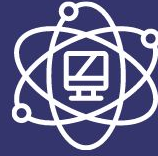


# Making Connections



Living  
Systems



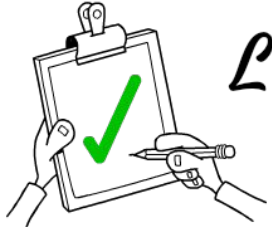
Computer  
Science



grade 5

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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | In what ways can design be used to help achieve desired outcomes or purposes?                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Learning Outcome                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Students apply design processes when creating artifacts that can be used by a human or machine to address a need.                                               |                                                                                                                                                                                                                                                                                                                                                                                     |  |
| Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Understanding                                                                                                                                                   | Skills & Procedures                                                                                                                                                                                                                                                                                                                                                                 |  |
| <p>A computational artifact is anything created by a human using a computer, such as</p> <ul style="list-style-type: none"> <li>• computer programs and code images</li> <li>• audio video</li> <li>• presentations</li> <li>• web pages</li> </ul> <p>Design can be used to create algorithms and translate them into code.</p> <p>Code is any language that can be understood by and run on a computer.</p> <p>There are many ways to code, including using visual block-based languages.</p> <p>Visual block-based languages are a form of code in which prepared chunks of instructions are in drag-and-drop blocks that fit together like puzzle pieces to design a program.</p> <p>A computer cannot think for itself and must rely on code for all that it does. A loop is a repetition of instructions used in an algorithm.</p> | <p>Design can be used by humans or machines to meet needs.</p>                                                                                                  | <p>Engage in the design process to create computational artifacts.</p> <p>Relate a block of code to an outcome or a behaviour.</p> <p>Explain what will happen when single or multiple blocks of code are executed.</p> <p>Translate a given algorithm to code using a visual block-based language.</p> <p>Design an algorithm that includes a loop and translate it into code.</p> |  |

| 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 can design be used to help achieve desired outcomes or purposes?                                                                                   |                                                                                                                                                                                                   |  |
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| Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Understanding                                                                                                                                                   | Skills & Procedures                                                                                                                                                                               |  |
| <p>Design process can be influenced by various factors, including</p> <ul style="list-style-type: none"> <li>• safety</li> <li>• functionality</li> <li>• usability</li> <li>• reliability</li> <li>• efficiency</li> <li>• aesthetics</li> </ul> <p>Functionality is the quality of being useful to do the job for which something was designed.</p> <p>Usability is the degree of ease with which something can be used to achieve an outcome.</p> <p>Design processes that support the development of multiple iterations include</p> <ul style="list-style-type: none"> <li>• enhancing</li> <li>• refining</li> </ul> <p>Design can be improved through collaboration.</p> | <p>Computational thinking is a problem-solving process that uses creativity.</p>                                                                                | <p>Create a set of instructions that could be followed by a human or a machine to complete a task.</p> <p>Identify computational thinking used to solve problems or achieve desired outcomes.</p> |  |

# Creativity

Finding different ways to reach the same outcome.

Problem solving to overcome obstacles to achieve a desired outcome.





# *Design Thinking Process*



*Brainstorm and  
Come up with  
Creative Solutions*



*Test Your Ideas*

*Learn About  
Your Audience*

*Define*

*Prototype*

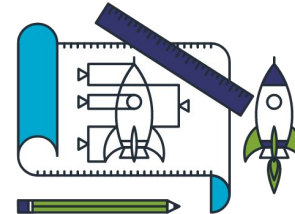
*Empathize*

*Construct Point  
of View Based  
on User Needs*

*Ideate*

*Build  
Representation  
of Your Ideas*

*Test*



# Computational Thinking

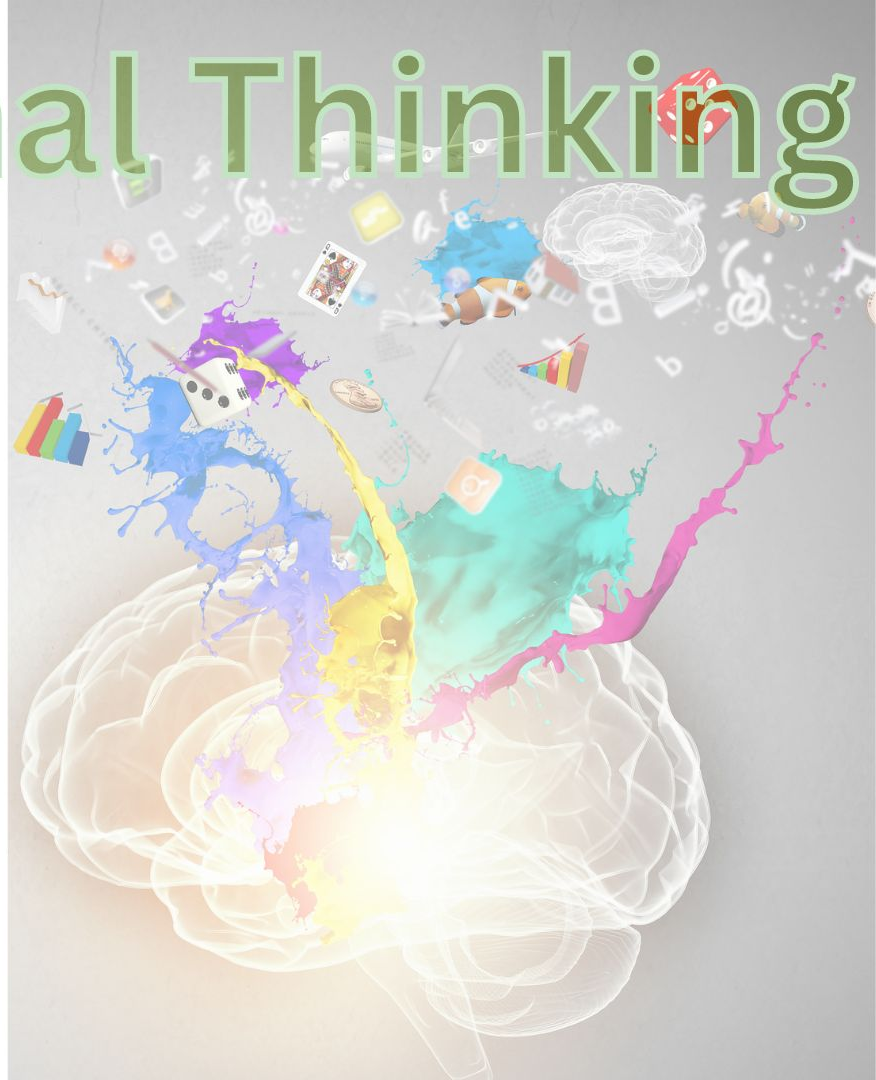
# Decomposition



# Pattern Recognition

# Pattern Abstraction

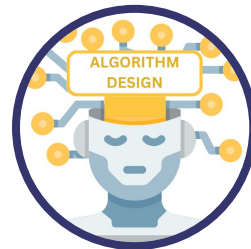
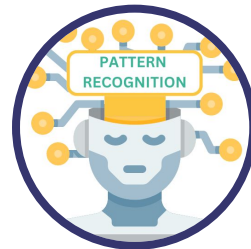
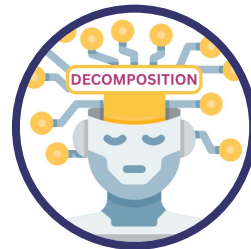
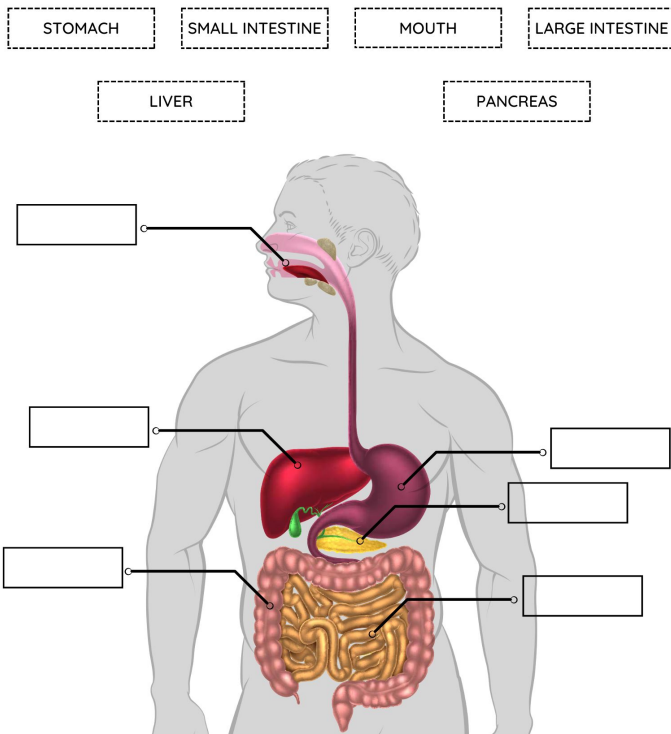
# Algorithm Design

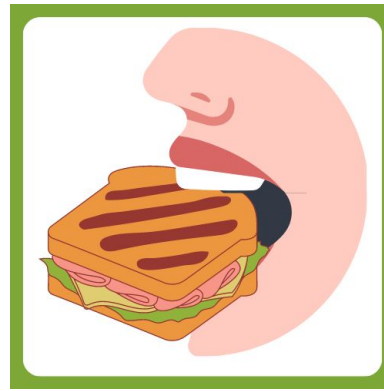
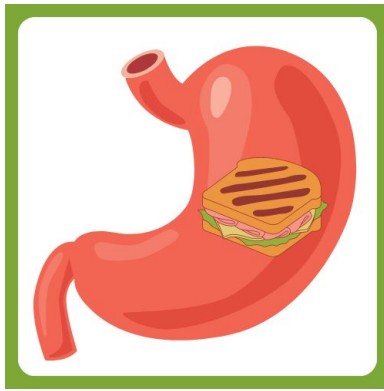
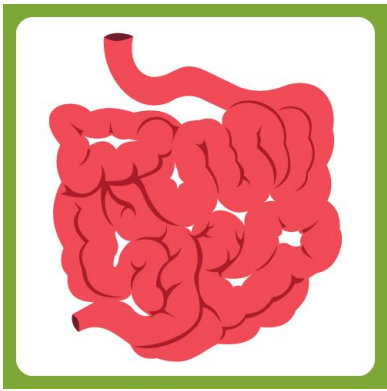


|                  |                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Organizing Idea  | Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions. |
| Guiding Question | How are organisms supported by vital biological processes and systems?                                                                     |
| Learning Outcome | Students investigate the internal systems of organisms and explain how they support vital biological processes.                            |

| Skills & Procedures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Relate vital biological processes to a human or other animal's internal biological systems.</b></p> <p><b>Examine the function of the human digestive, respiratory, circulatory, and musculoskeletal systems.</b></p> <p><b>Identify the digestive, respiratory, circulatory, and musculoskeletal systems of the human body and the major body parts of each system.</b></p> <p><b>Investigate the relationships between body systems that are involved in moving oxygen and nutrients throughout the human body.</b></p> |

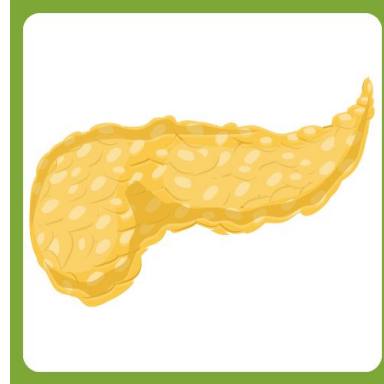
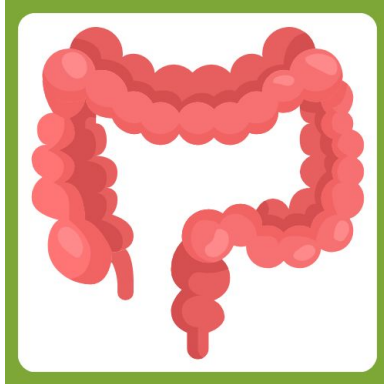
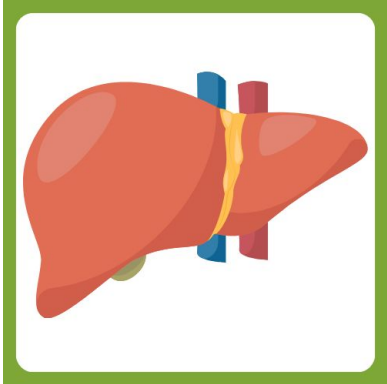
## PARTS OF THE DIGESTIVE SYSTEM





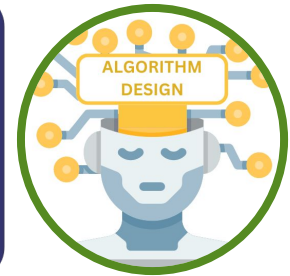
Engage in the design process to create computational artifacts.

SKILLS & PROCEDURES

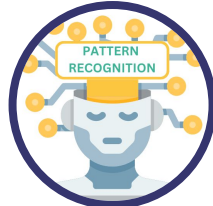
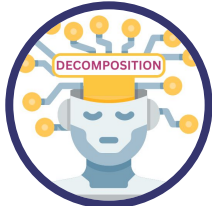


Create a set of instructions that could be followed by a human or a machine to complete a task.

SKILLS & PROCEDURES

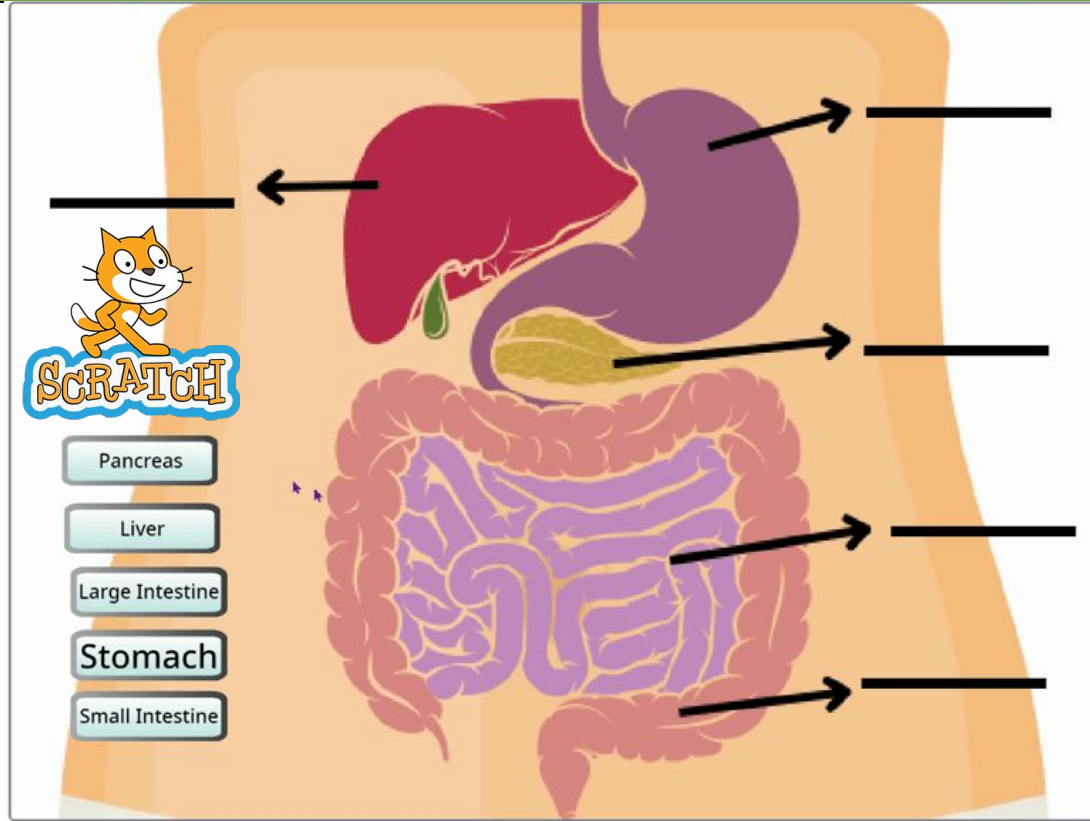


Put the pictures in order from first to last showing what happens as food moves through the digestive system.



|                  |                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
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| Learning Outcome | Students investigate the internal systems of organisms and explain how they support vital biological processes.                            |

| Skills & Procedures                                                                                                                      |  |
|------------------------------------------------------------------------------------------------------------------------------------------|--|
| Relate vital biological processes to a human or other animal's internal biological systems.                                              |  |
| Examine the function of the human digestive, respiratory, circulatory, and musculoskeletal systems.                                      |  |
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|                  |                                                                                                                                            |
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| Skills & Procedures                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------|
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## Create a Digestive System Game in Scratch

### Template

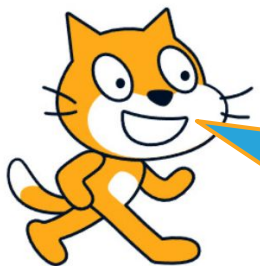
<http://bit.ly/MrsDDigest>



### Scratch Cards

<http://bit.ly/MrsDDigestCards>





Cat

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.



|                  |                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Organizing Idea  | Living Systems: Understandings of the living world, Earth, and space are deepened by investigating natural systems and their interactions. |
| Guiding Question | How are organisms supported by vital biological processes and systems?                                                                     |
| Learning Outcome | Students investigate the internal systems of organisms and explain how they support vital biological processes.                            |

## Skills & Procedures

Examine the transport systems of plants and describe their functions.

Engage in the design process to create computational artifacts.



Create a set of instructions that could be followed by a human or a machine to complete a task.

