# Making Connections

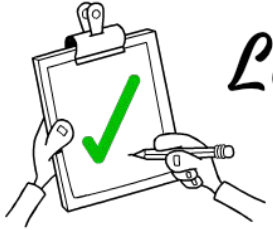
## Living Systems

## Computer Science

## grade 6

Alberta Regional Consortia

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.*

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|---|---|
| **Organizing Idea** | **Computer Science: Problem solving and scientific inquiry are developed through the knowledgeable application of creativity, design, and computational thinking.** |
| **Guiding Question** | **In what ways are abstraction, design, and coding related?** |
| **Learning Outcome** | **Students examine abstraction in relation to design and coding, and describe impacts of technologies.** |

| Knowledge | Understanding | Skills & Procedures |
|---|---|---|
| The process of abstraction includes<br>• determining what details to keep and what to ignore<br>• removing unnecessary details<br>• identifying important information<br>• generalizing patterns<br><br>Information is data that is organized to be more useful.<br><br>An abstraction is a simplified version of something complex.<br><br>Abstractions can make daily life easier; e.g.,<br>• simple controls on appliances<br>• light switches<br>• steering wheels<br>• apps<br><br>Computational artifacts can be designed to address societal needs and wants; e.g.,<br>• weather modelling<br>• communications<br>• automotive controls<br>• medical research<br>• apps | Abstraction is used in design and coding of computational artifacts to make problems easier to think about. | Apply abstraction during the design process.<br><br>Identify examples of abstractions encountered in daily life.<br><br>Discuss the role of design and coding in society.<br><br>Use a visual block-based language to design code that includes relevant design structures. |

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| Structures used in coding include<br>• sequences<br>• conditionals (if-then-else statements)<br>• loops<br><br>Sequence structures are ordered sets of instructions within code.<br><br>Conditional structures are statements that tell computers to complete different actions based on different situations. | Abstraction is used in design and coding of computational artifacts to make problems easier to think about. | Apply abstraction during the design process.<br><br>Identify examples of abstractions encountered in daily life.<br><br>Discuss the role of design and coding in society.<br><br>Use a visual block-based language to design code that includes relevant design structures. |

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| The use of computers, coding, and technology can have impacts that are<br>• personal<br>• social<br>• environmental<br>• economic<br><br>Impacts of computers, coding, or technology may be intentional or unintentional. | Computers, coding, and technology can be used in ways that have positive or negative impacts. | Discuss how computers, coding, or technology have had impacts.<br><br>Predict possible impacts of computers, coding, or technology. |

# 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**

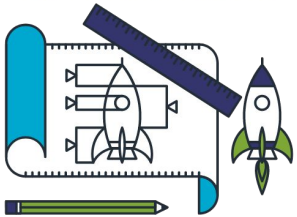
Construct Point of View Based on User Needs

Brainstorm and Come up with Creative Solutions

**Ideate**

**Prototype**

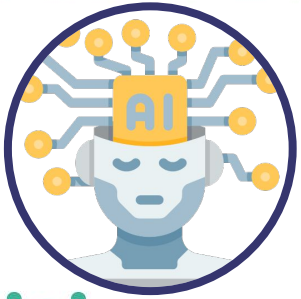
Build Representation of Your Ideas



Test Your Ideas

**Test**

# Computational Thinking

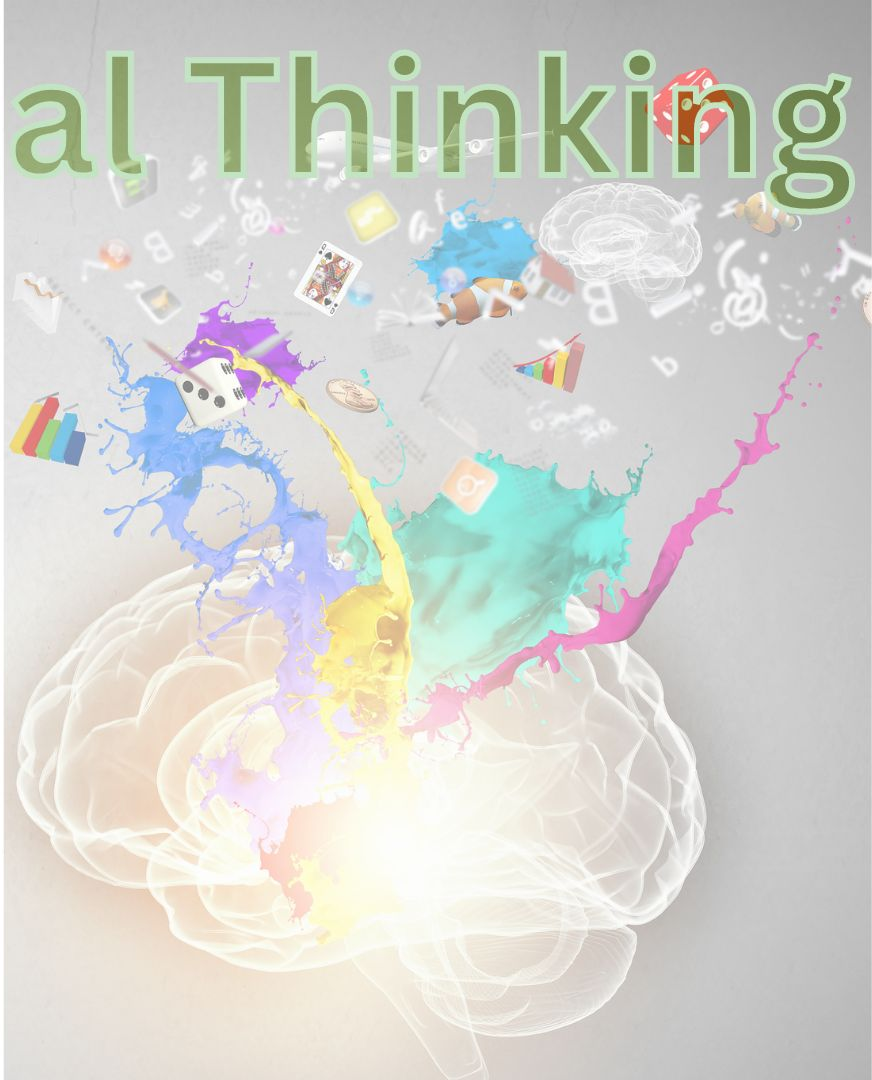



## Decomposition

## Pattern Recognition

## Pattern Abstraction

## Algorithm Design



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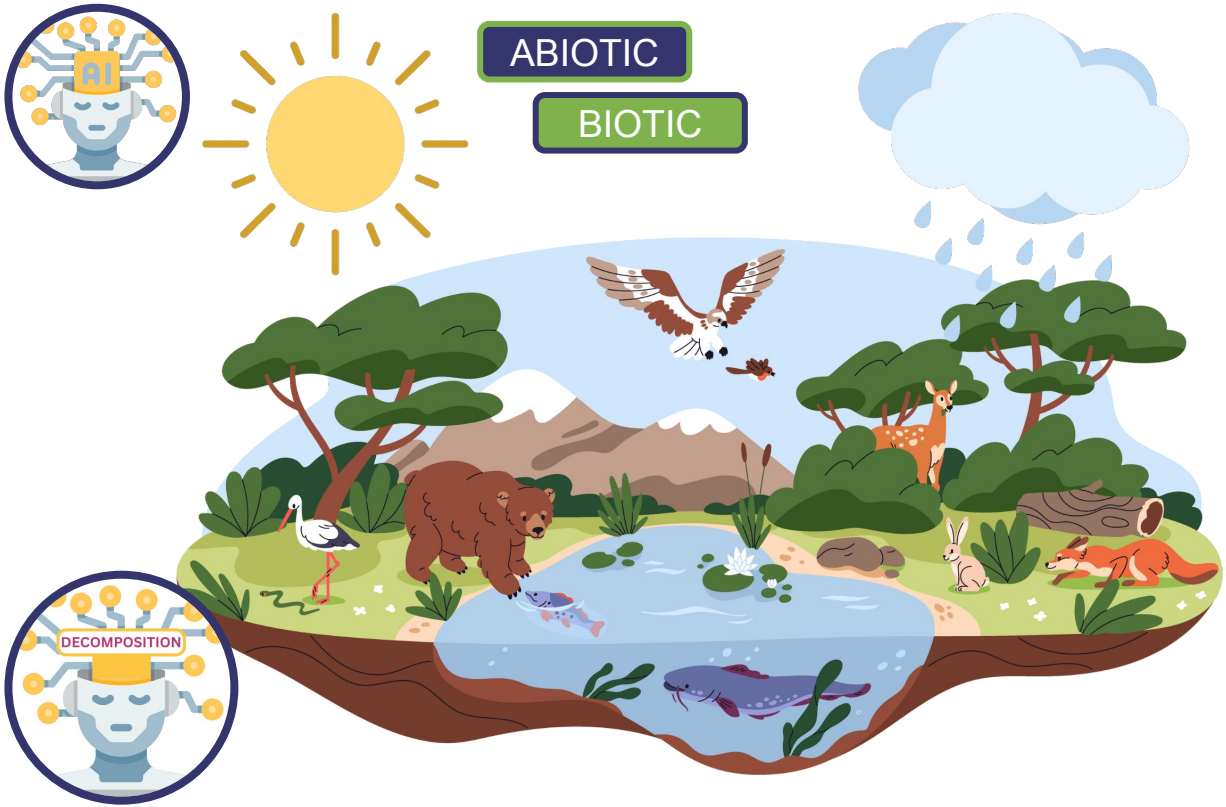
| **Organizing Idea** | **Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions.** |
| **Guiding Question** | **How do plants and animals interact?** |
| **Learning Outcome** | **Students analyze and describe how plants and animals interact with each other and within environments.** |

**Skills & Procedures**

**Represent and connect the biotic and abiotic components of an ecosystem.**

Compare the characteristics of two ecosystems.

Examine the diversity of animals and plants in various ecosystems in relation to abiotic components.



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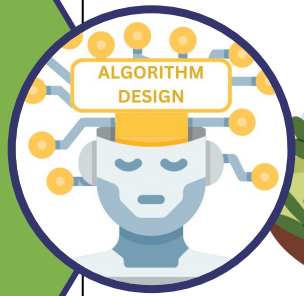
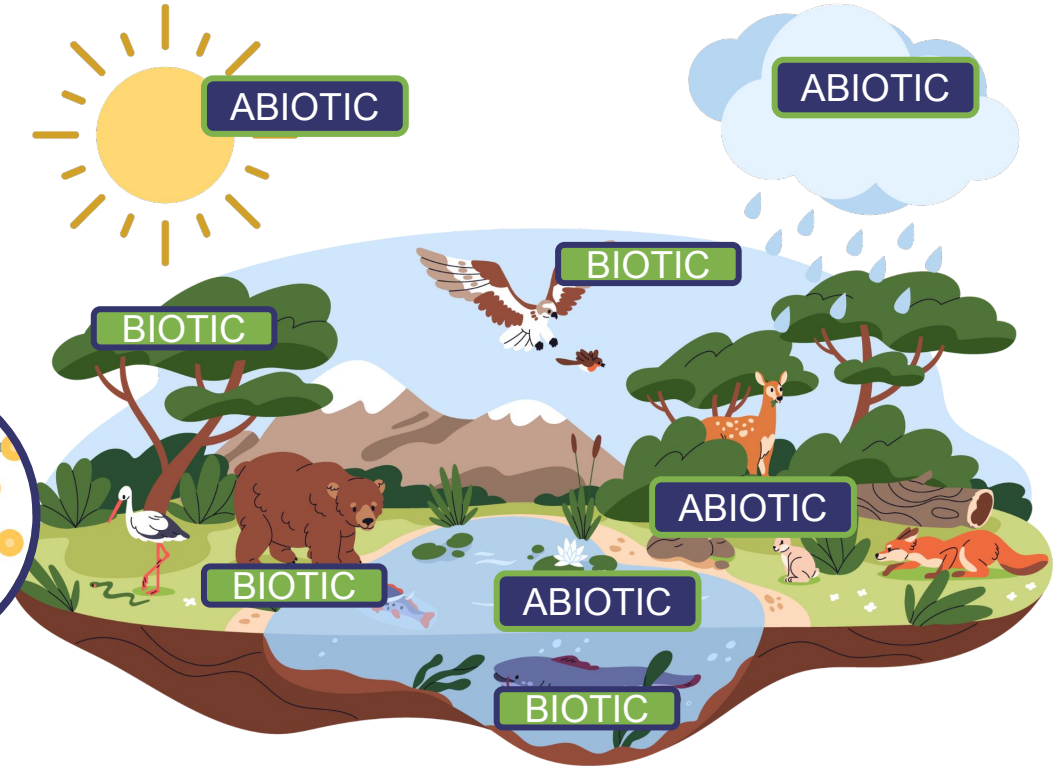
**Skills & Procedures**

**Represent and connect the biotic and abiotic components of an ecosystem.**

**Write a set of instructions a human or machine could use to determine if an object is BIOTIC or ABIOTIC.**



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## Skills & Procedures

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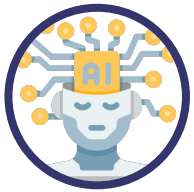
Identify examples of abstractions encountered in daily life.

SKILLS & PROCEDURES

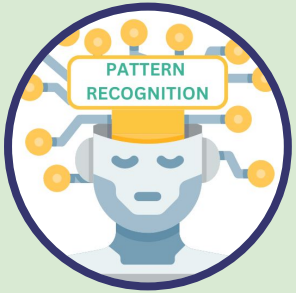



ABIOTIC

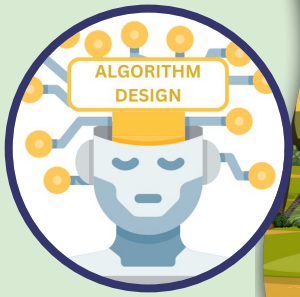
BIOTIC

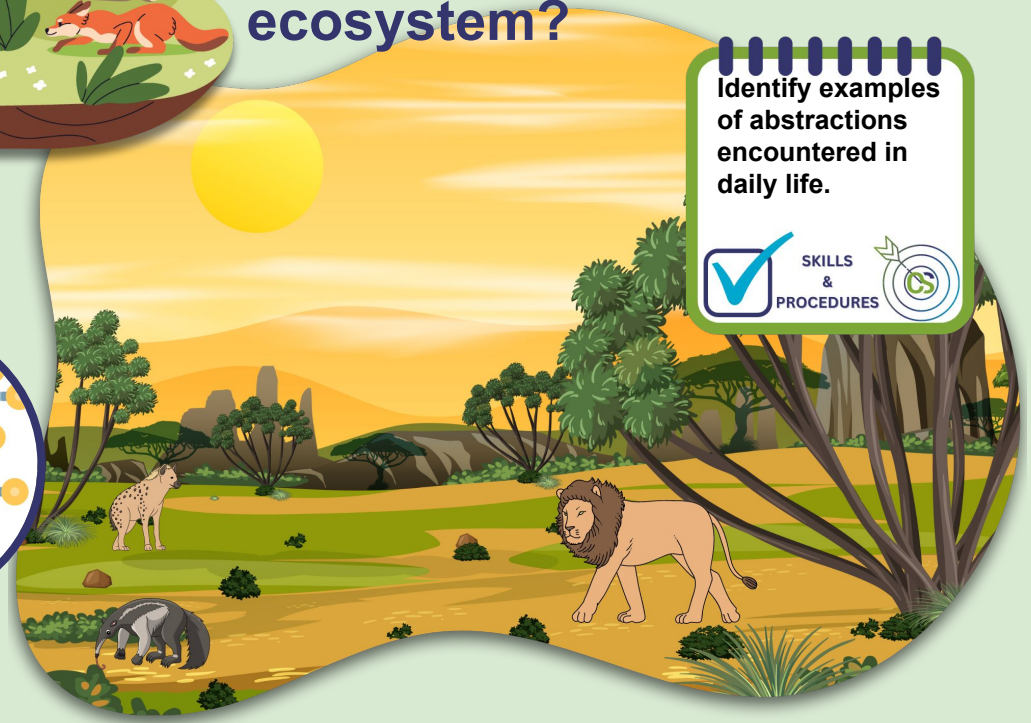

How are they the SAME?
How are they DIFFERENT?

## Can you create some rules for each type of ecosystem?







Identify examples of abstractions encountered in daily life.

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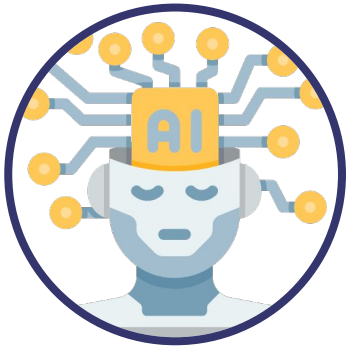


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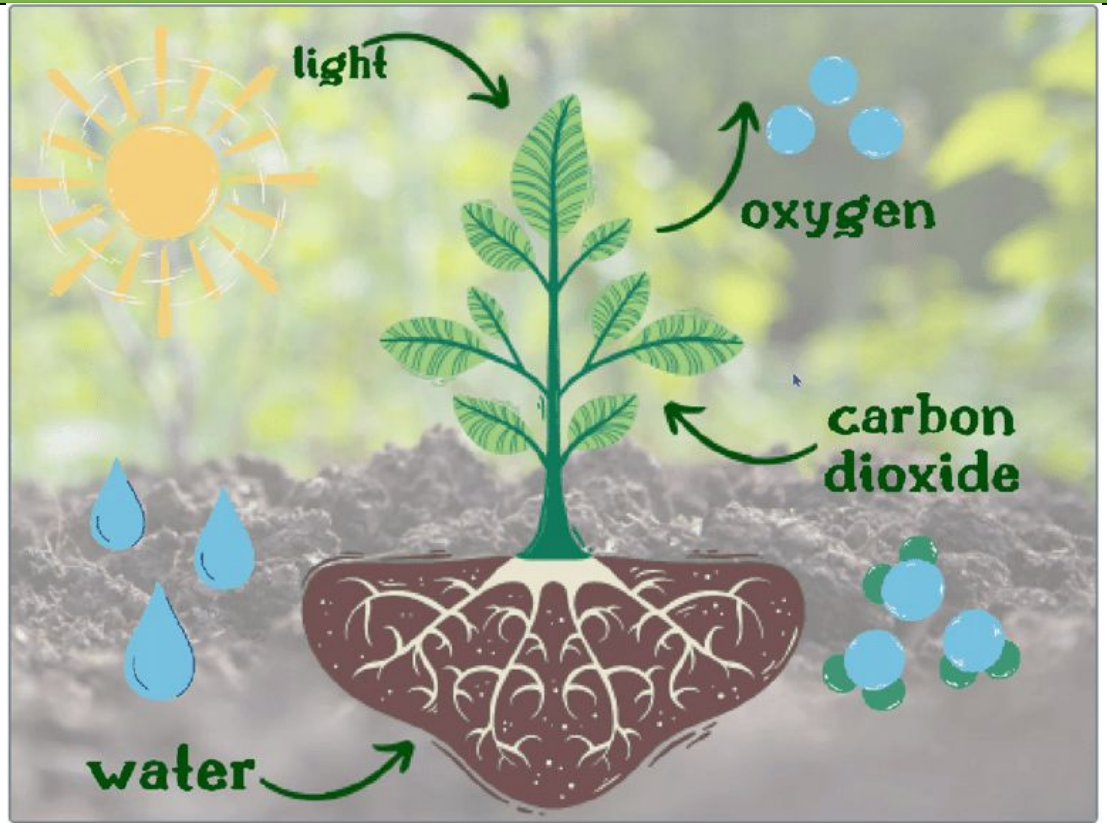
**Skills & Procedures**

# Explain the process of photosynthesis and its importance in an ecosystem.

Use a visual block-based language to design code that includes relevant design structures.

SKILLS & PROCEDURES



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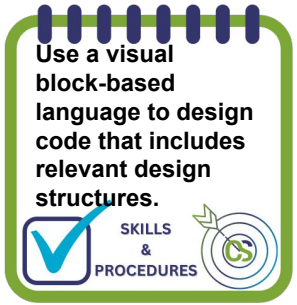


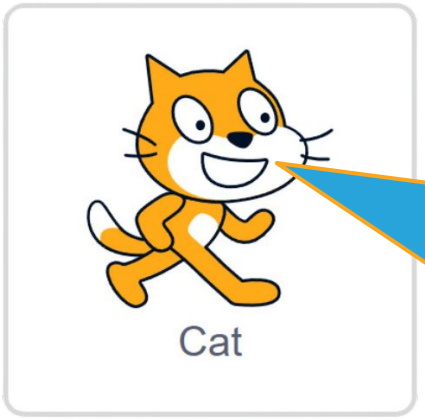

# Create a Photosynthesis Model in Scratch

## Template

http://bit.ly/MrsDPhotoS

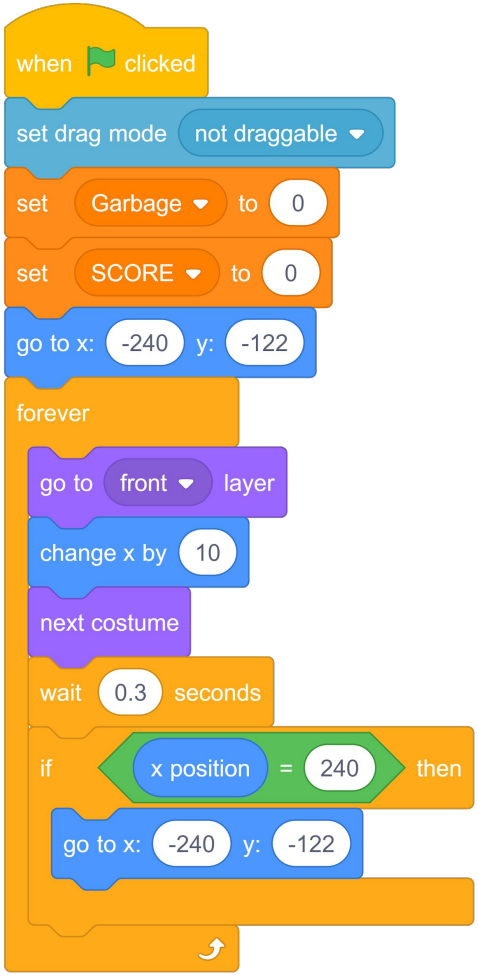
## Scratch Cards

http://bit.ly/MrsDPhotoSCards




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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**Skills & Procedures**

**Examine ways that plants and animals rely on each other to meet their needs.**

**Discuss plants that are considered sacred to First Nations and Métis.**


**How would I feel if my home was destroyed?**

**How do First Nations & Metis feel about it?**

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## Skills & Procedures

# Create a model or simulation to represent a chosen ecosystem and its characteristics.

Use a visual block-based language to design code that includes relevant design structures.

SKILLS & PROCEDURES

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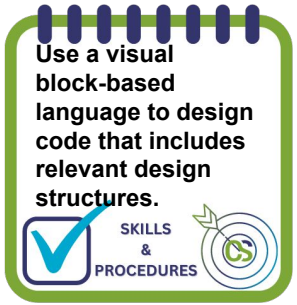


# Create an Ecosystem Model in Scratch

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