Exploring Kindergarten Computer Science

IF you teach THEN they will learn

Alberta Regional Consortia

ORGANIZING IDEA

Matter: Understandings of the physical world are deepened through investigating matter and energy.

ORGANIZING IDEA

Energy: Understandings of the physical world are deepened through investigating matter and energy.

ORGANIZING IDEA

Earth Systems: Understandings of the living world, Earth, and space are deepened through investigating natural systems and their

ORGANIZING IDEA

Living Systems: Understandings of the living world, Earth, and space are deepened through investigating natural systems and th

ORGANIZING IDEA

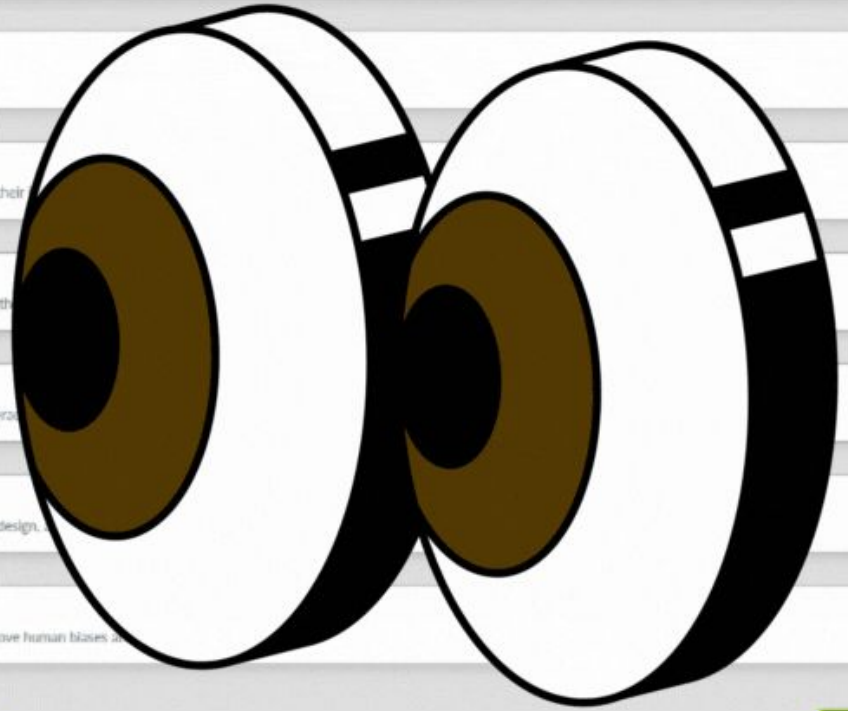
Space: Understandings of the living world, Earth, and space are deepened through investigating natural systems and their inter

ORGANIZING IDEA

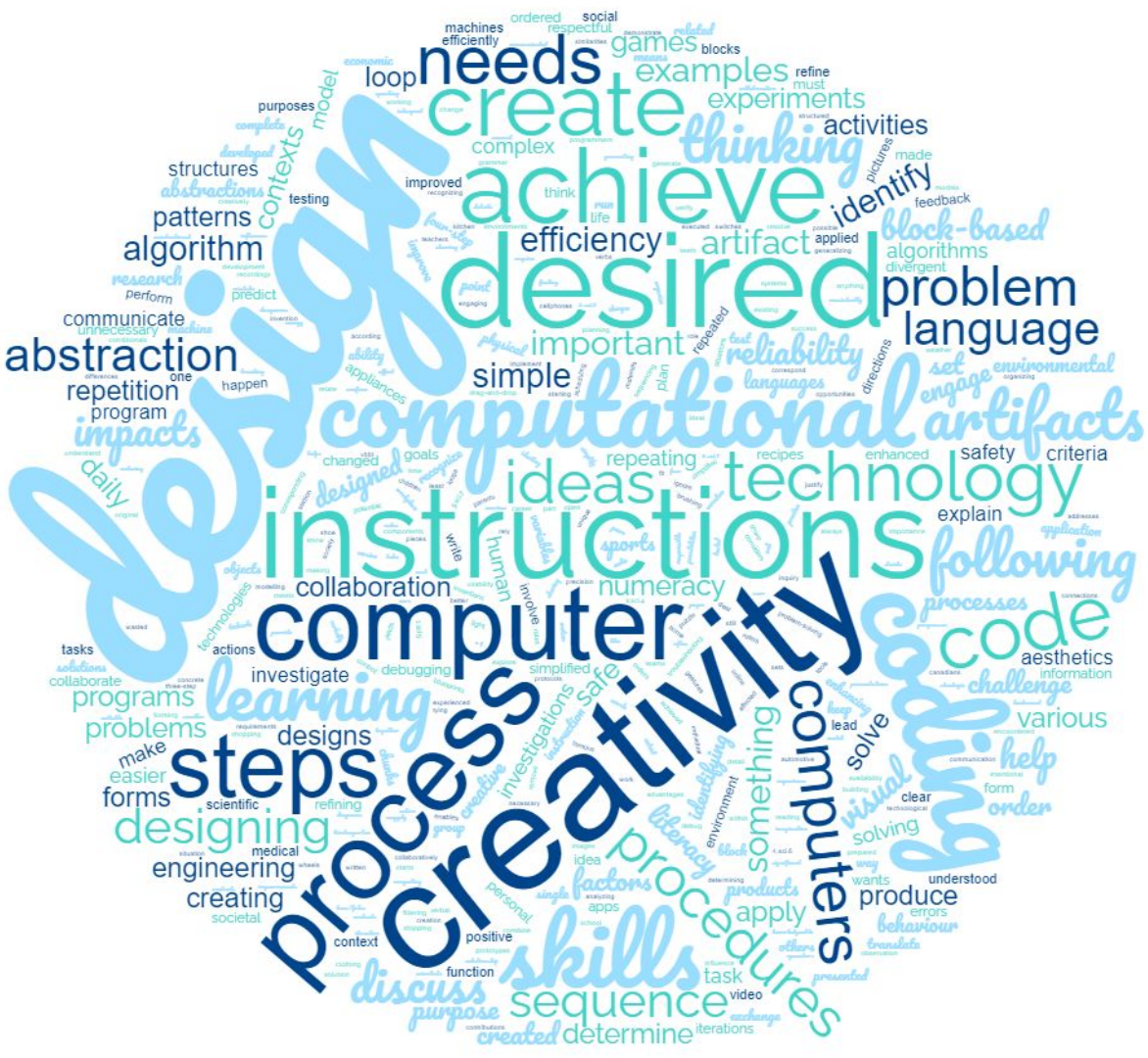
Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design

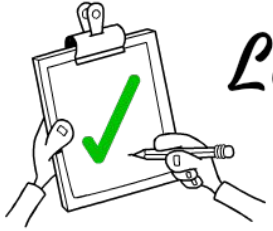
ORGANIZING IDEA

Scientific Methods: Investigation of the physical world is enhanced through the use of scientific methods that attempt to remove human biases



Problem solving and **scientific inquiry** are developed through the knowledgeable application of **creativity**, **design**, and **computational thinking**.





Learning Outcomes

K Children interpret instructions in the learning environment.

1 Students investigate instructions and their influence on actions and outcomes.

2 Students apply creativity when designing instructions to achieve a desired outcome.

3 Students investigate creativity and its relationship to computational thinking.

4 Students investigate and apply design in the context of computer science and technology.

5 Students create and justify a design that could be used by a human or machine to address a challenge.

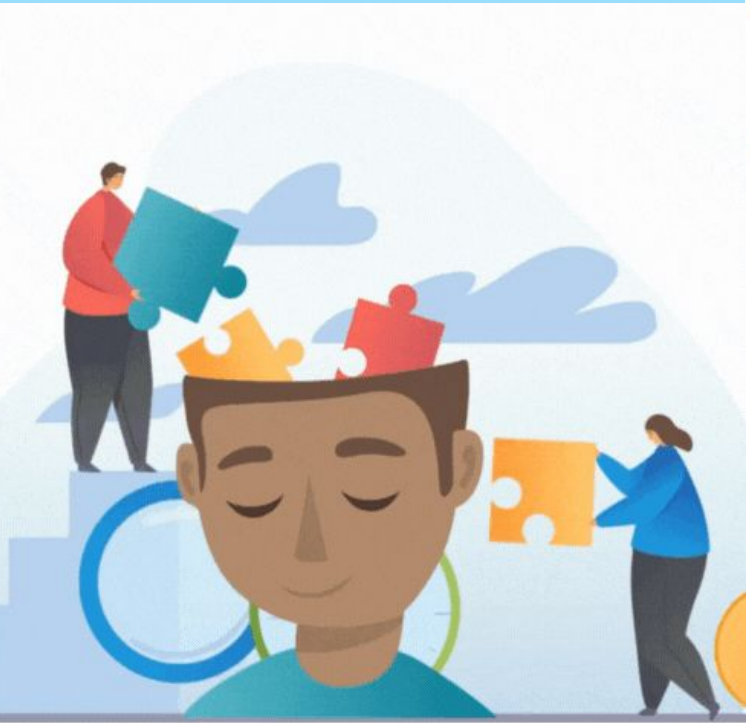
6 Students create and refine computational artifacts through the use of design and abstraction.

K *Children interpret instructions in the learning environment.*

1 ***Students investigate instructions and their influence on actions and outcomes.***

K *Children interpret instructions in the learning environment.*

1 *Students investigate instructions and their influence on actions and outcomes.*



design
needs
create
achieve
desired
computational
instructions
creativity
process
computer
steps
skills
computers
code
learning
designing
engineering
sequence
discuss
procedures
algorithm
abstraction
problem
language
artifacts
technology
ideas
thinking
activities
examples
games
loop
blocks
experiments
refine
must
identify
feedback
block-based
algorithms
divergent
artifact
efficiency
applied
patterns
structures
contexts
model
purposes
improved
testing
think
life
complex
made
pictures
abstractions
research
perform
predict
communicate
unnecessary
machines
efficiently
ordered
social
respectful
related
important
reliability
simple
repetition
program
impacts
daily
changed
goals
designed
repeating
recipes
enhanced
safety
criteria
explain
following
collaboration
numeracy
human
write
sports
processes
aesthetics
challenge
information
various
help
order
tasks
actions
investigate
debugging
simplified
safe
programs
problems
designs
make
easier
forms
scientific
refining
medical
creating
societal
context
positive
function
task
video
purpose
created
determine
iterations
apply
products
factors
apps
produce
understood
errors
behaviour
translate
presented
solving
visual
clear
form
lead
solve
something
literacy
environment
identifying
investigations
creative
idea
wants
engage
environmental
set
directions
languages
plan
appliances
happen
one
unnecessary
machine
predict
perform
research
abstractions
development
recordings
testing
improved
complex
structures
patterns
algorithm
efficiency
artifact
applied
block-based
algorithms
divergent
problem
language

Design Thinking Process

Learn About
Your Audience

Empathize

Define

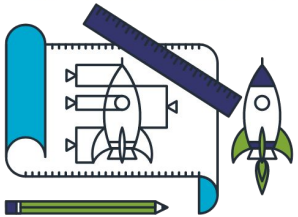
Construct Point
of View Based
on User Needs

Brainstorm and
Come up with
Creative Solutions

Ideate

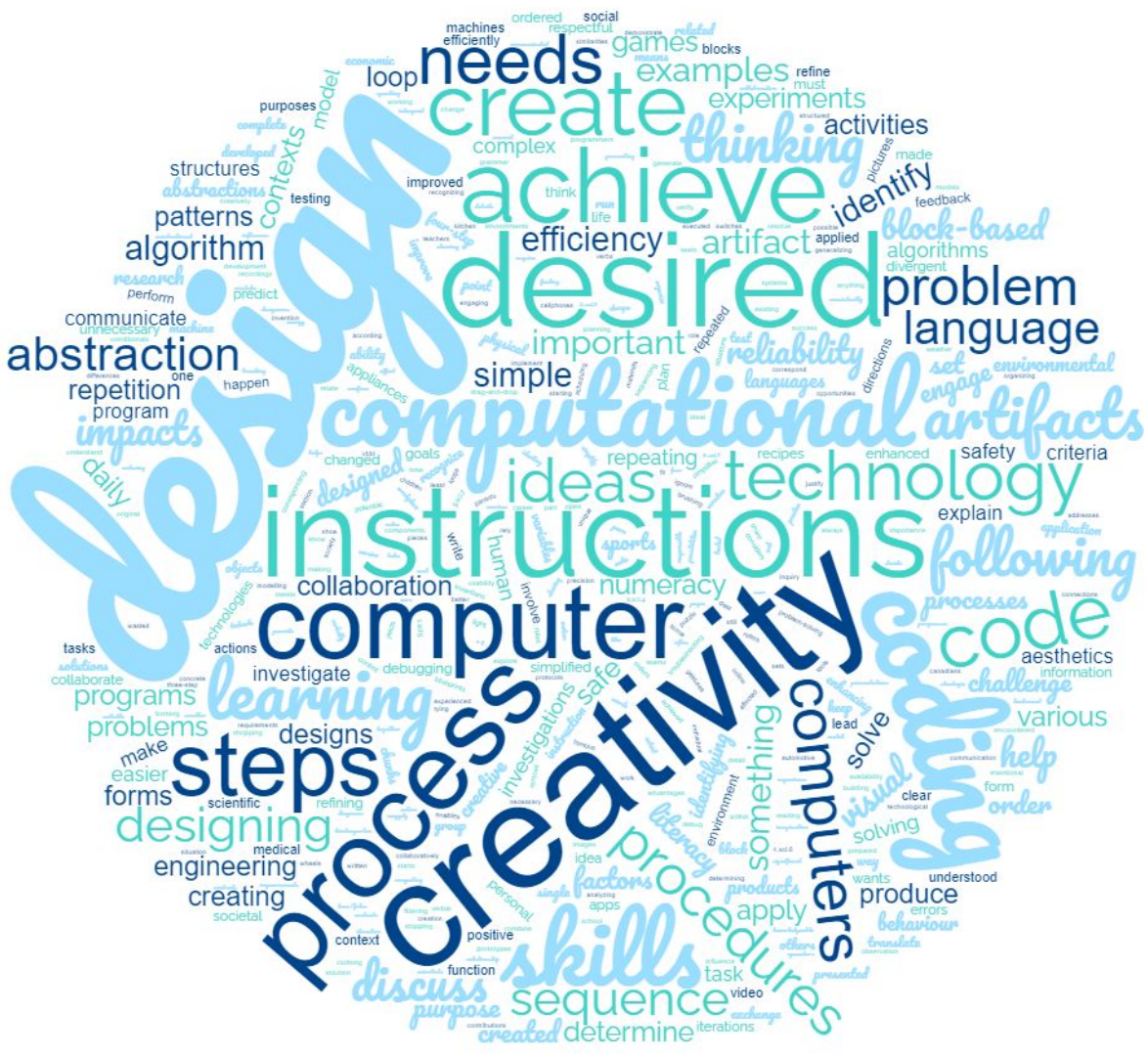
Prototype

Build
Representation
of Your Ideas



Test Your Ideas

Test


machines
efficiently
ordered
social
respectful
games
blocks
needs
loop
examples
refine
must
create
experiments
activities
thinking
complex
structures
abstractions
improved
think
identify
feedback
patterns
algorithm
efficiency
artifact
applied
block-based
algorithms
divergent
problem
language
important
reliability
abstraction
simple
repetition
program
computational
artifacts
impacts
daily
ideas
technology
safety
criteria
explain
following
instructions
collaboration
numeracy
computer
processes
code
aesthetics
tasks
actions
investigate
debugging
simplified
challenge
programs
learning
problems
designs
various
help
steps
make
easier
forms
scientific
refining
designing
engineering
medical
creating
societal
creativity
process
computers
solve
lead
visual
clear
solving
order
literacy
something
procedures
factors
products
apply
produce
understood
errors
behaviour
skills
discuss
sequence
context
positive
function
task
video
purpose
created
determine
iterations
design
build

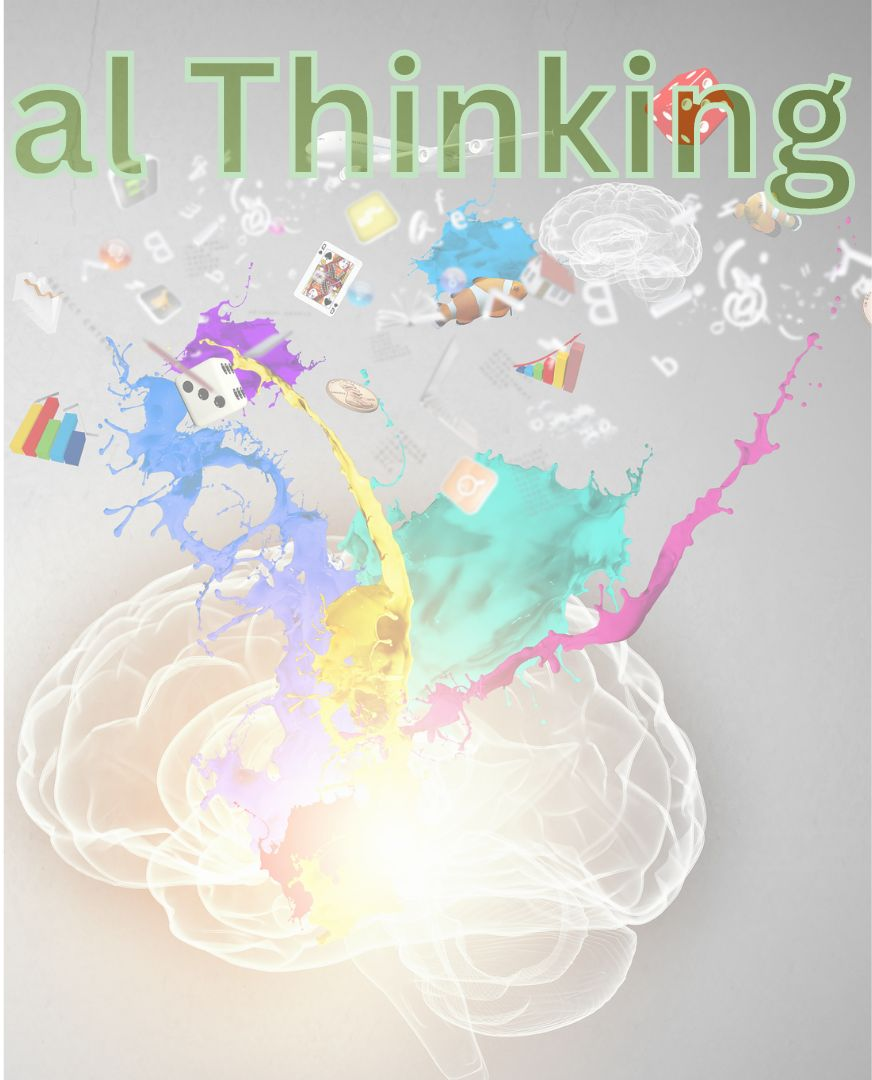
Computational Thinking

Decomposition

Pattern Recognition

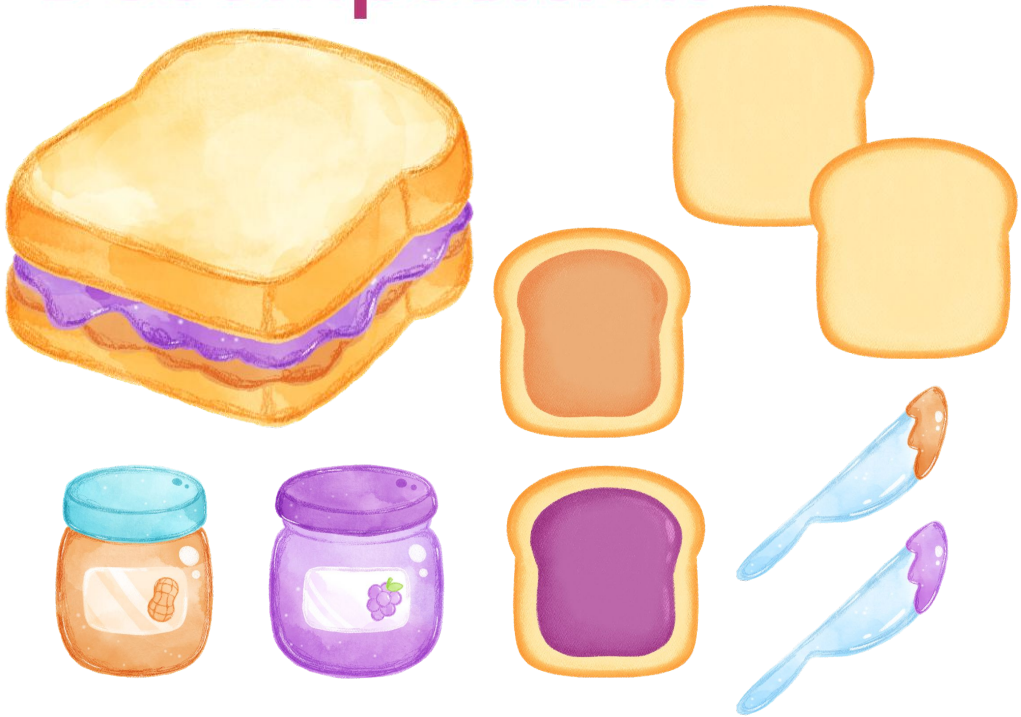
Pattern Abstraction

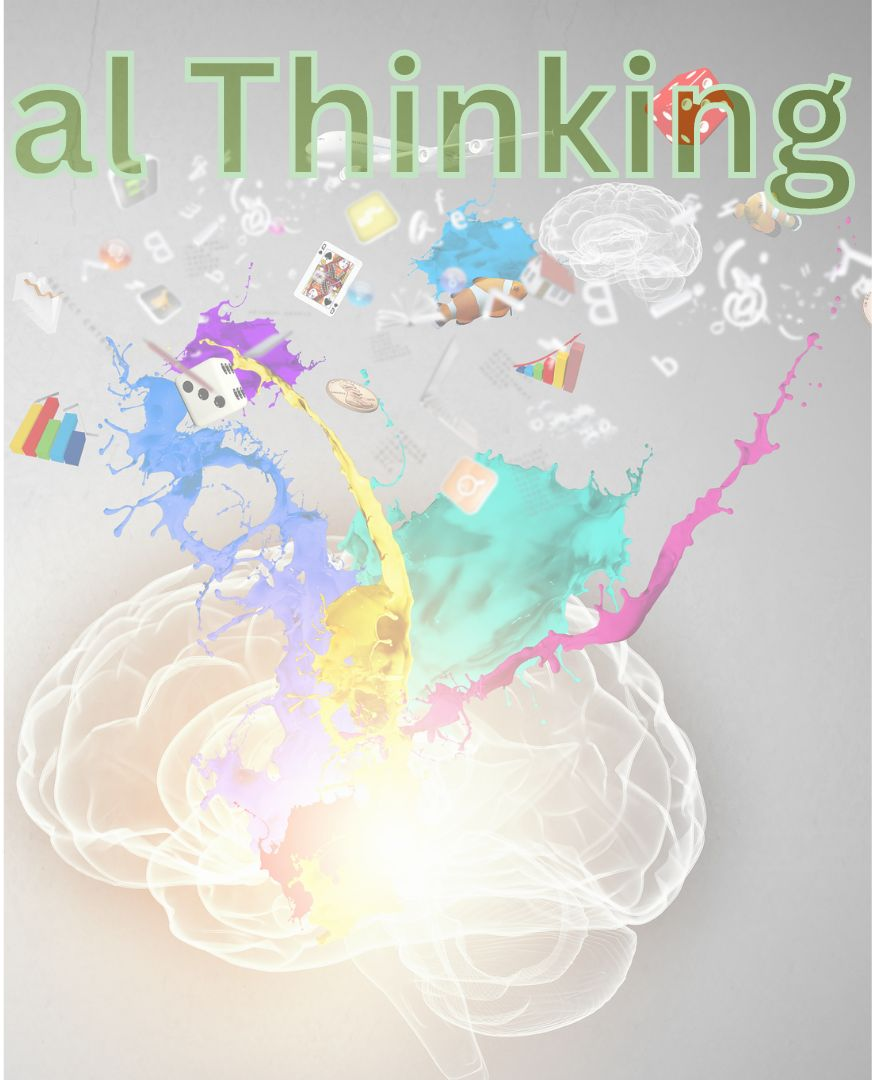
Algorithm Design



Computational Thinking

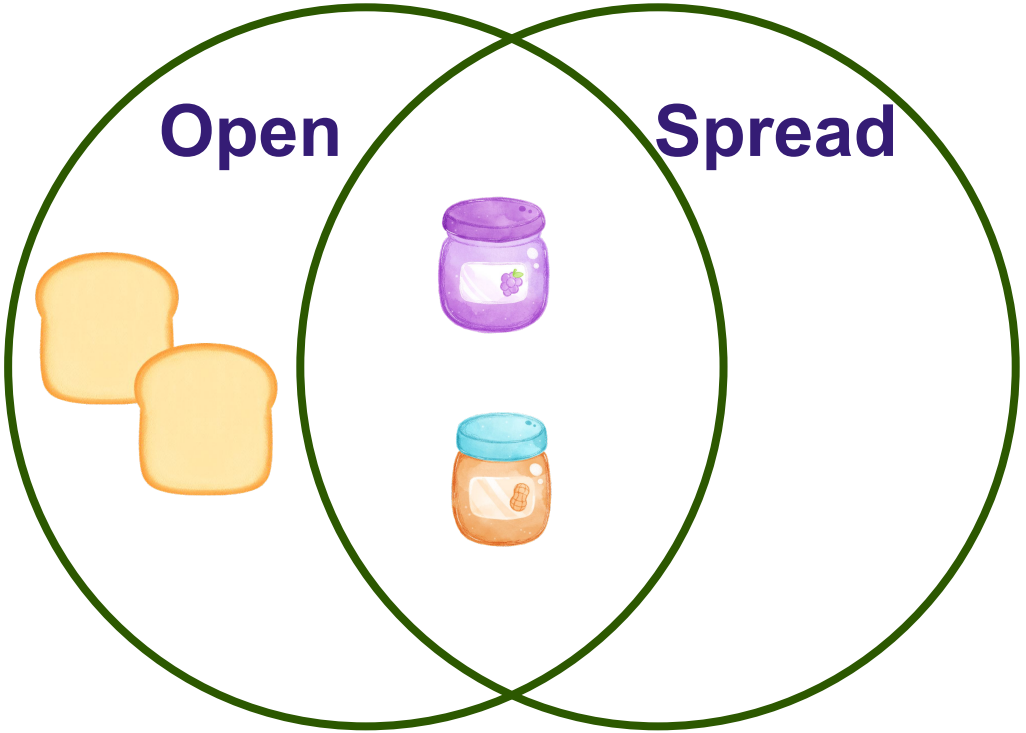
Decomposition

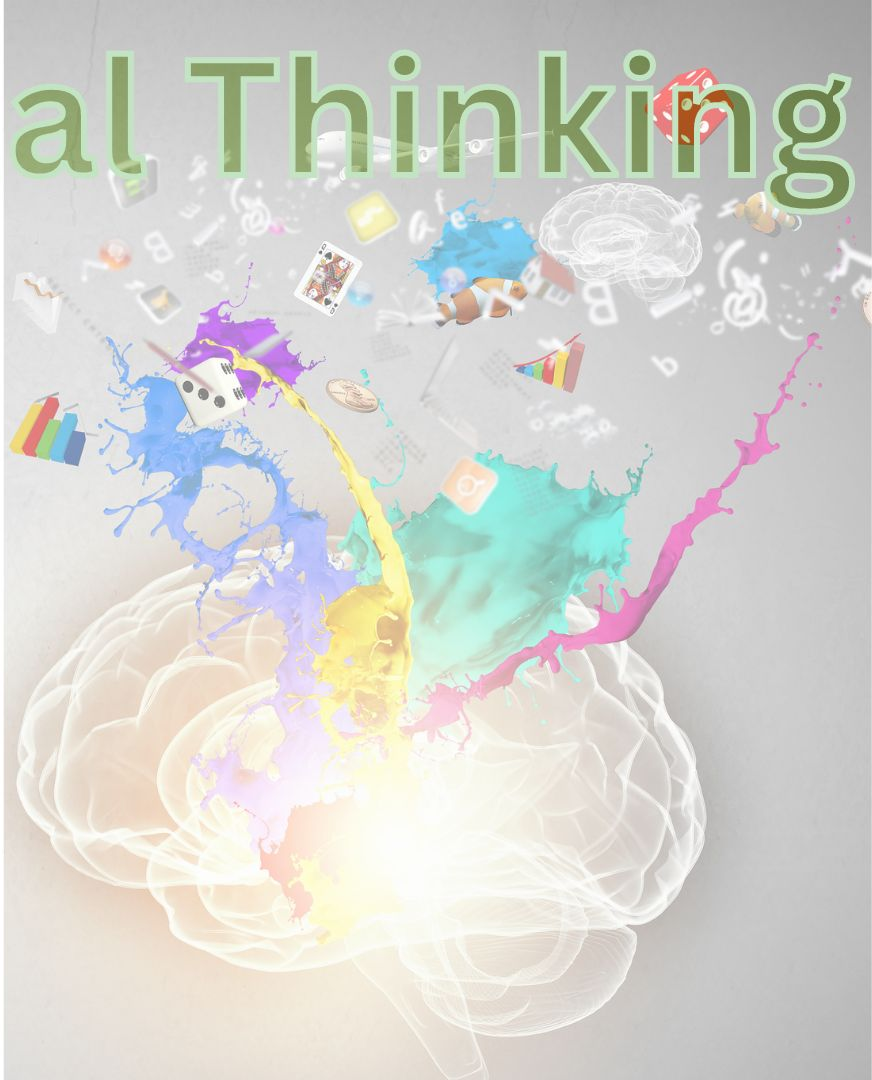




Computational Thinking

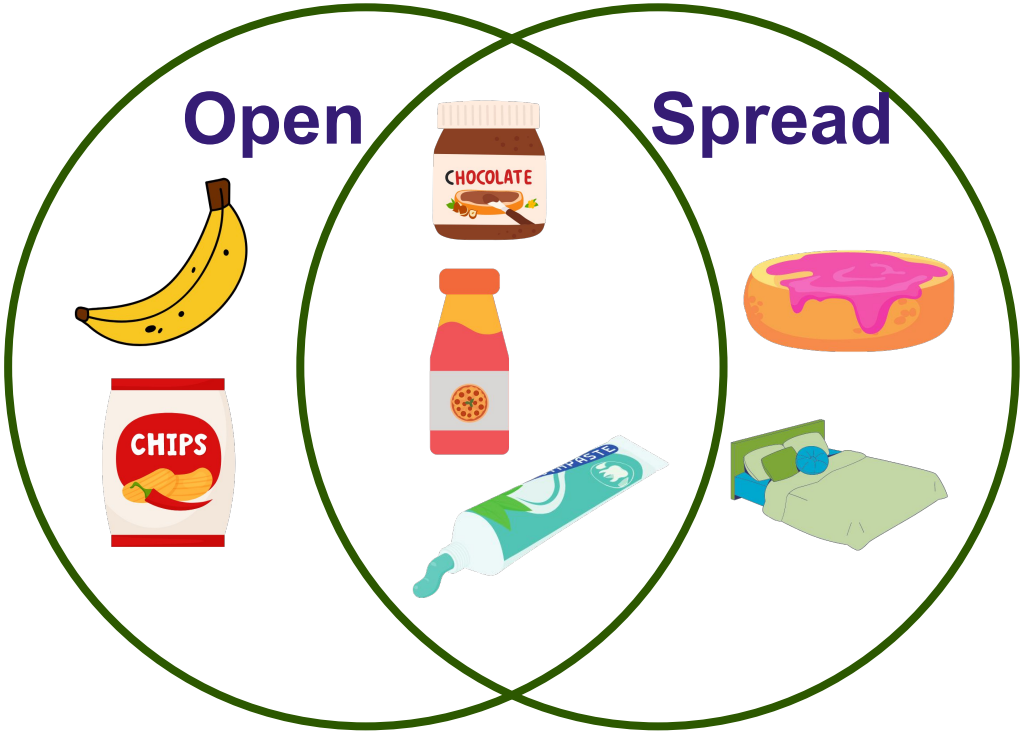
Pattern Recognition

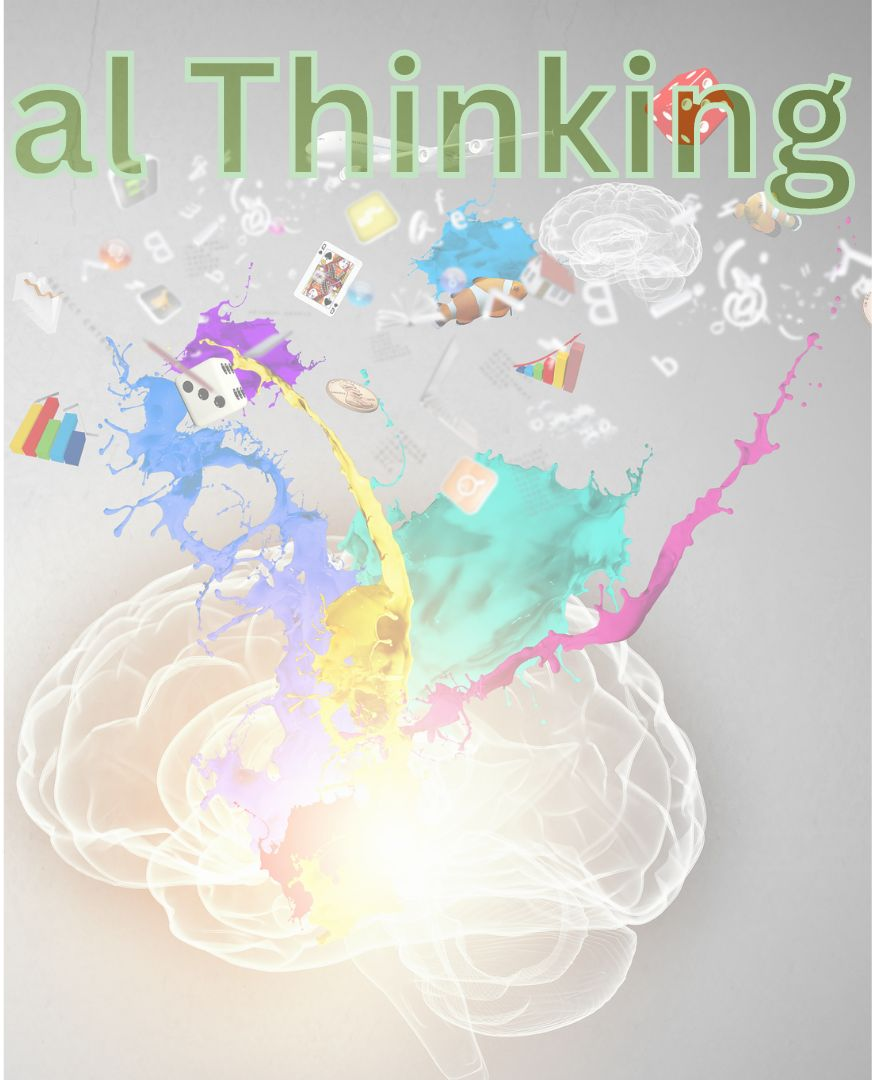




Computational Thinking

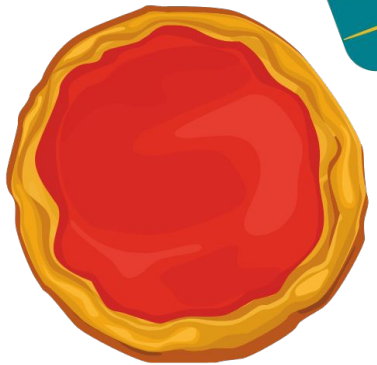
Pattern Abstraction

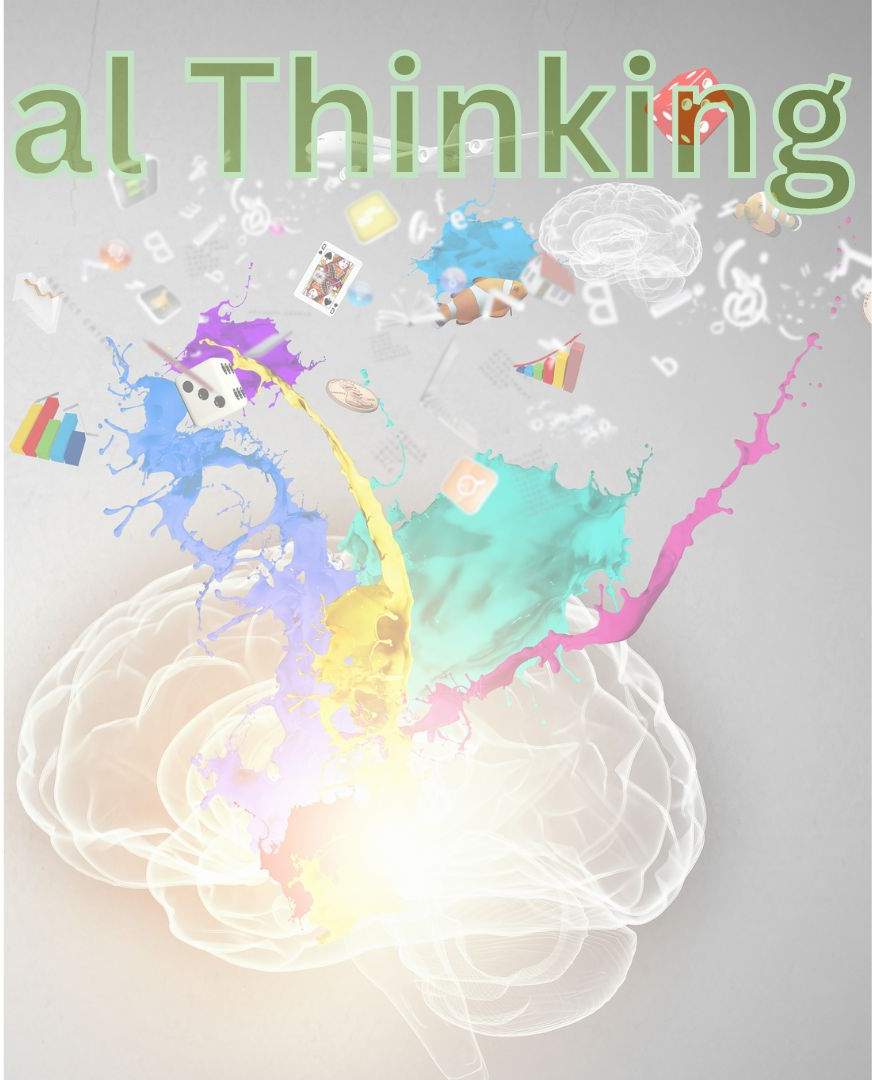




Computational Thinking

Pattern Abstraction

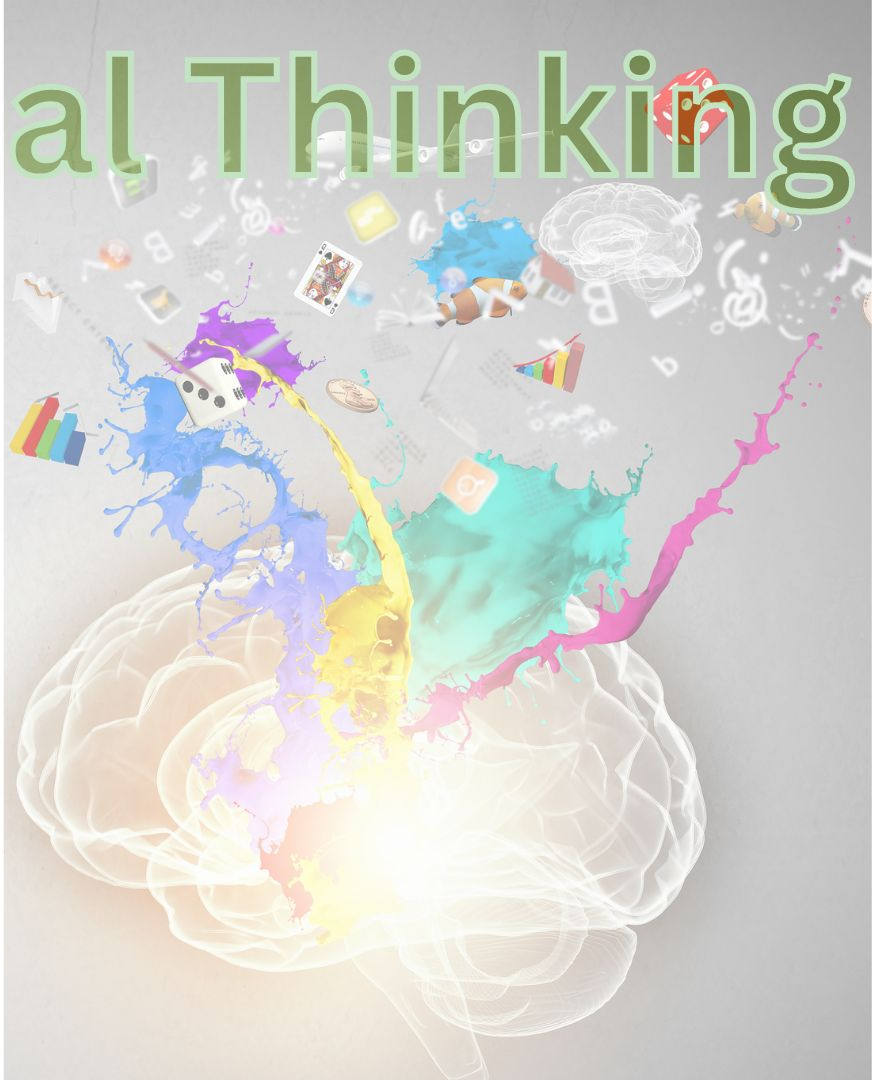




Computational Thinking

Algorithm Design

1. Get out everything you will need
    a. If it is in a container or bar then open it
2. Build the sandwich
    a. Lay out 2 slices of bread
    b. Dip knife in peanut butter and spread on 1 slice of the bread
    c. Dip another knife in jelly and spread on the other slice of bread.
    d. Put the peanut butter bread face down onto the jelly bread.
3. Close the containers and bag.



Creativity

Finding different ways to reach the same outcome.

Problem solving to overcome obstacles to achieve a desired outcome.

Ears

To listen to the ideas of others

Eyes

To make observations

Mouth

To collaborate & share your conclusions with others

Hands

To do experiments & record observations

Curious Mind

To make predictions & hypothesis. To think deeply about the world.

Strong Heart

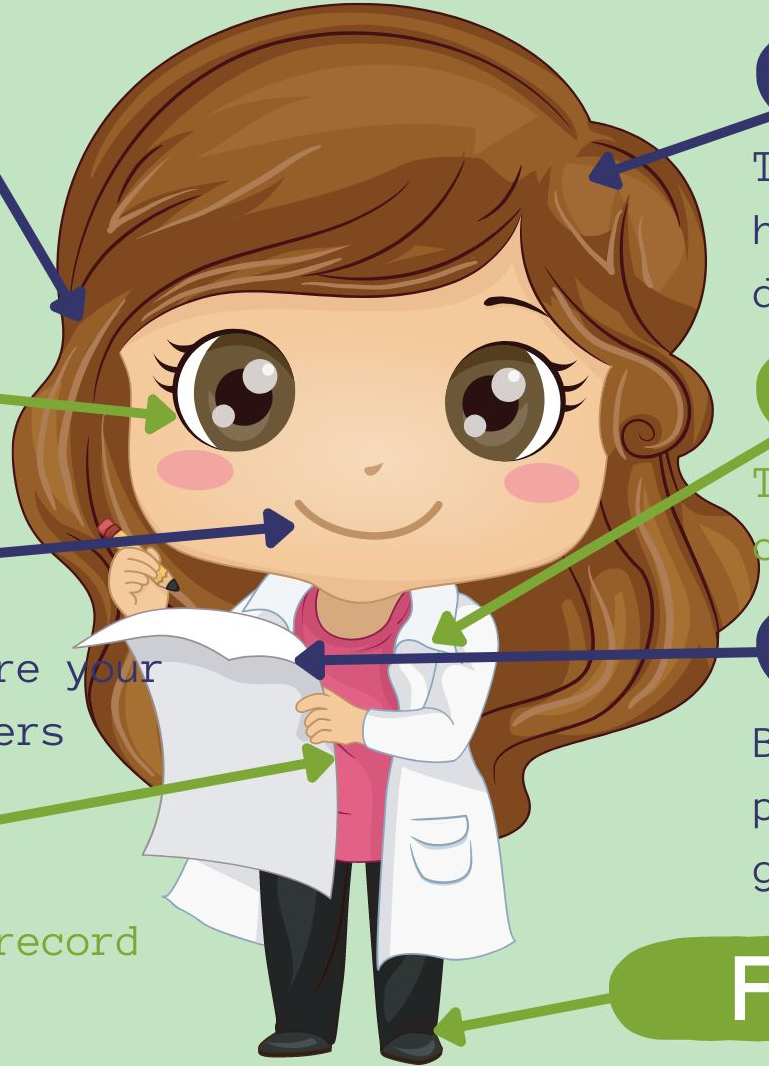
To be brave and take chances!

Tools

Beakers, Chromebooks, pencils, magnifying glasses & more

Feet

To move safely



Ears

To listen to the ideas of others

Eyes

To make observations

Mouth

To collaborate & share your conclusions with others

Hands

To do experiments & record observations

Curious Mind

To make predictions & hypothesis. To think deeply about the world.

Strong Heart

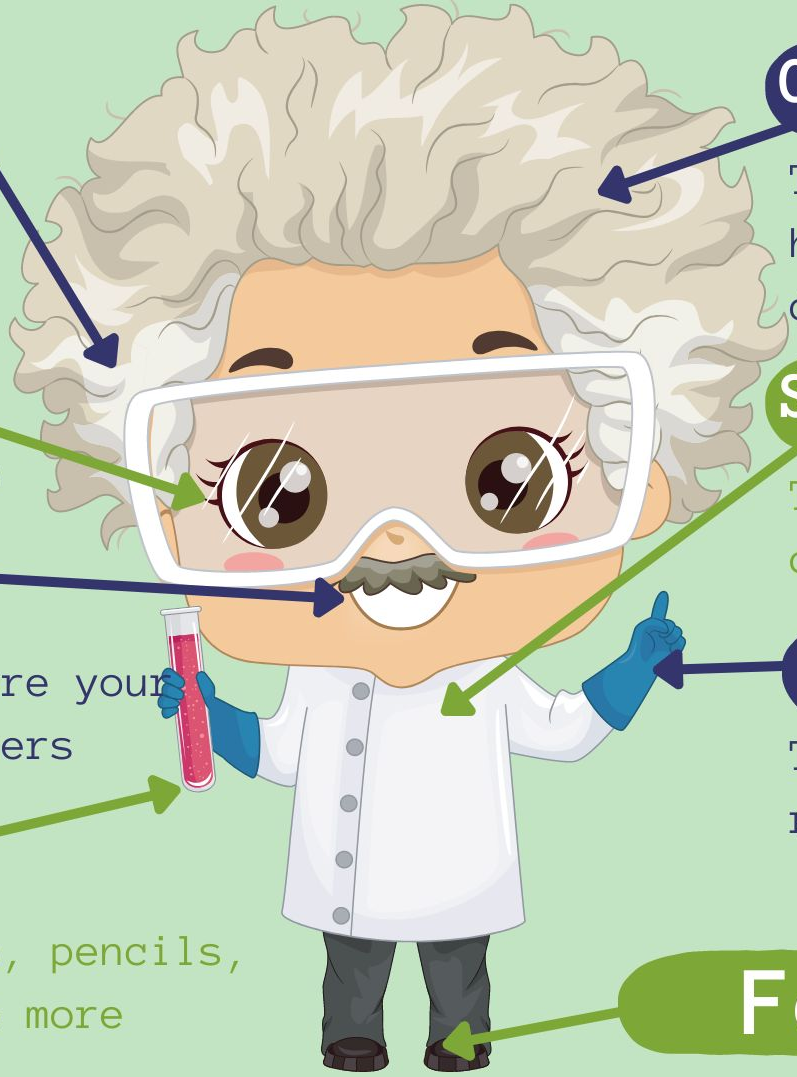
To be brave and take chances!

Tools

Beakers, Chromebooks, pencils, magnifying glasses & more

Feet

To move safely



Ears

To listen to the ideas of others

Eyes

To make observations

Mouth

To collaborate & share your conclusions with others

Tools

Beakers, Chromebooks, pencils, magnifying glasses & more

Curious Mind

To make predictions & hypothesis. To think deeply about the world.

Strong Heart

To be brave and take chances!

Hands

To do experiments & record observations

Feet

To move safely

Organizing Idea	**Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.**
Guiding Question	**How can instructions be used?**
Learning Outcome	**Children interpret instructions in various environments.**

Knowledge	Understanding	Skills & Procedures
Instructions are directions that can be followed. Instructions may be experienced in many different contexts, such as • home • learning environments • games • experiences in nature Instructions can be given in many ways and presented through • speaking • pictures • gestures • traditional teachings	Following instructions can help people be safe, complete a task, and know what to do.	Recognize when actions do not correspond to instructions. Match an action to the corresponding instruction. Engage in activities that involve following instructions in various contexts. Identify instructions that help keep people safe in various contexts. Engage in activities that involve following instructions presented in various ways.

Attack of the Kinderbots

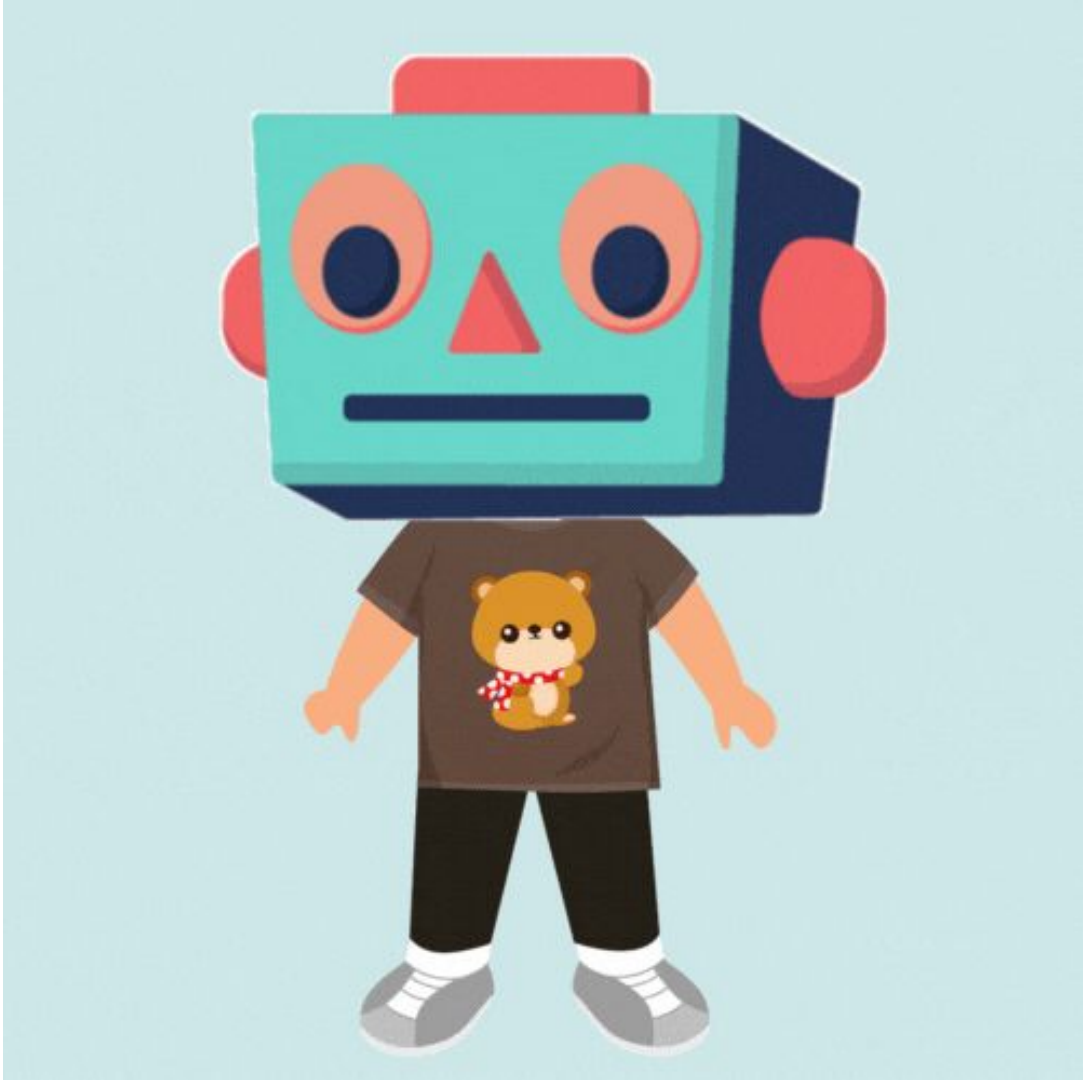
Classroom routines

Learning instructions

Other subject areas

Outside of school

- Community
- Family
- The world
- In nature



Skills & Procedures

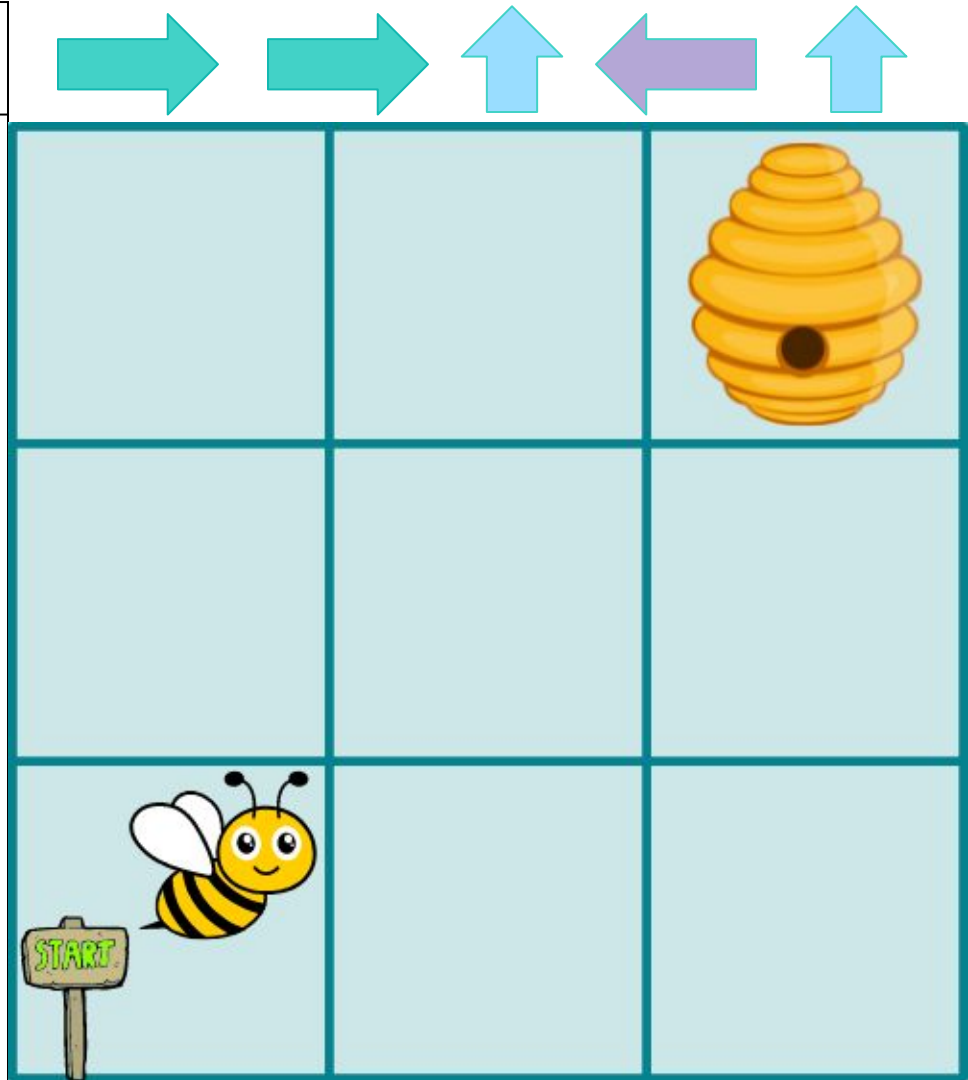
Recognize when actions do not correspond to instructions.

Match an action to the corresponding instruction.

Engage in activities that involve following instructions in various contexts.

Identify instructions that help keep people safe in various contexts.

Engage in activities that involve following instructions presented in various ways.



Skills & Procedures

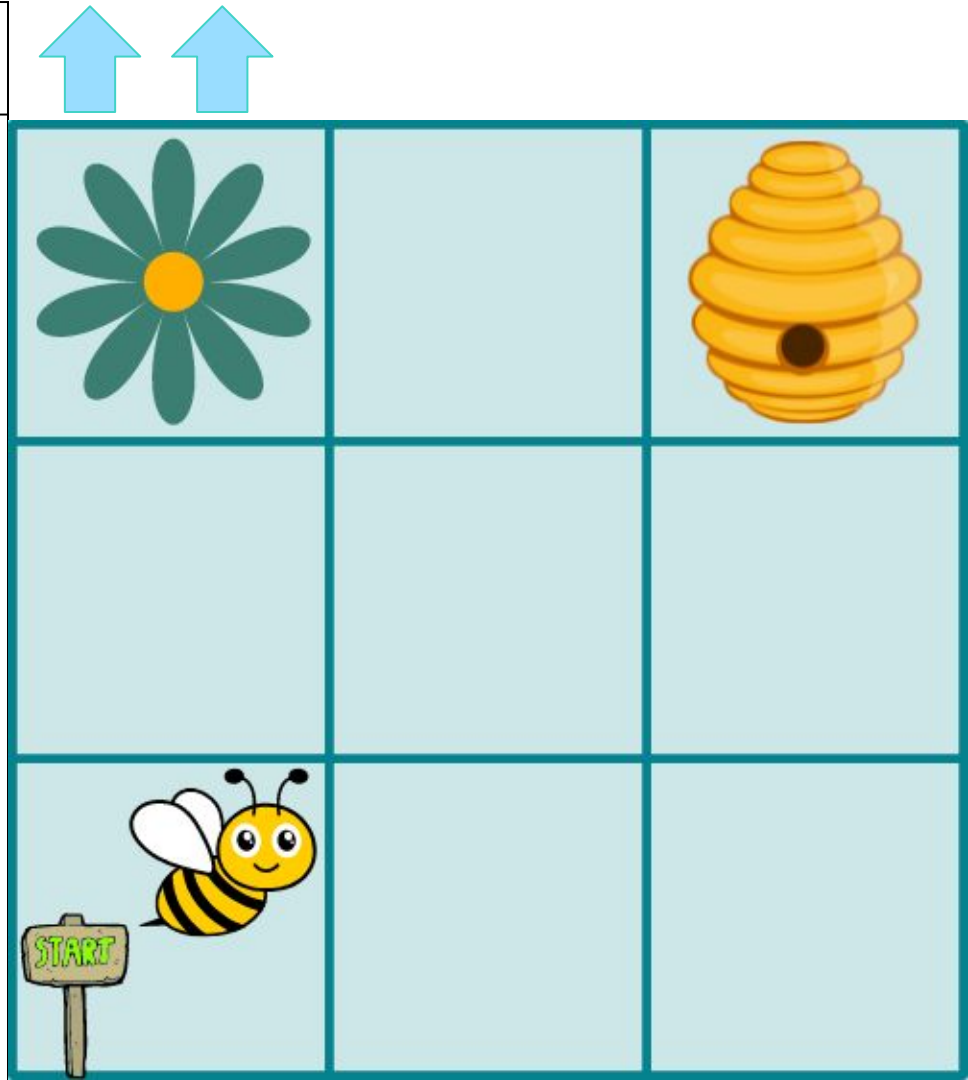
Recognize when actions do not correspond to instructions.

Match an action to the corresponding instruction.

Engage in activities that involve following instructions in various contexts.

Identify instructions that help keep people safe in various contexts.

Engage in activities that involve following instructions presented in various ways.



Skills & Procedures

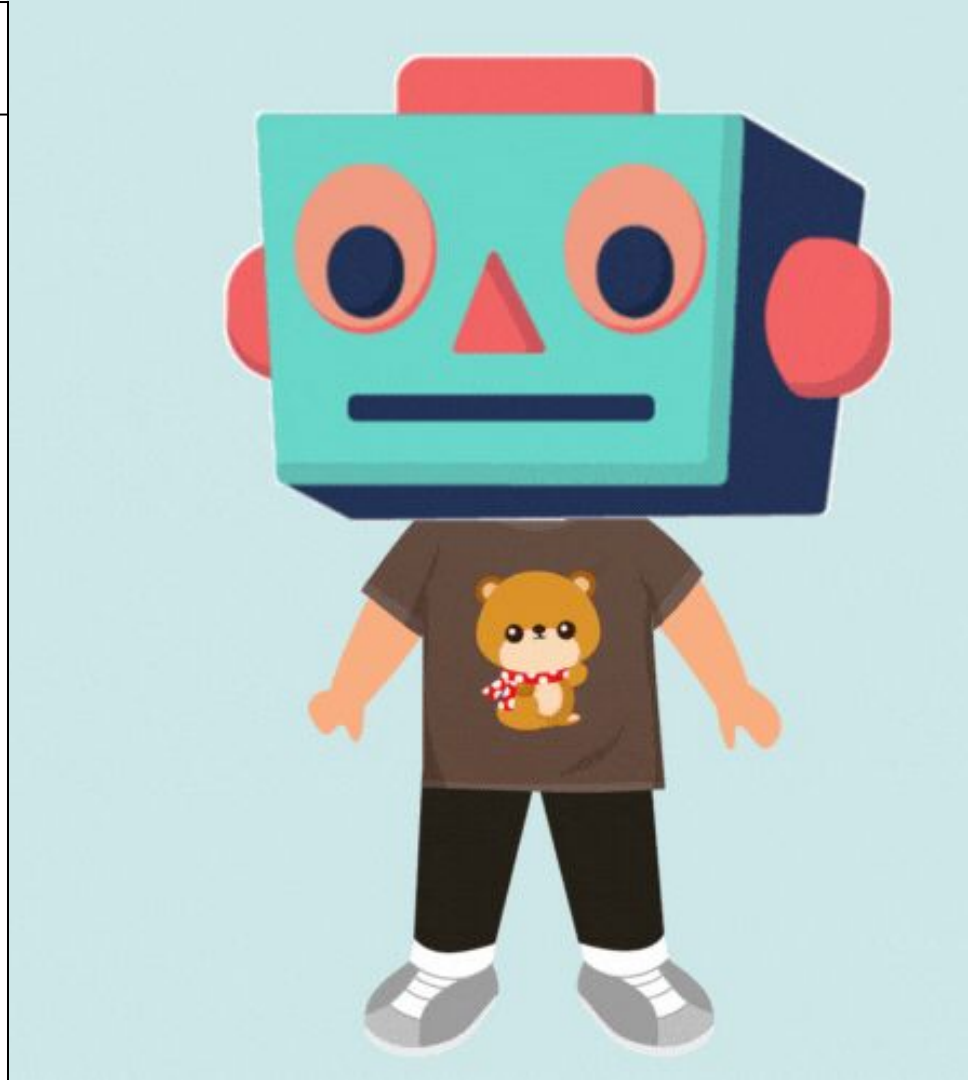
Recognize when actions do not correspond to instructions.

Match an action to the corresponding instruction.

Engage in activities that involve following instructions in various contexts.

Identify instructions that help keep people safe in various contexts.

Engage in activities that involve following instructions presented in various ways.



Skills & Procedures

Recognize when actions do not correspond to instructions.

Match an action to the corresponding instruction.

Engage in activities that involve following instructions in various contexts.

Identify instructions that help keep people safe in various contexts.

Engage in activities that involve following instructions presented in various ways.

Organizing Idea	**Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.**
Guiding Question	**How can instructions be used?**
Learning Outcome	**Children interpret instructions in various environments.**

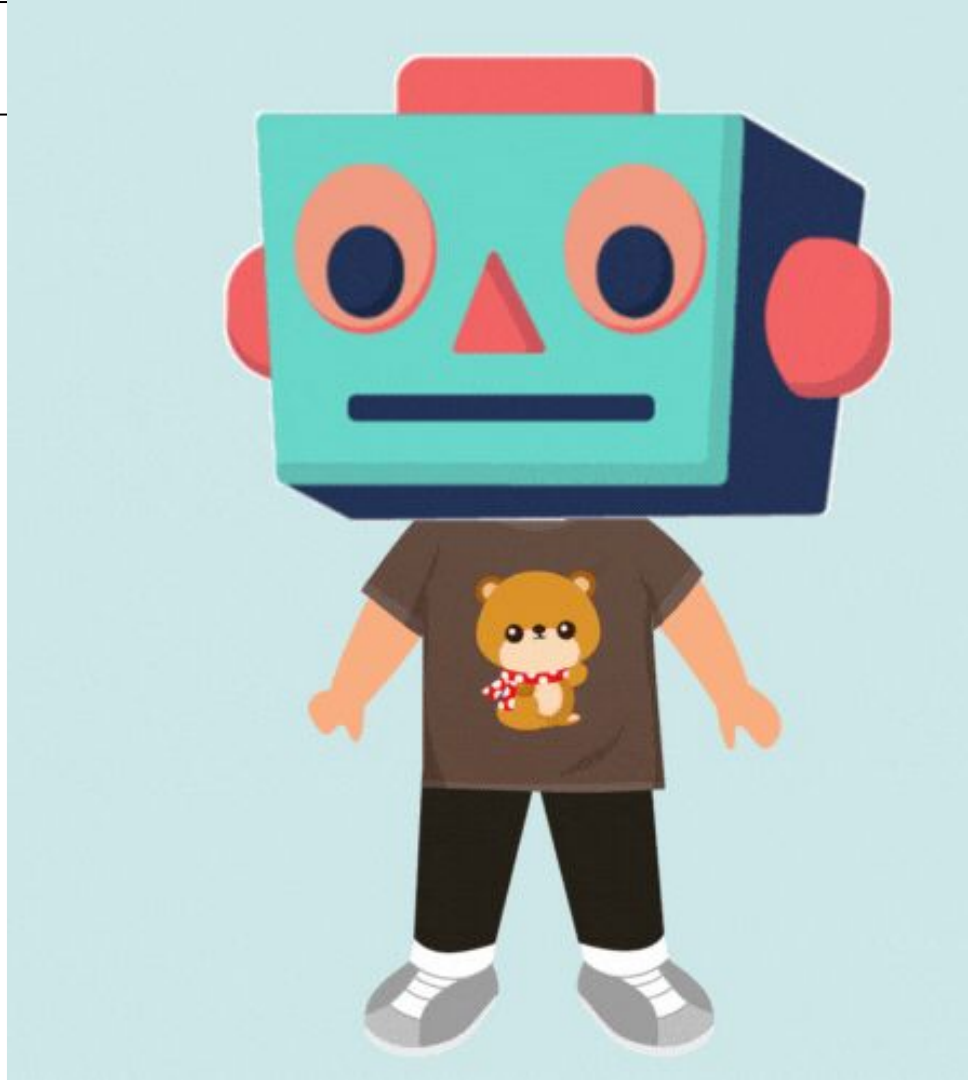
Knowledge	Understanding	Skills & Procedures
Instructions have one or more steps.	The order in which instructions are followed can affect the outcome.	Follow a sequence of two steps related to a learning experience. Identify differences in outcomes when the order of two steps is changed. Communicate a sequence of two steps for a given purpose.

Skills & Procedures

Follow a sequence of two steps related to a learning experience.

Identify differences in outcomes when the order of two steps is changed.

Communicate a sequence of two steps for a given purpose.

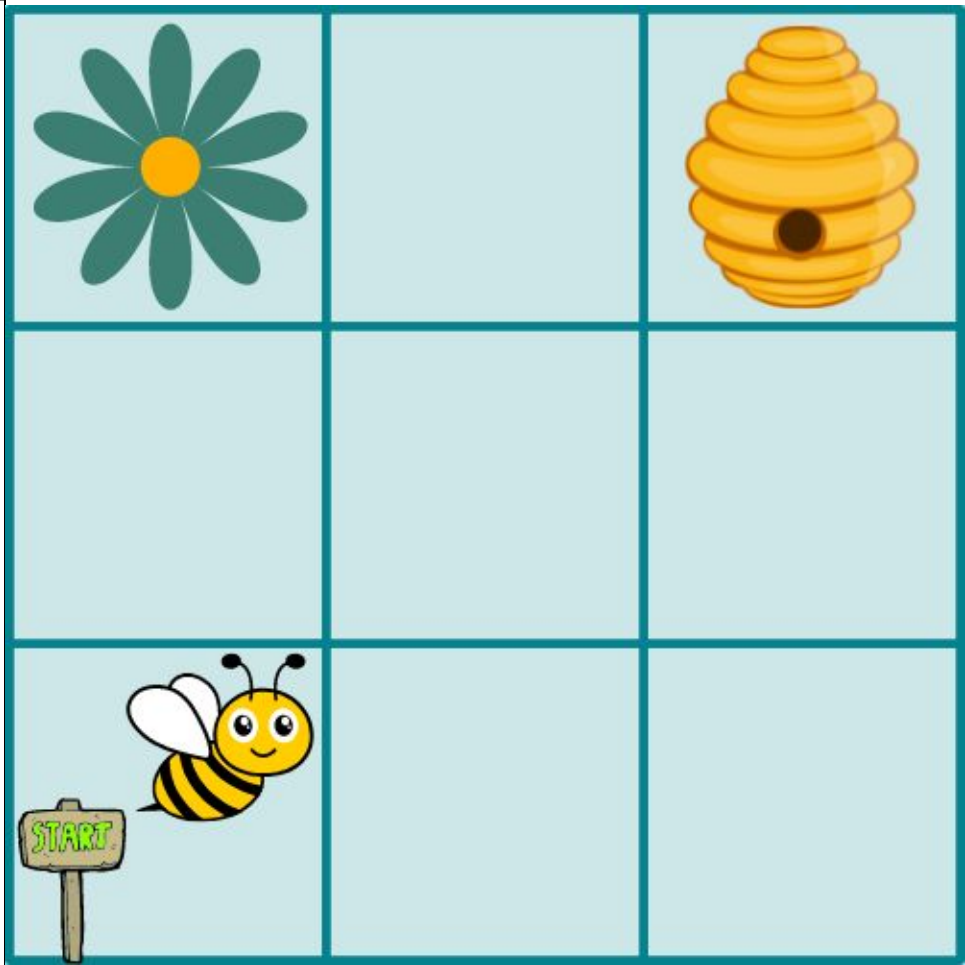


Skills & Procedures

Follow a sequence of two steps related to a learning experience.

Identify differences in outcomes when the order of two steps is changed.

Communicate a sequence of two steps for a given purpose.

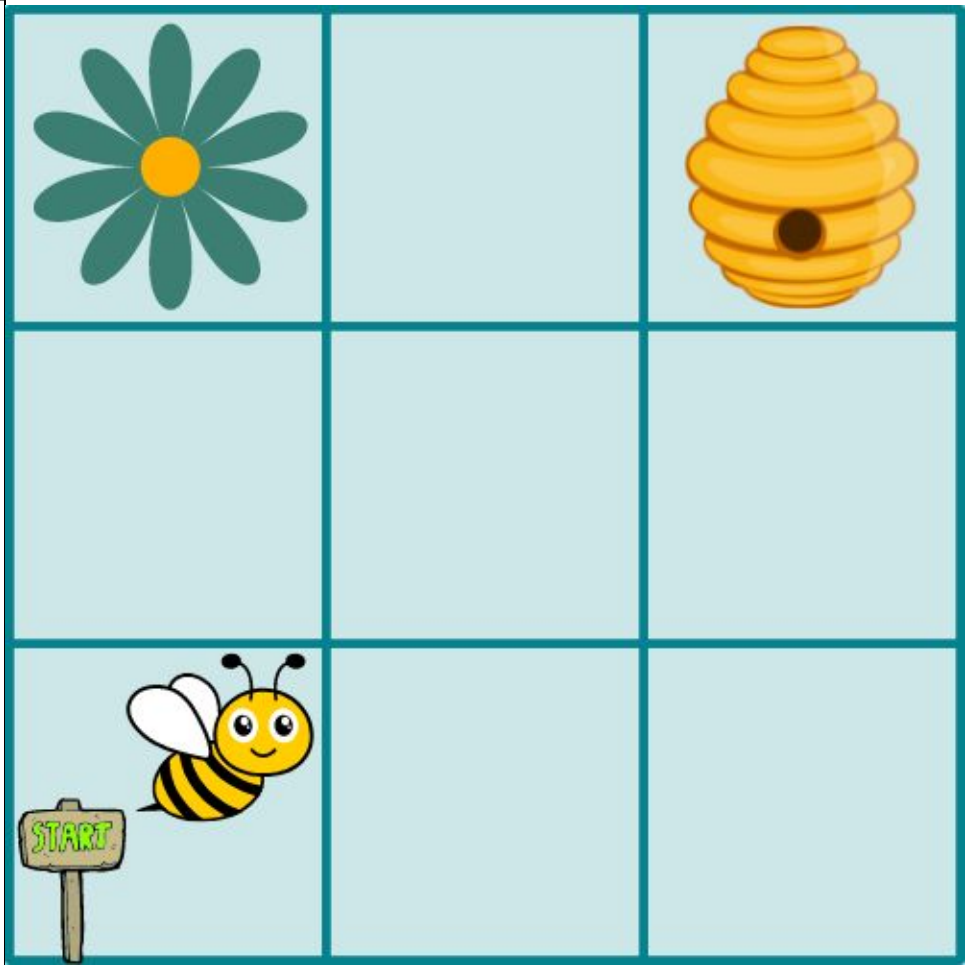


Skills & Procedures

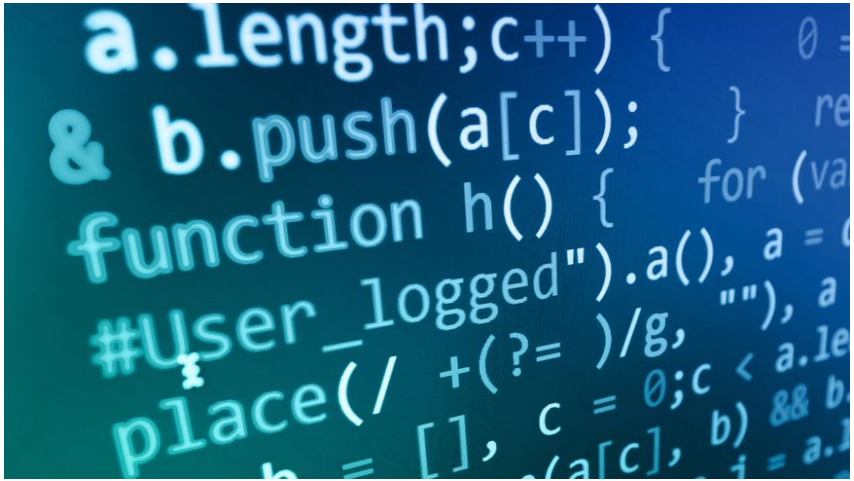
Follow a sequence of two steps related to a learning experience.

Identify differences in outcomes when the order of two steps is changed.

Communicate a sequence of two steps for a given purpose.



Coding consists of many languages that computers understand.



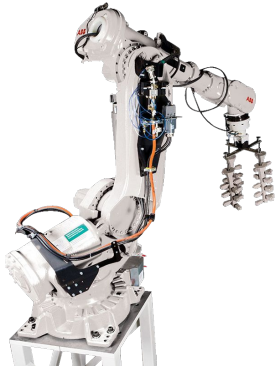
Search
Home
Discover
Apps
Pose

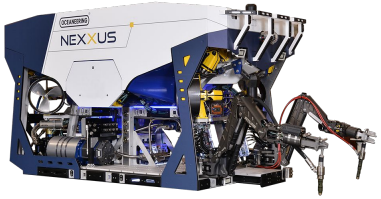
1:21
18°C

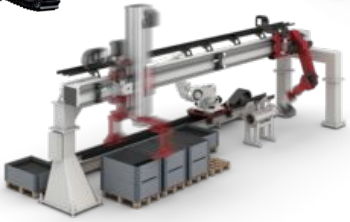
COOLING
75
78

Yale
1 2 3
4 5 6
CARD
7 8 9
* 0 #

ROBOTS!!!



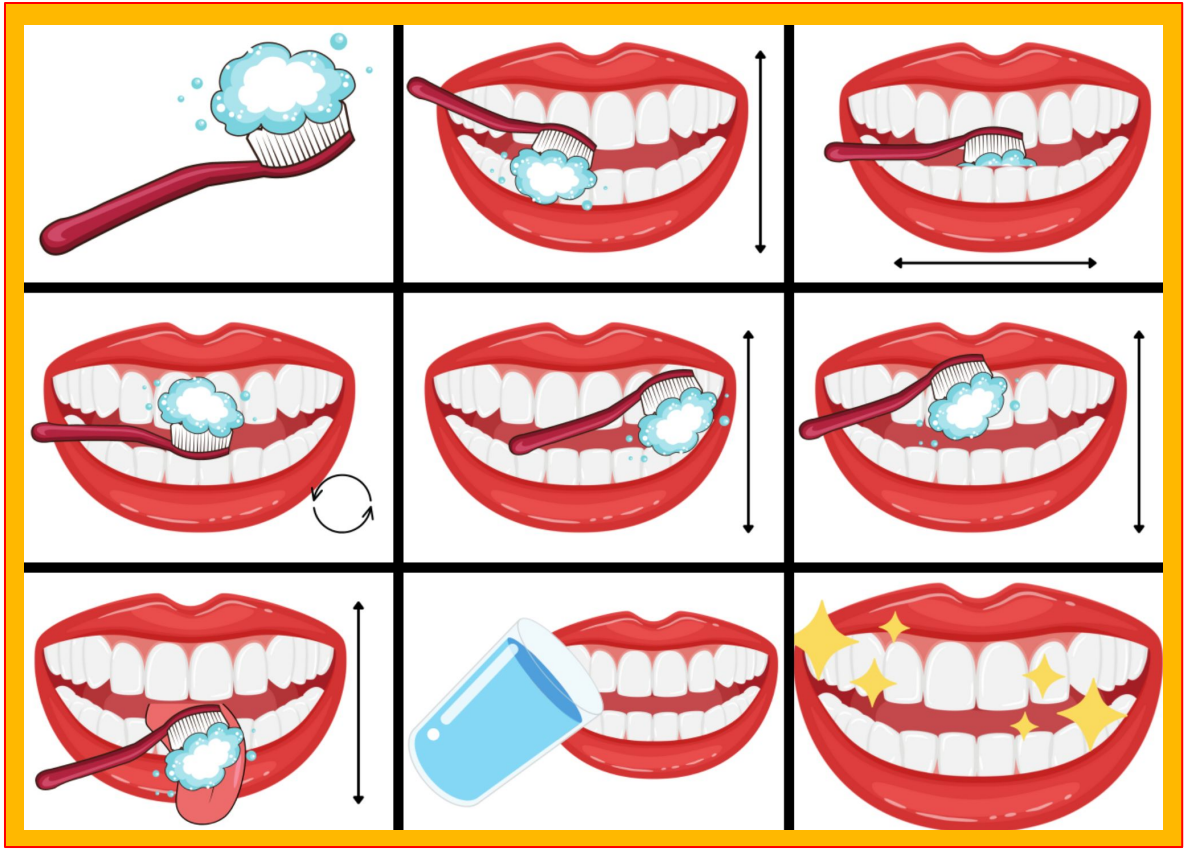




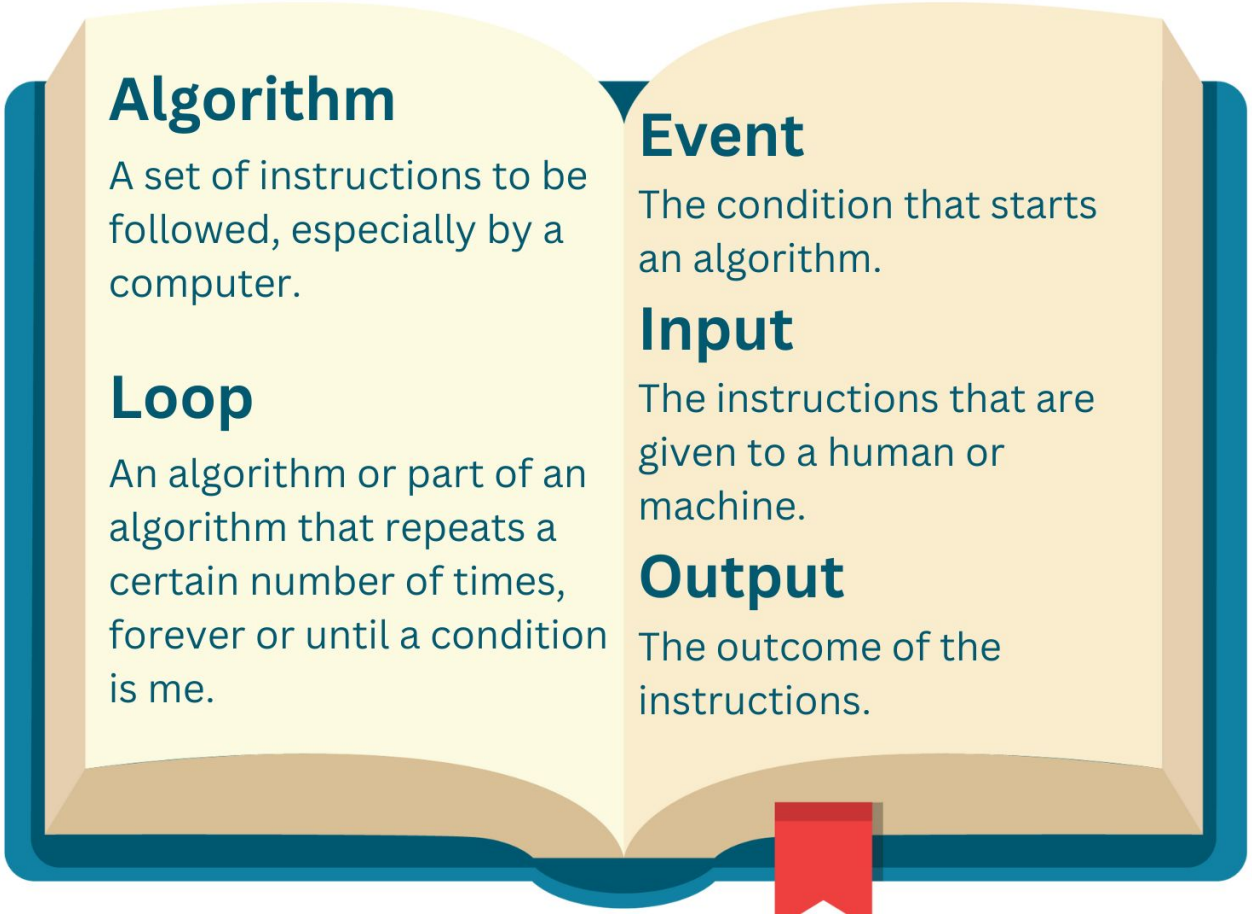
Coding

What we think it is…

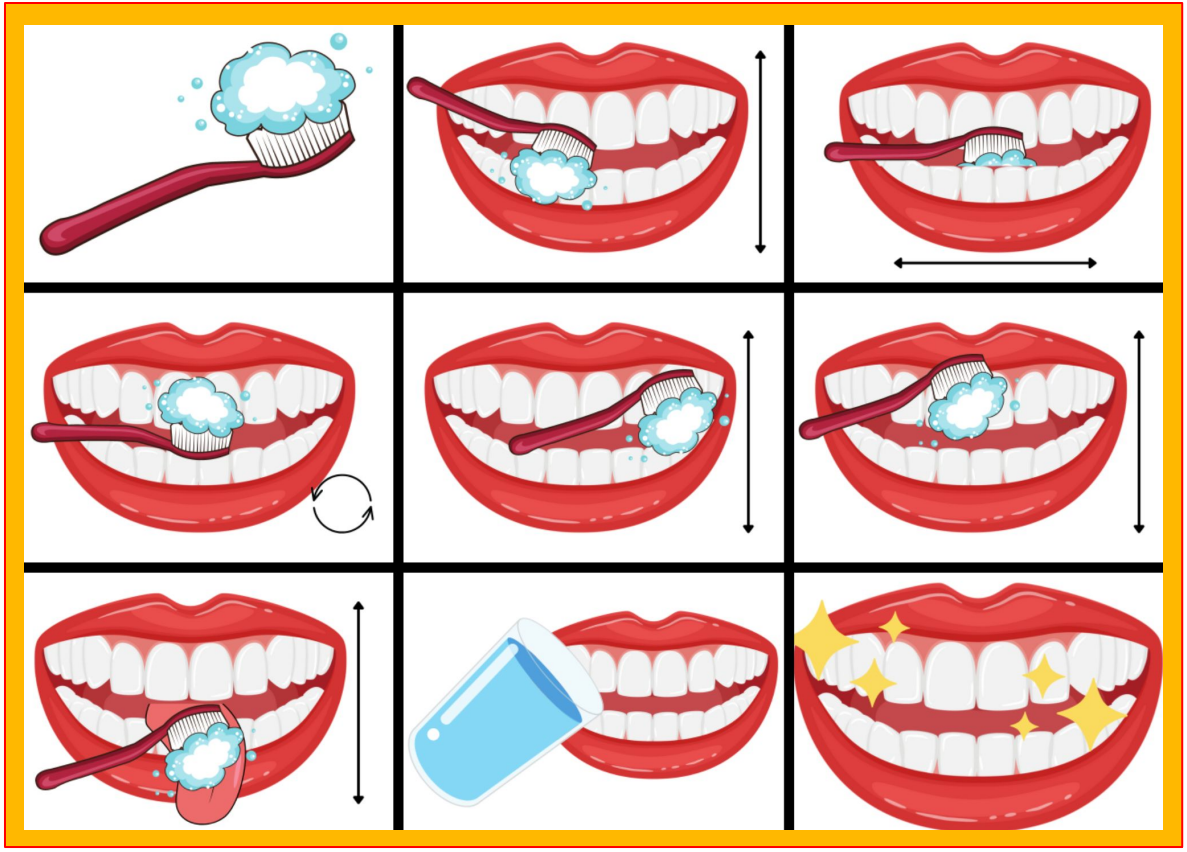
What Coding Really is



Computer Science Vocabulary



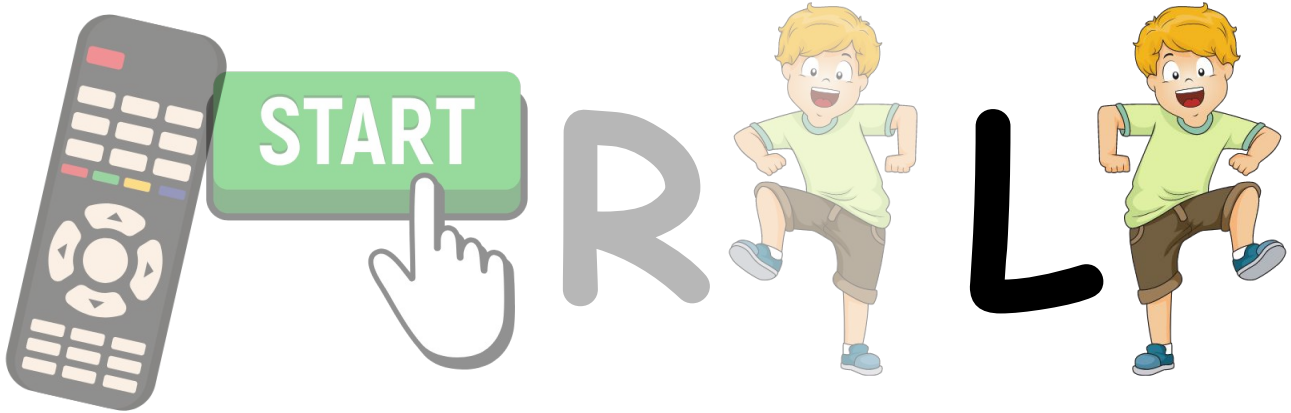
What Coding Really is



Algorithm

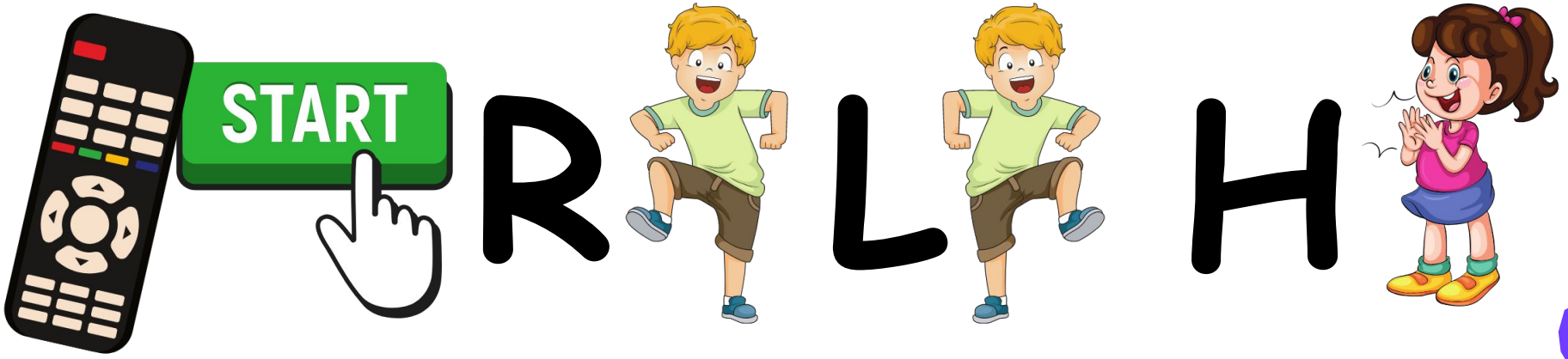
Algorithm

Algorithm

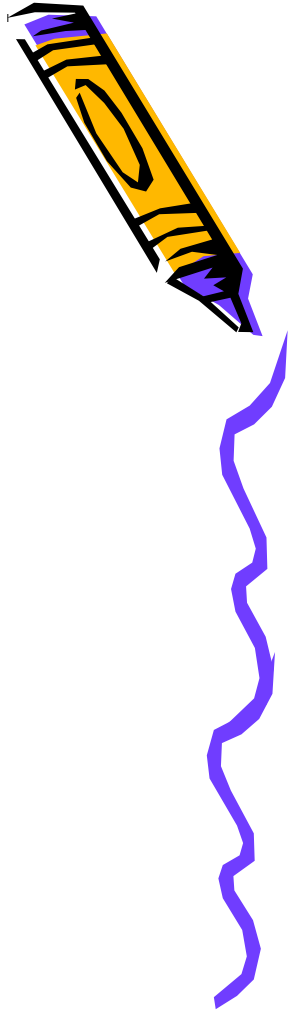


Algorithm

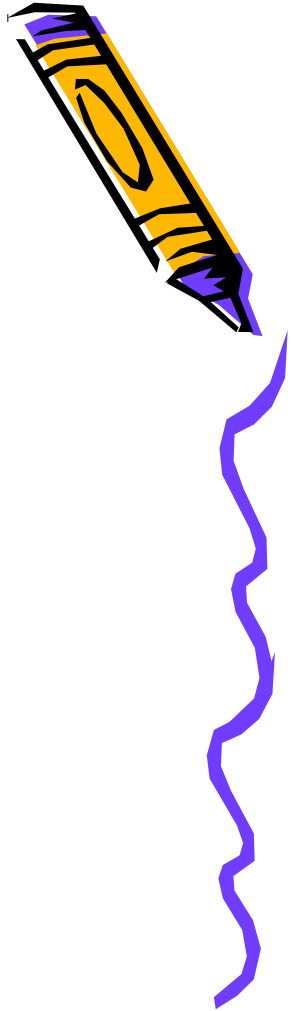
Algorithm



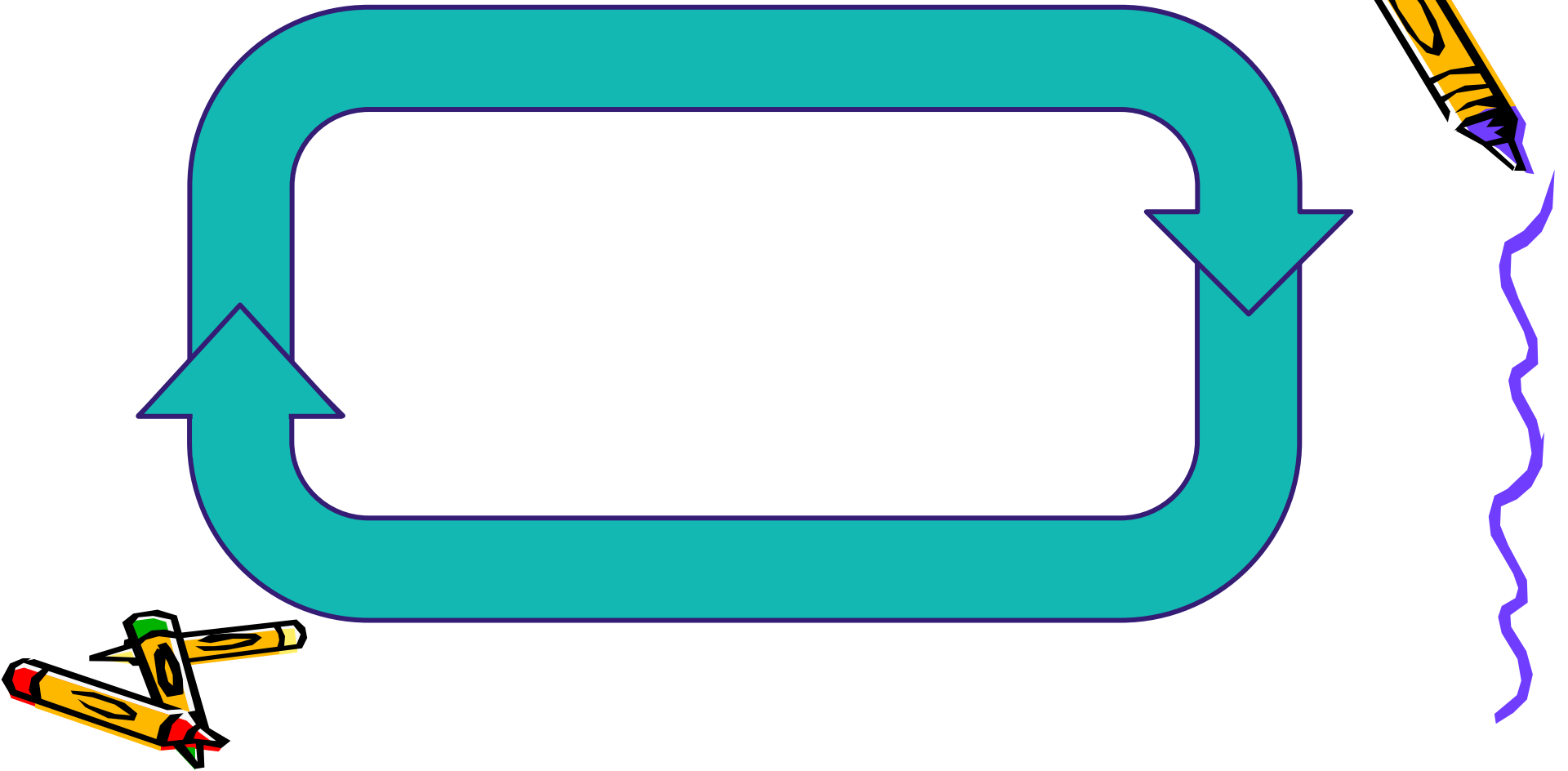
R H



L H



L H R



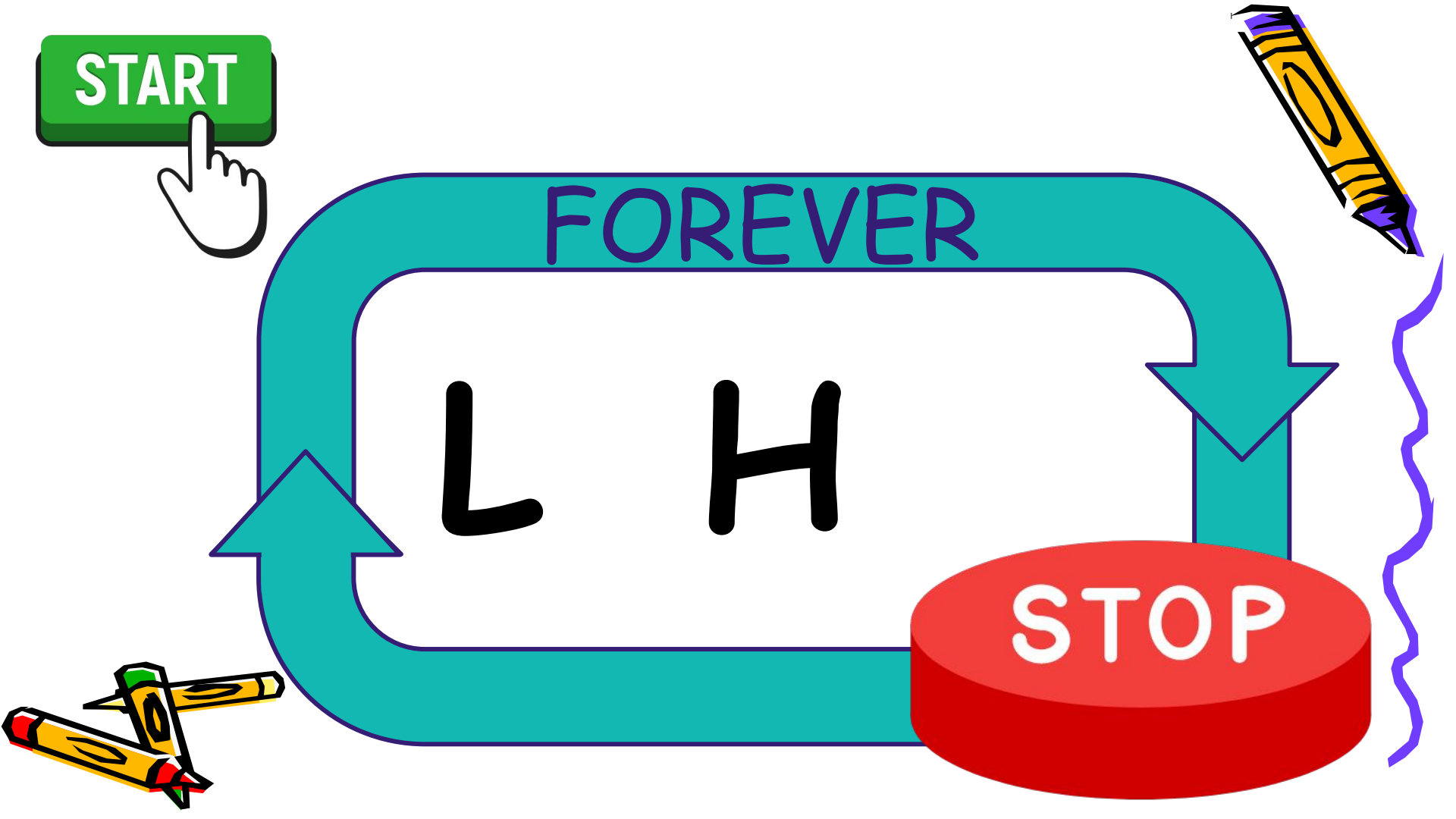
START

3

L H

FOREVER

L H


START
FOREVER
L H
STOP

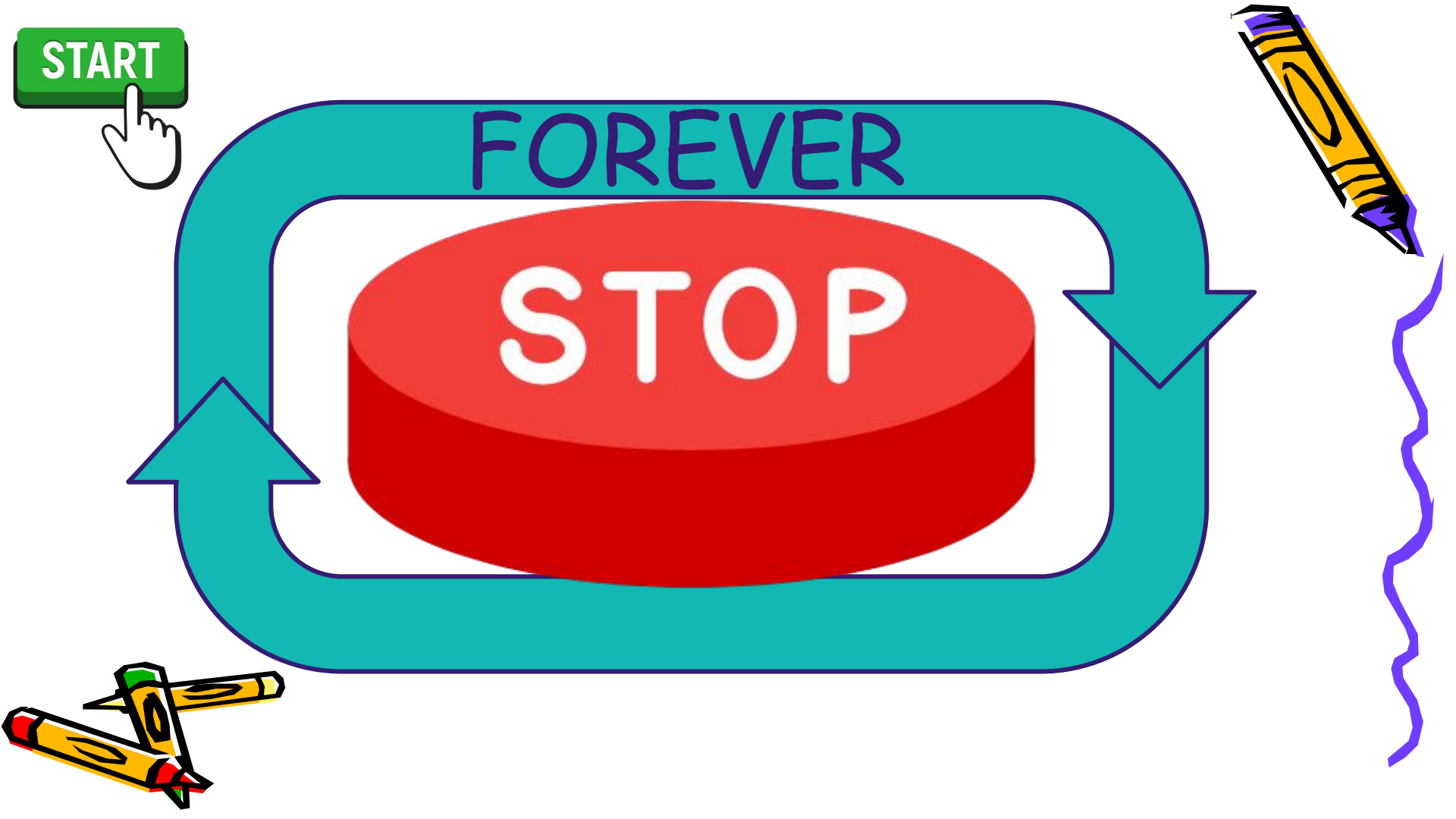
START

FOREVER

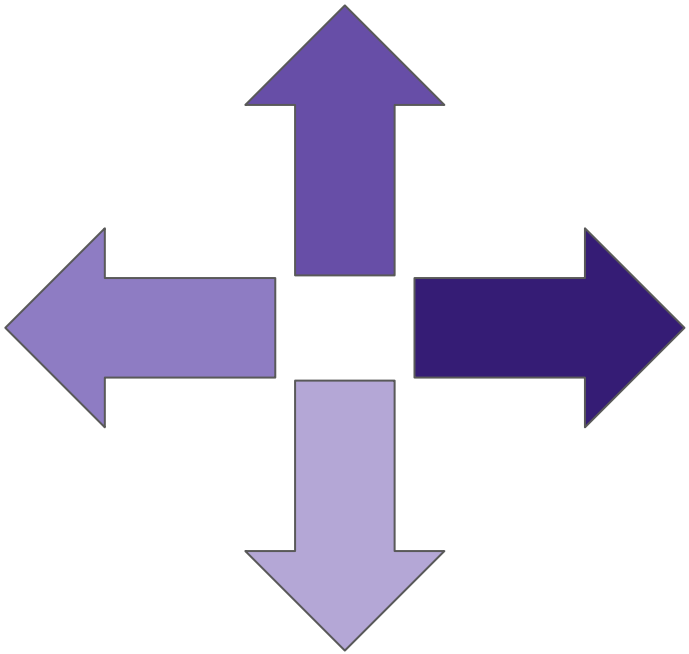
R L H

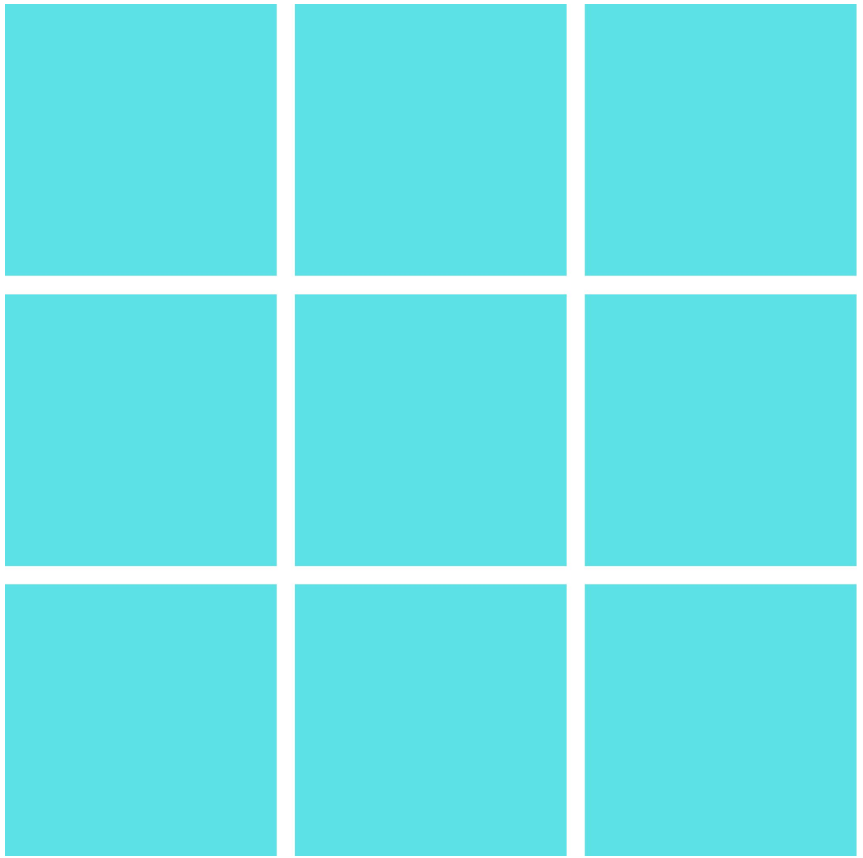
START

FOREVER

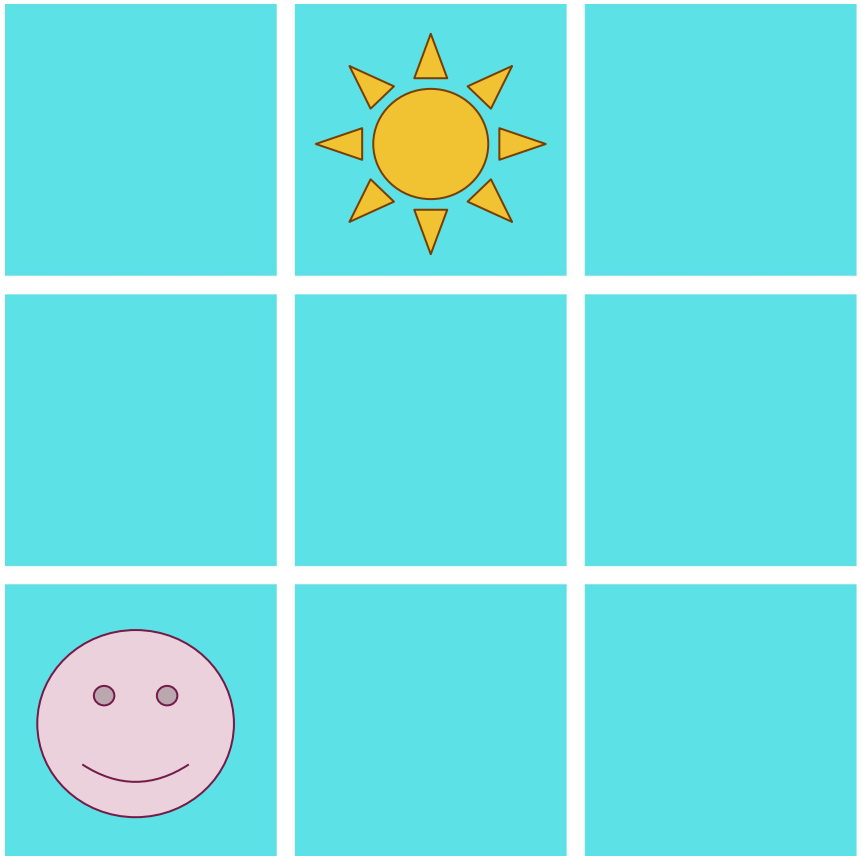

START
FOREVER
STOP

No tech? No problem.

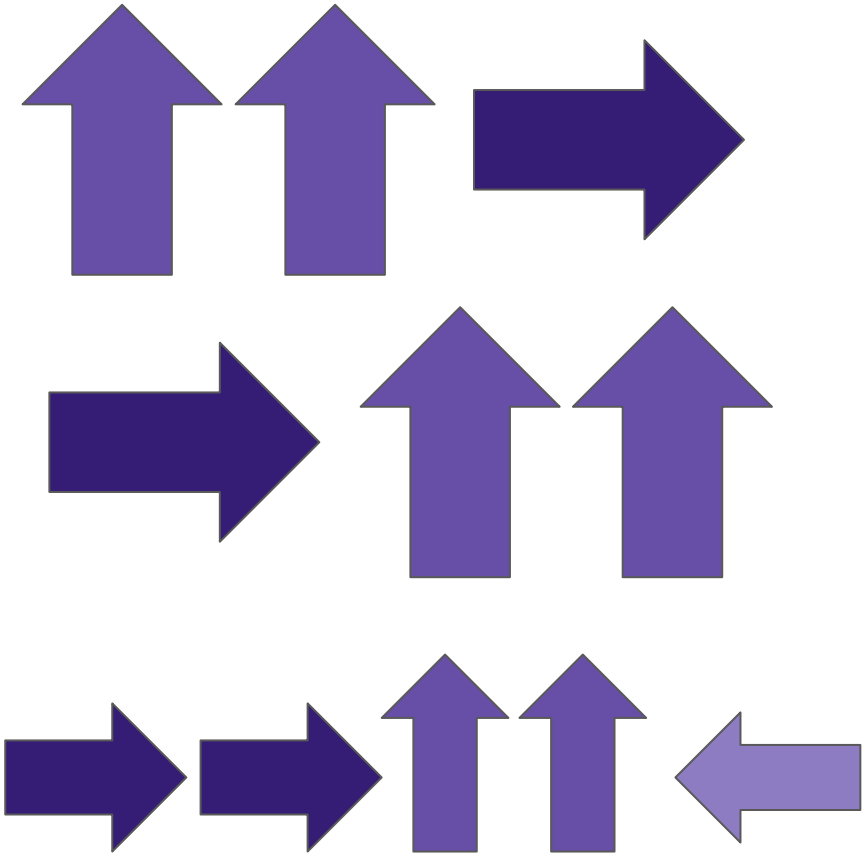


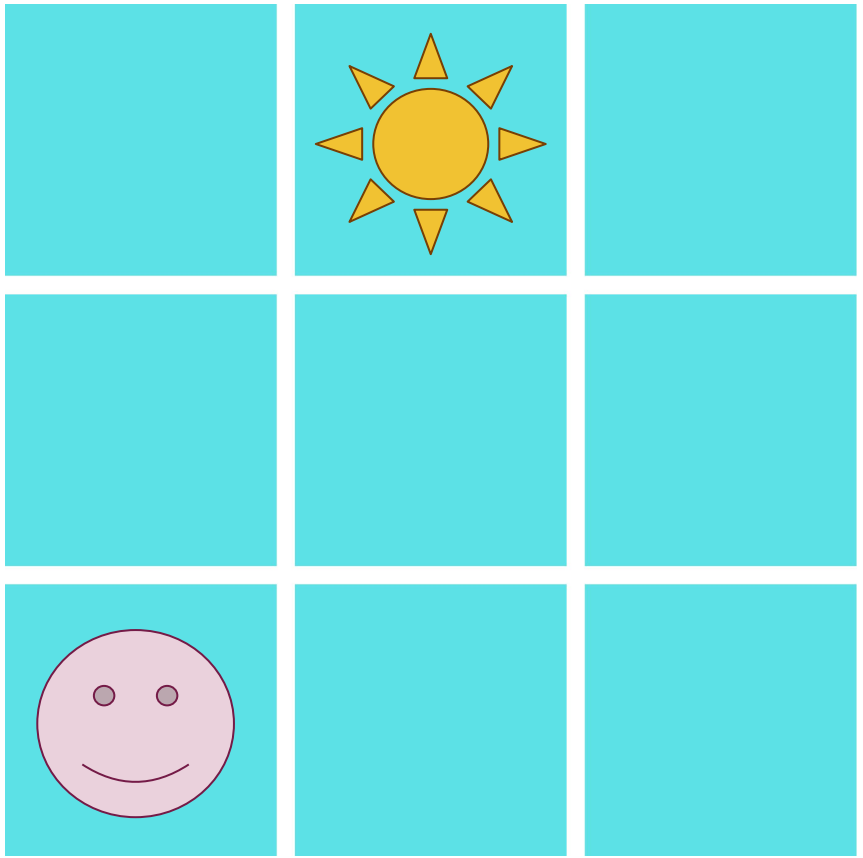


No tech? No problem.

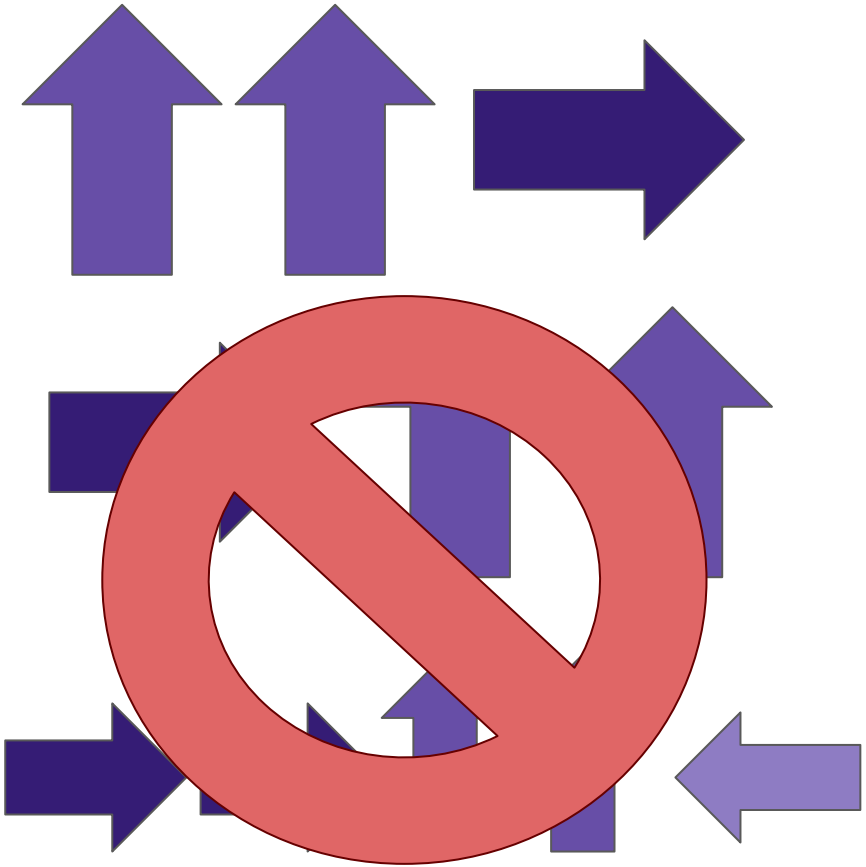


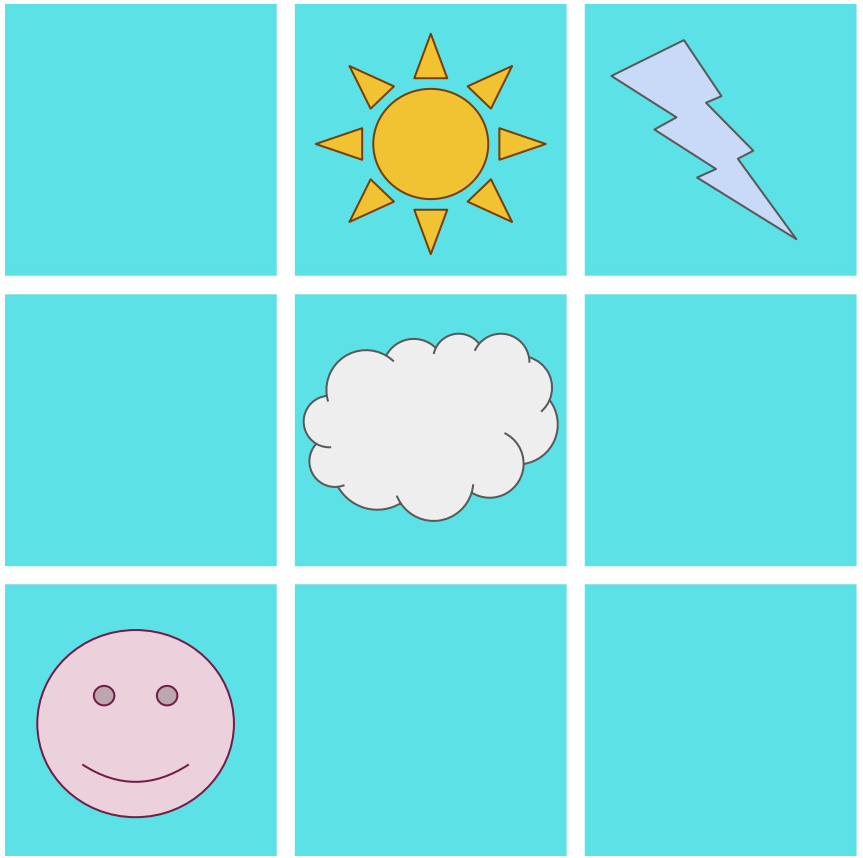
No tech? No problem.



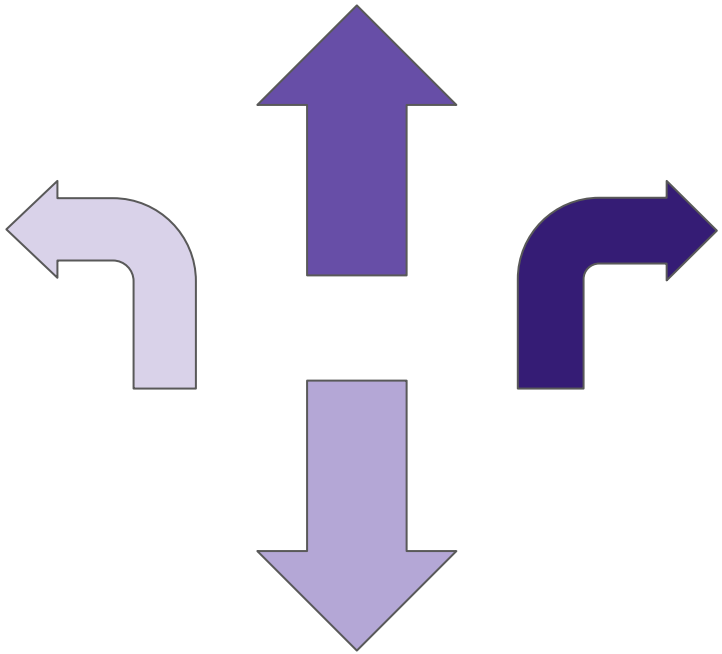


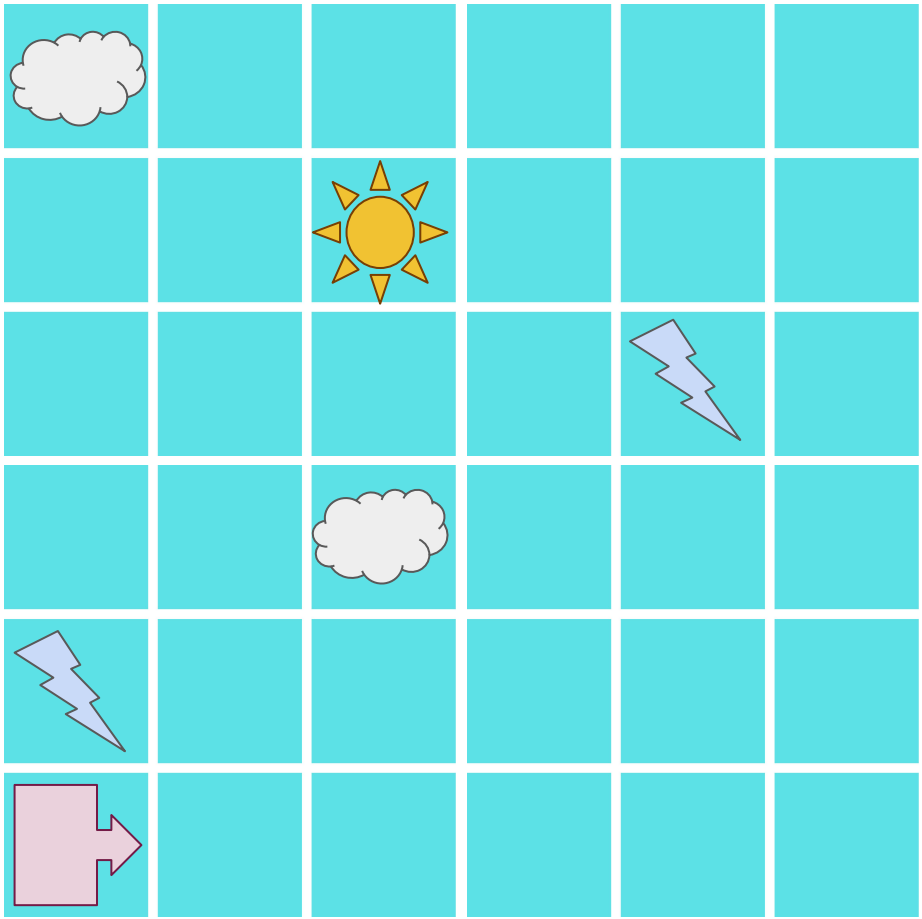
No tech? No problem.



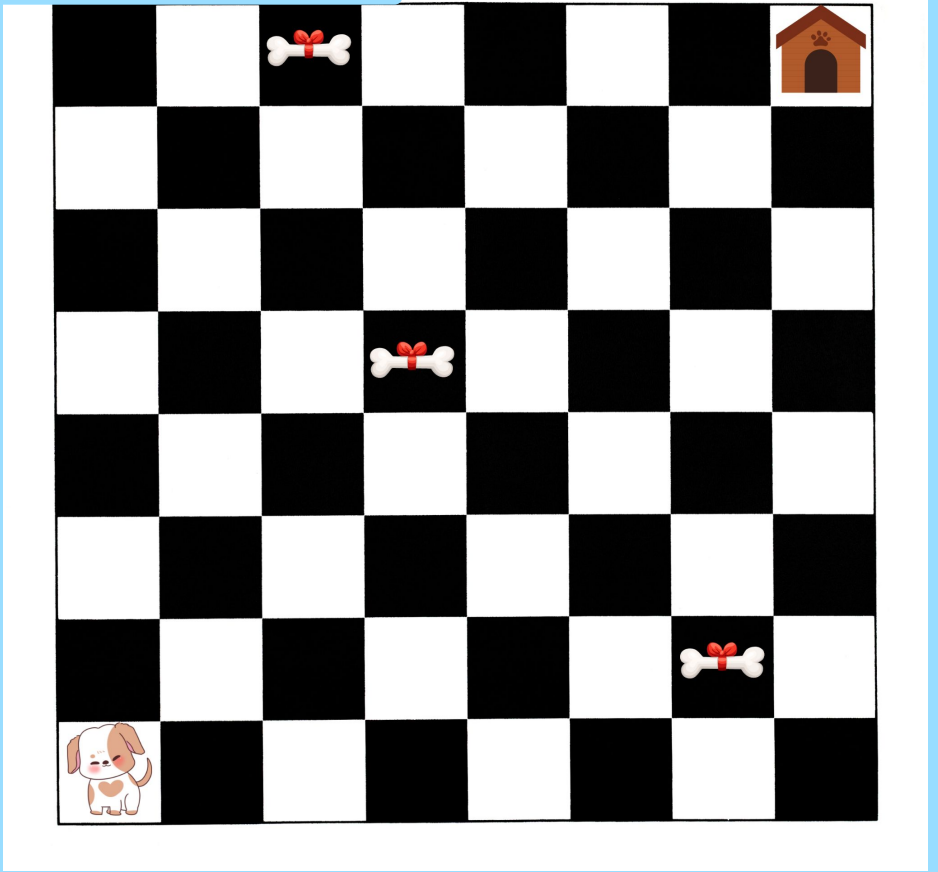


No tech? No problem.





No tech? No problem.



No tech? No problem.

- Sudoku
- Code a Drawing
- Code math counting or equations
- Eye spy and other guessing games
- Code a friend/family member/teacher
- Hand signals & actions

Chromebook Coding & Computational Thinking

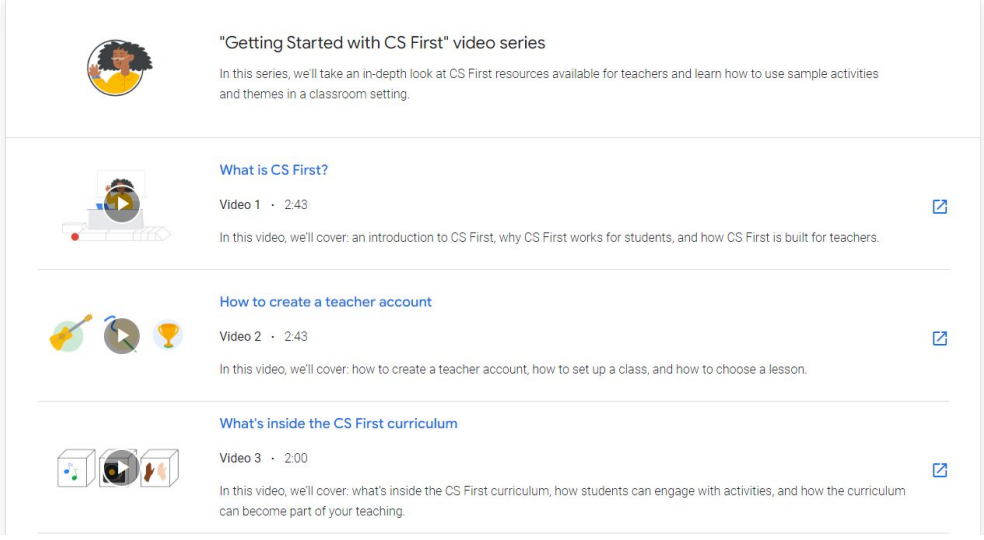
Blockly Games beta

Google CS First

Tynker

CODE.ORG

SCRATCH



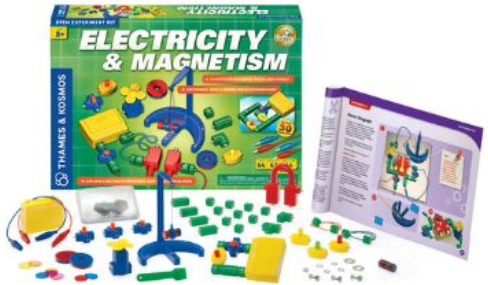
Toys!!!

Your ATA Library

The Alberta Teachers' Association

Kits in Your ATA Library

- Makerkits A-D
- Makerkits E-G
- Makerkits H-L
- Makerkits M-O
- Makerkits P-S
- Makerkits T-Z



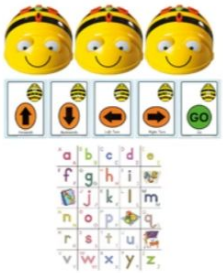
BeeBots

ROBOTIX EDUCATION

$134.95

Bee Bot - Programmable Floor Robot - See & Say Version !

Bee- Bot & Blue Bot Robotics



$495.95

Bee-Bot (3 Robot Pack)- Robot Bundle with Mat & Command Cards

Bee- Bot & Blue Bot Robotics

Code&Go Robot Mouse

Code & Go Robot Mouse

Learning Resources Code & Go Robot Mouse Activity Set - 83 pieces, Ages 4+ Coding Robot For Kids, STEM Toys For Boys And...

★★★★½ 2,006

$77.98

✓prime

Learning Resources Code & Go Robot Mouse Classroom Set, STEM Coding Classroom Set

★★★★½ 11

$286.56

Prime

Botley

Learning Resources Botley the Coding Robot Activity Set, Homeschool, Coding Robot for Kids, STEM Toy, Programming for Kids, Ages 5+

Visit the Learning Resources Store

4.5 out of 5 stars 152 ratings

$123.5

prime