

Let's go on a journey to
EXPLORE CODING TERMS
that you may already know by another name

Algorithms

Other Names:

- ◇ Sequence of Activities
- ◇ Following/ Giving Directions
- ◇ Chronological Order

Events

Other Names:

- ◇ Cause/ Effect
- ◇ Race Signal (ready, set, go)
- ◇ Bell Ringer

Coordinates

Other Names:

- ◇ X, Y Values on a Chart or Graph
- ◇ Latitude and Longitude
- ◇ Columns and Rows

Variables

Other Names:

- ◇ Keeping Score
- ◇ Tracking Points
- ◇ A Placeholder that Represents Another Thing

Patterns

Other Names:

- ◇ Recurring Sequence
- ◇ Repeated Design
- ◇ Arrangement of Items

Conditionals

Other Names:

- ◇ If/ Then
- ◇ Cause & Effect
- ◇ True/ False

Decomposition

Other Names:

- ◇ Breaking Down Problems
- ◇ How it's Made (breaker-space)

Loops

Other Names:

- ◇ Repeated Actions
- ◇ Circuits

Functions

Other Names:

- ◇ Classroom Procedures
- ◇ Repeatable Instructions
- ◇ Routines

Debugging

Other Names:

- ◇ Testing
- ◇ Fixing Mistakes
- ◇ Editing

Abstraction

Other Names:

- ◇ Context Clues
- ◇ Pattern Recognition



Coding concepts are already taught in other subjects.
You just need to know their name!

What are Variables?



CODE HEROES

“A representation of something that can easily be changed.”



Like a scoreboard!

Coding
for Littles

Variables



Coding concepts are already taught in other subjects.

How We Already Use Variables

Music: Tempo

In music, a director sets the speed we play or sing a song. This is called the tempo, which can be altered while you play or sing.

Movement Speed

When you throw a baseball, it moves at a certain speed (measured in miles per hour). This speed can be increased or decreased by throwing the ball harder or softer.

Temperature/ Weather

When the sun comes out from behind clouds, it feels warmer outside. This temperature changes throughout the day, making it a variable. You can even track this variable using a thermometer in science class.

Activities to Practice

Mad Libs

Provide students a pre-written story with key words missing. Ask students to fill in these words without seeing the full story. Afterward, read the story and discuss how each variable changed the story.

Draw a Robot*

Using paper and a pencil, students pull pre-made instructions out of a bag. Students then draw a robot using those instructions ("add three arms"). As a class, discuss how each variable changed the robot's appearance and potential function.

*Based on an activity from Code.org
(code.org/curriculum/course4/4/Activity4-Variables.pdf)

Coding
for Littles

What is an

Algorithm?

CODE HEROES



“ A list of steps to finish a task.”

To do

- _____
- _____
- _____

Like a
to-do list!

Coding
for Littles

Algorithms



Coding concepts are already taught in other subjects.

How We Already Use Algorithms

Patterns

Duck, Duck, GOOSE! That's a predictable pattern, but what if you wanted to tell how to play the game? You would tell them "each time you pat someone's head, say 'duck'. Then, after 30 seconds, say 'goose' and start running." This kind of repeated pattern is a type of algorithm.

Directions

When telling someone how to get from school to your house, you give them directions with street names. These directions are an algorithm.

Chronological & Alphabetical order

Chronological and alphabetical order are instructions for how to organize numbers and letters. Those instructions are an algorithm.

Activities to Practice

Drawing Directions

Students partner up and create a drawing (digitally or on paper), then write out directions to recreate the image. Next, their partner must recreate the drawing using only the written directions. Compare results when finished.

LEGO

Students work in pairs and sit on either side of a wall or barrier (tri-fold boards work well). Each student gets the same set of LEGO bricks (12-15 pcs) and instructions. Student 1 creates a design but cannot watch what student two is doing. Compare results to see how similar they turned out!

Coding
for Littles

What are Loops?



CODE HEROES

“Instructions given to repeat an action a specific number of times.”



Like jumping jacks!

Coding
for Littles

Loops



Coding concepts are already taught in other subjects.

How We Already Use Loops

Music

In music, certain sections of rhythm or lyrics repeat. Notations in sheet music, such as repeats, make it easier for performers to play the whole song correctly as intended.

PE

In gym class, your teacher might tell you to run around the room 3 times. This instruction is a loop that tells you to repeat the action ("run around the room") more than once.

Art: Patterns

Patterns are a significant part of art! Look at a piece of art and see what elements are repeated. Do you see repeated shapes or colors?

Activities to Practice

Dance Loops

Choreographed dances (like Head, Shoulders, Knees, and Toes or the Macarena) often contain sections where the same moves happen repeatedly.

After teaching students to perform one of these dances, show students that they can vary the dance by repeating a specific move. Demonstrate that you can also use a variable to specify how many loops to perform.

Relay Race

Divide students into equal groups and give each a task, such as selecting an object and running it across the room. Instruct students to continue with this task until everyone in the group has had a turn. Afterward, discuss how students looped their actions until they met the stated goal.

Coding
for Littles

What are Events?

CODE HEROES



“ A trigger that causes something to start or end. ”



Like a Starting Flag
at a Race!

Coding
for Littles

Events



Coding concepts are already taught in other subjects.

How We Already Use Events

Bell Ringing

We know it's time to go to class or head home when the bell rings. The bell ringing is an event that occurs every school day.

Call & Response Attention-Getters

When the teacher calls, "one-two-three eyes on me," students know to respond, "one-two eyes on you," and listen to the teacher. This event is designed to redirect student attention.

School Assemblies & Lunch Time

At school each day, you don't do the same thing all day, every day. Different events occur throughout the day (like lunchtime), including special events (like an all-school assembly).

Activities to Practice

Red Light, Green Light

Instruct students to only move or talk when you say "green light." If you say "red light," they must immediately stop. Afterward, discuss how these two events helped them understand when they could move or talk.

Game Controller

Ask students about their favorite online or video games. Share what events they recognize in their games that cause actions to happen. How do we get the game characters to move to the right? We press the right arrow. That's the event! What are some other events students can identify in their favorite games?

Coding
for Littles

Patterns



Coding concepts are already taught in other subjects.

How We Already Use Patterns

Social Studies

Historic Eras
Trends (regional, cultural, economical, etc.)

English Language Arts

Story structure
Themes
Poetry

Science

Classification
(animals, planets, ecosystems)

Math

Ordering
Functions

Music

Rhythms

Activities to Practice

Pattern Recognition

Pattern Recognition is all about combining what we notice with what we already know.

Prompt students to look at a collection of related objects and identify similarities. Then, using the same objects, identify differences.

Using the patterns, they've identified, encourage students to add to the collection and state why they are adding a particular object.

Poetry

Poetry utilizes patterns. A rhyme scheme, for example, creates a pattern out of similar sounds.

The sleepy yellow cat
Fell asleep on the bed
He has his own mat
But he likes to sleep by my head.

This poem uses an ABAB pattern. "Cat" and "mat" rhyme with each other, while "bed" and "head" also rhyme.

Poems like haiku's also create patterns but use syllable count instead of rhyming words.

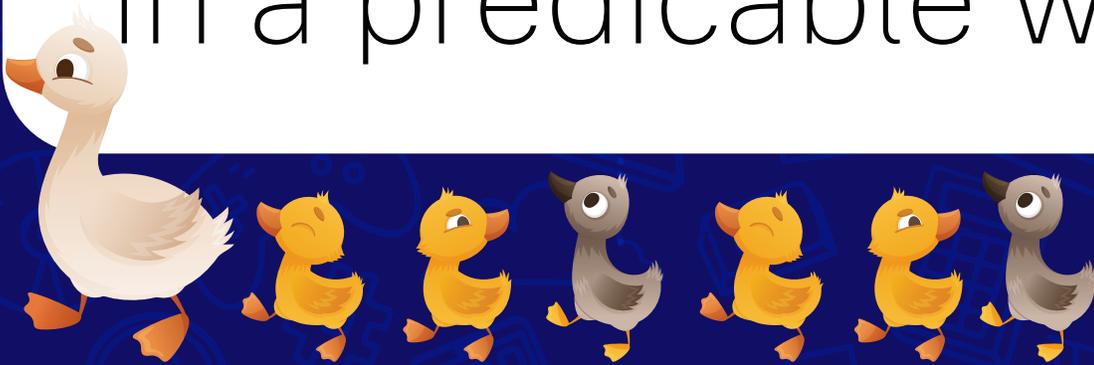
Coding
for Littles

What is a Pattern?

CODE HEROES



“Things that repeat
in a predicable way.”



Coding
for Littles

What is a Function?

CODE HEROES



“ An action that you can easily repeat over and over. ”



Like dance moves!

Coding
for Littles

Functions



Coding concepts are already taught in other subjects.

How We Already Use Functions

Routines

Daily routines include several steps. For example, when you brush your teeth, you first wet the brush, add the toothpaste, turn on the water, and brush. Together, these steps are a function.

Step-by-Step Cooking Instructions

To make our favorite foods, we follow instructions that tell us which ingredients to use, how much to add where in the process it should be added. When following a recipe, you are following a function.

PE Warm-Ups

We stretch our arms and legs in a specific order to prepare to play. Warm-ups and cool-downs help us move while playing sports or outdoor games. These warm-ups are a type of function.

Activities to Practice

Singing

Songs often include functions in their structure. Sing or play a familiar tune for students consisting of verses and a chorus. Ask students to identify a part of the song that is always the same (chorus). Then, discuss how those repeated parts make it easier to remember the song.

Dancing

Teach the class a popular, multi-step dance. Start with a single move, then combine several steps to complete the dance. Afterward, discuss how students can dance by repeating each action in the sequence. For example, the cupid shuffle.

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for Littles

What are

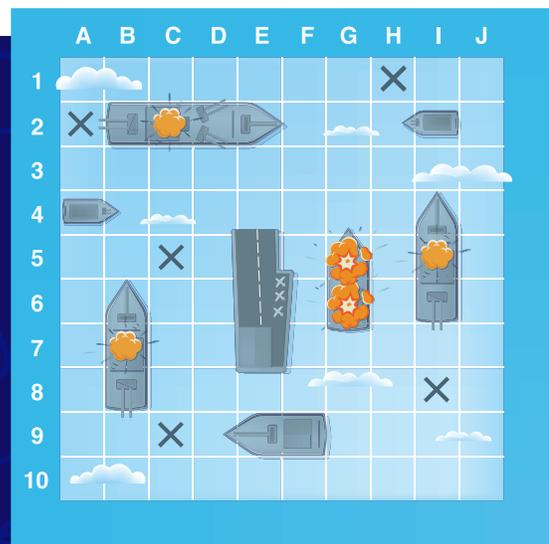
Coordinates?

CODE HEROES



Directions to a specific place

Like The Game Battleship!



Coding
for Littles

Coordinates



Coding concepts are already taught in other subjects.

How We Already Use Coordinates

Playing Battleship & Chess

When playing Battleship or Chess, players specify which space they are moving to by stating a letter followed by a number. These letters and numbers are coordinates that match the game's grid-shaped board.

GPS Locations

GPS uses satellite images in space to map every location on Earth using special coordinates on how far it is from the Equator and the Prime Meridian.

Activities to Practice

Giving Directions

Divide up the room into a grid and number each row/column. Students can then take turns giving directions to reach a specific spot or landmark on the grid using only a coordinate pair.

Robots!

Using a programmable robot, students teach their bot to travel to a specific location using grid-based coordinates. Use an accompanying mat or create your own with painter's tape.

Common Programmable Classroom Robots

Bee Bots

Coding Mouse

Sphero Indi

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What are

Conditionals?



CODE HEROES

“ Statements that only run under certain conditions. ”



Like the Game
Simon Says!

Coding
for Littles

Conditionals Coding concepts are already taught in other subjects.

How We Already Use Conditionals

The Weather

If it is raining outside, you take your raincoat and rain boots to school so that you stay dry. This weather is a conditional that influences what clothes you wear that day.

Decision Making

We make all kinds of decisions each day based on how we feel or the time of day.

What do I want to eat? IF it's breakfast, THEN I eat cereal. IF it's cold outside, THEN I eat soup.

Activities to Practice

Simon Says

Play a game of Simon Says! Afterward, discuss how the leader's instructions influence each player's actions. Highlight how each instruction to do something new is a "true" conditional, while each instruction to stop an action is a "false" conditional.

Go Fish

Play a game of Go Fish. Set special conditions based on card color (for example, if a blue card is played, player 1 gets 1 point). After playing a round, prompt student to add additional conditions to modify game-play.

**Coding
for Littles**

What is Debugging?



CODE HEROES

“Resolving problems by finding and correcting errors.”

Like Erasing!

Coding
for Littles

Debugging



Coding concepts are already taught in other subjects.

How We Already Use Debugging

Editing Writing

To ensure our writing is easy to read, we check it for spelling and punctuation errors. This is a type of debugging.

Solving a Math Problem

When we don't get the right answer to a math problem, we ask, "what went wrong?" When we go back and check the steps we took to solve the problem, we attempt to debug our solution.

Blocks

When building with blocks, your initial structure might lean or fall over. You can debug your tower by adding to it or changing its design to make it more stable.

Activities to Practice

Spot the Difference

Offer students two similar pictures with several visible differences. Encourage them to identify each difference and discuss how they found those differences.

Debugging a Maze

Give students a simple maze with directions (up, down, left, right) to get a character from start to finish. Include a mistake in the maze and ask students to offer a solution to this mistake when they reach an impasse.

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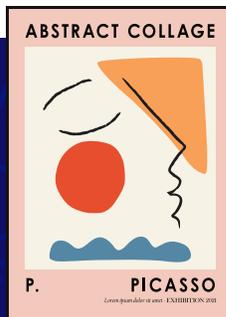
What is

Abstraction?



CODE HEROES

“Selecting important information to reduce complexity.”



Like a Picasso face!

Coding
for Littles

What is Decomposition?



CODE HEROES

“Breaking down big problems into smaller problems.”

Like ingredients
for a pizza!



Mushrooms



Salami



Olives



Cheese



Tomato



Greens



Coding
for Littles

Decomposition

Coding concepts are already taught in other subjects.

How We Already Use Decomposition

Math – Addition

There are different ways to add numbers together to reach the same sum. For example, you can get 10 by adding 5 and 5 or adding 3 and 7.

Science – Composting

When old fruit peels or leaves are in a compost pile, they are broken down by soil as the worms digest the meal.

Composting can also be called decomposition. The process allows nutrients to be returned to the soil, which we can use to grow new healthy plants.

Activities to Practice

Deconstruction (Breaker-space)

With a safe, easy-to-handle object (such as an old clock), encourage students to remove parts one at a time. Discuss how different parts work together to make the larger object operate as a group.

How-To Writing

Pair up students and ask them to select a task they do every day (like tying their shoes). With their partner, ask students to write our instructions for how to complete their chosen task. Afterward, have each pair discuss if they left any steps out and encourage them to act out their instructions.


**Coding
for Littles**

Abstraction



Coding concepts are already taught in other subjects.

How We Already Use Abstraction

Art

Drawing every detail of someone's face is hard! Instead, we can create an abstract version, like a bright yellow smiley face.

Summarizing a Story

When we summarize a story, we retell the important events and details while leaving out unimportant details. This allows us to capture what the story was about more quickly and without unnecessary distractions.

Gardening

Gardening takes lots of abstract thinking! When we are determining which plants we want and which plants we should remove because they are weeds, we are doing some abstraction. All of these plants have lots in common, but what are the differences? How can we determine what to keep and what to pluck out?

Activities to Practice

Describing a Familiar Item

Ask students to describe a familiar classroom item in detail, such as a chair. After they finish, review their description and discuss if they added or left out any key elements. Continue this exercise until students can describe the chosen classroom object in its simplest terms.

Sorting & Classification

Separate students into groups and offer each a collection of pictures or objects. Prompt students to separate these items into categories however they see fit. Afterward, discuss with students what groups they created and what attributes they used to define each group (color, size, etc.).

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