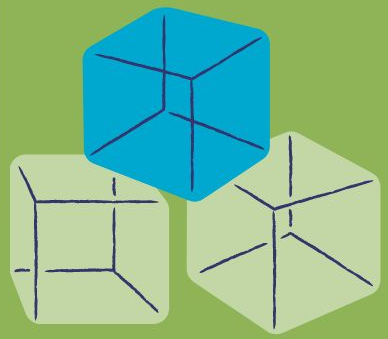
Making Connections

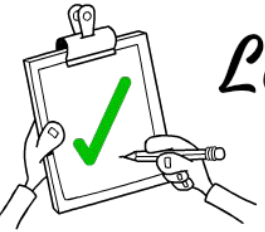


Matter

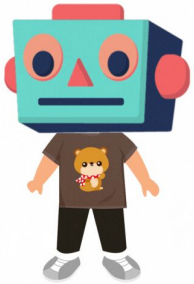
Computer Science

grade 4

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.

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 design meet needs?**
Learning Outcome	**Students examine and apply design processes to meet needs.**

Knowledge	Understanding	Skills & Procedures
Design processes include • understanding the problem • forming ideas (ideating) • planning • creating • analyzing • testing • troubleshooting Feedback helps to ensure all needs are considered during the design process. An algorithm is a sequence of instructions. Artifacts are objects or products made by humans, machines, or computers through the process of design.	Design involves processes that can transform ideas into artifacts that meet needs.	Plan and create an artifact to meet a need. Provide feedback to others during the design process. Test an artifact to confirm that it meets intended needs. Collaborate to design an algorithm to solve a problem. Examine availability and cost of materials during design.

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 design meet needs?**
Learning Outcome	**Students examine and apply design processes to meet needs.**

Knowledge	Understanding	Skills & Procedures
Design can produce many artifacts, including • algorithms • models • prototypes • blueprints • programs • experiments • objects Design can deal with complex problems. Availability of materials and costs are considerations in design.	Design involves processes that can transform ideas into artifacts that meet needs.	Plan and create an artifact to meet a need. Provide feedback to others during the design process. Test an artifact to confirm that it meets intended needs. Collaborate to design an algorithm to solve a problem. Examine availability and cost of materials during design.

Creativity

Finding different ways to reach the same outcome.

Problem solving to overcome obstacles to achieve a desired outcome.

Design Thinking Process

Learn About
Your Audience

Empathize

Define

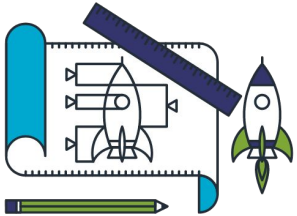
Construct Point
of View Based
on User Needs

Brainstorm and
Come up with
Creative Solutions

Ideate

Prototype

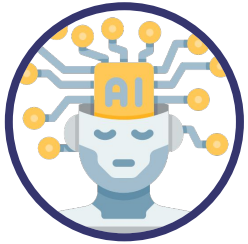
Build
Representation
of Your Ideas



Test Your Ideas

Test

Computational Thinking

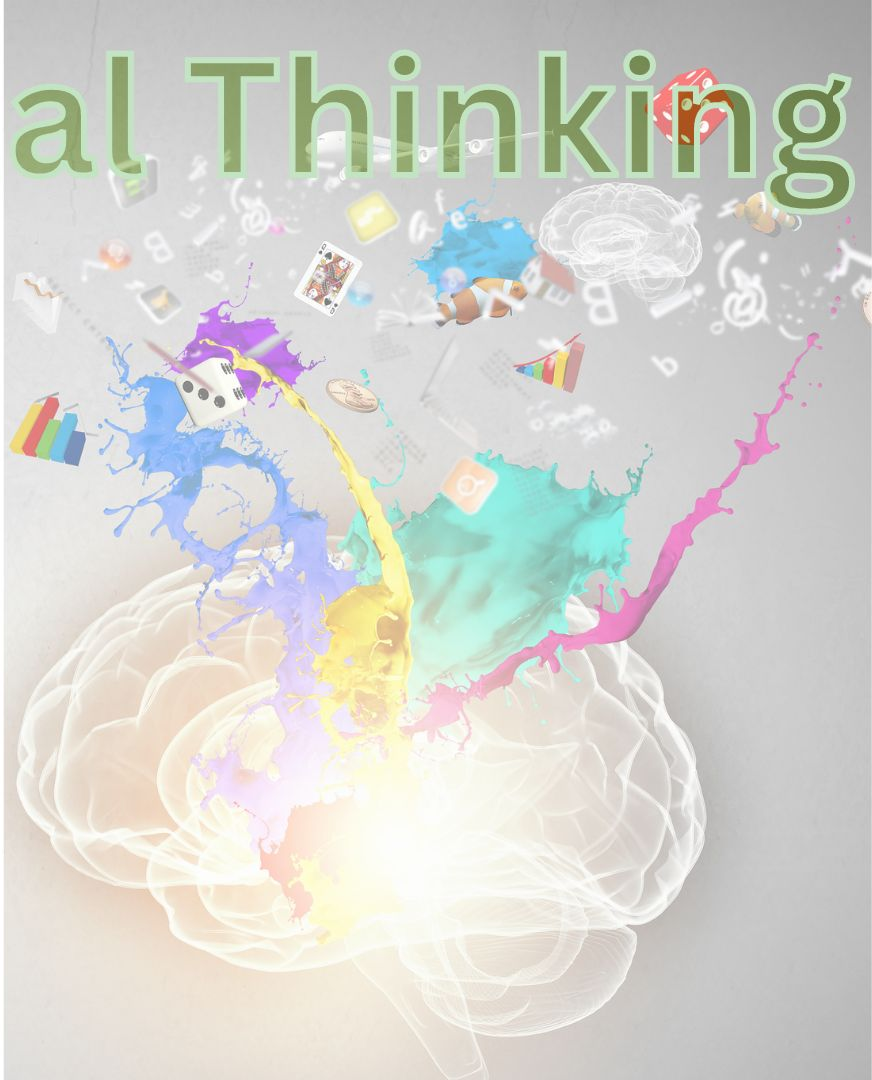


Decomposition

Pattern Recognition

Pattern Abstraction

Algorithm Design



Organizing Idea	Matter: Understandings of the physical world are deepened by investigating matter and energy.
Guiding Question	How can materials be managed safely?
Learning Outcome	Students investigate the management of waste and dangerous materials and describe environmental impacts.

Skills & Procedures

Compare the different methods of waste management and discuss their environmental impacts.

Develop a personal plan to reduce waste. Discuss local waste management programs.

Represent a recycling process using diagrams.

Create a Garbage Game in Scratch

UNDERSTANDING
Design involves processes that can transform ideas into artifacts that meet needs.

Plan and create an artifact to meet a need.

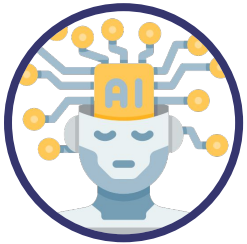
SKILLS & PROCEDURES

Provide feedback to others during the design process.

SKILLS & PROCEDURES

Test an artifact to confirm that it meets intended needs.

SKILLS & PROCEDURES



Collaborate to design an algorithm to solve a problem.

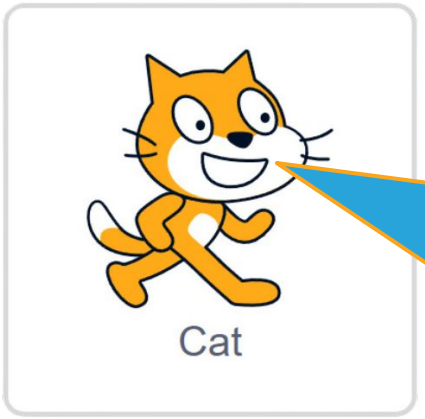
SKILLS & PROCEDURES

Examine availability and cost of materials during design.

SKILLS & PROCEDURES

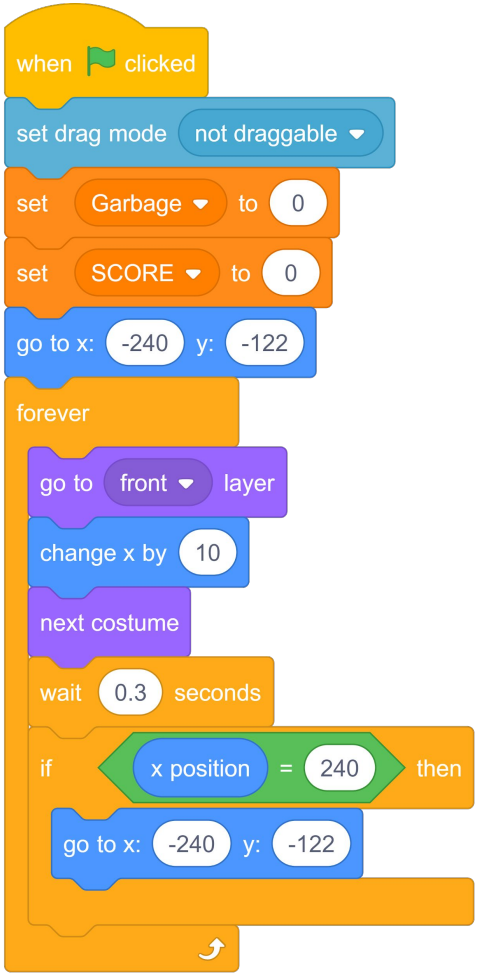
http://bit.ly/MrsDGarbageCards

https://bit.ly/MrsDGarbage



CHOICE!
Delete the cat sprite and choose a different garbage dropping sprite from the gallery.

Add this code to the cat sprite.



The cat will walk across the stage and change costumes creating a walking animation as it goes.

When the cat reaches the far right side of the stage it will restart at the far left making it continually move across the screen over and over.

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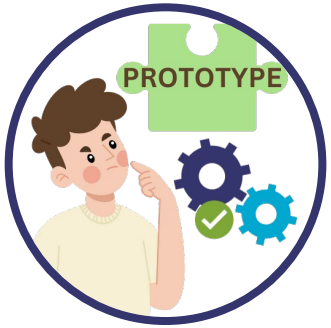

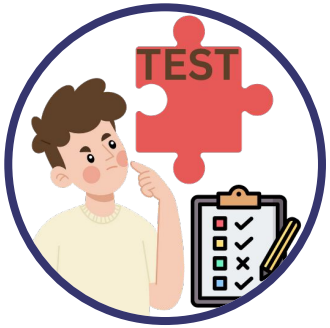

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Skills & Procedures

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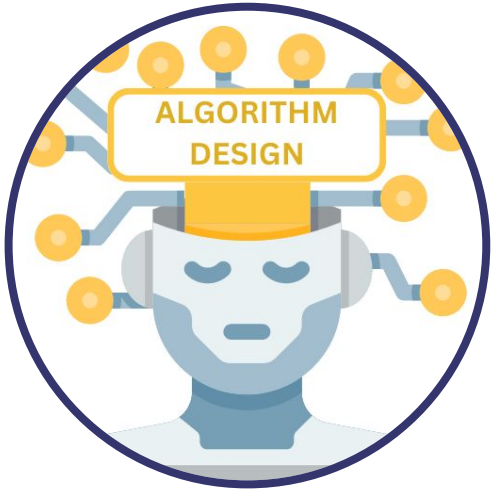
Develop a personal plan to reduce waste. Discuss local waste management programs.

Represent a recycling process using diagrams.

Write an algorithm for a recycling machine.



A set of instructions for recycling is an algorithm.

What do you think the algorithm would look like for different processes?

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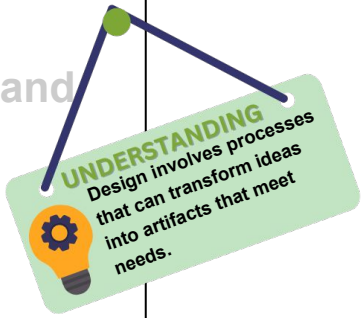
Skills & Procedures

Identify the hazard associated with symbols on various dangerous materials at home, at school, or in the community.

Discuss responsible use and disposal of dangerous materials.



Create a Hazard Symbol Game in Scratch

Plan and create an artifact to meet a need.

SKILLS & PROCEDURES

Provide feedback to others during the design process.

SKILLS & PROCEDURES

Test an artifact to confirm that it meets intended needs.

SKILLS & PROCEDURES

Collaborate to design an algorithm to solve a problem.

SKILLS & PROCEDURES

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SKILLS & PROCEDURES

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