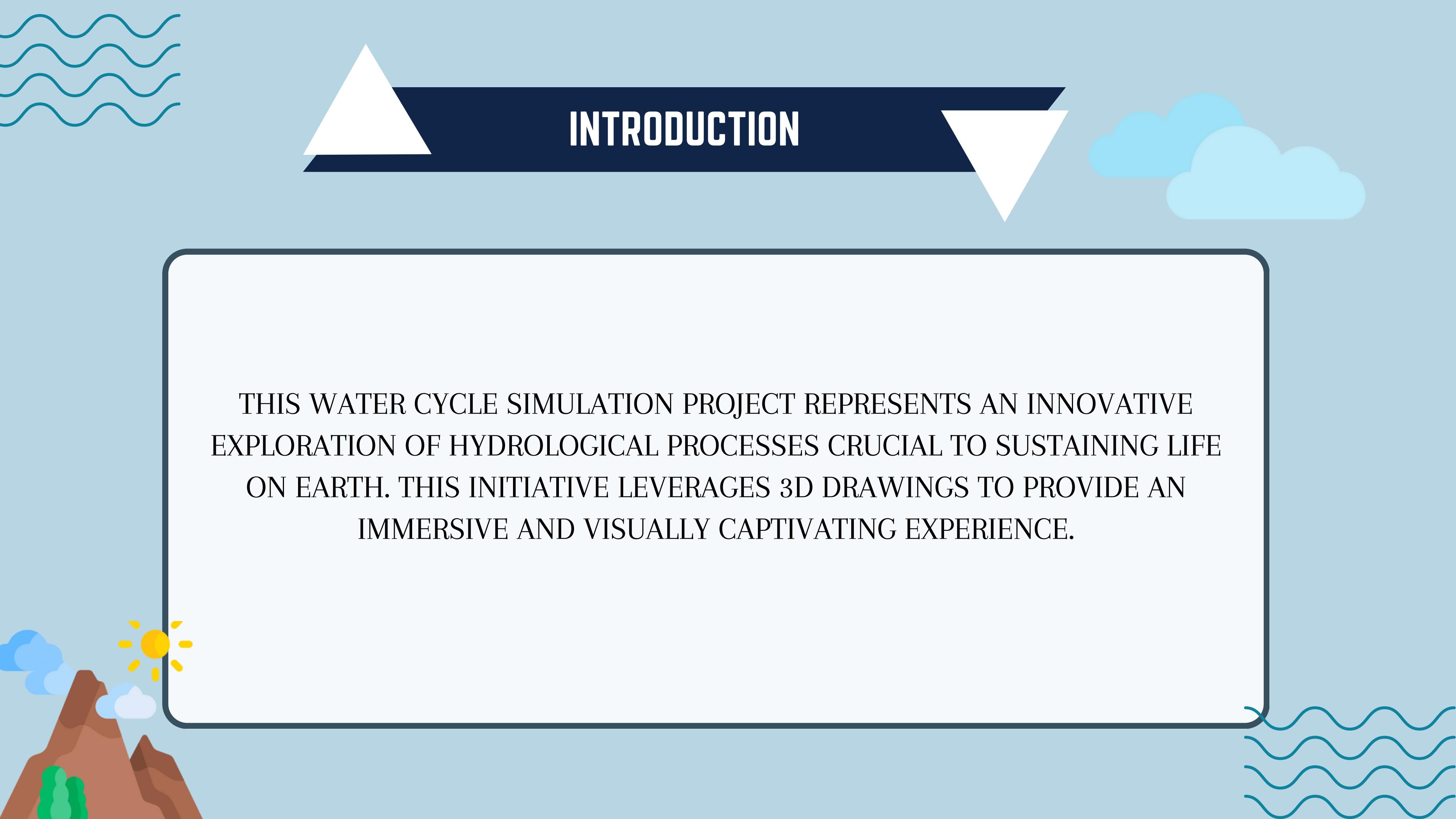


WATER CYCLE



COMPUTER GRAPHICS AND MULTIMEDIA
GROUP : 15



INTRODUCTION

THIS WATER CYCLE SIMULATION PROJECT REPRESENTS AN INNOVATIVE EXPLORATION OF HYDROLOGICAL PROCESSES CRUCIAL TO SUSTAINING LIFE ON EARTH. THIS INITIATIVE LEVERAGES 3D DRAWINGS TO PROVIDE AN IMMERSIVE AND VISUALLY CAPTIVATING EXPERIENCE.

OBJECTIVES

- THIS PROJECT AIMS TO CREATIVELY ILLUSTRATE THE DIFFERENT STAGES OF THE WATER CYCLE THROUGH AN ENGAGING 3D MODEL WITH ANIMATIONS.
- ENABLE USER INTERACTION TO CONTROL ANIMATION VIEWS AND CAMERA MOVEMENTS, MAKING IT POSSIBLE FOR USERS TO ENGAGE WITH THE EXPERIENCE.
- TO ENSURE **SMOOTH TRANSITIONS** BETWEEN DIFFERENT STAGES OF THE WATER CYCLE
- TO ADD NARRATION OR TEXT ANNOTATIONS TO GUIDE THE AUDIENCE THROUGH EACH STAGE.



TOOLS USED

PROGRAMMING LANGUAGE: C++

GRAPHICS LIBRARY: OPENGL

(IDE): VISUAL STUDIO CODE

ADDITIONAL TOOLS: - GIT FOR VERSION CONTROL

LIBRARIES AND DEPENDENCIES

OPENGL GRAPHICS LIBRARY: PROVIDES A CROSS-PLATFORM API FOR RENDERING 2D AND 3D VECTOR GRAPHICS.

FREEGLUT (FREE OPENGL UTILITY TOOLKIT): EXTENSION OF OPENGL, SIMPLIFYING WINDOW CREATION AND MANAGEMENT FOR OPENGL APPLICATIONS.

GLEW (OPENGL EXTENSION WRANGLER LIBRARY): ITS PRIMARY PURPOSE IS TO MANAGE OPENGL EXTENSIONS BY PROVIDING A SIMPLE INTERFACE FOR QUERYING AND LOADING SUPPORTED EXTENSIONS

Tasks implemented

CREATE A 3D SCENE

ADD TEXTS TO THE SCENE

USE THE KEYS TO SIMULATE THE PROGRAM

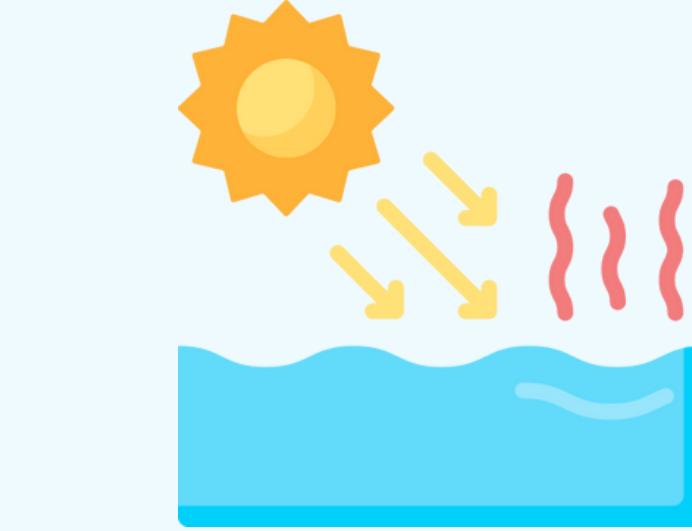
IMPLEMENT DIFFERENT TEXTURES

ADD A LIGHT SOURCE

CHANGE THE CAMERA'S POSITION

ANIMATION

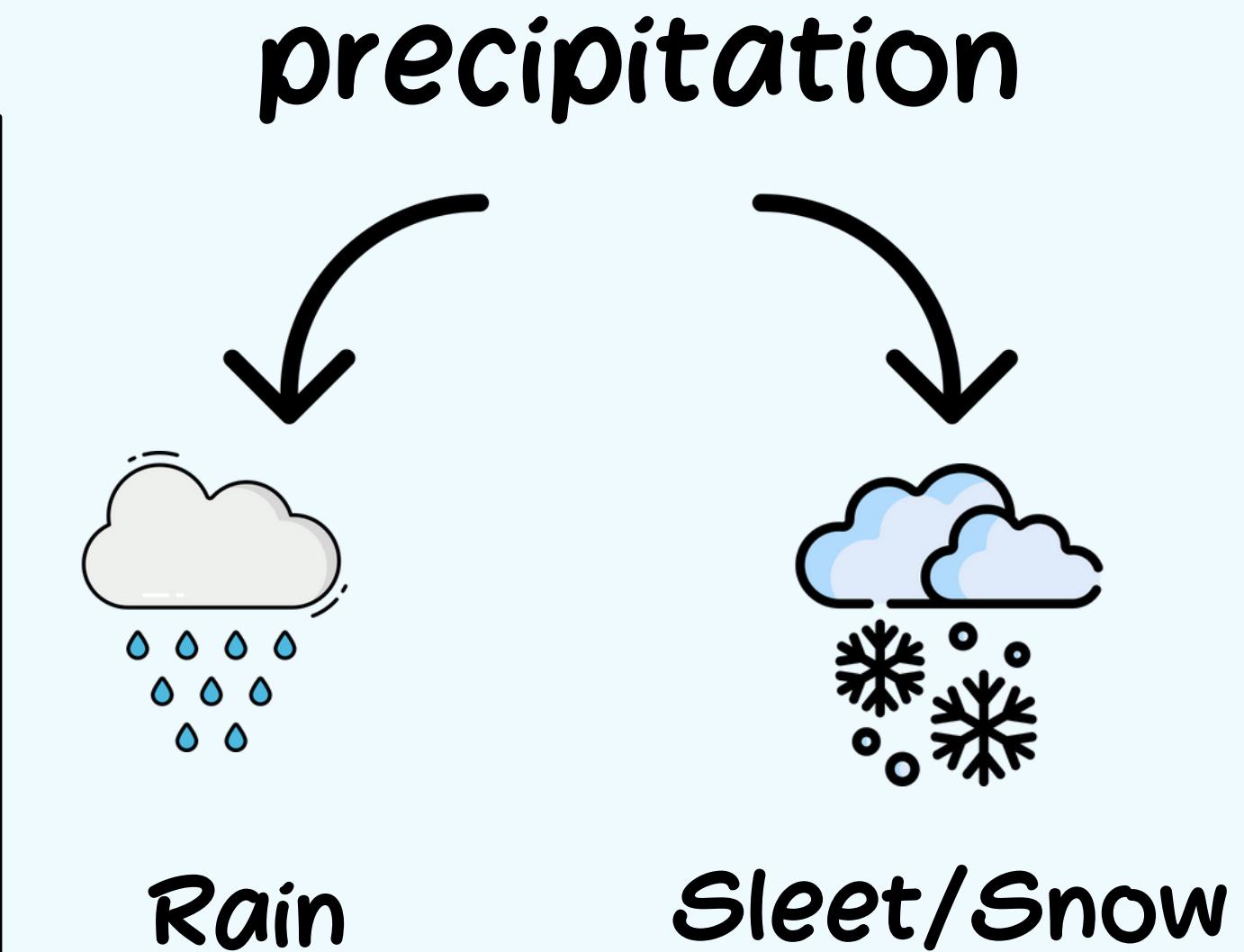
STAGES OF WATER CYCLE IMPLEMENTED:



EVAPORATION



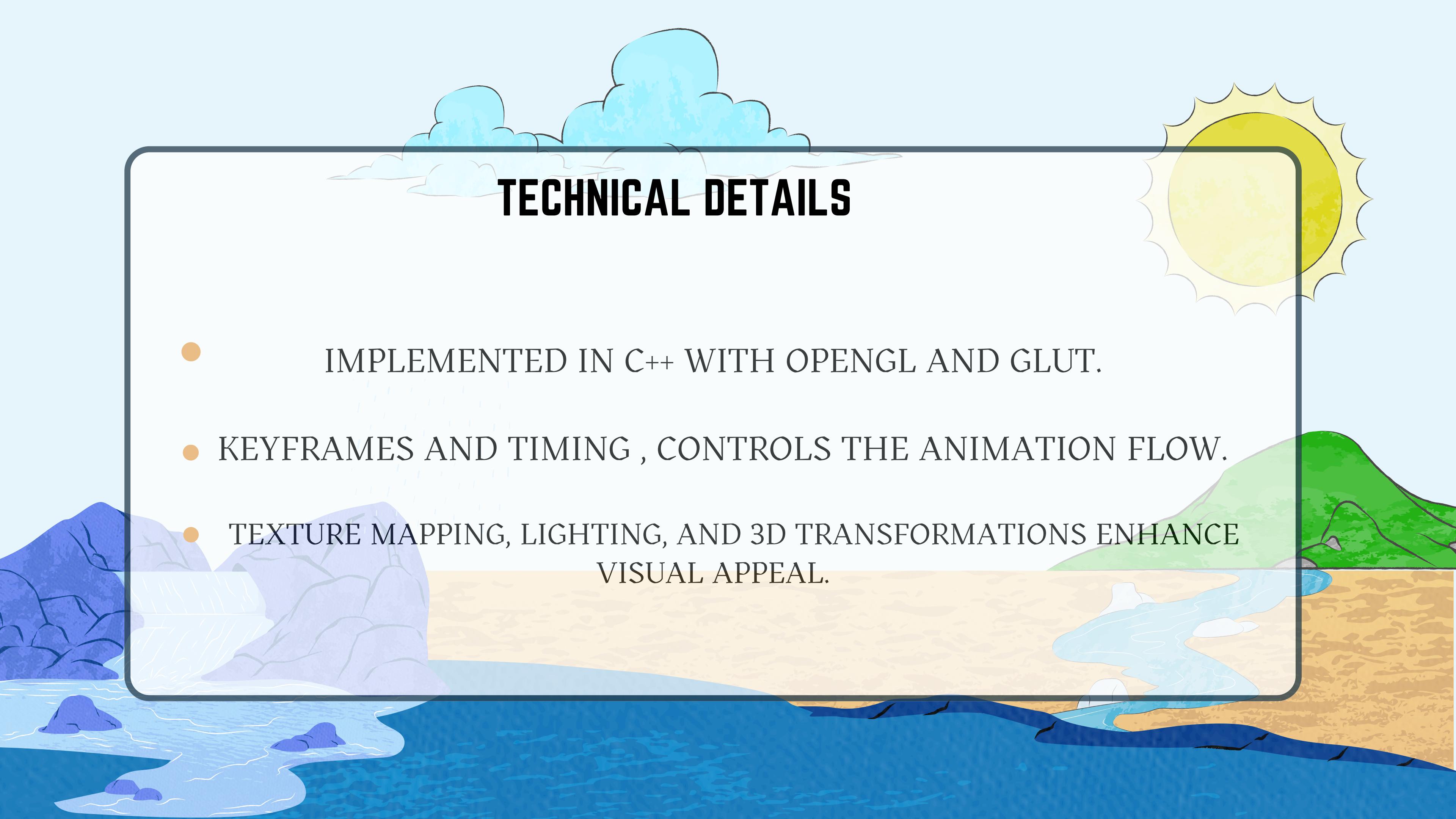
CONDENSATION



precipitation

Rain

Sleet/Snow



TECHNICAL DETAILS

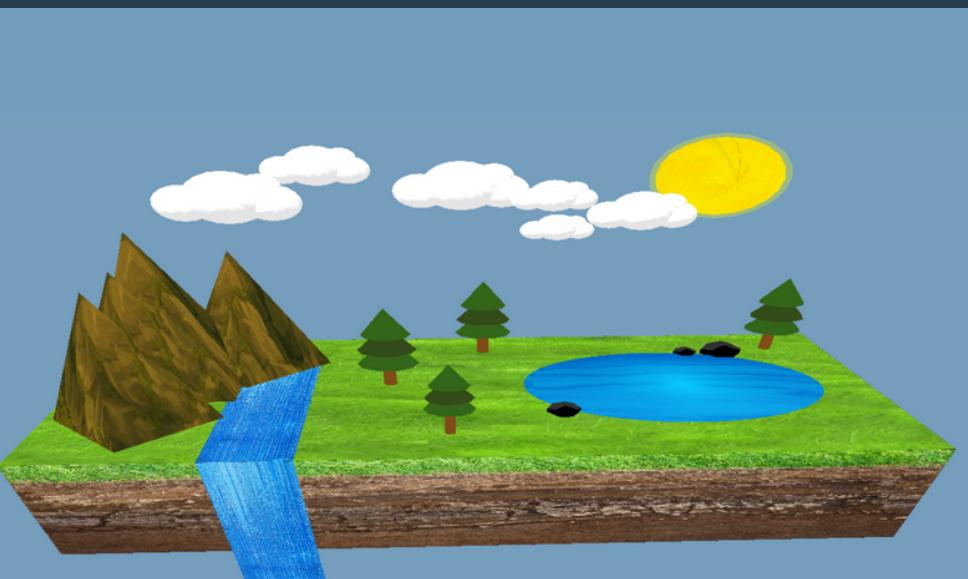
- IMPLEMENTED IN C++ WITH OPENGL AND GLUT.
- KEYFRAMES AND TIMING , CONTROLS THE ANIMATION FLOW.
- TEXTURE MAPPING, LIGHTING, AND 3D TRANSFORMATIONS ENHANCE VISUAL APPEAL.

RESULT



EVAPORATION

Evaporation



CONDENSATION

Condensation



PRECIPITATION

Precipitation–Rain

CONCLUSION

- IN SUMMARY, THIS WATER CYCLE SIMULATION PROJECT SUCCESSFULLY MERGES THEORETICAL KNOWLEDGE WITH 3D TECHNOLOGY, OFFERING AN ENGAGING VISUAL EXPLORATION OF THE WATER CYCLE.
- BY UTILIZING TOOLS LIKE **OPENGL**, **FREEGLUT**, AND **GLEW**, WE'VE DEVELOPED AN IMMERSIVE SIMULATION.
- THE PROJECT SHOWS HOW COOL SIMULATIONS CAN HELP US UNDERSTAND IMPORTANT NATURAL PROCESSES BETTER.