Book 2

Complete Text Content

KoderKids - Empowering Young Minds

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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 Tips:
• 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!

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.

    Step 1: Open Pixilart - Go to www.pixilart.com and click "Start Drawing" at the top of the page.

    Step 2: 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."

    Step 3: 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.

Step 4: 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!

Step 5: 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.

Step 6: 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 a 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.

Step 1: Open Your Project - Go to www.pixilart.com. Click "File" > "Open .pixil" and open your "MyKite.pixil" file.

Step 2: Find Frames - Go to the GIF Frames file at bottom of the screen.

Step 3: 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.

Step 4: 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.

Step 5: Play Animation - Click the "Preview" button to see your kite move!

Step 6: 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.

Step 7: 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.

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.

> **Step 1: Open Pixilart** - Go to www.pixilart.com and click "Start Drawing."
>
> **Step 2: Start a New Drawing** - Choose a slightly larger canvas size, like 128x128 pixels. Click "New Drawing."
>
> **Step 3: Draw a Background** - Use the Pencil and Paint Bucket tools to create a simple background, like a blue sky and green grass.
>
> **Step 4: 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).
>
> **Step 5: Use Different Colors** - Experiment with different colors from the palette to make your scene vibrant.
>
> **Step 6: Save** - Click "File" > "Save As .pixil" and name it "MyPixelScene.pixil."

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.

- **Step 1: Open Pixilart** - Go to www.pixilart.com and click "Start Drawing."
- **Step 2: Start a New Drawing** - Choose a canvas size like 160x160 pixels.
- **Step 3: Plan Your Story** - Think of a simple story with a beginning, middle, and end.
- **Step 4: 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).
- **Step 5: Play Your Story** - Click the "Play" button in the animation section to see your story unfold! Adjust the FPS if needed.
- **Step 6: 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.

1.5 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 10: AI for Audio Creation

Welcome to AI Audio!

AI can make music and sounds, just like it makes images (Chapter 6)! In this chapter, you'll use Chrome Music Lab to explore sounds and Suno AI to create songs with prompts. It's like being a DJ with a smart computer helper!

What is AI Audio?
Using AI to make music, sounds, or voices from your ideas.

Why Learn AI Audio?
Create songs for school projects, festivals, or fun!

Activity Preview:
You'll make sounds and songs today!

Instructions:
Ask an adult to help you access Chrome Music Lab and Suno AI.

10.1 Exploring Chrome Music Lab

Chrome Music Lab is a fun website where you can make music by clicking and dragging! It's like a playground for sounds, perfect for beginners before we use AI.

What is Chrome Music Lab?
A free website by Google with music experiments.

Key Experiments:
• Song Maker: Create melodies and beats.
• Rhythm: Tap out drum patterns.
• Melody Maker: Draw tunes with your mouse.

Fun Fact: Chrome Music Lab works on any device with a browser!

Activity Preview:
You'll create a melody next.

Class Activity 1: Create a Melody in Song Maker

Let's make a simple melody using Chrome Music Lab's Song Maker! You'll click to add notes.

Step 1: Open Website - Go to musiclab.chromeexperiments.com (with adult help).

Step 2: Open Song Maker - Click on "Song Maker" to open the experiment.

Step 3: Add Notes - Click on the grid to add notes - higher rows are higher sounds.

Step 4: Add Beats - Click on the bottom section to add drum beats.

Step 5: Play Song - Press the Play button to hear your melody!

Step 6: Save Link - Click "Save" to get a link you can share.

Challenge: Try to create a melody that sounds like "Twinkle Twinkle Little Star"!

Home Activity 1

Create a melody and share the link with your family.

10.2 Introduction to Suno AI

Suno AI is like ChatGPT for music! You type a prompt describing what you want, and it creates a song for you. It can make any style, from pop to classical to Pakistani music!

What is Suno AI?
An AI tool that creates songs from text prompts.

Why Use Suno?
Make professional-sounding music without any instruments!

Example Prompts:
• "A happy birthday song for a kid"
• "A peaceful melody about the moon"
• "An upbeat Pakistani celebration song"

Activity Preview:
You'll create your first AI song next.

Parent Tip: Help your child sign up for Suno AI safely!

Class Activity 2: Create Your First AI Song

Let's use Suno AI to create a simple song! You'll write a prompt and hear AI music.

> **Step 1: Open Suno** - Go to suno.ai (with adult help) and sign in.
>
> **Step 2: Click Create** - Click the "Create" button to start making music.
>
> **Step 3: Write Prompt** - Type a prompt: "A happy song about playing in the park"
>
> **Step 4: Generate Song** - Click "Create" and wait for the AI to generate your song.
>
> **Step 5: Listen** - Listen to the song - does it match your prompt?
>
> **Step 6: Download** - Download the song if you like it!

> **Challenge:** Try a prompt about your favorite Pakistani place!

Home Activity 2

Create an AI song for a family member's birthday.

10.3 Creating Songs with Detailed Prompts

Just like AI images (Chapter 6), detailed prompts make better songs! Add style, mood, instruments, and tempo to get exactly what you want.

Prompt Elements:
• Style: pop, classical, folk, rock
• Mood: happy, sad, peaceful, energetic
• Instruments: piano, guitar, drums, flute
• Tempo: slow, medium, fast

Example:
"A slow, peaceful classical song with piano about a sunset in Karachi"

Activity Preview:
You'll create a detailed song next.

DIY Idea: Combine your AI song with a Canva presentation (Chapter 8)!

Class Activity 3: Create a Detailed AI Song

Let's make a better song with a detailed prompt! You'll specify style, mood, and more.

> **Step 1: Open Suno** - Go to suno.ai and click "Create."
>
> **Step 2: Write Detailed Prompt** - Type: "An upbeat, happy pop song with guitar about flying kites at Basant festival"
>
> **Step 3: Generate Song** - Click "Create" and wait for the AI.
>
> **Step 4: Compare** - Compare this song to your first one - is it better?
>
> **Step 5: Try Another** - Try another prompt: "A slow, peaceful song with flute about the Indus River"
>
> **Step 6: Save Favorites** - Download your favorite songs!
>
> **Challenge:** Create a song in two different styles and compare them!

Home Activity 3

Create an AI song about a Pakistani festival with detailed prompts.

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.

> **Step 1: Open Song Maker** - Open www.musiclab.chromeexperiments.com and click "Song Maker."
>
> **Step 2: Create Melody** - Make a short melody (4-5 blocks) for a market tune.

Step 3: Save Melody - Save the melody link.

Step 4: Create Effect - Make a "ding" effect (2-3 blocks, fast notes) for a cart.

Step 5: Save Effect - Save the effect link.

Step 6: Write Story - 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.

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.

Step 1: Open Song Maker - Go to www.musiclab.chromeexperiments.com and click "Song Maker."

Step 2: Create Melody - Create a 5-block melody with a "Piano" instrument.

Step 3: Save Melody - Save the melody link.

Step 4: Create Jingle - Go to www.suno.ai and type: "A fun jingle for an Eid podcast."

Step 5: Save Jingle - Save the jingle MP3 (ask an adult).

Step 6: Write Intro - 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.

10.6 Chapter 10 Summary and Final Home Activity

10.S Chapter 10 Summary and Final Home Activity

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.

10.4: Built audio projects with market sounds.

10.5: Designed podcast intros combining both tools.

Skills You Learned:
• Using Chrome Music Lab's Song Maker
• Creating melodies, beats, and sound effects
• Writing prompts for AI music with Suno AI
• Understanding style, mood, and tempo
• Building complete audio projects
• Creating podcast intros

What's Next?
In Chapter 11, you'll learn about automation and making computers work together with n8n!

Final Home Activity: Make a Festival Sound

Create a complete festival soundtrack combining Chrome Music Lab and Suno AI!

 Step 1: Open Song Maker - Open www.musiclab.chromeexperiments.com and click "Song Maker."

 Step 2: Create Melody - Create a melody for a Mela Chiraghan festival (6 blocks).

 Step 3: Save Link - Save the link.

 Step 4: Create AI Song - Go to www.suno.ai and type: "A song about Mela Chiraghan lamps."

 Step 5: Save MP3 - Save the MP3.

 Challenge: 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

Let's find triggers and actions in everyday stories! Your teacher will read stories and you'll identify what starts the action.

Step 1: Read the Story - Your teacher or an adult will read a short story or describe a situation.

Step 2: Find the Trigger - Listen carefully for what starts the event. What is the "if this..."?

Step 3: Find the Action - Listen for what happens next because of the trigger. What is the "...then that" or "...then this happens"?

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.

Step 1: Get Ready - Get a piece of paper and a pencil, or open a simple drawing app on your computer.

Step 2: 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."

Step 3: Draw the Trigger - Draw a box or circle. Inside, write: "Trigger: Game Ready" (You can draw a small game controller icon!).

Step 4: Draw the First Action - Draw another box or circle. Inside, write: "Action 1: Find Game Link" (Draw a small magnifying glass icon!).

Step 5: Draw the Second Action - Draw a third box or circle. Inside, write: "Action 2: Send Message to Tablet" (Draw a small message bubble icon!).

Step 6: 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).

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!

Step 1: 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).

Step 2: Choose a Trigger App - Decide which app will be the Trigger (the one that starts the automation).

Step 3: Choose Action Apps - Decide what other apps will do the Actions.

Step 4: 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!

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).

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.

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 n8n-thinking skills to make it awesome.

   Step 1: 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."

   Step 2: The Trigger - What event will start your automation? Example: "The cartoon website updates."

   Step 3: The First Action - What's the very first thing the computer does? Example: "The computer checks the cartoon website for new pictures."

   Step 4: The Second Action - 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!'"

   Step 5: The Final Result - 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!"

Home Activity 4

Share your automation idea with your family and explain how it would help make life easier!

11.5 Chapter 11 Summary and Automation Challenge!

11.S Chapter 11 Summary

You're an Automation Expert!

11.1: Understanding "Triggers" and "Actions" - learned how automations start with triggers and respond with actions.

11.2: Building Simple Computer Chains (Workflows) - created workflow diagrams connecting triggers to multiple actions.

11.3: Connecting Different Computer "Tools" (Apps) - imagined how different apps can work together.

11.4: Planning a 5-Step Computer Automation Project - designed your own automation invention.

Skills You Learned:
• Identifying triggers and actions in everyday situations
• Drawing workflow chains with connected steps
• Understanding how apps can communicate
• Planning automation projects step by step
• Adding "if/then" decisions to workflows

What's Next?
In Chapter 12, you'll use these automation concepts with real robots using M3D GO!

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.

> **Step 1: Unpack Kit** - Carefully open the M3D GO kit and organize all components: the robot base, charger, LED screen, sensors, and servo motor attachments.

Step 2: Identify Parts - Identify each part; for example, note the LED screen's display function and the distance sensor's measurement role.

Step 3: Attach Component - Select one attachment, such as the LED screen, and connect it to the top port on the robot.

Step 4: Power On - 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.

12.1: Exploring the M3D GO Kit

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

This activity guides you through connecting your M3D GO robot to the Scratch platform via Bluetooth.

Step 1: Open Browser - With the robot powered on and in pairing mode, open a web browser and navigate to https://scratchmarkhor3d.com/.

Step 2: Access Extensions - Access the extensions menu via the bottom-left icon and select the M3D GO extension.

Step 3: Pair Robot - In the pairing dialog, choose the robot's name and confirm the connection; observe the success message.

Step 4: Verify Connection - 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.

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.

12.2: Setting Up and Connecting the Robot

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

This activity lets you control your robot using arrow keys for basic movements.

Step 1: Load Project - With the robot connected, upload the M3D GO Basic Controls.sb3 file to your project using File Menu → Load from Computer.

Step 2: Use Arrow Keys - Experiment with arrow keys for directional control: up for forward, left/right for turns, down for backward.

Step 3: Navigate - Navigate the robot in an open area, creating simple paths like straight lines or gentle curves.

Step 4: Observe Response - 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.

12.4 Chapter 12 Summary and Final Home Activity

12.S Chapter 12 Summary and Final Home Activity

Chapter 12 Summary

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.

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

Skills You Learned:
• Identifying M3D GO kit components and their functions
• Connecting attachments properly before powering on
• Setting up Bluetooth connection with Scratch platform
• Verifying connection status using M3D GO blocks
• Controlling robot movement with arrow keys
• Creating simple navigation paths

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.

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.

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.

> **Step 1: Open Teachable Machine** - In your web browser, go to teachablemachine.withgoogle.com and click "Get Started."

Step 2: Start a New Project - Click "Image Project." Select Standard Image Model.

Step 3: Create Classes - You'll see "Class 1" and "Class 2." Rename "Class 1" to "Happy Face" and "Class 2" to "Sad Face."

Step 4: 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.

Step 5: 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.

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.

Step 1: 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.

Step 2: Train Your AI - Click the big blue button that says "Train Model." Wait for it to finish - it might take a minute!

Step 3: 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?

Step 4: 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.

   Step 1: Open Teachable Machine - Go to teachablemachine.withgoogle.com and click "Get Started."

   Step 2: 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.

   Step 3: Train Model - Click "Train Model."

   Step 4: 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?

   Step 5: 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.

> **Step 1: 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.
>
> **Step 2: 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.
>
> **Step 3: 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!
>
> **Step 4: 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!
>
> **Step 5: The Fun** - What cool thing can your AI do once it's smart?
>
> **Step 6: Save Your Plan** - Save your document as "MyAIPlan.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.

2.5 Chapter 2 Summary and AI Challenge!

You're an AI Pro! You:

2.1 - Learned how AI "learns" from examples.

2.2 - Trained and tested your very first AI models.

2.3 - Explored different types of data like sound and pose.

2.4 - 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!

Get ready to create your own games and animations!

In Book 1, you learned about basic computer skills. Now, you'll use Scratch, a fun coding language made just for kids, to bring your ideas to life! You'll make characters move, add sounds, and create your very own stories and games.

What is Scratch?
Scratch is a free coding platform where you snap colorful blocks together to make programs, like building with digital LEGO!

Why Learn Scratch?
You can create games, animations, and interactive stories while learning how computers think!

Chapter Preview:
You'll explore the Scratch world, make sprites move, create interactive cards, and build your first mini-game.

Instructions:
Ask an adult to open scratch.mit.edu in a web browser on your computer. Click "Create" to start!

3.1 Exploring the Scratch Interface

Welcome to the Scratch world! Just like exploring a new playground, you'll discover all the cool things Scratch can do. The Scratch screen has different areas: a Stage where your creations come to life, a Sprite area for your characters, and a Block palette with all the coding pieces you'll use.

What's a Sprite?
A sprite is any character or object in your Scratch project. The default sprite is Scratch Cat!

What's the Stage?
The stage is like a theater where your sprites perform. It's the big white area on the right side of the screen.

Key Areas in Scratch:
• **Characters Area** - Shows all your sprites
• **Stage** - Where you see your project run
• **Programming Area** - Where you build your code with blocks

Fun Fact: Scratch was created at MIT and is used by millions of kids around the world!

Class Activity Preview:
You'll explore Scratch and make the cat move next.

Class Activity 1: Meet Scratch Cat

Let's explore Scratch and make the cat move! You'll learn where everything is and create your first simple program.

Step 1: Open Scratch - Go to scratch.mit.edu and click the "Create" button at the top of the page.

Step 2: Find the Stage - Look at the right side of the screen. You'll see the Scratch Cat on a white background. This is the Stage!

Step 3: Find the Blocks - Look at the left side. You'll see colorful categories like "Motion" (blue), "Looks" (purple), and "Sound" (pink). Click on "Motion."

Step 4: Make the Cat Move - Find the block that says "move 10 steps." Drag it to the middle area (Programming Area).

Step 5: Run Your Code - Click on the block you just placed. Watch the cat move on the stage!

Step 6: Make it Move More - Click on the number "10" in the block and change it to "50". Click the block again to see your cat move further!

Challenge: Change the number to 100 and see how far the cat moves!

Home Activity 1

Open Scratch at home and explore the different block categories. What colors do you see? Try dragging different blocks to the programming area!

3.2 Creating a Dancing Animation

Now let's make the cat dance! In Scratch, you can combine Motion and Looks blocks to create fun animations. You'll make Scratch Cat perform dance moves!

What are Motion Blocks?
Motion blocks are blue blocks that control where and how your sprite moves on the stage.

What are Looks Blocks?
Looks blocks are purple blocks that change how your sprite appears - like costumes and speech bubbles!

Key Blocks for Dancing:
• **move steps** - Moves the sprite
• **turn degrees** - Rotates the sprite
• **next costume** - Changes the sprite's look
• **wait seconds** - Pauses between actions

Parent Tip: Encourage your child to experiment with different numbers in the blocks!

Class Activity Preview:
You'll make the cat do a dance routine next.

Class Activity 2: Make the Cat Dance

Let's make Scratch Cat dance! You'll combine motion and looks blocks to create a fun animation.

Step 1: Open Scratch - Go to scratch.mit.edu and click "Create" to start a new project.

Step 2: Add Green Flag Event - Click on "Events" (yellow). Drag "when green flag clicked" to the Programming Area.

Step 3: Add Dance Moves - From Motion (blue), add "move 10 steps". From Looks (purple), add "next costume". From Control (orange), add "wait 0.5 seconds".

Step 4: Build the Dance - Stack these blocks under the green flag: move, next costume, wait. Then add turn 15 degrees.

Step 5: Repeat for More Moves - Repeat steps 3-4 twice for more dance moves.

Step 6: Test Your Dance - Click the green flag to test. The cat should dance!

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.

Step 1: Open a New Project - Open a new Scratch project with the Scratch Cat.

Step 2: Add Click Event - Drag "when this sprite clicked" (Events) to the coding area.

Step 3: Add Greeting Message - Add "say Happy Basant! for 2 secs" (Looks).

Step 4: Test It - Click the cat on the Stage to test - it talks!

Step 5: Change the Background - Change the Stage: Click "Backdrops" (bottom left) and pick a festive one (e.g., party).

Step 6: Add Sound - Add "play sound meow until done" (Sound).

Challenge: Change to "Happy Birthday!" for a friend.

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.

> **Step 1: Open a New Project** - Open a new Scratch project.
>
> **Step 2: Add an Apple Sprite** - Add an Apple sprite: Click "Choose a Sprite" and pick an Apple.
>
> **Step 3: Program the Apple** - 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).
>
> **Step 4: Program Cat Movement (Right)** - For Scratch Cat: Add "when right arrow key pressed" (Events). Add "change x by 10" (Motion).
>
> **Step 5: Program Cat Movement (Left)** - For Scratch Cat: Add "when left arrow key pressed". "change x by -10" (Motion).
>
> **Step 6: Test Your Game** - 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).

3.5 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.

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.

Fun Fact: VEXcode VR is used in schools for robotics competitions!

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.

Step 1: Open VEXcode VR - Open vr.vex.com and click "Playground" > "Wall Maze."

Step 2: Add Drive Forward - Drag "Drive Forward for 200mm" (Motion) to the coding area.

Step 3: Test Your Code - Run the program by clicking the play button!

Step 4: Add Turn Block - Add "Turn Left for 90 degrees" (Motion) after Drive Forward.

Step 5: Build the Path - 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.

Step 6: Complete the Maze - 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.

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.

> **Step 1: Select Grid Maze** - Open vr.vex.com and select "Grid Maze" from the Playground options.

> **Step 2: Add Repeat Block** - Drag the "Repeat Block" from (Logic - Control) to the coding area.

> **Step 3: Add Movement Inside Loop** - Inside the loop, add "Drive Forward for 200 mm" and "Turn Right 90 degrees" from Drivetrain category.

> **Step 4: Set Up Drawing** - 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.

> **Step 5: Set Loop Count** - Set the loop to "4 times" and click play - the robot draws a square! Increase the distance, See moving in a bigger square.

> **Step 6: Save Your Work** - 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."

Step 1: Select Wall Maze - Open vr.vex.com and select "Wall Maze" from the Playground options.

Step 2: Add Forever Loop - Drag a "forever" loop (from the Logic category) to the coding area to keep the robot moving continuously.

Step 3: Add Small Movement - Inside the loop, add "Drive Forward for 50mm" (from the Drivetrain category) so the robot advances in small steps to allow time for sensing.

Step 4: Add Condition Block - 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.

Step 5: Build the Condition - Combine both blocks into one: Place "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.

Step 6: Add Turn Action - 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.

Step 7: Test Your Code - Run the code. Robot will now avoid walls. It will move to left when a Wall is detected at 50mm.

Step 8: Experiment - 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

Put everything together! Use motion blocks, loops, and sensors to navigate the robot through the maze to the finish.

>**Step 1: Open Wall Maze** - Open vr.vex.com and select "Wall Maze."
>
>**Step 2: Plan Your Path** - Plan your path: Add "Drive Forward" and "Turn" blocks for turns.
>
>**Step 3: Add Loops** - Add a loop for repeated moves (e.g., "repeat 3 times").
>
>**Step 4: Add Sensors** - Insert sensor blocks to avoid walls (e.g., "if close, turn").
>
>**Step 5: Test and Debug** - Run your code and watch the robot. If it hits a wall, adjust the distances or add more sensor checks.
>
>**Step 6: Complete the Challenge** - Keep improving until your robot reaches the finish point!

Challenge: Try to complete the maze in the fewest blocks possible!

4.S Chapter 4 Summary and Final Home Activity

You're a Robot Programmer! You:

4.1: Navigated an obstacle course with motion blocks.

4.2: Used loops to repeat robot movements efficiently.

4.3: Added sensors to avoid obstacles automatically.

4.4: Learned about robot challenges.

4.5: Completed a full maze challenge!

Skills You Learned:
• Drive Forward and Turn blocks for movement
• Repeat/Loop blocks for efficiency
• Distance sensors for obstacle detection
• If-then conditions for smart decisions
• Combining skills for complex challenges

Home Activity 3

Create your own maze challenge and share it with a friend or family member!

Homework

Practice coding different paths in VEXcode VR playgrounds. Try the "Dynamic Wall Maze" for an extra challenge!

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.

> **Step 1: Open Google Colab** - Open colab.google.com and sign in (with teacher help).
>
> **Step 2: Create New Notebook** - Click "File" > "New notebook" to start a project.
>
> **Step 3: Create Variable** - In the code cell, type: score = 10
>
> **Step 4: Print Variable** - Below, type: print(score) to show the number.
>
> **Step 5: Run Code** - Click the "Play" button (triangle) next to the cell to run.
>
> **Step 6: Change Value** - Change 10 to 20 and run again.

Challenge: Make a variable age = 8 and print it.

Home Activity 1

Create a variable for your roll number and print it.

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.

    Step 1: Open Colab - Open a new notebook on colab.google.com.

    Step 2: Ask for Name - In a code cell, type: name = input("What is your name? ")

    Step 3: Say Hello - Below, type: print("Hello, " + name + "!")

    Step 4: Run and Test - Click the "Play" button, type your name (e.g., "Ayesha") in the box, and press Enter.

    Step 5: See Output - See the output, like "Hello, Ayesha!" Google colab automatically saves your notebook.

    Step 6: Rename Notebook - You can rename the notebook name. Double click the name (above File Menu).

    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.

> **Step 1: Open Colab** - Open a new notebook on colab.google.com.
>
> **Step 2: Ask for Name** - In a code cell, type: name = input("What is your name? ")
>
> **Step 3: Ask for Food** - Type: food = input("What is your favorite food? ")
>
> **Step 4: Print Message** - Type: print(name, " loves ", food, "!")
>
> **Step 5: Run and Test** - Click "Play," enter a name (e.g., "Bilal") and food (e.g., "biryani"), press Enter.
>
> **Step 6: See Result** - See "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.

> **Step 1: Open Colab** - Open a new notebook on colab.google.com.
>
> **Step 2: Create Question** - In a code cell, type: question = "What is the capital of Pakistan?"
>
> **Step 3: Ask Question** - Type: answer = input(question + " ")
>
> **Step 4: Check Answer** - Type: if answer == "Islamabad": print("Correct!")
>
> **Step 5: Add Wrong Answer** - Type: else: print("Oops, it's Islamabad.")

Step 6: Test Quiz - Click "Play," answer the question, see the result.

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

Home Activity 4

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

5.5 Chapter 5 Summary and Final Home Activity

5.S 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!

6.1 Exploring AI Image Tools

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.

Key Tools:
• Grok: Type prompts in a chat for images.
• ChatGPT: Ask for pictures via DALL-E.
• Colab: For coding AI tasks.

Fun Fact: AI learns from millions of images to draw for you!

Instructions:
Ask an adult to open grok.com or chat.openai.com.

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.

> **Step 1: Open AI Tool** - Open grok.com or chat.openai.com (with adult help).

Step 2: Type Prompt - Type: "Create an image of A camel standing in a desert."

Step 3: Generate Image - Press enter and wait for the image.

Step 4: Check Image - Check the camel - does it have humps?

Step 5: Save Image - Download the image and rename to camel.jpeg

Challenge: Try "a camel with a hat" for fun!

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.

Step 1: Open AI Tool - Open grok.com or chat.openai.com.

Step 2: Type Detailed Prompt - Type: "Create an image of A green parrot on a mango tree in a sunny garden."

Step 3: Generate Image - Press enter to see the image.

Step 4: Check Image - Check the parrot - does it look happy?

Step 5: Save Image - 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.

> **Step 1: Open AI Tool** - Open grok.com or chat.openai.com.
>
> **Step 2: Type Scene Prompt** - Type: "Create an image of Kids flying colorful kites at a Basant festival in Lahore with a sunset."
>
> **Step 3: Generate Image** - Press enter - see the kites?
>
> **Step 4: Save Image** - Save as "BasantScene.jpg"
>
> **Step 5: Try Another Prompt** - 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.

Step 1: Open AI Tool - Open grok.com or chat.openai.com.

Step 2: Type Complex Prompt - Type: "Create an image of A Pakistani superhero in a green cape flying over Karachi at night in a cartoon style."

Step 3: Generate Image - Press enter to see the superhero.

Step 4: Save Image - Save as "MySuperheroScene.jpg"

Step 5: Try Another Prompt - 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!

6.5 Chapter 6 Summary and Final Home Activity

6.S Chapter 6 Summary

You're an AI Artist! You:

6.1: Explored AI tools and generated a camel image.

6.2: Added details to prompts for better images.

6.3: Created festival scenes with AI.

6.4: Used complex prompts for superhero art.

Skills You Learned:
• Using Grok and ChatGPT for image generation
• Writing clear and detailed prompts
• Creating scenes with multiple elements
• Complex prompts for creative projects
• Saving and naming AI-generated images

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.

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.

Step 1: Open Google Drive - Open drive.google.com.

Step 2: Create New Folder - Click "New" > "Folder."

Step 3: Name Your Folder - Type a name, like "My School Projects."

Step 4: Create Folder - Click "Create" to upload your folder.

Step 5: Open Folder - 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.

    Step 1: Open Folder - Open drive.google.com and go to "My School Projects" folder.

    Step 2: Create New Doc - Click "New" > "Google Docs."

    Step 3: Add Title - Type a title, like "My Adventure Story."

    Step 4: Write Story - Write one sentence, e.g., "I met a talking parrot!"

    Step 5: Save File - 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.

  Step 1: Open Google Drive - Open drive.google.com.

  Step 2: Create New File - Click "New" > "Google Docs" to create a new file.

  Step 3: Name and Write - Name it "Homework" and type one sentence, e.g., "I love math!"

  Step 4: Rename File - Right-click the file, select "Rename," and change it to "Math Notes."

  Step 5: Move to Folder - Drag "Math Notes" into "My School Projects" folder.

  Challenge: Create a "Science Notes" file and move it too.

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!

Class Activity 4: Edit Your Story File

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

  Step 1: Open Folder - Open drive.google.com and go to "My School Projects."

  Step 2: Open Story - Double-click "My Adventure Story" to open it.

  Step 3: Add Sentences - Add two new sentences, e.g., "The parrot flew to Badshahi Mosque. It sang a song!"

  Step 4: Auto Save - Click anywhere - it autosaves!

  Step 5: Check Story - 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

Let's practice deleting a file safely.

> **Step 1: Open Google Drive** - Open drive.google.com.
> **Step 2: Create Test File** - Click "New" > "Google Docs" and name it "Test File."
> **Step 3: Delete File** - Right-click "Test File" and select "Move to Trash."

Class Activity 6: Delete and Restore

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

> **Step 1: Open My Drive** - Open drive.google.com and go to "My Drive."
> **Step 2: Create File** - Create a new Google Doc named "Old Note."
> **Step 3: Delete File** - Right-click "Old Note" and click "Remove" to delete it.
> **Step 4: Open Trash** - Click "Trash" on the left to see deleted files.
> **Step 5: Restore File** - Right-click "Old Note" in Trash and select "Restore."

> **Challenge:** Delete "Old Note" again and empty Trash (ask an adult).

Home Activity 5

Create and delete another file in presence of family.

Home Activity 6

Delete an old online note and restore it.

7.S Chapter 7 Summary and Final Home Activity

Great job, cloud explorer! You:

7.1: Explored Google Drive and created a school folder.

7.2: Created files using Google Docs.

7.3: Organized files by moving and renaming them.

7.4: Edited files to make them better.

7.5: Deleted files safely and restored them from Trash.

Skills You Learned:
• Created and organized folders and files in Google Drive.
• Moved, renamed, edited, and deleted files.

What's Next?
Use Google Drive to save your VEXcode VR screenshots (Chapter 4), Python notebooks (Chapter 5), and AI images (Chapter 6)!

Final Activity: Make a Festival Folder

Let's create a festival folder and add a document to it!

> **Step 1: Open Google Drive** - Open drive.google.com.
>
> **Step 2: Create Folder** - Click "New" > "Folder" and name it "Basant Festival."
>
> **Step 3: Create Document** - Create a Google Doc inside it called "Kite Plan."
>
> **Step 4: Write Content** - Write one sentence, e.g., "I'll make a red kite!"
>
> **Step 5: Move File** - 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.

Fun Fact: Canva has templates for everything, even Pakistani weddings!

Activity:
Review with a template.

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.

Step 1: Open Canva - Go to www.canva.com and click "Create a design" > "Poster."

Step 2: Choose Template - Choose a colorful poster template (search "art").

Step 3: Edit Title - Change the title to "Lahore Art Show."

Step 4: Replace Image - Replace an image with a new one (search "painting" in "Elements").

Step 5: Change Color - Change the text color to blue or red.

Step 6: Download - 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.

> **Step 1: Open Canva** - Open www.canva.com and click "Create a design" > "Invitation."
> **Step 2: Choose Template** - Choose a blank design or simple template.
> **Step 3: Add Background** - Add a background: Search "pattern" in "Elements" and pick one.
> **Step 4: Add Image** - Add an image: Search "flower" and place it on top.
> **Step 5: Add Text** - Add text: Type "Eid Party!" in a big font.
> **Step 6: Use Layers** - Click "Position" > "Layers" to move text above the flower.
> **Step 7: Download** - Download as "EidInvite.png."

Home Activity 2

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

8.3 Creating Animations in Canva

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.

    Step 1: Open Canva - Go to www.canva.com and click "Create a design" > "Social Media Post."

    Step 2: Choose Template - Choose a blank design or search "festival" for a template.

    Step 3: Add Image - Add an image: Search "kite" in "Elements" and place it.

    Step 4: Add Text - Add text: "Fly High at Basant!" in a bold font.

    Step 5: Animate - Click "Animate" > choose "Rise" for the text and "Pan" for the kite.

    Step 6: Download GIF - 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.

    Step 1: Open Canva - Open www.canva.com and click "Create a design" > "Presentation."

    Step 2: Slide 1 - Title - Slide 1: Add a title, "My Favorite Animal: Peacock."

    Step 3: Slide 2 - Content - Slide 2: Add an image (search "peacock" in "Elements") and text: "Peacocks dance!"

    Step 4: Slide 3 - End - Slide 3: Add text: "The End" and a button (search "button" in "Elements").

> **Challenge:** Add animations to each slide!

Home Activity 4

Create a presentation about your favorite Pakistani place.

8.5 Collaborative Design Projects

Teamwork makes art better! In Canva, you can share designs with friends and work together, like a real design studio. Let's collaborate on a project!

What's Collaboration?
Working with others on the same design online.

Why Collaborate?
Share ideas and create amazing art together!

Activity Preview:
You'll make a newsletter with a partner.

Parent Tip: Help your child share designs safely!

Class Activity 5: Design a Newsletter

Let's create a class newsletter with a partner! You'll share and edit together in Canva.

    Step 1: Open Canva - Open www.canva.com and click "Create a design" > "Newsletter."

    Step 2: Choose Template - Pick a simple newsletter template.

    Step 3: Add Title - Add a title: "Our Class News."

    Step 4: Share Design - Click "Share" > "Anyone with the link" > "Can edit."

    Step 5: Partner Edits - Send the link to a partner - they add a sentence about school.

    Step 6: Download - Download as "ClassNews.pdf."

    Challenge: Add an image your partner suggests!

Home Activity 5

Create a family newsletter with a sibling or parent.

8.S Chapter 8 Summary and Final Activity

You're a Canva Pro! You:

8.1: Reviewed Canva basics and created an art poster.

8.2: Used layers to design an invitation card.

8.3: Created animated posts with GIF effects.

8.4: Designed interactive presentations.

8.5: Collaborated on a newsletter with a partner.

Skills You Learned:
• Opening and editing templates
• Using layers to stack elements
• Adding animations and effects
• Creating GIFs for social media

- Designing multi-slide presentations
- Adding interactive elements
- Collaborating with others online

What's Next?
Use your Canva skills with Arduino projects (Chapter 9) and AI audio (Chapter 10)!

Final Activity: Design a Festival Card

Let's make a festival card for Mela Chiraghan! You'll use all your Canva skills.

    Step 1: Open Canva - Open www.canva.com and click "Create a design" > "Card."

    Step 2: Choose Template - Pick a festive template or start blank.

    Step 3: Add Title - Add title: "Happy Mela Chiraghan!"

    Step 4: Add Image - Add an image: Search "lamp" or "lights" in Elements.

    Step 5: Use Layers - Use layers to put the image behind the text.

    Step 6: Add Animation - Add animation: Choose "Fade" for the text.

    Step 7: Download - Download as a GIF: "MelaCard.gif."

Final Home Activity

Create an animated poster for your favorite Pakistani festival and share it with family!

Homework

Design a 5-slide presentation about Pakistan and present it to your class or family.

Chapter 9: Introduction to Arduino Basics

Welcome to Arduino!

Arduino is a tiny computer you can program to do cool things, like blinking lights or making sounds! In this chapter, you'll learn what Arduino is, set it up, and write your first program. It's like coding in Python (Chapter 5), but with real hardware!

What is Arduino?
A small board that controls electronics, like LEDs or sensors.

Why Learn Arduino?
Build robots, games, or smart gadgets!

Activity Preview:
You'll blink an LED today!

Instructions:
Ask an adult to help you set up the Arduino IDE.

9.1 What is Arduino?

Arduino is a small computer board that talks to electronics! It has pins to connect LEDs, buttons, and sensors. You write code to tell it what to do, like blinking a light or playing music.

Key Parts:
• Board: The main computer (like Arduino Uno).
• Pins: Connect wires and components.
• USB Port: Connects to your computer for coding.

Fun Fact: Arduino is named after a bar in Italy where the inventors met!

Activity Preview:
Explore an Arduino board next.

Class Activity 1: Explore an Arduino Board

Let's look at an Arduino board and learn its parts! You'll identify the key components.

> **Step 1: Get Arduino** - Get an Arduino Uno board from your teacher (or look at a picture).
>
> **Step 2: Find USB Port** - Find the USB port - it connects to your computer.
>
> **Step 3: Find Digital Pins** - Find the digital pins (numbered 0-13) - they connect LEDs.
>
> **Step 4: Find Power Pins** - Find the power pins (5V, GND) - they give electricity.
>
> **Step 5: Draw Diagram** - Draw a simple diagram of the board in your notebook.
>
> **Challenge:** Label the reset button on your diagram!

Home Activity 1

Draw an Arduino board and explain its parts to your family.

9.2 Setting Up the Arduino IDE

The Arduino IDE is a program where you write code for your Arduino, like Google Colab for Python (Chapter 5). You'll download it and connect your board to start coding!

What's an IDE?
A place to write and upload code to Arduino.

Why Setup?
Without the IDE, you can't talk to your Arduino!

Activity Preview:
You'll install the IDE and connect your board.

Parent Tip: Help your child download the Arduino IDE safely!

Class Activity 2: Install and Connect Arduino IDE

Let's set up the Arduino IDE and connect your board! You'll be ready to code in no time.

  Step 1: Open Website - Go to www.arduino.cc/en/software (with adult help).
  Step 2: Download IDE - Download the Arduino IDE for your computer (Windows, Mac, or Linux).
  Step 3: Install IDE - Install the IDE by following the instructions.
  Step 4: Connect Arduino - Connect your Arduino Uno to the computer using a USB cable.
  Step 5: Select Board - In the IDE, go to Tools > Board > Arduino Uno.
  Step 6: Select Port - Go to Tools > Port and select the correct port (e.g., COM3).

  Challenge: Take a screenshot of your IDE with the board connected!

Home Activity 2

Practice opening the Arduino IDE and finding the Tools menu.

9.3 Your First Arduino Program: Blinking LED

Let's make an LED blink! You'll write a simple program (called a "sketch" in Arduino) to turn a light on and off. It's like a Python loop (Chapter 5), but controls real hardware!

What's a Sketch?
A program for Arduino, written in the IDE.

Key Functions:
• setup(): Runs once at the start.
• loop(): Runs over and over forever.

Activity Preview:
You'll blink the built-in LED next.

DIY Idea: Try changing the blink speed!

Class Activity 3: Blink the Built-in LED

Let's write your first Arduino sketch to blink the built-in LED on your board!

Step 1: Open Arduino IDE - Open the Arduino IDE on your computer.

Step 2: Open Blink Example - Go to File > Examples > 01.Basics > Blink.

Step 3: Read Code - Read the code - it uses digitalWrite() to turn the LED on/off.

Step 4: Upload Sketch - Click the Upload button (right arrow) to send the code to Arduino.

Step 5: Watch LED - Watch the built-in LED (near pin 13) blink on and off!

Step 6: Change Speed - Change delay(1000) to delay(500) and upload again - it blinks faster!

Challenge: Make the LED blink in a pattern: fast, fast, slow!

Home Activity 3

Experiment with different delay values and record what happens.

9.4 Adding External Components

Now let's connect an external LED to your Arduino! You'll use a breadboard and wires to build a circuit. It's like building with LEGO, but for electronics!

What's a Breadboard?
A board with holes to connect wires and components without soldering.

What You Need:
• Arduino Uno
• Breadboard
• LED (any color)
• 220 ohm resistor
• Jumper wires

Activity Preview:
You'll build a circuit and blink an external LED.

Safety Tip: Always disconnect the USB before changing wires!

Class Activity 4: Blink an External LED

Let's build a circuit and blink an external LED! You'll connect components on a breadboard.

Step 1: Disconnect USB - Disconnect the USB cable from your Arduino.

Step 2: Place LED - Place the LED on the breadboard - long leg is positive (+).

Step 3: Add Resistor - Connect the resistor from the short leg of LED to the GND rail.

Step 4: Connect Positive - Connect a wire from the long leg of LED to pin 9 on Arduino.

Step 5: Connect Ground - Connect a wire from GND rail to GND on Arduino.

Step 6: Modify Code - Change the Blink code: replace LED_BUILTIN with 9.

Step 7: Upload and Test - Connect USB, upload, and watch your external LED blink!

Challenge: Add a second LED on pin 10 and make them blink alternately!

Home Activity 4

Draw your circuit diagram and explain it to your family.

9.5 Chapter 09 Summary

9.S Chapter 9 Summary and Final Activity

You're an Arduino Explorer! You:

9.1: Learned what Arduino is and explored the board.

9.2: Set up the Arduino IDE and connected your board.

9.3: Wrote your first sketch to blink the built-in LED.

9.4: Built a circuit with an external LED on a breadboard.

Skills You Learned:
• Identifying Arduino board components
• Installing and using the Arduino IDE
• Writing and uploading sketches
• Understanding setup() and loop() functions
• Using digitalWrite() and delay()
• Building circuits on a breadboard
• Connecting external LEDs with resistors

What's Next?
Combine Arduino with AI audio (Chapter 10) to create amazing projects!

Final Activity: Traffic Light Project

Let's build a mini traffic light with three LEDs! You'll use everything you learned.

Step 1: Setup Circuit - Connect three LEDs (red, yellow, green) to pins 9, 10, 11.

Step 2: Add Resistors - Add a 220 ohm resistor to each LED.

Step 3: Write Code - Write code to turn on green for 5 seconds, then yellow for 2 seconds, then red for 5 seconds.

Step 4: Upload and Test - Upload and watch your traffic light work!

Final Home Activity

Create a blinking pattern that spells your name in Morse code!

Homework

Research one Arduino project you would like to build and present it to your class.