Wacky While Loops
Educator’s Guide

Overview 🎉
CS Hands-On is a 501(c)(3) nonprofit teaching computational thinking skills through technology-free lessons and activities. This curriculum is built to teach fundamental computer science concepts in an engaging, hands-on way. In this mission, students decipher a maze puzzle using while loops.

Prerequisite Knowledge
Student should have completed Looping Dance Party activity, which introduces the concept of loops.

Lesson Details
At Patteron, students will learn to find and distinguish different patterns with Pancho the Snail. Students will learn the while loop flowchart, then use while loops to travel to the correct destination in a maze.

This lesson was developed for students ages 8 to 13 and can be modified for all skills and ages. This lesson takes around 30 minutes.

Learning Objectives

Key Question
How can you create a loop to repeat dance moves in a dance routine?

Key Terms
Loop: Repeats a sequence of instructions until a certain criteria is reached

Curriculum Standards
Students should be able to...
• Detect patterns of direction in a maze (Patterns)
• Read, write, and interpret while loops (Literacy)
• Explain the flowchart of a while loop (Creative Arts)

View standards addressed here
Lesson Plan

Materials
• Wacky While Loops worksheet (per student)

Setup
• Hand out a Wacky While Loops worksheet to each student
• Set up your classroom to arrange students individually or in pairs

Wacky While Loops

It’s a Wild Time
Pancho is thrilled to have you back at Patteron. Get excited to embark on a journey of totally wild while loops!

What are While Loops?
A while loop executes a set of instructions as long as a condition is true.

In this example, our condition is “I am hungry.” Our body of the while loop is “Eat a cracker.” If the condition is true (Pancho is hungry), Pancho will eat a cracker. Then, he will reassess whether he is hungry or not. If he is, he’ll eat another cracker and reassess again, and the loop continues. Once the condition is false, he will stop eating crackers.

Educator Note
Explain to students that the while loop continues to execute the instruction until the condition is false. As shown in our flowchart of a while loop, the arrows continue to loop around and around when the condition is true, and stop when it is false.

Reflect
Along with snoozing an alarm, what other ways do we use while loops in our everyday life?
Examples include:
Am I cold? True: Put on another sweater, False: Stop
Are there dishes to be cleaned? True: Take 1 dish and clean it, False: Stop
When traveling to Abstrac topia, Pancho’s friends gave him maps to navigate to different places. However, the maps have unfamiliar symbols, and Pancho needs your help to decipher them!

**Decipher the Maze!**

When traveling to Abstrac topia, Pancho’s friends gave him maps to navigate to different places. However, the maps have unfamiliar symbols, and Pancho needs your help to decipher them!

**Directions**

Each map contains 4 symbols, each with its own while loop. Although there are multiple destinations on the map, only one of them is correct!

Using your knowledge of while loops, determine which one of the instructions below belong to each symbol:

- Move 1 tile left
- Move 1 tile right
- Move 1 tile up
- Move 1 tile down

Here, our condition is “I am sleepy.” If this is true, Pancho will snooze the alarm for 10 minutes. Then, he will continue to check until he isn’t sleepy, and that’s when Pancho will wake up!

**Extension**

Students who finish early can use the blank maze templates to create their own maze puzzle for their classmates to solve. To do this, they would draw 4 symbols representing a while loop signaling to each instruction: Move 1 tile left, Move 1 tile right, Move 1 tile up, and Move 1 tile down. Then, students would create a path to their goal destination based on those while loops.
Grocery Store Rush

Mission: Get to the 🍩!
Heading back Home
Mission: Get to the ⛪️!
Extension

For an additional challenge, have students create their own mazes with four different symbols. Then, students can share and solve mazes with their peers.
Wrap up & reflect

Group students into pairs and have them discuss the following reflection questions. Afterwards, have students share their ideas as a class.

- When would it be appropriate to use while loops?
  - While loops are appropriate to use when we have instructions that need to be repeated when a condition is true, and do something else when a condition is false.

- Why are while loops important?
  - While loops are important because they help us repeat instructions until a condition is false.
  - While loops can come in handy when modeling situations that apply this pattern, such as snoozing an alarm or eating a meal.