

Preparing for Success in Coding and Robotics

A Comprehensive Study Guide for Grade 5 Students



Grade 5 Coding and Robotics Study Guide



TEST SCOPE

Here's what to study for your upcoming coding and robotics test. Remember, the test is worth 40 marks and you'll have 60 minutes to complete it. Good luck!



Topic Area 1: Code Breaker – Secret Messages



What is a "Code"?

- Definition: A code is a secret way to send a message so other people can't understand it.
- Purpose: Used to keep information private and secure.



Symmetric-Key Encryption

- Encryption: Changing a normal message into a secret message.
- Decryption: Changing a secret message back into a normal message.
- Key: The secret rule used to encrypt and decrypt.
- Important: The same key is used for both locking (encrypting) and unlocking (decrypting).



Caesar Cipher

- Definition: A cipher that shifts each letter by a fixed number.
- How it works: If the shift is 3, A becomes D, B becomes E, and so on.
- Example: With shift 3, the word "CAT" becomes "FDW".
- History: Named after Julius Caesar who used it to send secret military messages.



Ciphers vs. Codes

- **Plaintext:** The normal message you can read (before encryption).
- **Ciphertext:** The secret message after it has been encrypted (unreadable).
- **Difference:** A cipher changes individual letters, while a code replaces whole words or phrases.

Decoding a Message

- **Important:** You use the **SAME** key to encrypt and decrypt.
- **To decode:** Shift backwards by the same number you shifted forwards.
- **Example:** If you encrypted with shift 3, decrypt by shifting back 3.

Topic Area 2: General Computer Knowledge

Hardware vs. Software

- **Hardware:** The parts of a computer you can touch (physical components).
- **Examples of hardware:** Monitor, keyboard, mouse, CPU (processor), printer, speakers, webcam.
- **Software:** Programs and instructions that run on the computer (non-physical).
- **Examples of software:** Games, Microsoft Word, Google Chrome, Windows, apps.

Input, Output, and Storage Devices

- **Input devices:** Send information **IN** to the computer.
 - **Examples:** Keyboard, mouse, microphone, scanner, touchscreen, webcam.
- **Output devices:** Send information **OUT** from the computer.
 - **Examples:** Monitor (screen), printer, speakers, headphones, projector.
- **Storage devices:** Save information for later use.
 - **Examples:** Hard drive, USB flash drive, memory card, CD/DVD, external hard drive.

Basic Computer Parts

- **Monitor:** The screen that displays information.
- **Keyboard:** Used to type letters, numbers, and commands.
- **Mouse:** Used to point, click, and select items on screen.
- **CPU (Central Processing Unit):** The "brain" of the computer that processes information.
- **Printer:** Prints documents and images on paper.
- **Speakers:** Output sound and audio.

Understanding Networks

- **Internet:** A worldwide network that connects millions of computers together.
- **Network:** A group of computers connected to share information.
- **Wi-Fi:** A wireless way to connect to the Internet without cables.
- **Purpose:** Networks allow people to communicate, share files, and access information.

Safe Passwords

- **Use at least 8 characters** (longer is better).

- Mix uppercase letters, lowercase letters, numbers, and symbols.
- Don't use your name, birthday, or simple words like "password".
- Never use "123456" or "qwerty" – these are too easy to guess.
- Never share your password (except with a parent or teacher when necessary).
- Use different passwords for different accounts.

File & Folder

- File: A single document, picture, video, or program stored on the computer.
- Folder: A container that organizes and holds multiple files together.
- Example: You might have a "School Work" folder containing many homework files.

Skills expected:

- Encrypt and decrypt messages using Caesar cipher with different shift values.
 - Identify the difference between hardware and software.
 - Recognize and categorize input, output, and storage devices.
 - Explain password safety rules and why they're important.
 - Understand what the Internet is and how networks work.
 - Distinguish between files and folders.
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DETAILED NOTES FOR STUDENTS

Part A: Code Breaker – Secret Messages

What is a Code?

We use secret messages to keep information private, to play games, or to send messages that only the right person can understand. Throughout history, people have used codes to protect important information during wars, to keep secrets safe, and to communicate privately.

Encryption & Decryption

- Encryption = normal → secret (locking the message)
- Decryption = secret → normal (unlocking the message)
- Key = the secret rule (example: "shift by 3")
- Both the sender and receiver must know the same key.

Caesar Cipher (Shift Cipher)

The Caesar cipher is one of the oldest and simplest encryption methods. It works by shifting each letter in the alphabet by a fixed number of positions.

How shifting works:

You move each letter forward by the same number (the key). When you reach the end of the alphabet, you wrap around to the beginning.

Example: Shift 3 means:

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

Practice example:

Encrypt the word HELLO with shift 3:

- H → K
- E → H
- L → O
- L → O
- O → R

Result: KHOOR

 How to decode (reverse shift)

To decode a message, you need to know the key (shift number). Then shift each letter BACKWARDS by that same number.

Rule:

To decode, shift letters backwards by the same key.

Worked example (shift 3):

Decrypt the ciphertext: KHOOR

- K → H (shift back 3)
- H → E (shift back 3)
- O → L (shift back 3)
- O → L (shift back 3)
- R → O (shift back 3)

Plaintext: HELLO

Remember: Same key to lock (encrypt) and unlock (decrypt).

 Tip: If you don't know the key, you can try all 25 possible shifts (1 through 25) until you find one that makes sense!

Part B: General Computer Knowledge

 Hardware (Things You Touch)

Hardware refers to all the physical parts of a computer system that you can see and touch.

- **Monitor (screen):** Displays text, images, and videos.
- **Keyboard:** Input device with keys for typing.
- **Mouse:** Pointing device to control the cursor.
- **CPU (brain):** Processes all instructions and calculations.
- **Printer:** Creates physical copies of digital documents.
- **Speakers:** Output device for sound and music.

Software (Programs/Instructions)

Software is the collection of programs and instructions that tell the hardware what to do. You cannot touch software – it's digital information.

Examples of software:

- **Games (Minecraft, Roblox)**
- **Microsoft Word (word processing)**
- **Google Chrome (web browser)**
- **Windows or macOS (operating system)**
- **Apps on tablets and phones**

Understanding Devices

Input devices (send info IN):

These devices allow you to give information and commands to the computer.

Keyboard, mouse, microphone, touchscreen, scanner, webcam, game controller

Output devices (send info OUT):

These devices show or present information from the computer to you.

Monitor, printer, speakers, headphones, projector, smartboard

Storage devices (save info):

These devices store data so you can access it later, even after turning off the computer.

Hard drive (inside computer), USB flash drive, memory card, CD/DVD, external hard drive, cloud storage

What is a Network?

- **A network is a group of computers connected together so they can communicate and share information.**
- **The Internet is the largest network in the world, connecting millions of computers across all continents.**
- **Wi-Fi is a wireless technology that lets devices connect to a network without cables.**

- Networks allow us to send emails, browse websites, play online games, and video chat with friends and family.

Password Safety

Passwords protect your personal information and accounts. Creating strong passwords is one of the most important ways to stay safe online.

Password rules:

- At least 8 characters long (12 or more is even better).
- Mix uppercase letters (A-Z), lowercase letters (a-z), numbers (0-9), and symbols (!@#\$%).
- Do NOT use: your name, birthday, pet's name, "password", or "123456".
- Avoid common words that can be found in a dictionary.
- Never share your password with friends (only parents or teachers when necessary).
- Use different passwords for different websites and accounts.

Good password example:

MyDog@2026! (mixes letters, numbers, and symbols)

Bad password examples:

password, 123456, yourname, birthday

File vs Folder

- File = one document, picture, video, or game saved on the computer.
- Folder = a container that holds and organizes multiple files together.
- Think of it like a filing cabinet: folders are the drawers, and files are the papers inside.
- Example: You might create a folder called "Grade 5 Projects" and put all your school assignment files inside it.
- Organizing files into folders makes it easier to find what you need.

✨ Study these notes, practice encrypting and decrypting messages, and you'll be ready to ace your coding and robotics test! 🎯