OBSERVING NATURE

LITERACY + COMPUTATIONAL THINKING

GRADES 3-5

UNIT SUMMARY

Observing Nature is a literacy unit that integrates computational thinking (CT). Over the course of seven lessons, students use the computational thinking practice of **abstraction** to **observe** the natural world, determine the **main idea** of an informational text, and **plan** and **code** an **interactive digital collage** to illustrate their thinking.

Note: *This unit was co-designed with teachers using the Benchmark Universe literacy 4th grade curriculum and uses "A Bird's Free Lunch" as the main informational text that students read and analyze. However, using Benchmark Universe is not a prerequisite for teaching this unit, and you can replace "A Bird's Free Lunch" with another informational text if you feel it is appropriate.*

BEFORE YOU START

This unit uses the Scratch programming platform. To use Scratch with your students, you will need a **Scratch Teacher Account**. Instructions for setting up a Teacher Account can be found **here**. In our experience, Teacher Accounts can take a few days to become active, so we recommend creating your account ahead of time.

UNIT MATERIALS AND RESOURCES

- Internet-capable computers or tablets, either 1 per student or 1 per pair of students
- **CT + Literacy Student Booklet**, 1 per student
- Main informational text: **A Bird's Free Lunch** (or other nature text chosen by the classroom teacher)
- *Additional lesson-specific resources are linked within each lesson plan*

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UNIT OVERVIEW

Lesson One	**Exploring Abstraction** *Students explore the concept of **abstraction** by using an online predictive drawing application. Students then create their own abstract drawings of an animal, followed by an abstract drawing of their observations of nature.* **Length**: 50 minutes **Resources:** Lesson Plan | Slide Deck
Lesson Two	**Mind Mapping** *Students learn about the process of creating a **Mind Map** to organize their thinking. Afterwards, students engage in a small group activity to explore a Literacy concept from the main text.* **Length:** 60 minutes **Resources:** Lesson Plan | Slide Deck
Lesson Three	**Planning Your Collage** *Students are introduced to the Scratch coding platform and use the **TIPP & SEE** protocol to explore a sample Scratch project. They then brainstorm ways to visually represent the main idea and key details of their main informational text, and use their ideas to plan their own literacy collages.* **Length:** 50 minutes **Resources:** Lesson Plan | Slide Deck
Lesson Four	**Collage Creation!** *Students continue using the **TIPP & SEE** protocol to analyze the code used in the starter project. They then log into their Scratch account to program the narrator of their collage before moving to more independent work.* *In an optional extension activity, students explore Scratch's Backpack feature as a way to reuse sprites or scripts across projects, and explore using Sprite Packs to add sprites into their work.* **Length:** 50 minutes **Resources:** Lesson Plan | Slide Deck | Extension Slide Deck
Lesson Five	**Debugging** *Students are introduced to different ways computer scientists can **debug** their code, and practice **debugging** Scratch projects as a group. They continue*

	adding to their Scratch projects, looking for bugs in their projects and working through them as they arise. **Length:** 50 minutes **Resources:** Lesson Plan | Slide Deck
Lesson Six	**Giving and Receiving Feedback** *Students discover **broadcasting** as a way to send messages between sprites and activate specific scripts that customize their projects. Students then practice sharing thoughtful **feedback** with one another and have an opportunity to incorporate the feedback into their projects.* **Length:** 40-50 minutes **Resources:** Lesson Plan | Slide Deck
Lesson Seven	**Student Showcase** *Students spend time exploring one another's projects in the class Studio. They will practice **digital citizenship** by sharing connections, compliments, and constructive feedback through likes and comments.* *In an optional extension activity, students have an opportunity to reflect on the unit and share their greatest wins and challenges, ways in which they needed to adopt their original plans, and ideas regarding where they can take their learning in the future.* **Length:** 50 minutes **Resources:** Lesson Plan | Slide Deck | Extension Slide Deck

CONTENT AREA STANDARDS AND COMPETENCIES

2020 Academic Standards in English Language Arts — *Effective at the beginning of the 2025-26 school year*

Grade 4 Standards	Lesson							
Reading	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
4.1.4.1. *Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text; summarize the text.*		✔	✔	✔	✔	✔	✔	✔
4.1.4.2. *Determine a theme or central idea of a story, drama or poem from details in the text.*		✔	✔					
4.1.5.3. *Interpret the ideas/information conveyed through illustrations, graphics and other audiovisual elements to support understanding and compare and contrast illustrations, graphics and other audiovisual elements in a wide variety of texts.*	✔	✔					✔	✔
Writing	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
4.2.3.2. *Use words, phrases and punctuation to convey ideas precisely in formal and informal writing contexts.*	✔	✔	✔	✔	✔	✔	✔	✔
4.2.5.1. *Write to inform or explain, organizing and presenting ideas clearly, using precise, domain-specific vocabulary and a variety of text structures, and including an introduction and conclusion, building on skills from previous years.*		✔	✔	✔	✔	✔	✔	
Listening, Speaking, Viewing and Exchanging Ideas	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
4.3.1.1. *Exchange ideas in storytelling, discussion and collaboration, intentionally including and considering voices and perspectives of Dakota and Anishinaabe people and other perspectives.* a. *Help create and follow agreed-upon norms for a discussion (e.g., speaker norms, listener norms, participation norms) respectful of*								✔

culture. b. *Participate as a speaker and listener, highlighting commonalities and differences in views shared by others.* c. *Express one's own ideas, stories and experiences, linking to comments of others.* d. *Negotiate and compromise to support productive exchange of ideas.* e. *Identify and work toward a shared goal.*								
4.3.1.2. *Ask and answer questions to clarify or follow up on viewpoints of others in a discussion.*								✔
4.3.1.3. *Receive and act on feedback from others, self- reflect, and provide constructive feedback on peers' work in various ways (e.g., written, oral, non-verbal).*							✔	✔
4.3.3.1. *Create written, oral and digital content that communicates knowledge and ideas in an organized manner, including relevant and credible facts and descriptive details to support central ideas or themes, in a variety of presentation styles.*		✔	✔	✔	✔	✔	✔	
4.3.3.2. *Create and share work, using self-selected digital tools, and articulate how chosen tools meet the task, purpose and audience, demonstrating understanding of digital footprint.*				✔	✔	✔	✔	✔

COMPUTATIONAL THINKING PRACTICES

Practice	Lesson							
Abstraction and Modularization	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Students will create visual representations of ideas or systems and determine which details should be included and which should be left out.	✔	✔	✔					
Students will identify and analyze common features of coded algorithms.				✔	✔			
Students will plan the development of their project in chunks, reflecting on and modifying their creative process.		✔	✔	✔				
Algorithm Design	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Students will use events and sequencing to decide what starts their interactive projects.				✔	✔	✔	✔	
Students will use loops to repeat parts of their programs.				✔	✔	✔	✔	
Students will modify an existing project to improve or customize it.				✔				
Debugging	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Students will solicit peer feedback and determine what modifications to make in their work.							✔	
Students will provide feedback to a classmate's model, plan, or idea.							✔	
Students will systematically troubleshoot their code by isolating parts of their program, testing their code, and identifying and fixing errors.						✔	✔	
Students will explain choices made during program development using code comments, presentations, and demonstrations.							✔	✔

ATTRIBUTIONS

This unit was created by the Science Museum of Minnesota as part of the InspireCT project, with generous funding from the Cargill Foundation. We wish to also thank our teacher leaders in Minneapolis Public Schools and Hopkins Public Schools for their dedication and work to help bring these lessons to fruition. To connect, email inspirect@smm.org.