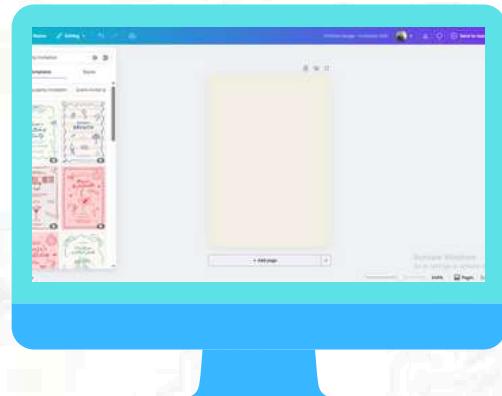
1 Step

Open www.canva.com and click "Create a design" > "invitation."



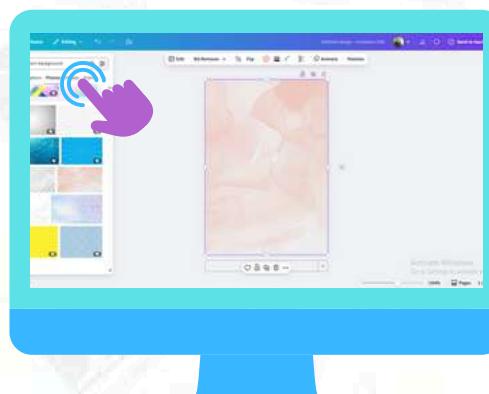
2 Step

Choose a blank design or simple template.



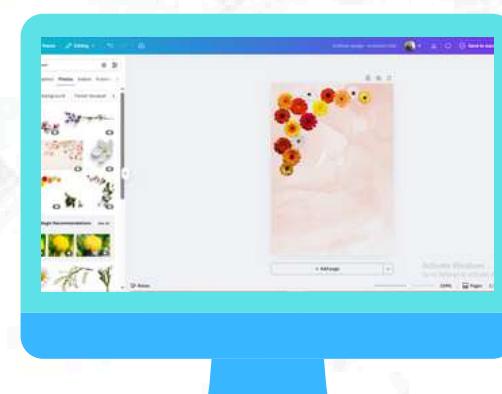
3 Step

Add a background: Search "pattern" in "Elements" and pick one.



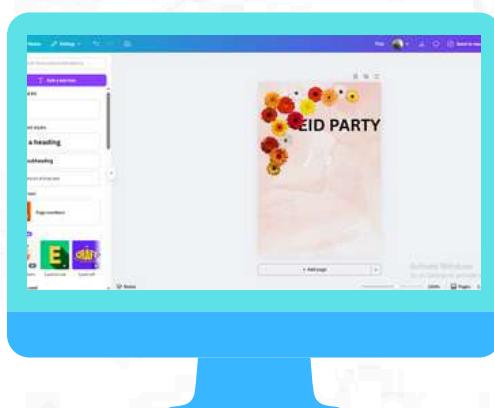
4 Step

Add an image: Search "flower" and place it on top.



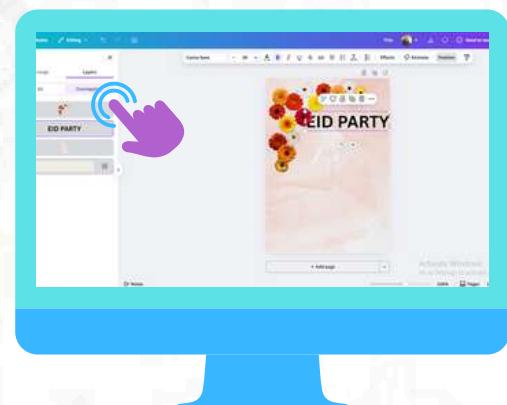
5 Step

Add text. Type "Eid Party!" in a big font.



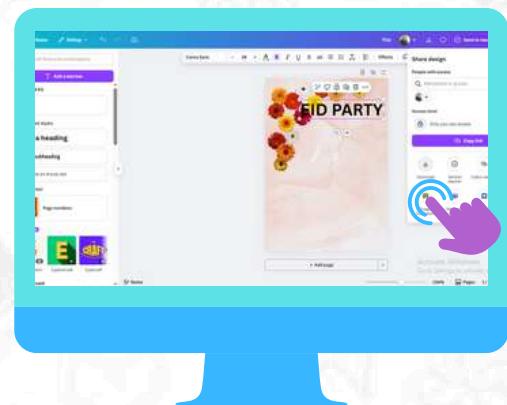
6 Step

Click "Position" > "Layers" to move text above the flower.



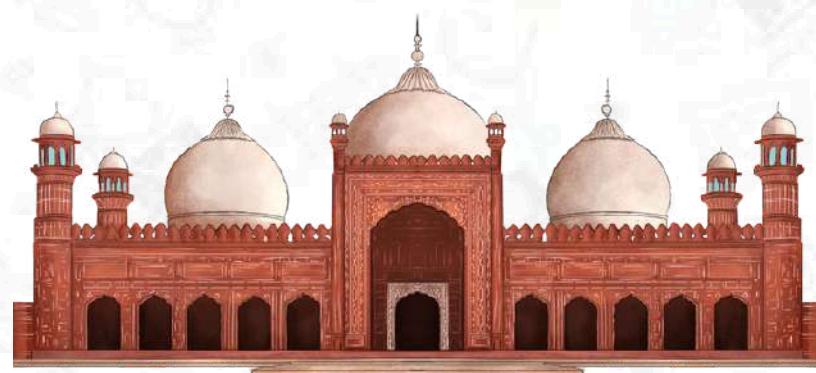
7 Step

Download as "EidInvite.png."



Home Activity 2:

Add a Pakistani touch, like "at Badshahi Mosque."



8.3 Creating Animations in Canva

Content: Animations make your designs move, like a dancing kite! Canva lets you add effects to create GIFs or videos, perfect for sharing online.

What's an Animation?

A moving picture, like a mini-cartoon.

Why Animate?

Make your art fun for festivals or school!

Class Activity Preview:

You will create an animated post next.

DIY Idea:

Present your animated designs to family members.

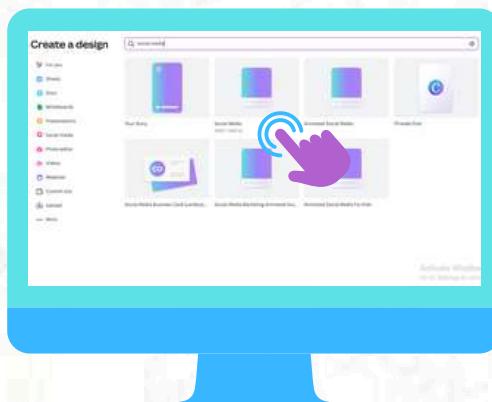


Class Activity 3: Design an Animated Post

Let's make a moving social media post for Basant! You'll add animation effects to text and images.

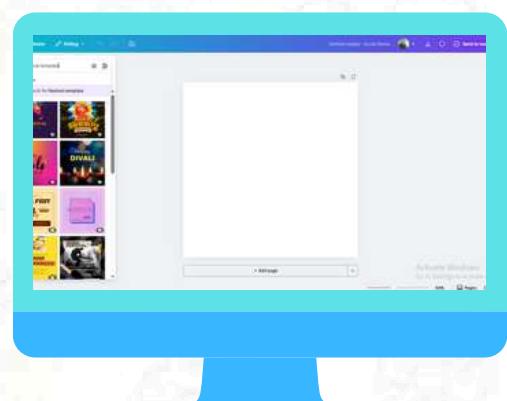
1 Step

Go to www.canva.com and click "Create a design" > "Social Media Post."



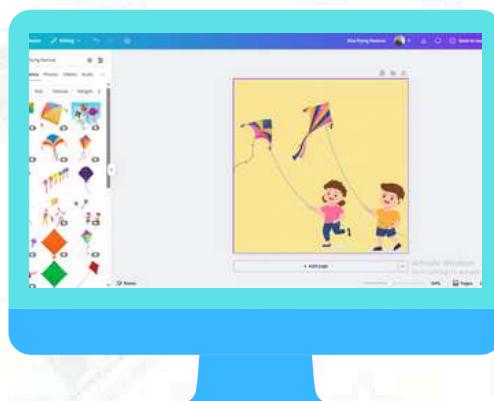
2 Step

Choose a blank design or search "festival" for a template.



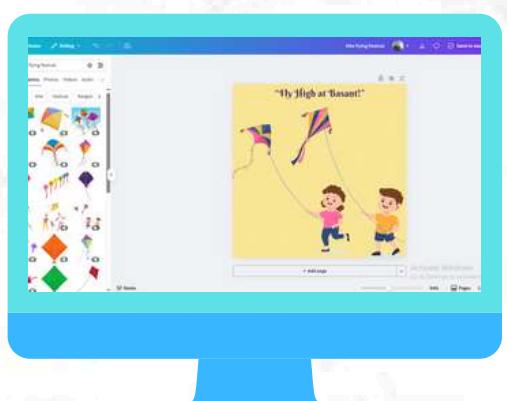
3 Step

Add an image: Search "kite" in "Elements" and place it.



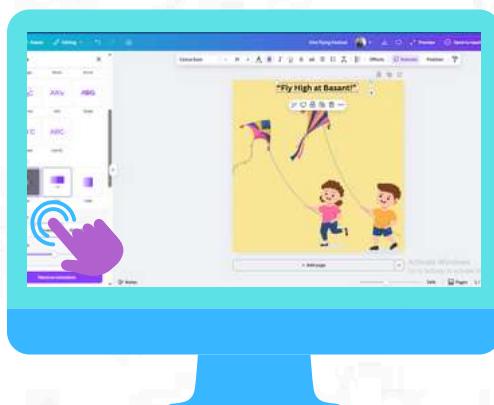
4 Step

Add text: "Fly High at Basant!" in a bold font.



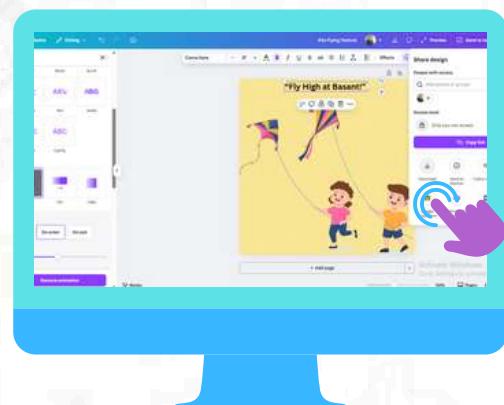
5 Step

Click "Animate" > choose "Rise" for the text and "Pan" for the kite.



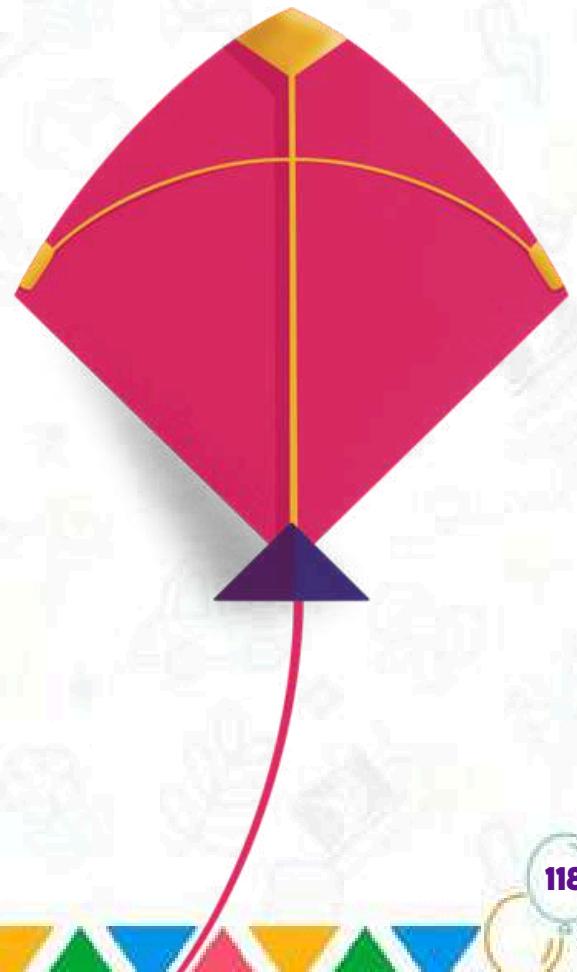
6 Step

Download as a GIF ("Share" > "Download" > "GIF").



Challenge:

Add a second kite with a different animation.



Home Activity 3:

Add more Animations to Basant card.

8.4 Designing Presentations

Presentations are like digital stories! In Canva, you can make interactive slides with images, text, and effects, better than PowerPoint from Chapter 1.

What's a Presentation?

Slides to share ideas, like a school project.

Why Interactive?

Add buttons or links to make slides fun!

Activity Preview:

You'll make a 3-slide presentation next.

DIY Idea:

Present your slides to your family!

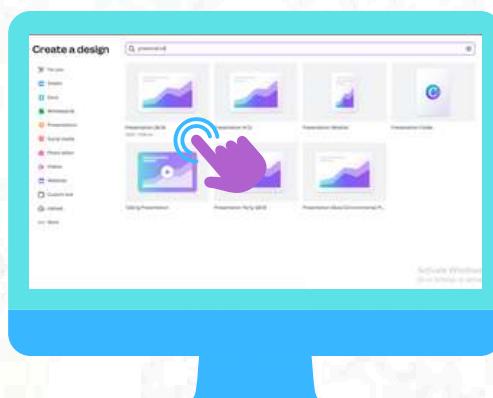


Class Activity 4: Create a 3-Slide Presentation

Let's design a presentation about your favorite animal! You'll make slides with images and interactive elements.

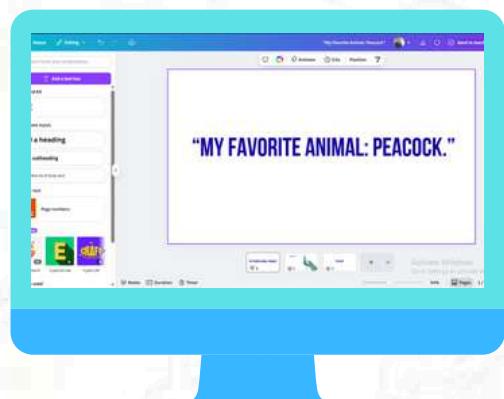
1 Step

Open www.canva.com and click "Create a design" > "Presentation."



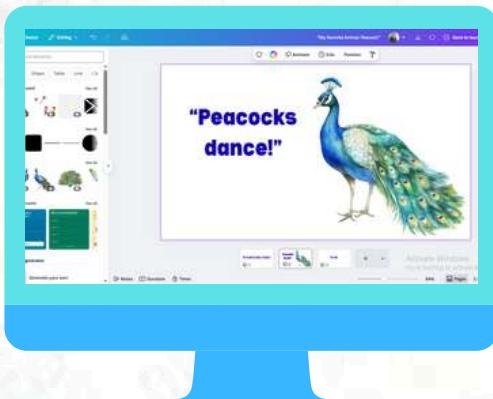
2 Step

Slide 1: Add a title, "My Favorite Animal: Peacock."



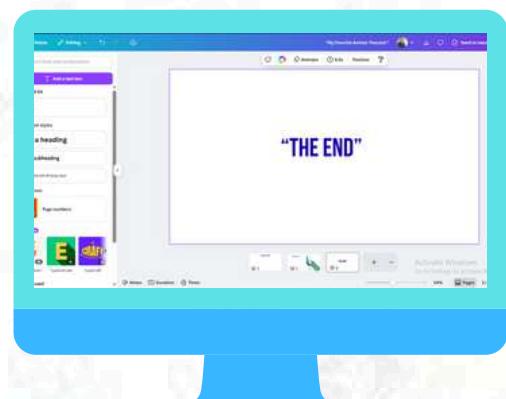
3 Step

Slide 2: Add an image (search "peacock" in "Elements") and text: "Peacocks dance!"



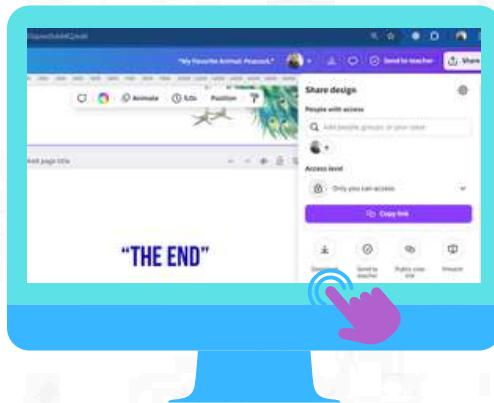
4 Step

Slide 3: Add text: "The End" and a button (search "button" in "Elements").



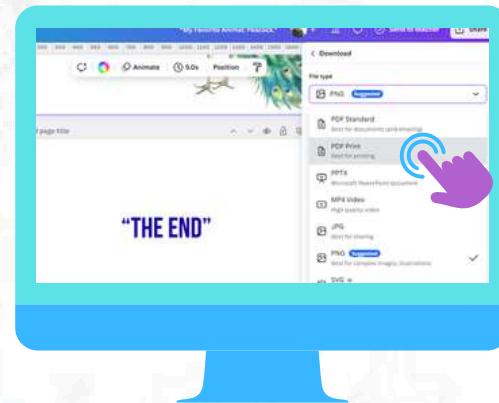
5 Step

Click the button, "Share" and then download.



6 Step

Download as "PeacockSlides.pdf."



Challenge:

Add a Pakistani fact, like
"Peacocks live in Sindh."



Home Activity 4:

Design an interactive family story slide online.

8.5 Collaborative Design Projects

Canva lets you work with friends on designs, like a class poster! You'll share a project and edit together, building teamwork skills.

What's Collaboration?

Working as a team on one design.

Why Collaborate?

Make bigger projects with others' ideas!

Class Activity Preview:

You will create a class newsletter next.

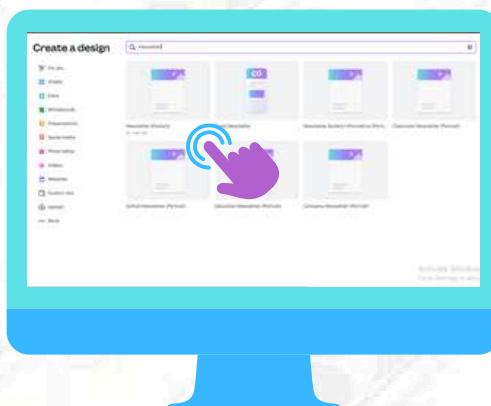


Class Activity 5: Design a Newsletter

Let's make a newsletter with a friend! You'll design a class update and share it for teamwork.

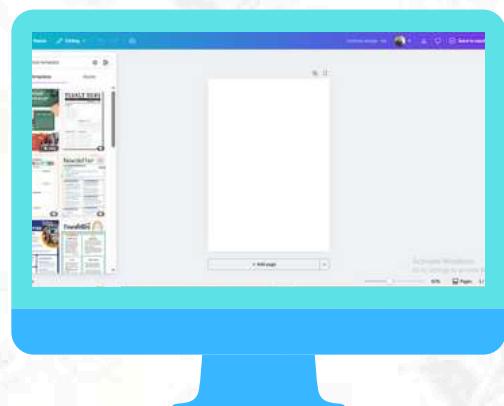
1 Step

Go to www.canva.com and click "Create a design" > "Newsletter."



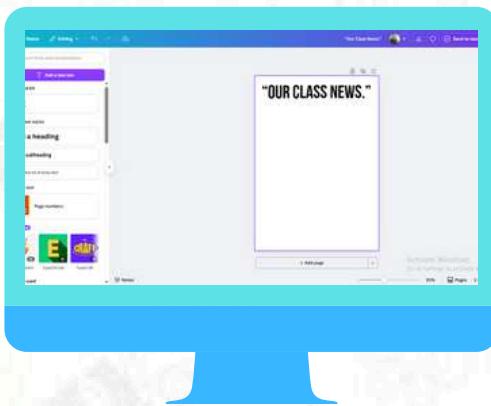
2 Step

Choose a blank design or search "school" for a template.



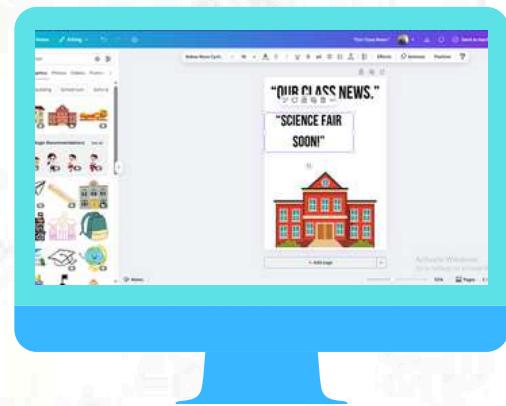
3 Step

Add a title: "Our Class News."



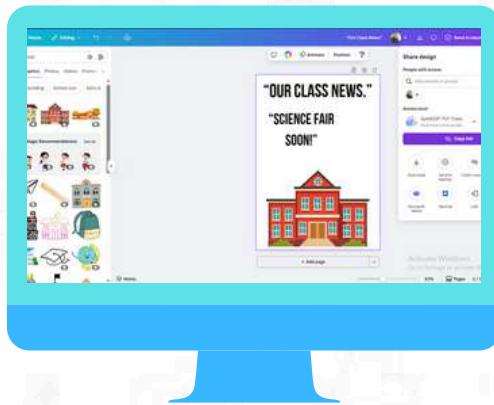
4 Step

Add an image (search "school" in "Elements") and text: "Science Fair Soon!"



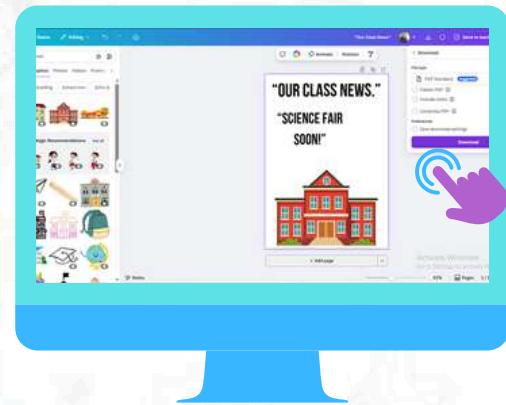
5 Step

Click "Share" > "Link" > "Can edit" and pretend to send to a friend.



6 Step

Download as "ClassNews.pdf."



Challenge:

Add a section about a Pakistani event, like "Eid Mela."



Chapter 8 Summary and Final Activity

Wow, you're a Canva star! You:

- Reviewed Book 1 by editing a template.
- Used layers, animations, presentations, and collaboration.
- Made art for festivals and school!
- Final Activity: Design a Festival Card

8.1 Reviewed Book 1 by editing a template.



8.2 Used layers, animations, presentations, and collaboration.



8.3 Made art for festivals and school!



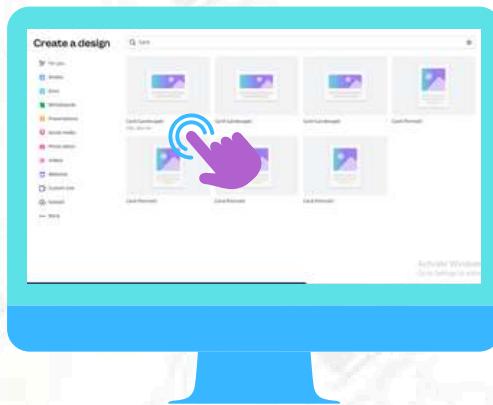
8.4 Final Activity: Design a Festival Card



Final Home Activity

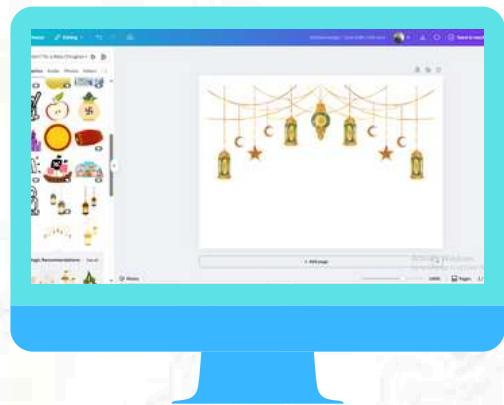
1 Step

Open www.canva.com and click "Create a design" > "Card."



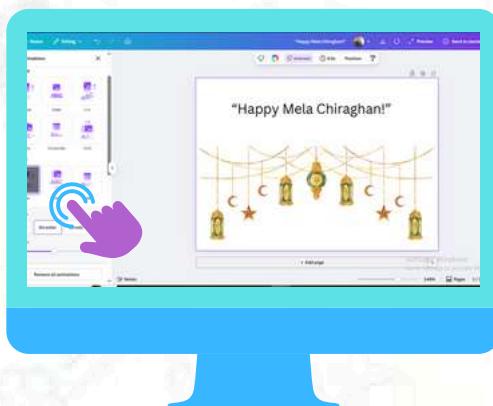
2 Step

Add an image: Search "lantern" for a Mela Chiraghan theme.



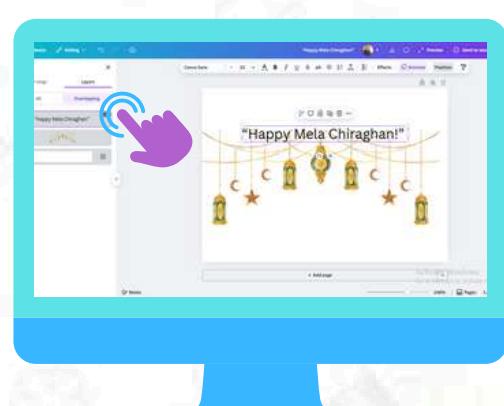
3 Step

Add text: "Happy Mela Chiraghan!" with a "Rise" animation.



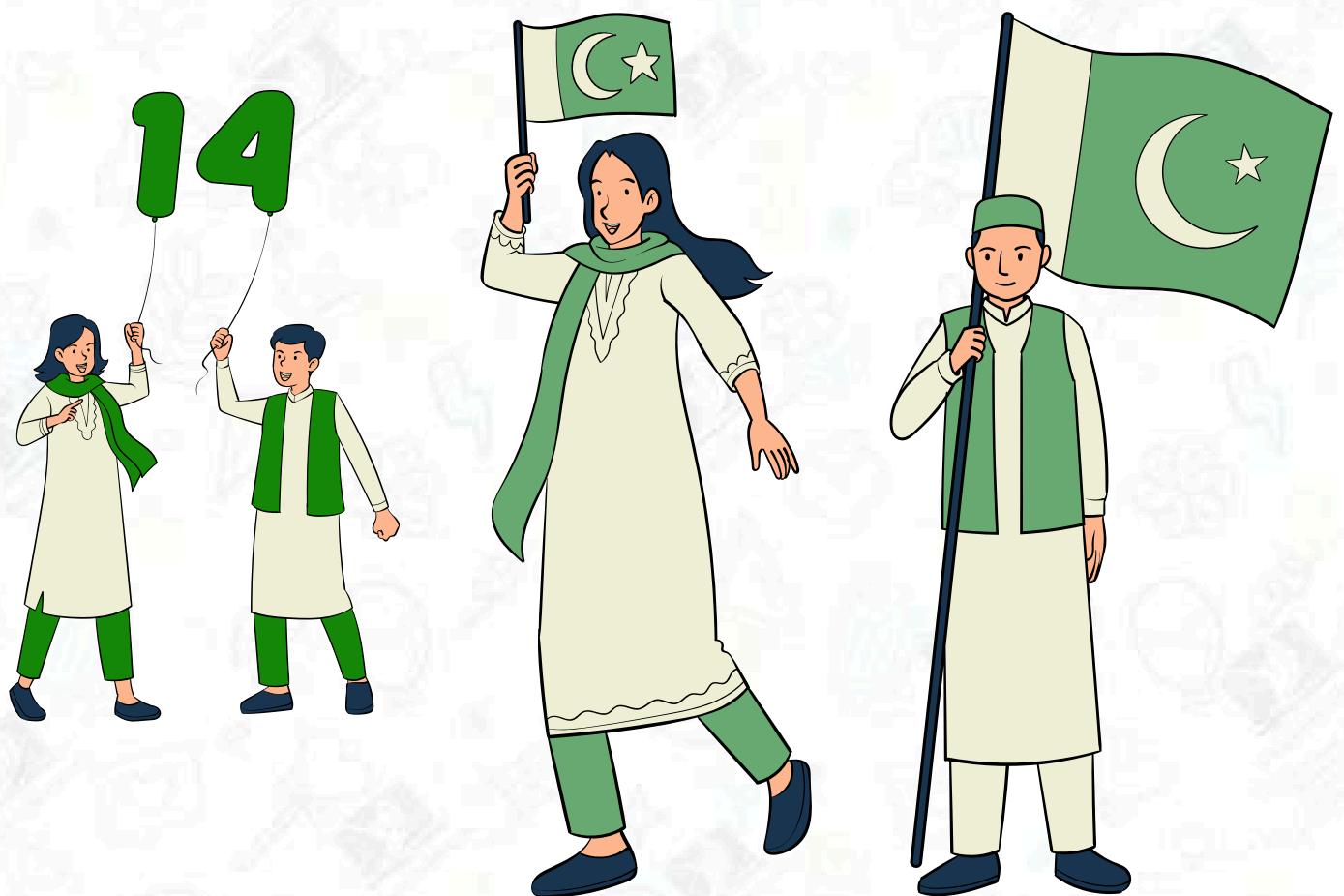
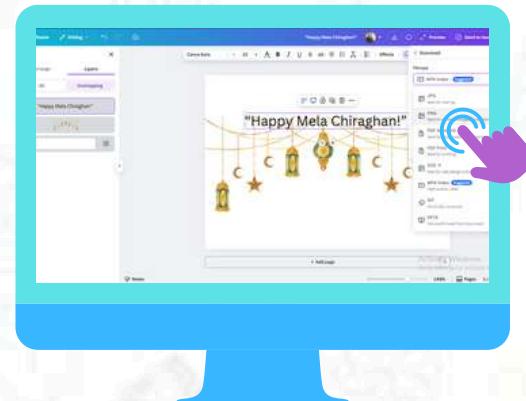
4 Step

Use layers to place text over the lantern.



5 Step

Download as "FestivalCard.png."



Homework:

Share your card with your teacher!

CHAPTER 9: Introduction to Arduino Basics

Welcome to Arduino!

Arduino is like a small computer you can program to make things light up or move! In this chapter, you'll learn the basics of Arduino hardware and simple coding, like turning on an LED, building on electronics from Book 1. It's like coding a robot in VEXcode VR (Chapter 4), but with real parts!

What is Arduino?

A board to build fun projects with code and parts.

Why Learn Arduino?

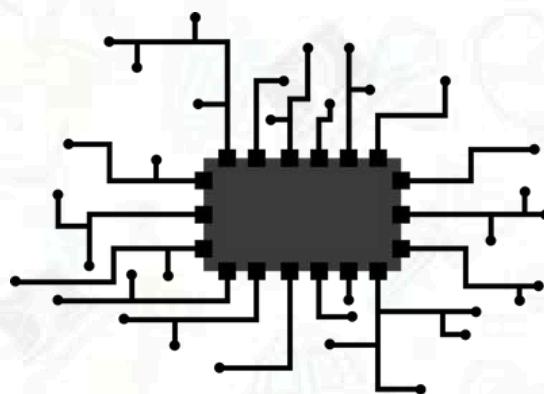
Make lights blink or sensors work, like a mini inventor!

Chapter Preview:

You'll explore the board, set up software, and make an LED blink.

Instructions:

Ask an adult to help with Arduino kit and open the Arduino IDE on your computer.



9.1 Exploring Arduino Hardware

The Arduino board has pins for connecting parts like LEDs or buttons. You'll learn the main parts, like the USB port for power and the microcontroller chip.

Key Parts:

Pins (for wires), USB (for computer), LED (built-in light).

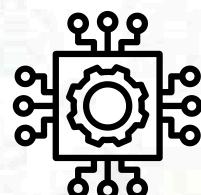
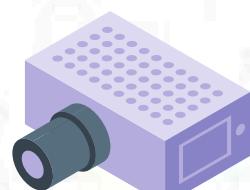
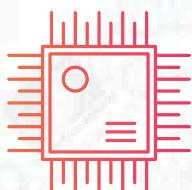


Fun Fact:

Arduino is open-source, used by makers worldwide!

Class Activity Preview:

You'll identify Arduino parts.



Class Activity 1: Explore the Arduino Kit

Let's look at the Arduino kit! You'll name the main parts and draw them.

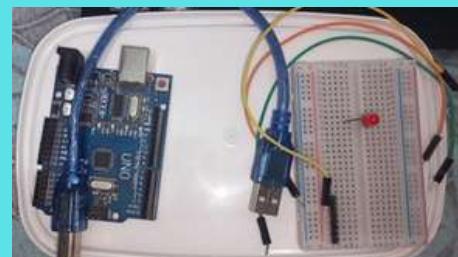
1 Step

Open the Arduino kit with your teacher.



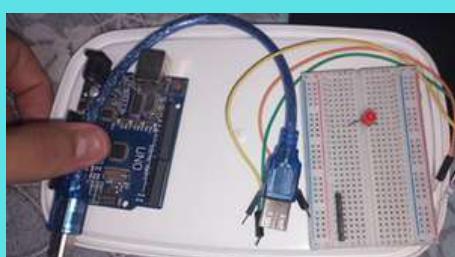
2 Step

Find the board, wires, LED, and USB cable.



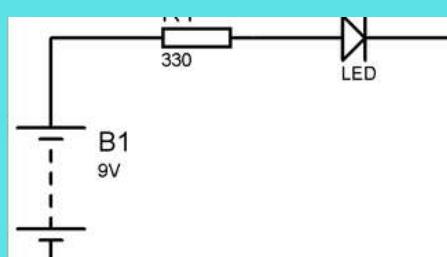
3 Step

Touch the pins and USB port (don't plug in yet).



4 Step

Draw the board and label "Pins," "USB," and "LED on a paper."



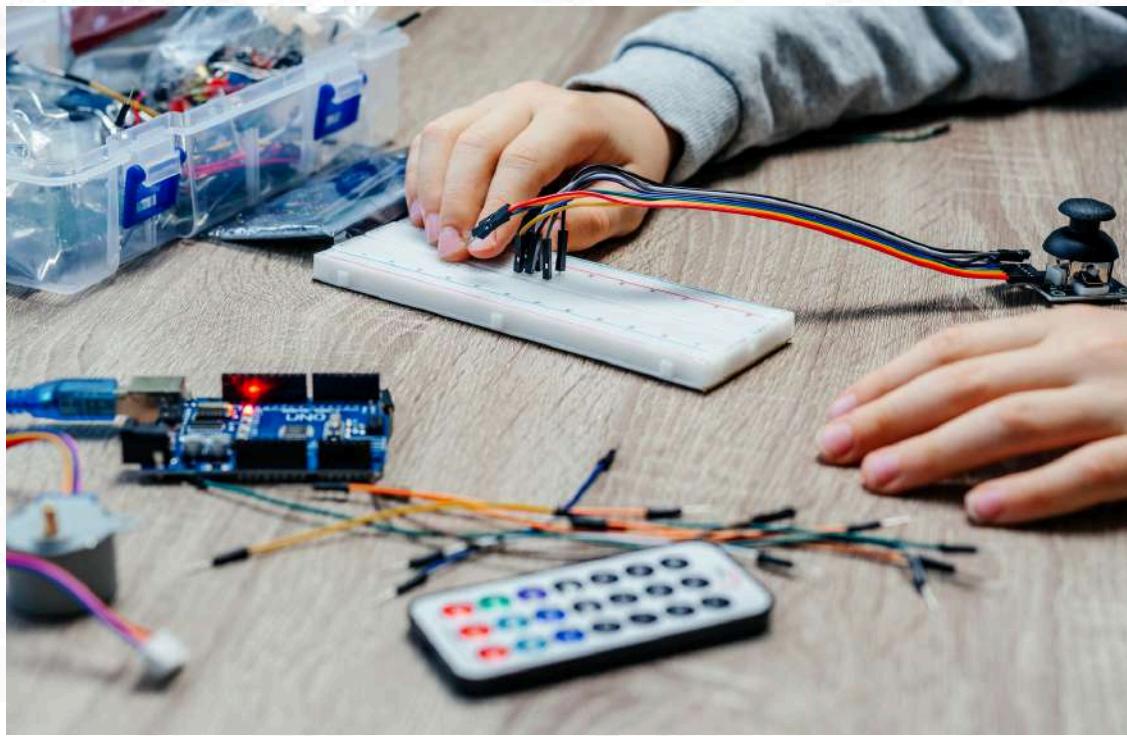
5 Step

Discuss: How is this like the computer parts in Book 1?



Challenge:

Count the number of pins on the board.



Home Activity 1:

Draw an Arduino board and label three parts at home.

9.2 Setting Up the Arduino Software

The Arduino IDE is software to write code, like Google Colab (Chapter 5). You'll install it and connect the board.

What's the IDE?

A program to code and upload to Arduino.

Why Set Up?

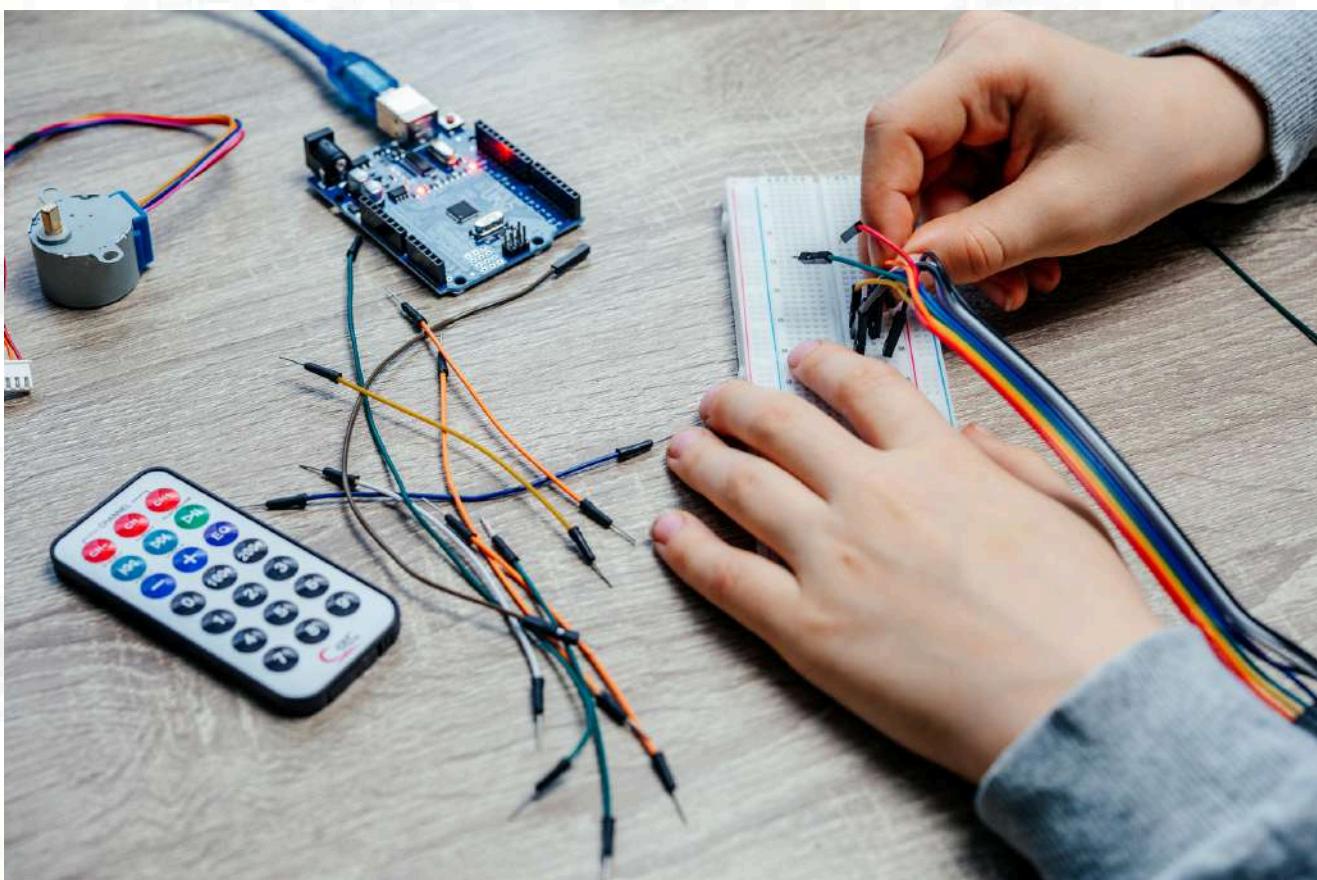
To send instructions to the board.

Class Activity Preview:

You'll connect the board.

Parent Tip:

Help your child download the IDE safely!

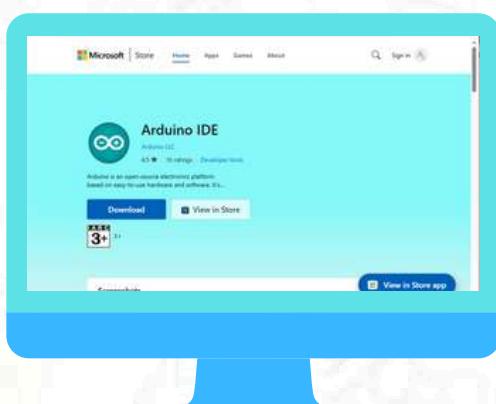


Class Activity 2: Set Up the Software

Let's set up the software! You'll connect the board to your computer and test it.

1 Step

Download the Arduino IDE from arduino.cc with teacher help.



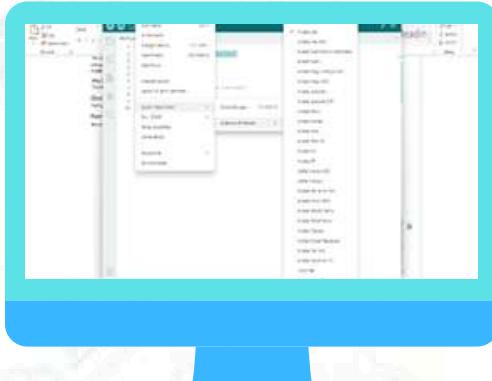
2 Step

Open the IDE and connect the Arduino board with USB cable.



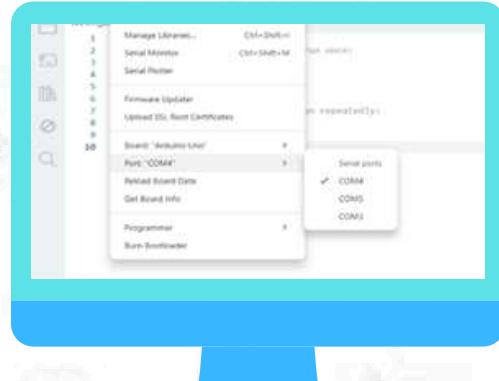
3 Step

Select the board type in Tools > Board (e.g., Arduino Uno).



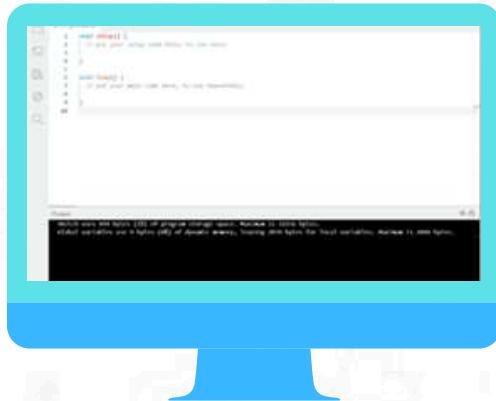
4 Step

Select the port in Tools > Port. Select COM4



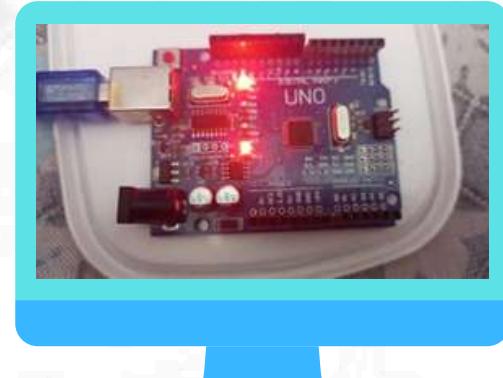
5 Step

Click the upload button (arrow) with an empty sketch to test.



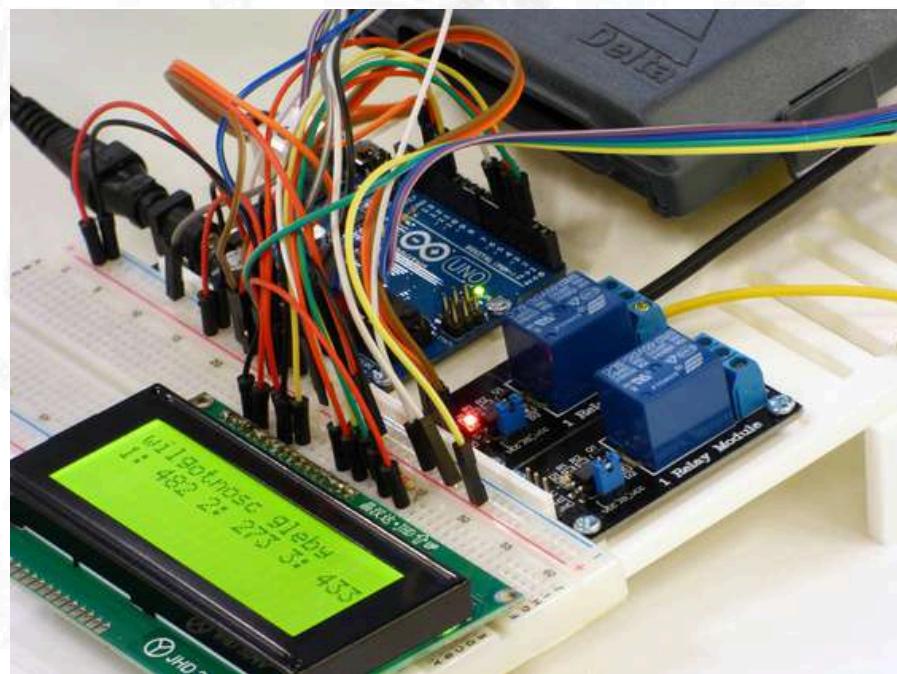
6 Step

See the board's LED blink—it's ready!



Challenge:

Unplug and reconnect the board.



Home Activity 2:

Open the Arduino IDE at home and draw the toolbar buttons.

9.3 Making an LED Blink

An LED is a small light that blinks with code! You'll write a simple program to make it flash, like animations in Scratch (Chapter 3).

What's an LED?

A light that turns on with electricity.

Example:

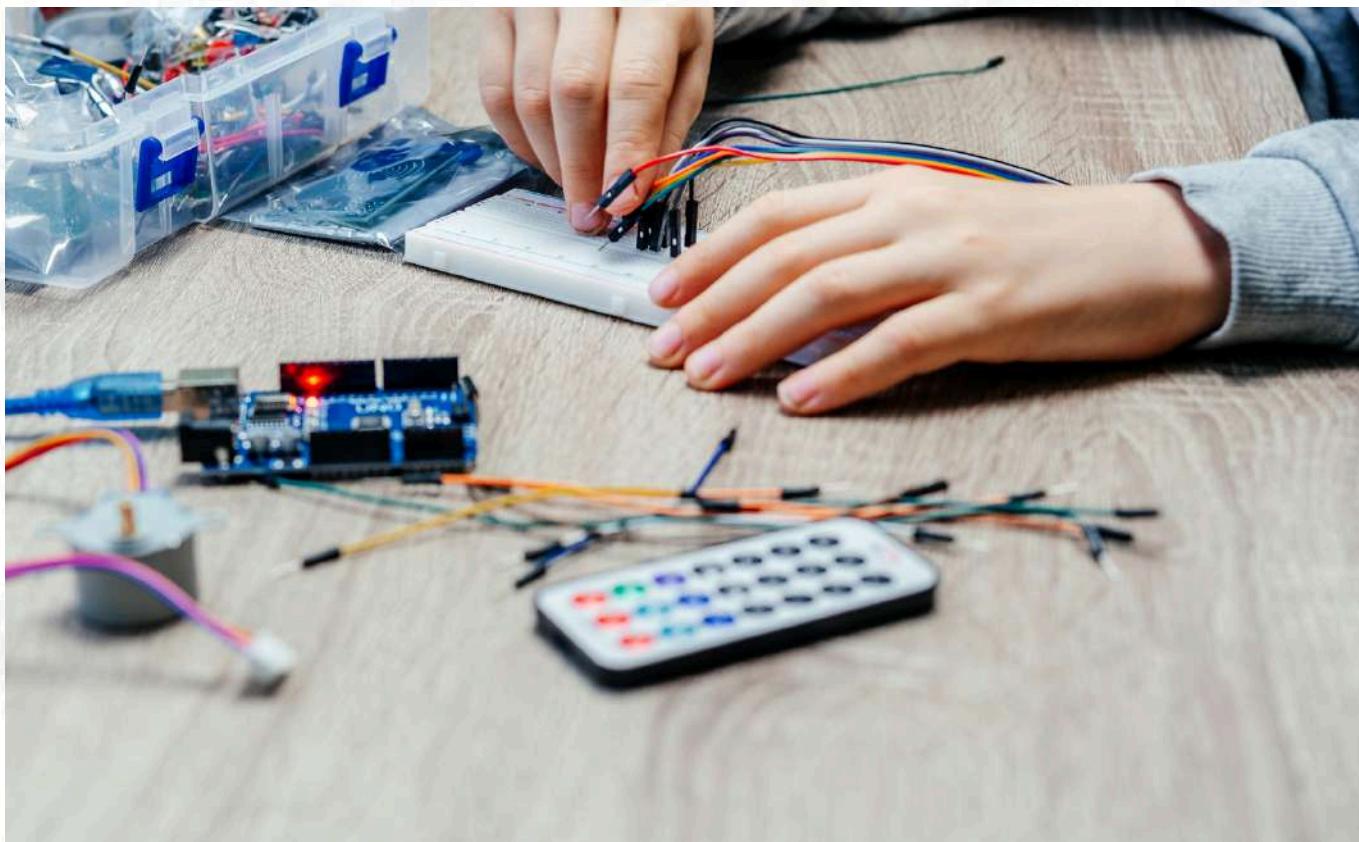
Blink like a signal light!

Class Activity Preview:

You'll code a blink.

DIY Idea:

Think of it as a festival light!

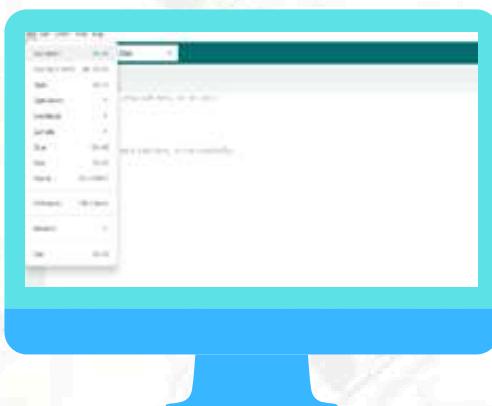


Class Activity 3: Blink an LED

Let's make an LED blink! You'll write code to turn it on and off.

1 Step

Open the Arduino IDE and create a new sketch.



2 Step

Type in `setup(): pinMode(13, OUTPUT);`



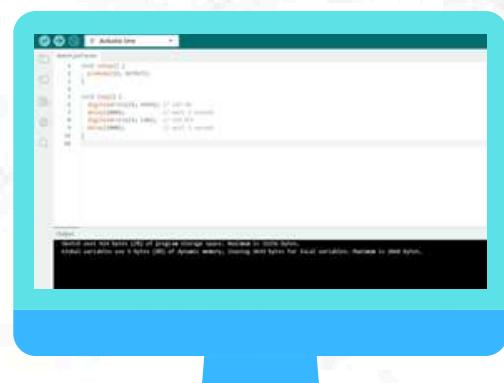
3 Step

Type in `loop(): digitalWrite(13, HIGH); delay(1000); digitalWrite(13, LOW); delay(1000);`



4 Step

Connect the board and click upload.



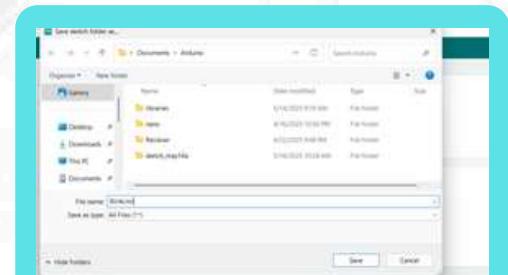
5 Step

Watch the built-in LED blink!



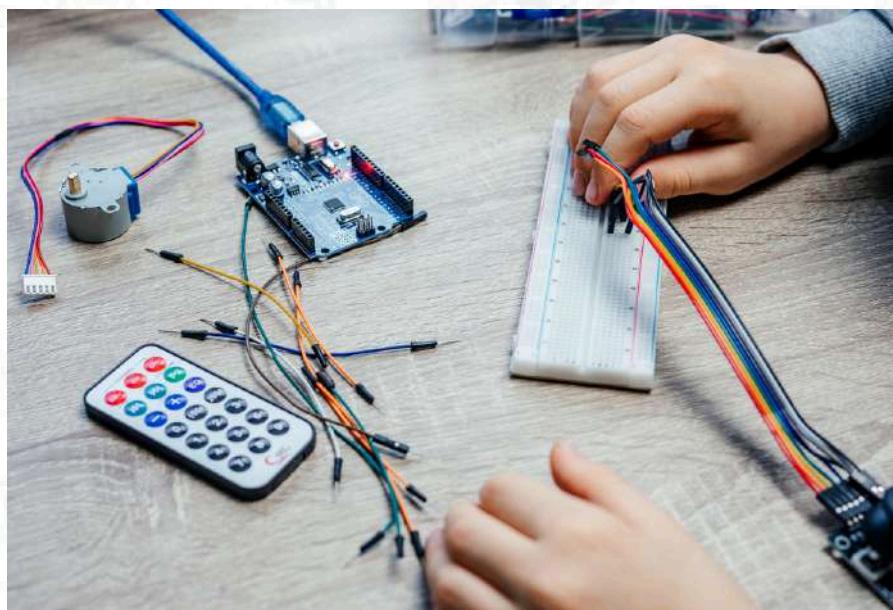
6 Step

Save the sketch as "Blink.ino" and upload to Google Drive (Chapter 7).



Challenge:

Change delay to 500 for faster blinking.



Home Activity 3:

Draw a blinking LED and write what the code does.

9.4 Building a Simple Circuit

Connect an external LED with wires! You'll build a circuit and code it to blink, like electronics in Book 1.

What's a Circuit?

A loop for electricity to flow.

Example:

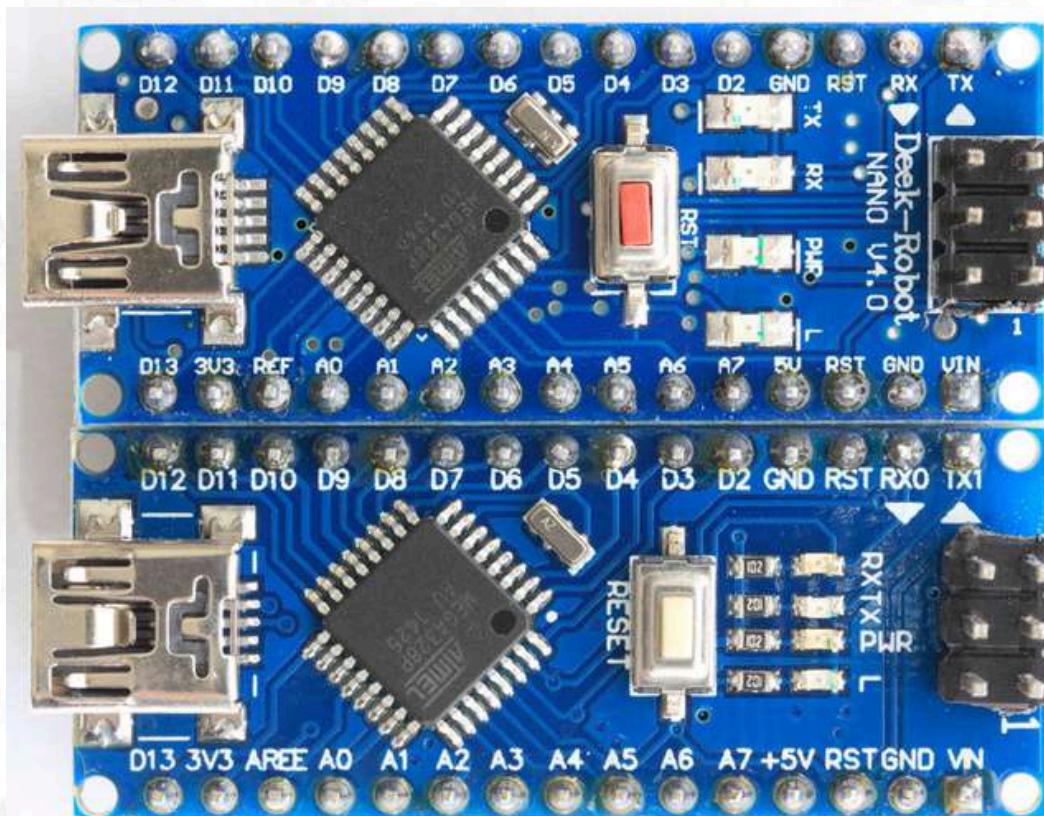
Wire an LED to a pin!

Class Activity Preview:

You'll build and code a circuit.

Safety Tip:

Always unplug when connecting wires!

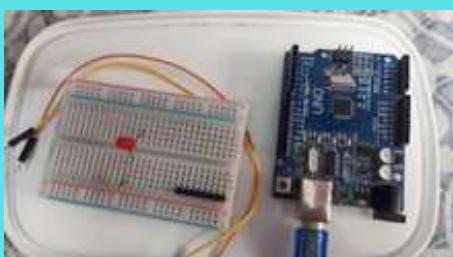


Class Activity 4: Build an LED Circuit

Let's connect an LED! You'll build a circuit and code it to blink.

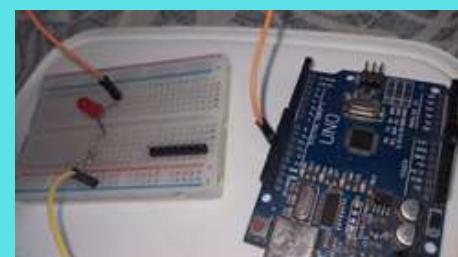
1 Step

Unplug the Arduino and get an LED, resistor, and wires from the kit.



2 Step

Connect the LED long leg to pin 13, short leg to GND via resistor on a breadboard.



3 Step

Plug in the board.



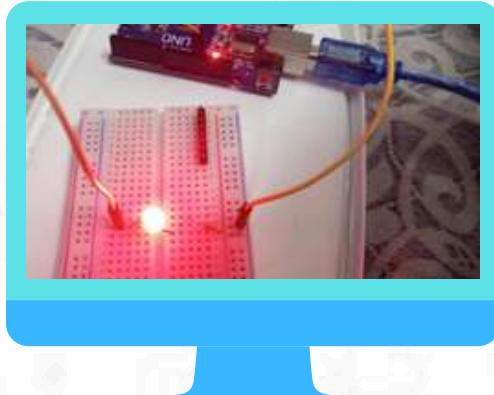
4 Step

use the blink code from Activity 3, but change pin to 13 if needed.



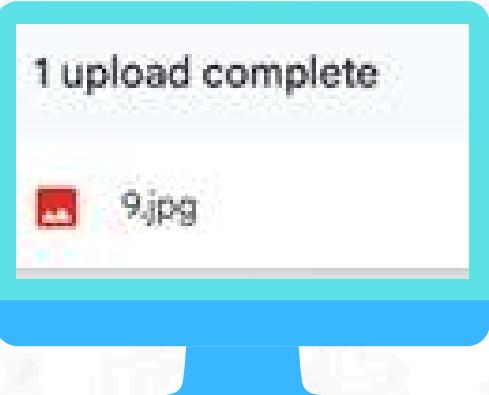
5 Step

Upload and watch the external LED blink!



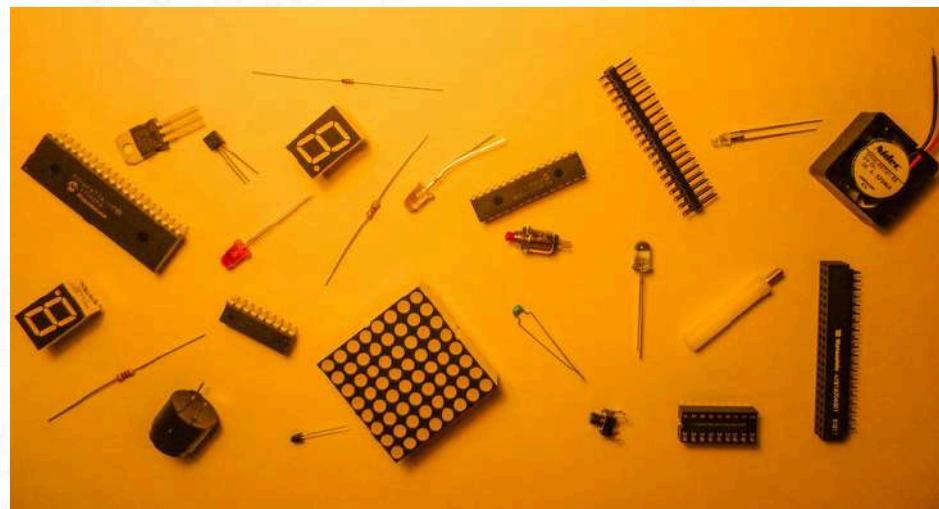
6 Step

Save a photo of your circuit to Google Drive.



Challenge:

Use pin 12 for a second LED.



Home Activity 4:

Draw your LED circuit and label the parts.

Chapter 9 Summary

You're an Arduino beginner! You:

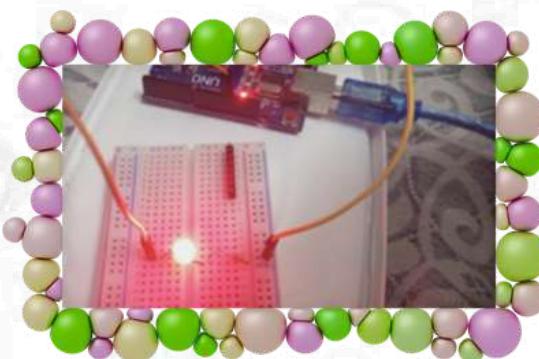
9.1: Explored Arduino hardware.



9.2: Set up the software.



9.3: Made an LED blink with code.



9.4: Built a simple LED circuit.

Home Activity 5:

Research a simple Arduino project online (with adult help) and draw it.

Homework: Share your LED blink video with your family!

CHAPTER 10:

AI for Audio Creation

Welcome to AI Audio Magic!

Artificial Intelligence (AI) can make music and sounds! In this chapter, you'll use Chrome Music Lab and Suno AI to create melodies, effects, and tunes, like a kite festival tune. It's like being a DJ!

What is AI Audio?

AI turns your ideas into music or sounds.

Why Make Audio?

Create fun sounds for stories, games, or festivals!

Activity Preview:

- You'll make a melody today!

Instructions:

Get ready to explore www.musiclab.chromeexperiments.com and www.suno.ai.



10.1 Exploring AI Audio Tools

Let's meet two AI tools! Chrome Music Lab makes simple melodies with blocks. Suno AI creates full songs from your words. Both are fun and easy, like coding in Tynker!

Key Tools:

- Chrome Music Lab: Drag blocks to make tunes.
- Suno AI: Type words to get songs.

Class Activity Preview:

You will make a melody next.

Fun Fact:

AI can mix sounds like a real music producer!



Class Activity 1: Create a Simple Melody

Let's make a melody! You'll use Chrome Music Lab to create a short tune, like a ringtone.

1 Step

Go to www.musiclab.chromeexperiments.com and click "Song Maker."



2 Step

Click the grid to add colored blocks (each block is a note).



3 Step

Make a pattern, like 4 blocks in a row.



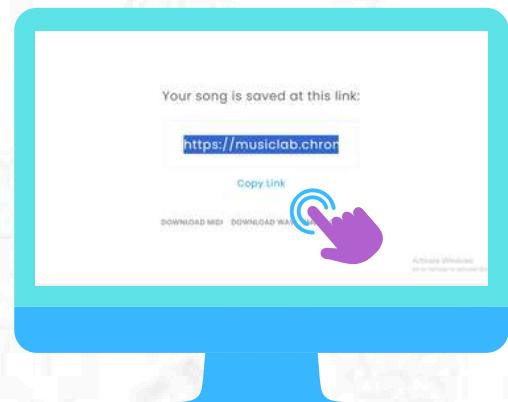
4 Step

Click "Play" to hear your melody.



5 Step

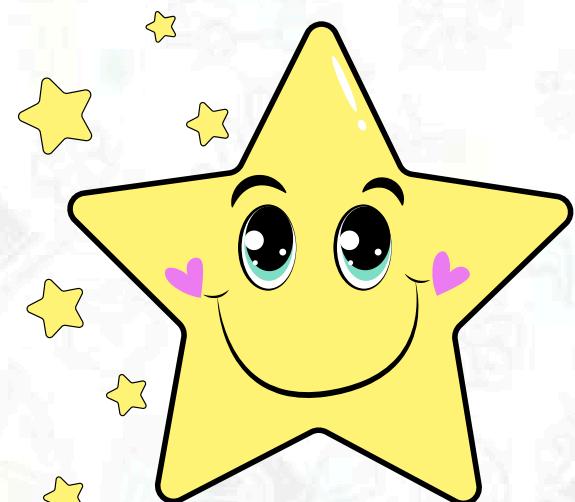
Click "Save" and copy the link (ask an adult to save it).



Challenge:



Make a melody like a Pakistani National Anthem.



Home Activity 1:

Create a melody for your favorite sound at home.

10.2 Designing Sound Effects

Sound effects add fun to stories or games, like a "whoosh" for a kite! Chrome Music Lab can make effects, and you'll use them in a project, like in Scratch (Chapter 3).

What's a Sound Effect?

A short sound, like a beep or clap.

Why Use Them?

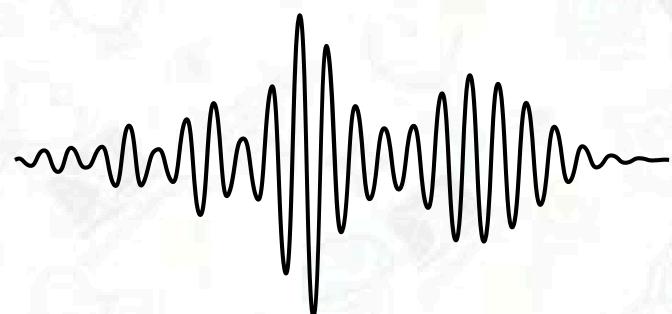
Make your creations more exciting!

Activity Preview:

You'll create a kite sound next.

Parent Tip:

Play the sound with your child!

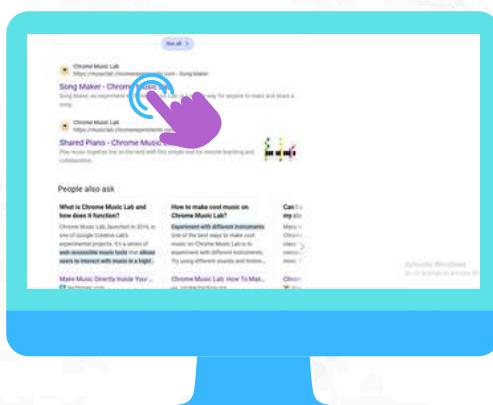


Class Activity 2: Create a Kite Sound Effect

Let's make a sound for a kite soaring! You'll use Chrome Music Lab to design a cool effect.

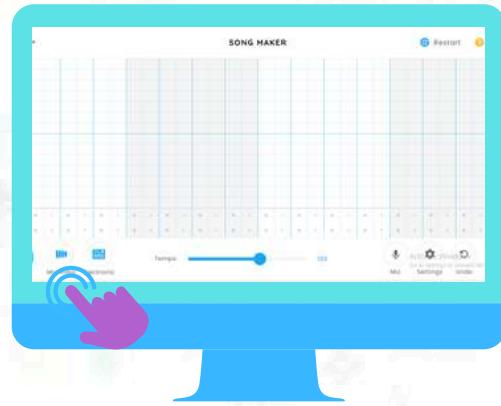
1 Step

Open www.musiclab.chromeexperiments.com and click "Song Maker."



2 Step

Choose a "Marimba" or "Synth" instrument (bottom menu).



3 Step

Add 3-4 blocks going up or down fast for a "whoosh" sound.



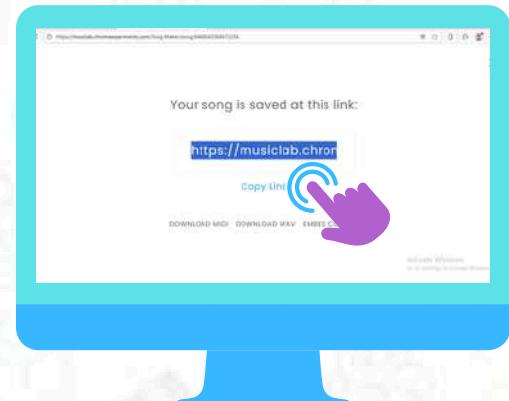
4 Step

Click "Play" to test—does it sound like a kite?



5 Step

Save the link (ask an adult to copy it).



Challenge:

Make a "clap" sound for a festival crowd.



Home Activity 2:

Design a sound effect for a Pakistani instrument like a tabla.

10.3 Creating a Short Song with AI

Suno AI can make full songs from your words, like a qawwali or pop tune! You'll type a description, and AI sings it, building on Chapter 6's AI prompts.

What's a Song?

Music with words, like a radio hit.

Example:

A song about a Pakistani festival!

Class Activity Preview:

You will make a festival song next.

DIY Idea:

Sing along with your AI song!

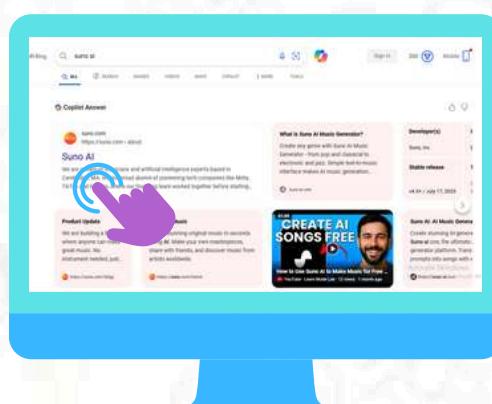


Class Activity 3: Create a Festival Song

Let's make a song for Basant! You'll use Suno AI to create music with words about kites.

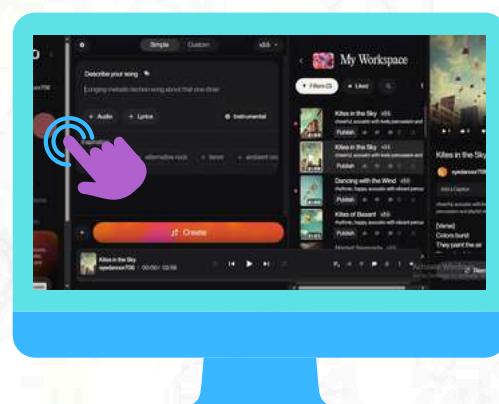
1 Step

Go to www.suno.com and sign in (with adult help).



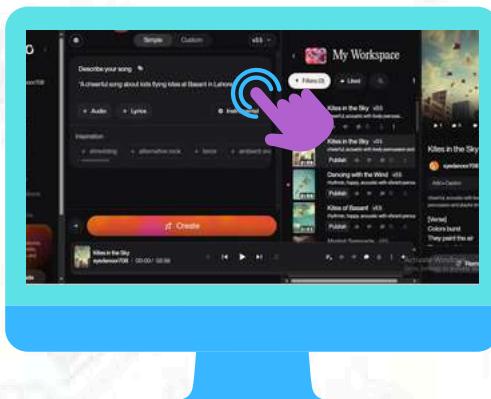
2 Step

On the Home Screen, Click Create from left menu.



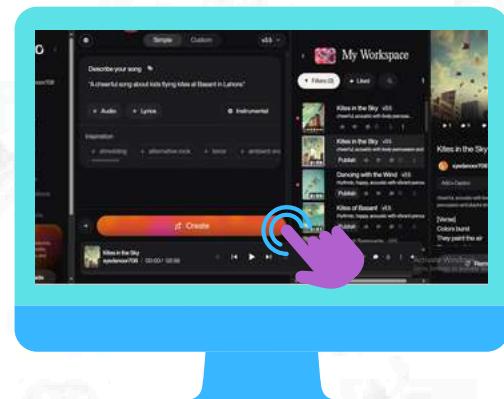
3 Step

Type: "A cheerful song about kids flying kites at Basant in Lahore."



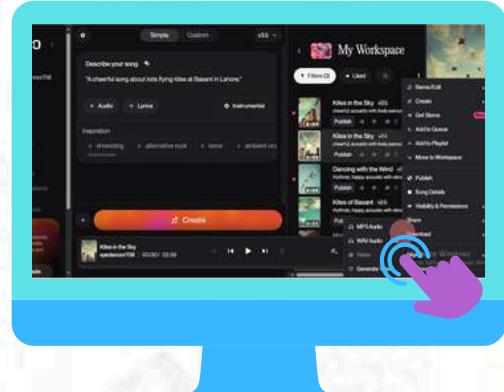
4 Step

Click "Create" and listen to your song.



5 Step

Save it (ask an adult to download the MP3).



Challenge:

Try a song about "Eid celebrations."



Home Activity 3:

Create a short song about a Pakistani landmark like Minar-e-Pakistan.

10.4 Building an Audio Project

Combine your skills to create complete audio projects! You will mix melodies, effects, and songs to make a podcast intro or story soundtrack.

What is an Audio Project?

A mix of sounds for stories or presentations.

Example:

A podcast intro with music and effects!

Class Activity Preview:

You'll add sounds to a story next.

DIY Idea:

Act out the story with your sounds!



Class Activity 4: Create a Market Sound Story

Let's make a market story with sounds! You'll create a melody and effect for a tale, like in Chapter 9's robot story

1 Step

Open
www.musiclab.chromeexperiments.com and click "Song Maker."



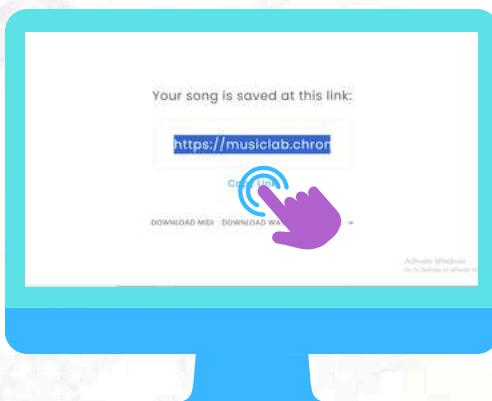
2 Step

Make a short melody (4-5 blocks) for a market tune.



3 Step

Save the melody link.



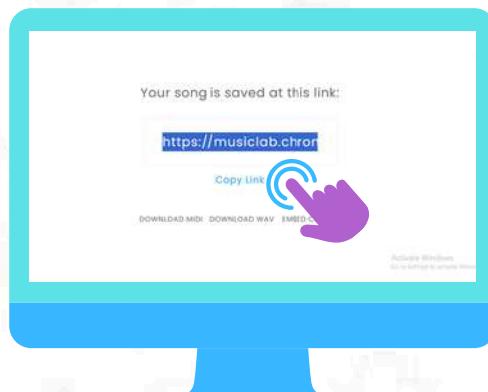
4 Step

Make a "ding" effect (2-3 blocks, fast notes) for a cart.



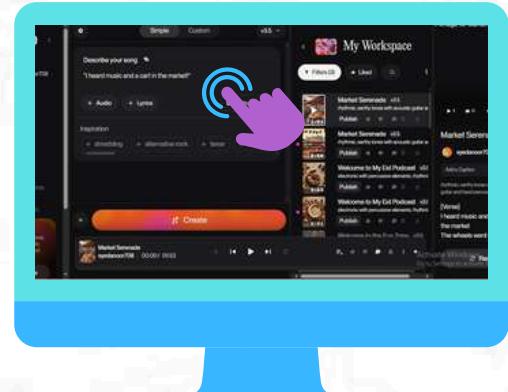
5 Step

Save the effect link.



6 Step

Write a story sentence: "I heard music and a cart in the market!"



Challenge:

Add a Pakistani detail, like "in Anarkali Bazaar."



Home Activity 4:

Add sounds to a family story at home.

10.5 Building an Audio Project

Let's combine all your skills! You'll create a podcast intro with music and effects, like a radio show for your class, using both AI tools.

What's a Podcast Intro?

A short audio to start a talk show.

Example:

"Welcome to my Eid show!" with music.

Activity:

Make a podcast intro.

1 Step

Open Chrome Music Lab's Song Maker.



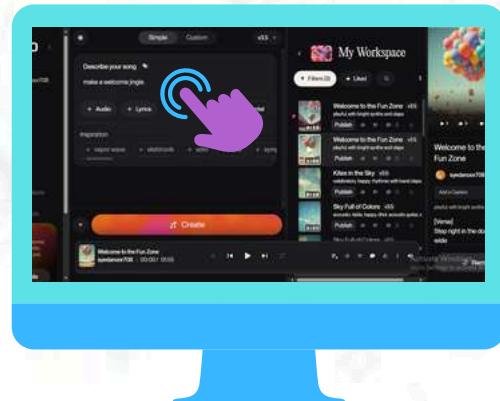
2 Step

Create a short tune for your intro.



3 Step

Open Suno AI and make a welcome jingle.



Class Activity 5: Design a Podcast Intro

Let's make a podcast intro for an Eid show! You'll mix a melody and a jingle for a cool opening.

1 Step

Go to www.musiclab.chromeexperiments.com and click "Song Maker."



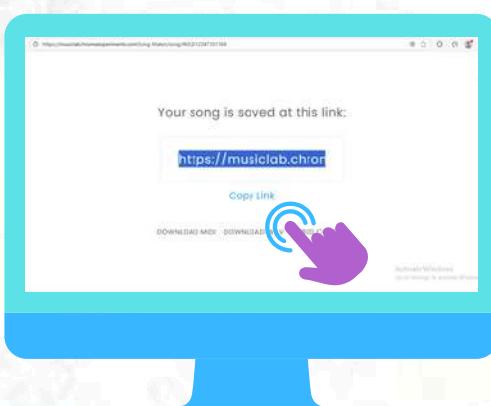
2 Step

Create a 5-block melody with a "Piano" instrument.



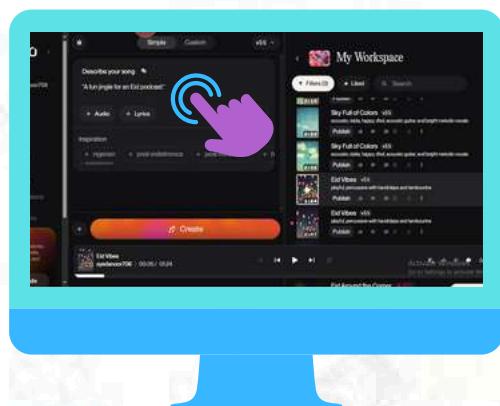
3 Step

Save the melody link.



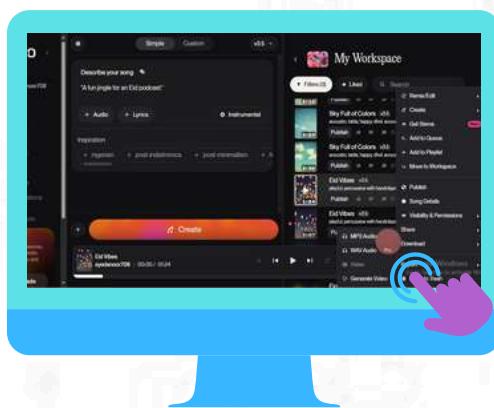
4 Step

Go to www.suno.ai and type: "A fun jingle for an Eid podcast."



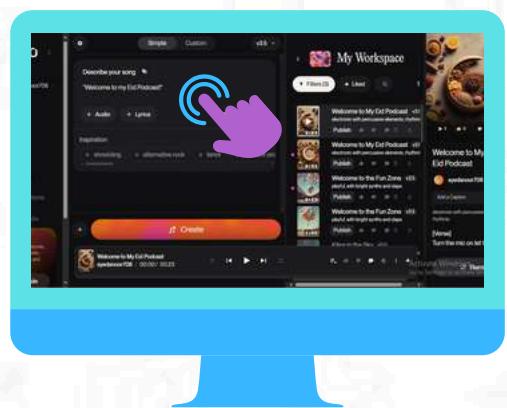
5 Step

Save the jingle MP3 (ask an adult).



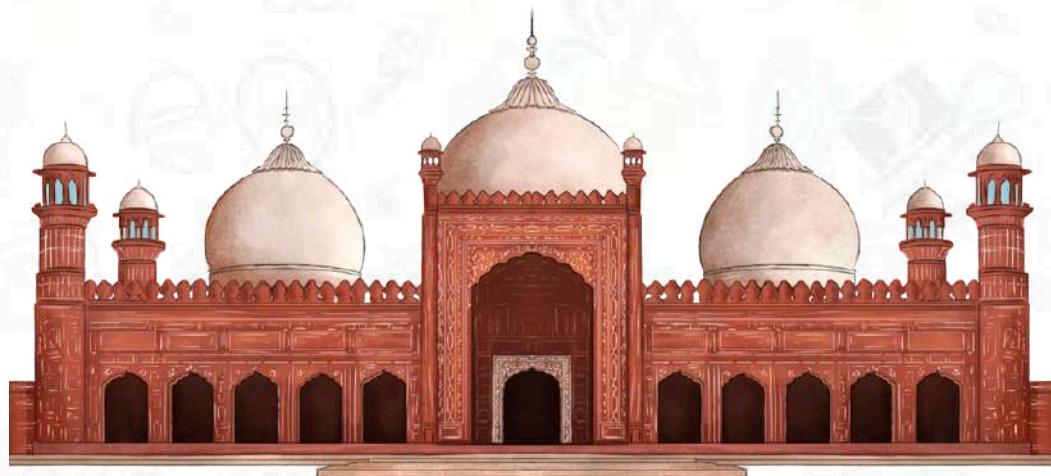
6 Step

Write: "Welcome to my Eid Podcast!" to say with your sounds.



Challenge:

Add "from Lahore!" to your jingle prompt.



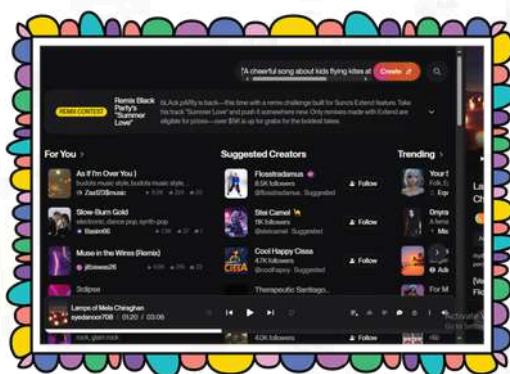
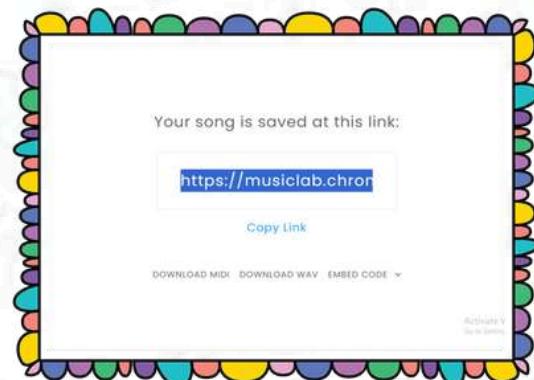
Home Activity 5:

Create a podcast intro for a Basant festival.

Chapter 10 Summary and Final Home Activity

Content: You're an AI audio star! You:

10.1: Made melodies and effects with Chrome Music Lab.



10.2: Created songs and jingles with Suno AI.



10.3: Added sounds to stories and a podcast intro.



10.2: Created songs and jingles with Suno AI.

Final Home Activity: Make a Festival Sound

1 Step

Open
www.musiclab.chromeexperiments.com and click "Song Maker."



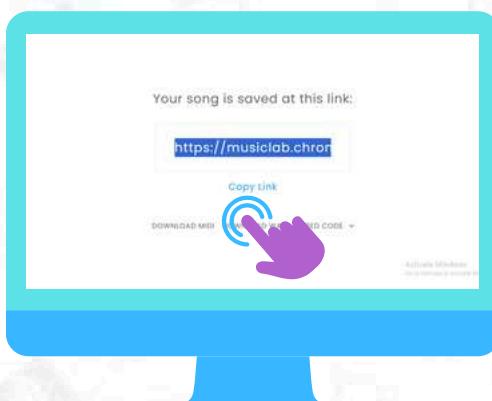
2 Step

Create a melody for a Mela Chiraghan festival (6 blocks).



3 Step

Save the link.



4 Step

Go to www.suno.ai and type: "A song about Mela Chiraghan lamps."



5 Step

Save the MP3.

Share your festival sound with your teacher!

CHAPTER 11:

Making Computers Work Together with n8n

Welcome to Automation Magic!

Get ready to make computers do amazing things for you! In Book 1, you learned simple coding. Now, you'll learn how to teach different computer programs (like your email app, or a game app) to talk to each other and do tasks automatically! We'll explore an idea called "automation" using a tool called n8n (say "n-eight-n"). It's like building smart chains for your computer, just like connecting different parts of a train! Let's get started!

What is Automation?

It's when computers do tasks by themselves, following rules you set, so you don't have to do them every time.

Why Learn Automation?

You can create exciting projects, like having your computer send you a message when your favorite show starts!

Chapter Preview:

You'll learn about starting points (triggers), what happens next (actions), connecting different computer tools, and planning your own automation.



Instructions:

Ask an adult to help you visit www.n8n.io to see what the n8n website looks like and explore its visual workflow builder. This chapter focuses on understanding how automation works, so you won't need to sign up for an account or install anything for now - we're learning the ideas behind it!

11.1 Understanding "Triggers" and "Actions"

Every automatic task starts with something happening, and then something else happens! Imagine a domino effect: one domino falls (Trigger), and it makes another domino fall (Action). In computers, a Trigger is the event that starts an automation, and an Action is what the computer does because of that trigger. Good planning of triggers and actions helps your automation work perfectly, just like planning all the steps for cooking a delicious biryani!

Why Focus on Triggers & Actions?

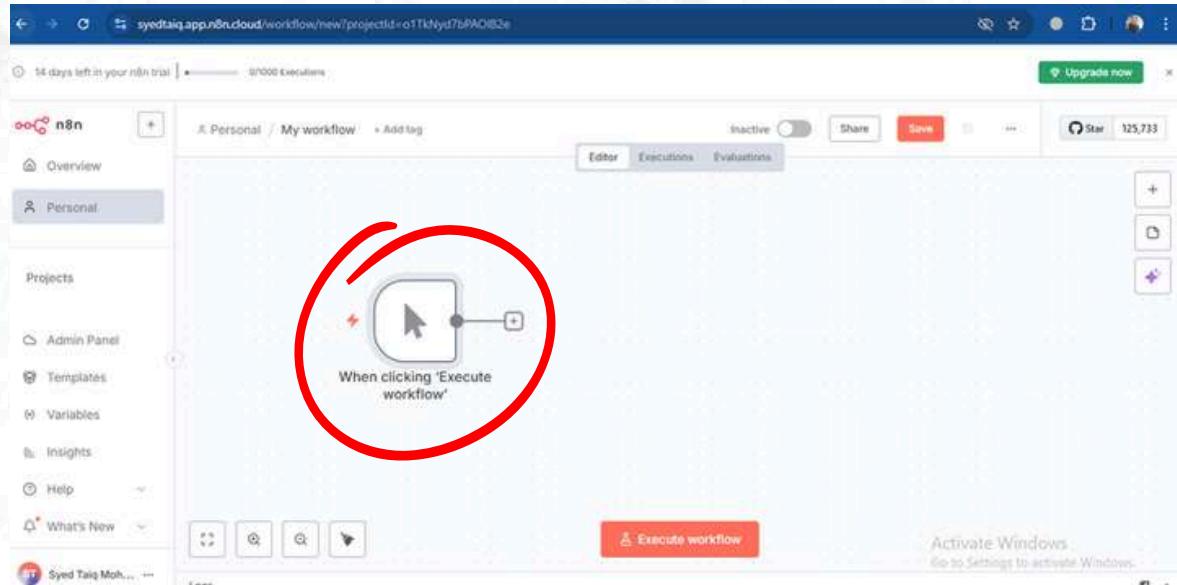
They are the two main parts of every automation chain.

Key Tip

- An automation always starts with a Trigger (the "if this..." part).
- An Action is what you want the computer to do (the "...then that" part).

Fun Fact:

When you get an email, your phone showing a notification is an automation (email arriving is the trigger, notification is the action)!



Class Activity Preview:

You'll identify triggers and actions in simple stories next.

Class Activity 1: Identify Triggers and Actions

1. Read the Story: Your teacher or an adult will read a short story or describe a situation.
2. Find the Trigger: Listen carefully for what starts the event. What is the "if this...?"
3. Find the Action: Listen for what happens next because of the trigger. What is the "...then that" or "...then this happens"?

Example Stories:

1. Story 1: "When the call to prayer (Azan) sounds, my family gets ready for prayer."
2. Trigger: _____
3. Action: _____
4. Story 2: "If the Eid moon is sighted, then we know Eid is tomorrow and everyone starts planning celebrations!"
5. Trigger: _____
6. Action 1: _____
7. Action 2: _____
8. Story 3: "When my favorite cartoon starts on TV, then my tablet gives a little 'ding' noise."
9. Trigger: _____
10. Action: _____

Challenge:

Think of your own simple everyday event. What is the trigger and what is the action?

Home Activity 1:

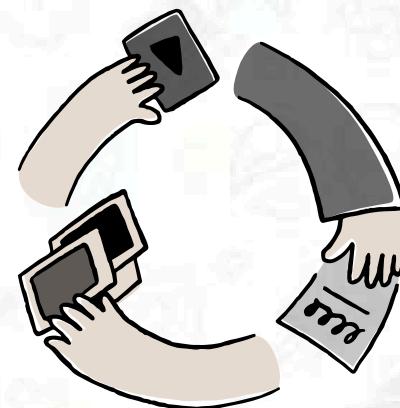
With a parent, find one trigger and action pair in your home routine (e.g., "When the alarm rings, I wake up," or "When the doorbell rings, the dog barks").

11.2 Building Simple Computer Chains (Workflows)

Just like you can link many dominoes to create a long chain, you can link many triggers and actions to create a workflow! A workflow is a series of steps where one computer task leads to another. These chains make your computer do many things automatically, one after the other.

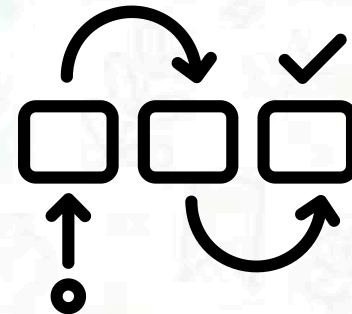
What's a Chain/Workflow?

It's a series of connected steps that make computers do multiple tasks automatically, like a path from start to finish.



How to Build a Chain?

You start with a trigger, then connect it to an action, and that action can lead to another action, and so on!



Class Activity Preview:

You'll draw your first computer workflow chain next



Parent Tip:

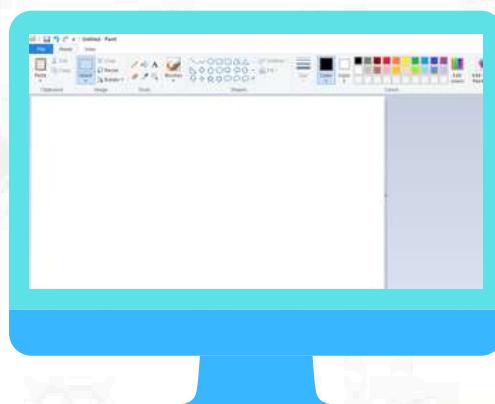
Discuss real-life "chains" with your child (e.g., "If I put my dirty clothes in the basket, then the washing machine washes them, then they get dried, then I fold them").

Class Activity 2 - Draw Your First Computer Chain

Let's design a simple computer chain (workflow)! You'll draw out the steps for a computer to follow for a fun task.

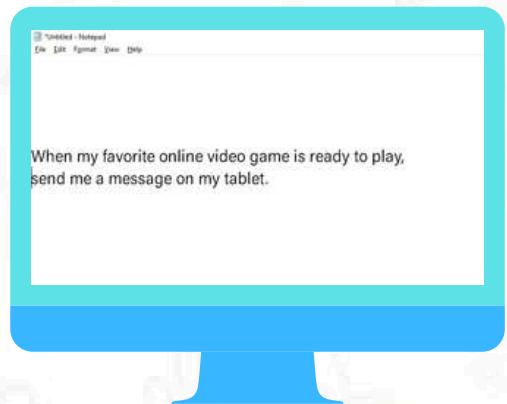
1 Step

Get Ready: Get a piece of paper and a pencil, or open a simple drawing app on your computer.



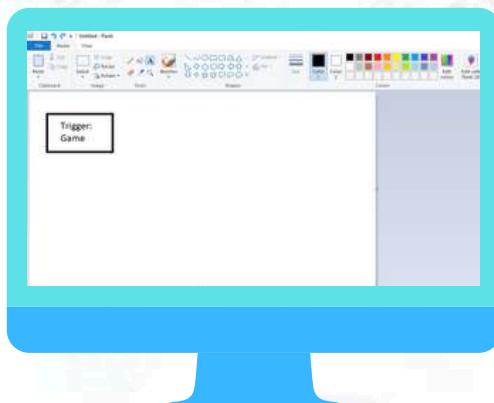
2 Step

Choose a Goal: We want to automate this: "When my favorite online video game is ready to play, send me a message on my tablet."



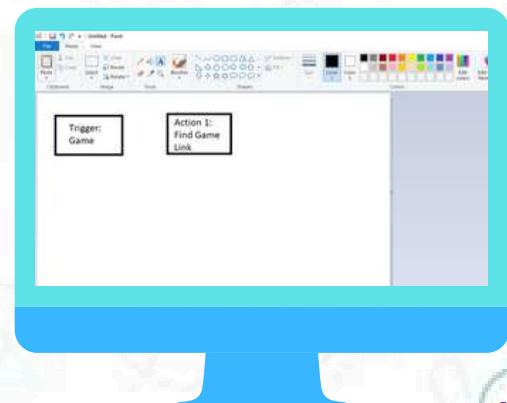
3 Step

Draw the Trigger: Draw a box or circle. Inside, write: "Trigger: Game Ready" (You can draw a small game controller icon!).



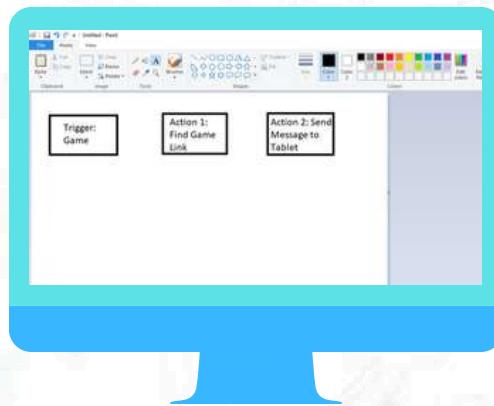
4 Step

Draw the First Action: Draw another box or circle. Inside, write: "Action 1: Find Game Link" (Draw a small magnifying glass icon!).



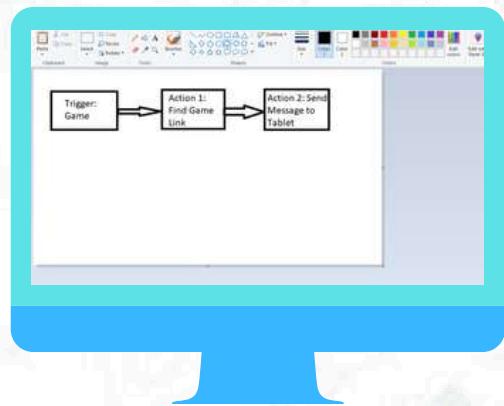
5 Step

Draw the Second Action: Draw a third box or circle. Inside, write: "Action 2: Send Message to Tablet" (Draw a small message bubble icon!).



6 Step

Connect Them! Draw arrows from the "Trigger" box to "Action 1," and from "Action 1" to "Action 2." This shows the chain!



Challenge:

Add a new action to your chain: "If the game is a new update, also send a message to my friend!" (This introduces a simple "if/then" idea).



Home Activity 2

Draw a simple chain (workflow) for how your favorite app works from when you open it to when it does something cool (e.g., "When I open YouTube, it loads my profile, then it shows new videos").

11.3 Connecting Different Computer "Tools" (Apps)

Automation is super powerful because it can make many different computer programs, or "apps," work together! n8n helps these different "tools" share information and tasks, just like different instruments playing together in an orchestra. You can connect your email app to a messaging app, or a weather app to a calendar app! You'll try to imagine connecting these tools next!

Why Connect Tools?

To make different computer programs work as a team, so you don't have to copy-paste information or jump between apps!

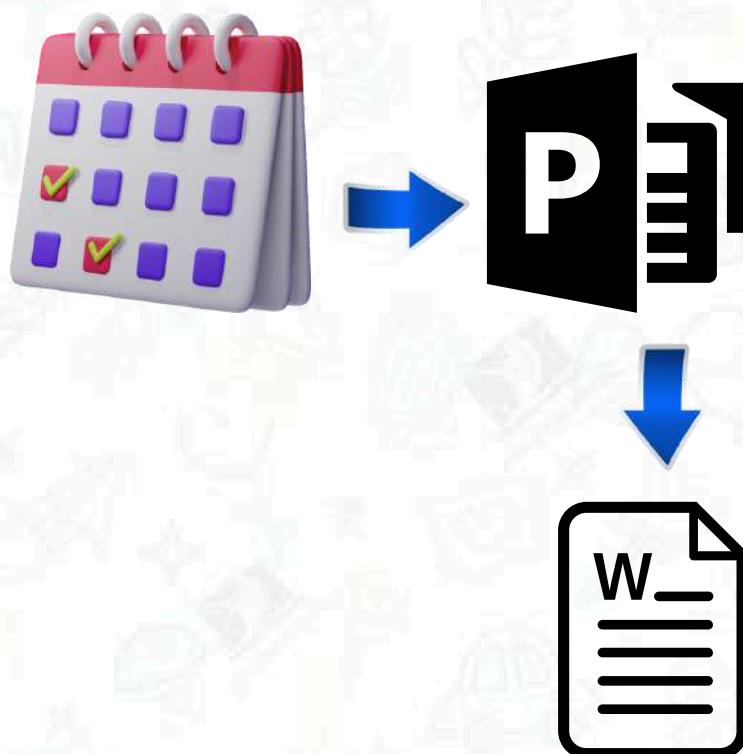
Example:

Connect an online photo album to a friend's sharing app.



Class Activity Preview:

You'll imagine connecting different apps.



DIY Idea:

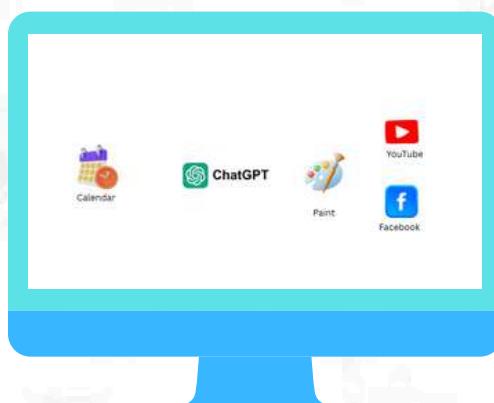
Think about two apps you use often. What would happen if they could talk to each other? What new cool thing could they do?

Class Activity 3 - Imagine Connecting Your Favorite Apps

Let's be super creative and imagine connecting our favorite computer apps to do something new!

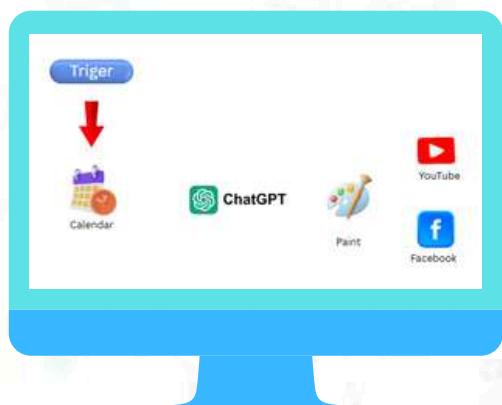
1 Step

Pick Your Apps: Choose 2 or 3 of your favorite computer apps or online tools (e.g., a drawing app, a game, a music player, a video chat app, a calendar app).



2 Step

Choose a Trigger App: Decide which app will be the Trigger (the one that starts the automation).



3 Step

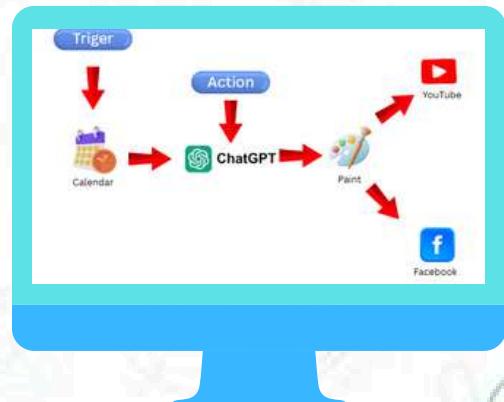
Choose Action Apps: Decide what other apps will do the Actions.



4 Step

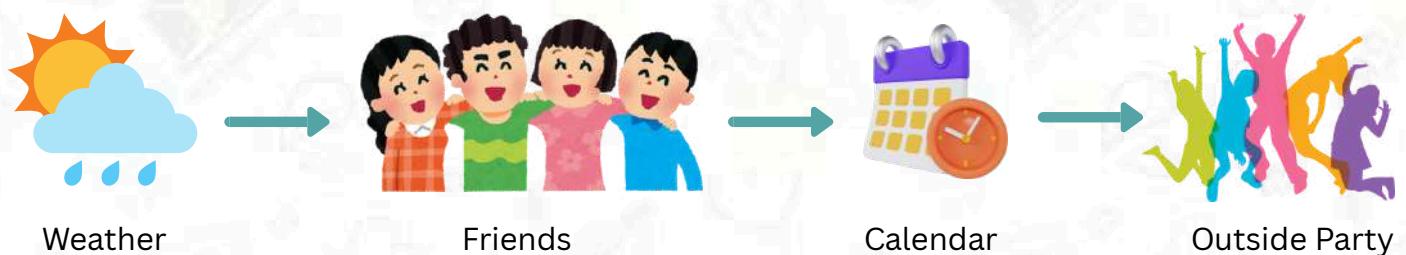
Draw Your Idea:

- Draw each chosen app as a box. You can draw their logos inside!
- Draw arrows showing how you would want them to share information or trigger actions.
- Write a simple sentence explaining what your automation does!



Example Scenario:

- (Trigger App: Weather App) "When it's sunny tomorrow" → (Action App 1: Messaging App) "Send message to friends: 'Let's go outside!'" → (Action App 2: Calendar App) "Add 'Outdoor Playtime' to my calendar."



Challenge:

Add a decision step: "if it's raining, then send message: 'Let's play indoor games!'" (This is like an "if/then" rule within your workflow).

11.4 Planning a 5-Step Computer Automation Project

Now combine all your new knowledge to plan your very own computer automation! You'll create a simple 5-step plan for an automation project, like writing down all the ingredients and steps before you bake a cake. This is like outlining a story on Google Drive (Chapter 7).

What's an Automation Project?

It's an idea for how to use triggers, actions, and connected apps to make a computer do a helpful task automatically.

Example:

An automation that tells you when your favorite game has a new update, or when a friend posts a new drawing online.

Class Activity Preview:

You'll plan your own 5-step automation idea next.

Parent Tip:

Discuss simple ways automation could help in your family's daily life!



Class Activity 4 - Plan Your Automation Invention

Let's create a 5-step plan for an amazing automation invention you can imagine! You'll use all your non-thinking skills to make it awesome.

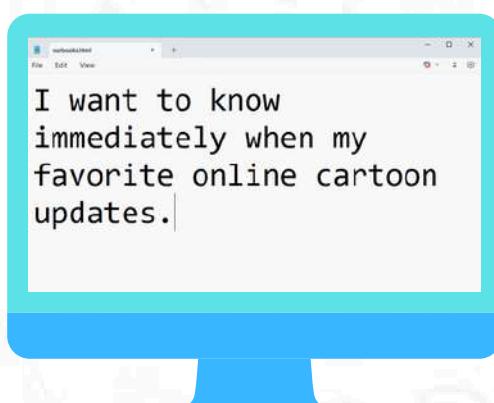
Get Ready

Get Ready: Open a blank document (like Google Docs or a simple text editor) or grab a piece of paper and a pencil.

1 Step

The Goal! What problem do you want your automation to solve, or what cool thing do you want it to do?

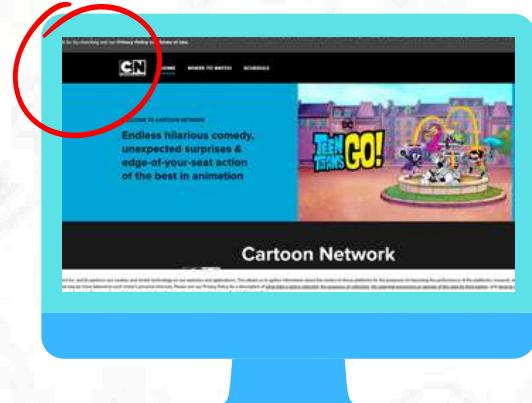
- Example: "I want to know immediately when my favorite online cartoon updates."



2 Step

The Trigger! What event will start your automation?

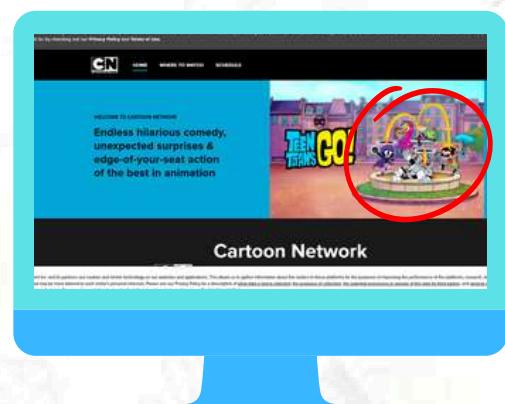
- Example: "The cartoon website updates."



3 Step

The First Action! What's the very first thing the computer does?

- Example: "The computer checks the cartoon website for new pictures."



4 Step

What else does the computer do after that?

- Example: "If there are new pictures, the computer sends a message to my parents' phone, saying 'New comic!'"



5 Step

What's the final cool thing that happens because of your automation?

- Example: "My parents tell me right away, and I get to read the new comic without even looking for it!"



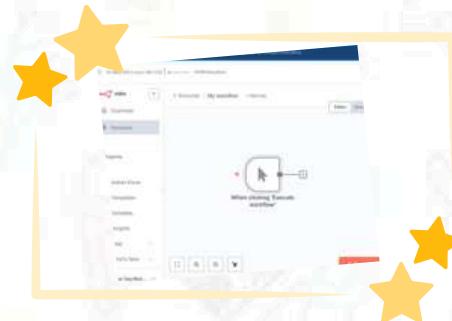
Challenge:

Add a "smart" decision to your plan. Example: "If it's past bedtime, don't send the message, just save the link for tomorrow!"

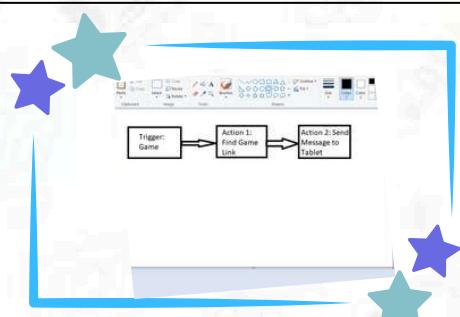
Chapter 11 Summary

You're a Automation Expert:

- 11.1** Understanding "Triggers" and "Actions"



- 11.2** Building Simple Computer Chains (Workflows)



- 11.3** Connecting Different Computer "Tools" (Apps)



- 11.4** Planning a 5-Step Computer Automation Project



Home Activity 3: Make a Festival Folder

Create a pixel art picture about your family or a pixelated scene of your favorite family activity (e.g., a pixel picnic, a pixel game night, or a pixel picture of your family in traditional Pakistani clothes). Save it as a .pixel file or export it as a .png image.

Homework:

Present your family pixel art to your parents and tell them the story behind it!

CHAPTER 12:

Getting Started with M3D GO Robotics

Welcome to M3D GO Adventures!

The M3D GO robotics kit provides an accessible platform for exploring fundamental concepts in robotics and coding. This chapter focuses on initial setup procedures, followed by introductory activities to facilitate practical engagement. By understanding the kit's components and establishing a reliable connection, learners can transition to basic exploratory tasks, such as free robot movements. This foundational knowledge supports subsequent chapters on advanced controls.

What is M3D GO?

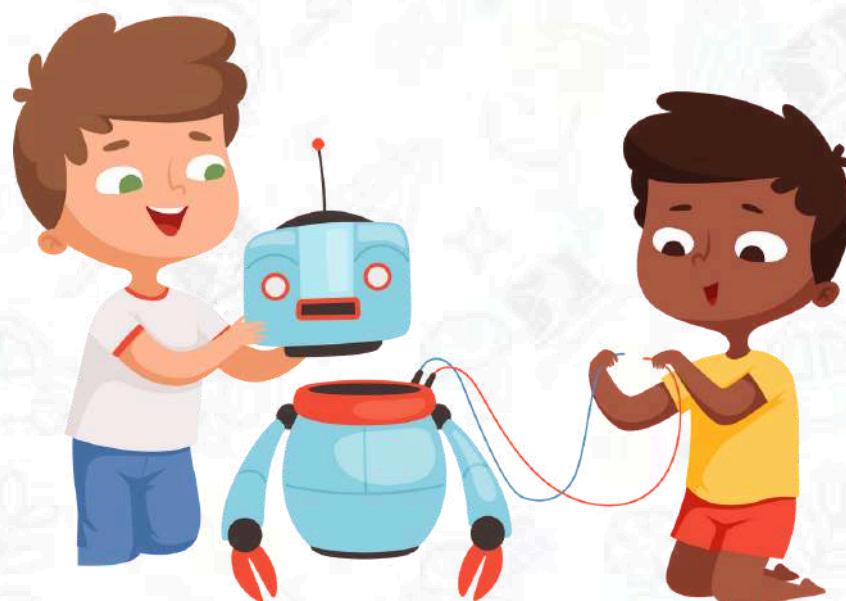
- A comprehensive robotics kit including a programmable robot, attachments, and integration tools for educational coding.

Why Learn It?

It develops skills in technology and problem-solving, applicable to real-world scenarios like automated systems in Pakistani industries.

Chapter Preview:

The content covers kit exploration, connection setup, and introductory free movement activities. Instructions: Ensure adult supervision during unpacking to maintain safety.



12.1 Exploring the M3D GO Kit

The M3D GO kit comprises the core robot, charger, and various attachments designed for plug-and-play functionality. These include the OLED screen for displays, distance and line sensors for detection, and servo motor with extensions such as the dumper, pen holder, dozer, forklift, and Lego adapter. Familiarity with these elements is essential prior to setup, as attachments must be connected before powering on the robot to ensure accurate detection. This section prepares users for systematic assembly.

Why Explore Attachments?

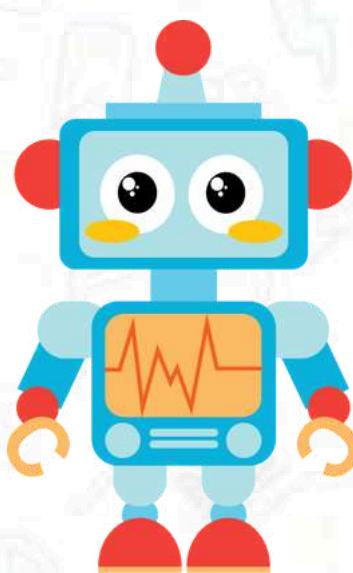
Each component extends the robot's capabilities, enabling diverse applications from display outputs to physical interactions.

Key Tips:

- Handle attachments carefully to avoid connector damage; verify compatibility with designated ports.

Fun Fact:

Similar robotics kits are utilized in Pakistani STEM programs to promote innovation in fields like agriculture and education.



Class Activity Preview:

The following activity focuses on practical identification and attachment.

Class Activity 1: Unpack, Identify, and Attach Kit Parts

This activity emphasizes the initial setup phase by guiding users through unpacking and attachment, ensuring a solid foundation for subsequent operations.

1 Step

Carefully open the M3D GO kit and organize all components: the robot base, charger, LED screen, sensors, and servo motor attachments.



2 Step

Identify each part; for example, note the LED screen's display function and the distance sensor's measurement role.



3 Step

Select one attachment, such as the LED screen, and connect it to the top port on the robot.

4 Step

Press the side button to power on the robot; observe the red blinking light.



Home Activity 1: Practice Kit Identification

At home, review the unpacked kit and attach a different component, such as the line sensor. Power on the robot and note any visual indicators. Create a diagram labeling at least five parts and their functions. Kit Setup Extensions: If connectivity issues arise during home practice, refer to basic power checks, such as ensuring the charger is functional. This builds confidence for classroom progression.

12.2 Setting Up and Connecting the Robot

Establishing a connection via Bluetooth and the Scratch platform is critical for operational control. This section details the process, ensuring users can verify setup before advancing to activities.

Why Set Up Properly?

A stable connection enables reliable command execution and prevents interruptions in learning.

Key Tips:

Use a compatible browser and ensure the robot is in pairing mode, indicated by slow blinking.

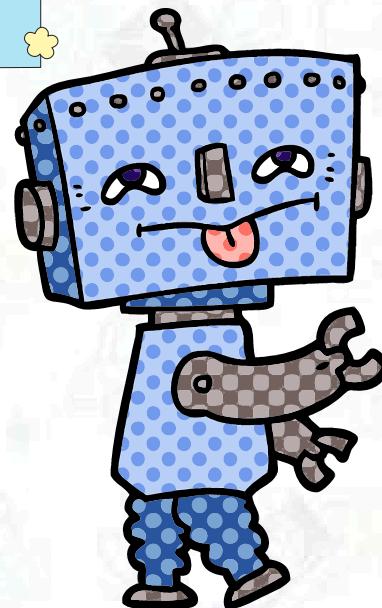


Fun Fact:

Bluetooth technology, essential for such connections, draws from historical unification efforts, paralleling collaborative STEM initiatives in Pakistan.

Activity Preview:

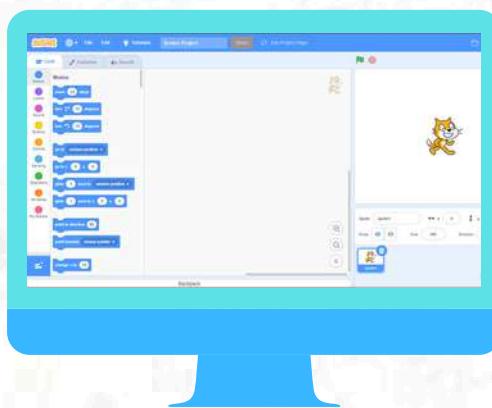
The activity centers on completing and verifying the connection.



Class Activity 2: Connect and Verify Your Robot Setup

1 Step

With the robot powered on and in pairing mode, open a web browser and navigate to <https://scratchmarkhor3d.com/>.



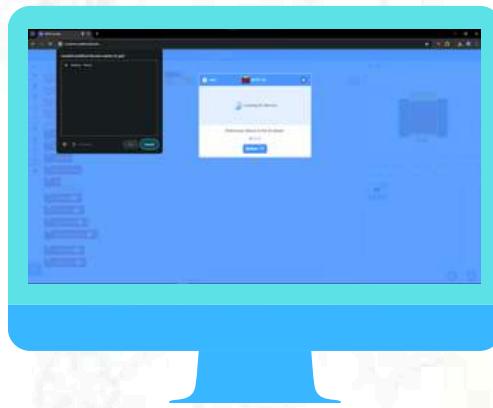
2 Step

Access the extensions menu via the bottom-left icon and select the M3D GO extension.



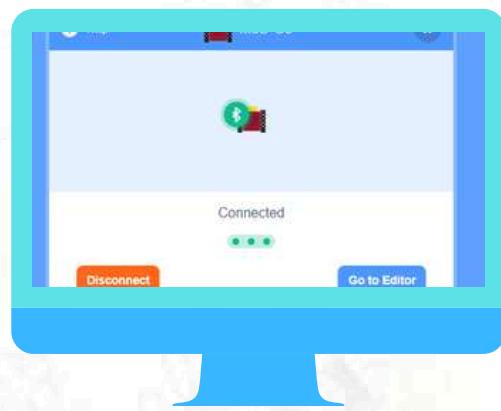
3 Step

In the pairing dialog, choose the robot's name and confirm the connection; observe the success message.



4 Step

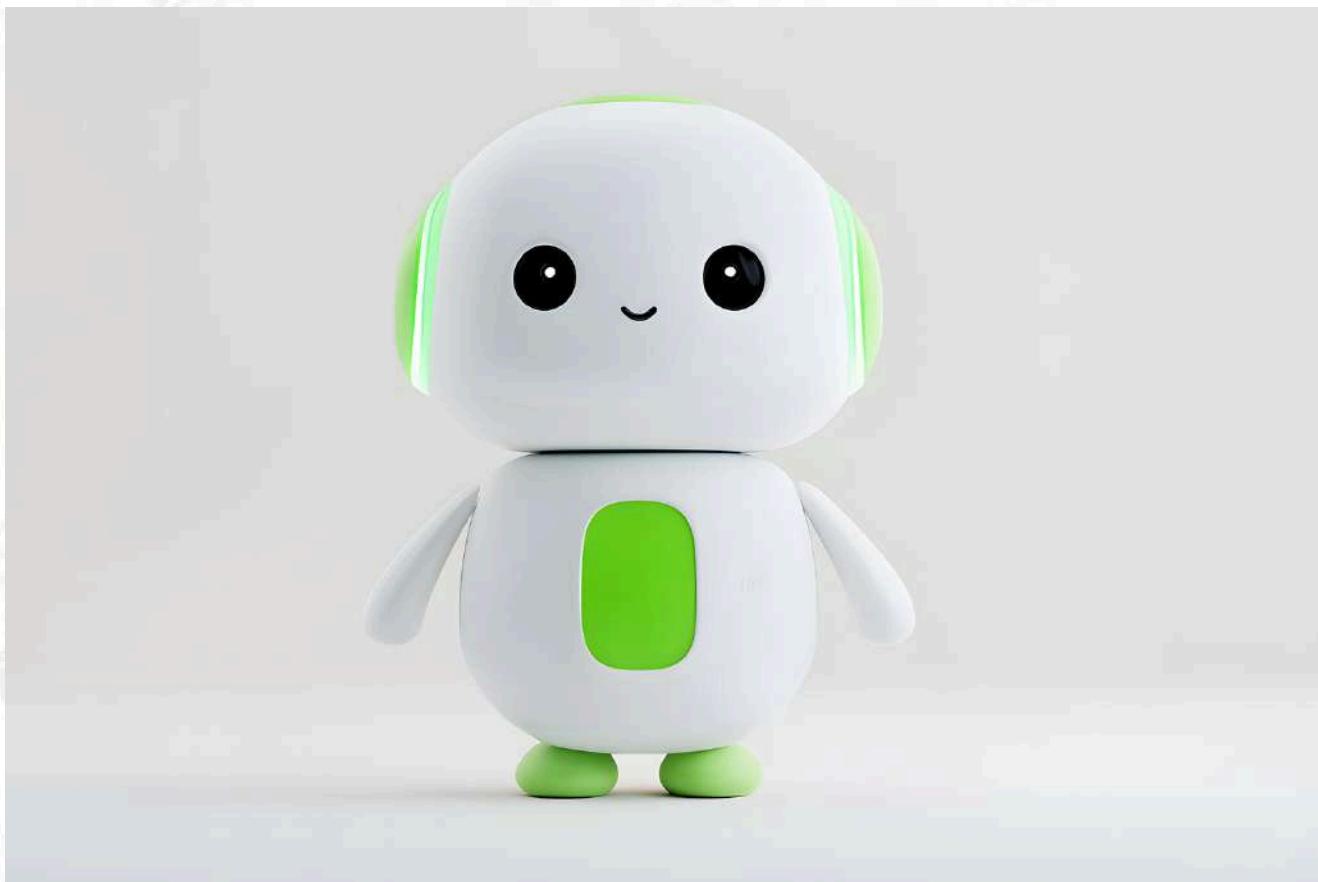
If the dialog does not appear, manually connect via the M3D GO blocks section, ensuring the button turns green.





Challenge:

Confirm setup by checking for the robot's name in the interface.



Home Activity 2: Reconnect and Verify

Replicate the connection process at home, powering on the robot and pairing via Scratch. Note the time taken and any variations in indicators. Practice disconnecting and reconnecting to build familiarity. Connection Verification Practice: Use the "M3D GO is Connected" block to confirm status; this ensures readiness for exploratory tasks.

12.3 Introduction to Basic Robot Activities

With setup complete, this section introduces fundamental activities, such as free movements using controls, to demonstrate immediate application.

Why Start with Basics?

It allows users to experience robot responsiveness, fostering motivation for advanced topics.

Key Tips:

Connect an online photo album to a friend's sharing app.

Fun Fact:

Basic controls in robotics mirror those used in Pakistani educational tools for early STEM exposure.



Class Activity Preview:

The activity involves guided free movements.

Class Activity 3: Free Robot Movements and Exploration

1 Step

With the robot connected,
upload the [M3D GO Basic Controls.sb3](#) file to
your project using File Menu → Load from
Computer



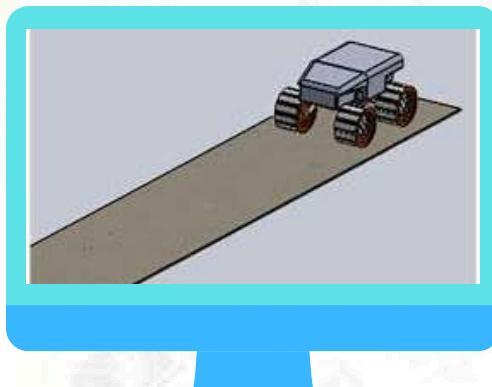
2 Step

Experiment with arrow keys for
directional control: up for forward,
left/right for turns, down for
backward.



3 Step

Navigate the robot in an open area,
creating simple paths like straight
lines or gentle curves.



4 Step

Observe and note the robot's response
to commands, adjusting for smoother
operation.

Challenge:

Guide the robot around a marked point without collisions.

Home Activity 3: Customize Free Movements

At home, reconnect the robot and use keys to create a custom path, such as a figure-eight pattern. Document the sequence of directions used and any observations on responsiveness.

Movement Customization:

Experiment with varying durations for each direction to refine control.

Chapter Review and Integrated Basic Troubleshooting

This review consolidates setup and introductory activities, incorporating light troubleshooting for common early issues.

Chapter Review:

Reflect on kit components, connection steps, and free movement experiences; address potential glitches like unresponsive controls by verifying Bluetooth status.

Integrated Basic Troubleshooting:

If movements falter, recheck the connection using the green indicator and test with a single command.

Chapter 12 Summary and Final Home Activity

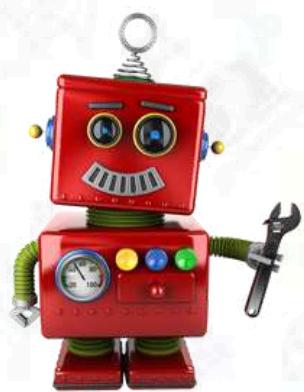
This chapter has equipped users with essential setup knowledge and initial hands-on experience. You have explored the kit, established connections, and engaged in basic free movements.

Chapter 12 Summary:

Award yourself a "Setup Explorer!" badge for mastering these foundations.

Final Home Activity: Combined Setup and Movement Review

Reverify your setup by connecting the robot, then perform a free movement sequence around a home object. Draw the path and note any adjustments made. Submit your drawing for class discussion.





KODER KIDS

EMPOWERING YOUNG MINDS



BOOK 2

www.koderkids.pk