

ST CLEMENT'S SECONDARY SCHOOL

INFORMATION AND COMMUNICATION TECHNOLOGY

FILE MANAGEMENT

FORM 2

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2026

File Compression and Encryption

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ACTIVITY 1

Defining file compression

REAL-LIFE SCENARIO FOR THE LEARNING ACTIVITY

- A learner wants to email a school project containing many images to the teacher. The email system rejects the file because it is too large. By understanding **file compression**, the learner compresses the files into a single ZIP folder, reducing the size and successfully sends the assignment on time.
- **Application:**
This scenario helps learners see how file compression is used in **schoolwork, communication, and ethical use of technology**.

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Computer file

- A **computer file** is a collection of related data or information stored on a computer.

Examples of computer files

- **Document files** – e.g. Word documents (.docx), PDF files (.pdf)
- **Image files** – e.g. JPEG (.jpg), PNG (.png)
- **Audio files** – e.g. MP3 (.mp3), WAV (.wav)
- **Video files** – e.g. MP4 (.mp4), AVI (.avi)
- **Spreadsheet files** – e.g. Excel files (.xlsx)
- **Presentation files** – e.g. PowerPoint files (.pptx)
- **Compressed files** – e.g. ZIP (.zip), RAR (.rar)
- **Executable files** – e.g. Program files (.exe)
- **Text files** – e.g. Notepad files (.txt)



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File Compression

- **File compression** is the process of **reducing the size of a file or folder.**
- So that it uses less storage space and is easier to transfer.

Why File Compression is Important

- Saves storage space on a computer or device
- Makes files faster to upload and download
- Allows large files to be sent via email
- Helps organize many files into one compressed folder

Types of File Compression

1. Lossless Compression

- No data is lost
- Original file can be restored exactly
- Example: ZIP, RAR, 7Z formats

2. Lossy Compression

- Some data is lost
- File size is reduced permanently
- Common for images, audio, and video (e.g., JPEG, MP3)

Exercise

1. Wami is a Form 2 learner who wants to send his ICT project folder to his teacher by email. The folder contains many pictures and documents, but the email system does not allow large attachments.
 - (a) Explain what *file compression* is and why it would help Wami in this situation.
 - (b) State on type of compression method Wami could use and explain why he could use this method
 - (c) State one advantage of compressing files when using email or cloud storage.

ACTIVITY 2

Identifying file compression tools
(WinRAR, 7-zip, power ISO...)

REAL-LIFE APPLICATION SCENARIO

- A learner wants to submit multiple project files through email. The teacher advises using a compression tool. The learner chooses **7-Zip** because it is free and compresses all files into one folder, making submission faster and easier.

Common File Compression Tools

- **File compression tools** are software programs used to reduce the size of files and folders by compressing them.
- This makes files easier and faster to store, upload, download, or send via email or cloud storage.

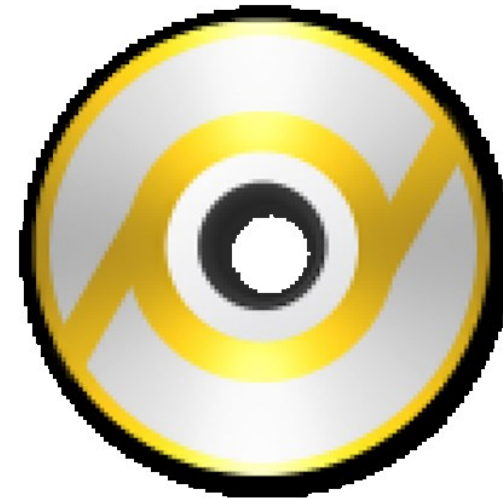
Common File Compression Tools

1. WinRAR

2. 7-Zip

3. WinZip

4. PowerISO



Common File Compression Tools

1. WinRAR

- Compresses files into formats like .rar and .zip
- Allows splitting large files into smaller parts
- Can also encrypt files with a password

2. 7-Zip

- Free and open-source compression tool
- Compresses files into .7z and .zip formats
- Produces high compression, reducing file size significantly

Common File Compression Tools

3. WinZip

- Compresses files mainly into .zip format
- Easy to use and commonly used for emailing files

4. PowerISO

- Used for compressing and managing image files (ISO)
- Can also compress files into archive formats

Common File Compression Tools

Tool Name	Description
WinRAR	Popular tool for compressing and extracting files
7-Zip	Free and open-source compression software
PowerISO	Used for compressing files and managing disk images
ZIP (Built-in)	Available in Windows without installing extra software

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Exercise

A school ICT club is asked to upload learning materials to a shared Google Drive folder so that all members can access them easily. The files take up too much space and upload very slowly.

- a) Define file compression tools.
- b) Explain how compressing the files before uploading can improve storage and file transfer.
- c) Identify one file compression tool that the ICT club could use and state its purpose.

ACTIVITY 3

Demonstrating file Compression and extraction

REAL-LIFE APPLICATION SCENARIO

1. A learner wants to submit multiple photos for a school project but the email system rejects them. By **compressing** the files into one ZIP folder and **extracting** them later, the learner successfully submits and accesses the files without loss.
2. A learner needs to submit multiple school documents online. By compressing them into one ZIP folder and extracting them later, the learner saves time, storage space, and internet data.

File Compression Formats

- **.zip** – Most common and widely supported
- **.rar** – Created using WinRAR
- **.7z** – Created using 7-Zip
- **.iso** – Common with PowerISO

Steps to Compress Files or Folders

1. Select the file or folder
2. Right-click on it
3. Choose a compression
4. Select compression format
5. Click **OK**
6. A compressed file is created

6. Extracting (Unzipping) Files

Extraction is the process of restoring compressed files to their original form.

Steps:

- 1.Right-click the compressed file
- 2.Select **Extract Here** or **Extract to Folder**
- 3.Files return to normal size and format

Assessment

You are a member of the school debate team. The patron asks you to submit several documents and pictures used during practice sessions by uploading them to the school's cloud storage. The files are many and occupy a lot of space.

Using a file compression tool available on the computer (WinRAR or 7-Zip):

- a) Create a folder named **Debate_Materials** and place the given files inside it.
- b) Compress the folder into a single compressed file.
- c) Rename the compressed file to **Debate_Materials.zip** (or .rar).
- d) Save the compressed file in the **Documents** folder.

PRACTICAL ASSESSMENT TABLE

Teacher Activity	Learner Activity	Assessment Criteria
• Moves around assisting learners. • Checks naming and file size.	• Perform compression and extraction.	Folder compressed and extracted successfully.

ACTIVITY 4

**Practicing transferring files via email
or cloud storage.**

REAL-LIFE APPLICATION

- A learner compresses a project folder and uploads it to Google Drive, then shares the link with the teacher instead of sending many large files via email saving data, time, and storage.

7. Transferring Compressed Files

a) Transferring via Email

- Compress files to reduce size
- Attach the compressed file to an email
- Send to the recipient

Transferring Compressed Files via Email

- **Compress the file or folder**

- Right-click on the file/folder.
- Select **Compress / Add to archive / Send to → Compressed (zipped) folder**.

- **Open your email account**

- Log in to your email (e.g. Gmail, Outlook).

- **Compose a new email**

- Click **Compose** or **New Mail**.

- **Attach the compressed file**

- Click the **Attach** (paperclip) icon.
- Browse and select the compressed file (.zip or .rar).

- **Enter recipient details**

- Type the recipient's email address.
- Add a subject and message.

- **Send the email**

- Click **Send**.

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b) Transferring via Cloud Storage

- Upload compressed files to:
 - Google Drive
 - OneDrive
 - Dropbox
- Share the download link

Transferring Compressed Files via Cloud Storage

- **Compress the file or folder**
 - Use a compression tool such as WinRAR or 7-Zip.
- **Open cloud storage**
 - Log in to Google Drive, OneDrive, or Dropbox.
- **Upload the compressed file**
 - Click **Upload**.
 - Select the compressed file and wait for it to upload.
- **Share the file**
 - Right-click the uploaded file.
 - Select **Share** or **Get link**.
- **Send the link**
 - Share the link via email or messaging app.

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Transferring Compressed Files Using a Flash Disk

- **Insert the flash disk**

- Plug the USB flash disk into the computer.

- **Copy the compressed file**

- Right-click the compressed file.
- Select **Copy**.

- **Paste into flash disk**

- Open the flash disk folder.
- Right-click and select **Paste**.

- **Safely remove the flash disk**

- Eject the flash disk properly before removing it.

Advantages of File Compression

- Faster file transfer
- Saves internet data
- Reduces storage usage
- Combines many files into one

Task 1: Transferring Files via Email

- Open email account.
- Compose a new email.
- Attach a compressed file.
- Send email to teacher/peer.

Task 2: Transferring Files via Cloud Storage

- Upload file to cloud storage.
- Generate share link.
- Share link with a peer.

Assessment

Mwewa has completed a group ICT assignment saved in a folder called **“Form2_ICT_Assignment”**. His teacher has asked him to submit the work by **email**. The folder contains several documents and images.

Task:

You are required to help Mwewa send the assignment correctly.

- a) Compress the folder **“Form2_ICT_Assignment”** into one compressed file.
- b) Open an email account and create a new email to the teacher.
- c) Attach the compressed file to the email.
- d) Write a short, appropriate email message and send it.

ACTIVITY 5

Defining file encryption

File encryption

- **File encryption** is the process of converting readable data (plain text) into an unreadable format (cipher text) to protect it from unauthorized access.
- Encrypted files can only be opened using a **password, PIN, or encryption key**.
- It helps to keep sensitive information **secure and confidential**.

Importance of File Encryption

- Protects personal and confidential information
- Prevents unauthorized access
- Enhances data security when sharing files online
- Reduces risk of data theft and cybercrime

HOME WORK

Butemwe wants to back up her ICT notes so she can access them from home and school. The notes are saved in different files on the computer. She decides to use **cloud storage**.

- **Task:**

You are required to help Butemwe store and share her files using cloud storage.

- a) Create a folder named “**Butemwe_ICT_Notes**”.
- b) Compress the folder into a single file.
- c) Upload the compressed file to a cloud storage platform (e.g., Google Drive or OneDrive).
- d) Share the uploaded file with a classmate or teacher.

ACTIVITY 6

Identifying file Encryption tools
(BitLocker, 7-zip, power ISO...)

File Encryption Tools

These are software tools used to encrypt files and folders:

(a) BitLocker

- Built into **Windows Operating System**
- Used to encrypt **drives, folders, and files**
- Requires a password or recovery key
- Commonly used to protect data on laptops and flash drives

(b) 7-Zip

- Free and open-source software
- Encrypts files while compressing them
- Uses **password protection** and **AES-256 encryption**
- Supports encrypted ZIP and 7z files

(c) Power ISO

- Used mainly for disk image files
- Can encrypt files and folders with passwords
- Allows creation of protected ISO files

Exercise

1. What is the purpose of file encryption?
2. Name two tools that can be used to encrypt files.
3. Explain how a password helps in file encryption.
4. Give one advantage of using file encryption for your documents.

ACTIVITY 7

**Discussing and demonstrate
file encryption methods**

File Encryption Methods

(a) Password-Based Encryption

- A password is set to lock the file or folder
- Only users with the correct password can access the data

3. File Encryption Methods

(b) Folder Encryption

- Entire folders are encrypted at once
- All files inside the folder are automatically protected

File Encryption Methods

(c) Drive Encryption

- Encrypts the whole storage device (e.g. flash disk, hard drive)
- Commonly done using BitLocker

Demonstration of File Encryption

(Example using 7-Zip)

1. Right-click on a file or folder
2. Select **7-Zip**
3. Click **Add to archive**
4. Enter a **password** under Encryption
5. Choose encryption method (AES-256)
6. Click **OK**
7. The file becomes encrypted and password-protected

ACTIVITY 8

**Transferring encrypted files via
email or cloud storage**

Transferring Encrypted Files

(a) Email Transfer

- Attach the encrypted file to an email
- Send the password separately (e.g. via SMS or phone call)
- Ensures secure file sharing

(b) Cloud Storage Transfer

- Upload encrypted files to cloud platforms (Google Drive, OneDrive)
- Share download link with authorized users
- Even if accessed, file cannot be opened without the password

Advantages of Encrypting Files and Folders

- Protects data privacy
- Prevents data misuse
- Safe file sharing over the internet
- Reduces risk of hacking and unauthorized access

Steps for Transferring Encrypted Files

Step 1: Select the File or Folder

1. Locate the file or folder you want to protect.
2. Right-click on it.
3. Ensure the new compressed file has been created.
4. Try opening it to confirm that a **password is required**.

Step 2: Encrypt the File or Folder

1. Choose a compression tool (e.g. **7-Zip** or **WinRAR**).
2. Select “**Add to archive**” or “**Add to compressed file**”.
3. Enter a **strong password** in the password/encryption section.
4. Click **OK** to create an encrypted compressed file.

Step 3: Verify the Encrypted File

1. Ensure the new compressed file has been created.
2. Try opening it to confirm that a **password is required**.

Step 4: Transfer the Encrypted File

a) Via Email

- Open your email account.
- Click **Compose**.
- Attach the encrypted file.
- Enter the recipient's email address and send.

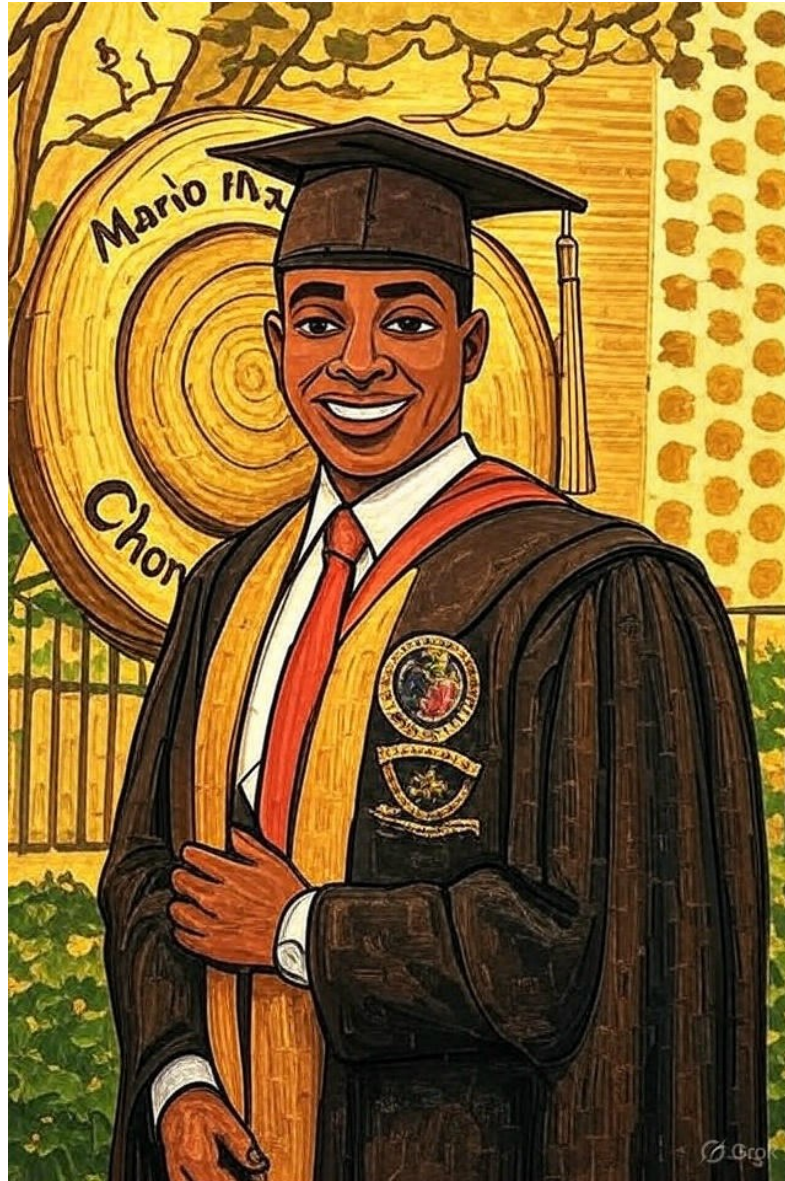
b) Via Cloud Storage

- Log in to a cloud storage service (e.g. Google Drive, OneDrive).
- Upload the encrypted file.
- Share the file with the recipient.

c) Share the Password Securely

- Send the password using a **separate method** (e.g. SMS or phone call).
- Do **not** send the password in the same email or cloud message.

*"A well-organized
file system is the
backbone of
digital
productivity;
without it, chaos
is just a click
away."*



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