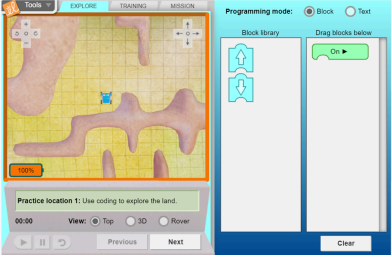

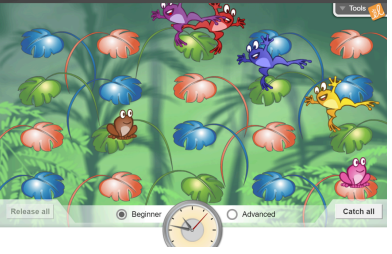
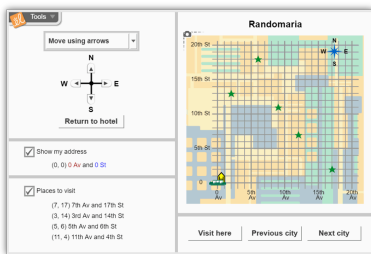


Enhance Computational Thinking with Gizmos (Elementary)

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

Gizmo	Computational Thinking Task	Notes
 <p>Programmable Rover</p> <ul style="list-style-type: none"> • New Learn Alberta Link • ExploreLearning Link 	<p>Program a rover to explore the surface of Mars and collect rock samples.</p> <p>Sample Task: Complete the Programmable Rover, Beginner-Middle School Activity</p> <p>Assessment Ideas:</p> <ul style="list-style-type: none"> -Challenge students to optimize their code when completing the training and the missions. Share screenshots or describe examples of optimized and non-optimized code and how the programs provide different results. - Students can share an example of a bug in their program and how they debugged it - Teacher provides students with screenshots of code and ask them to troubleshoot to optimize or debug the program. 	<p>The Student Exploration sheet (SES) contains three ready-to-go activities.</p> <p>Activity A – Students learn how to write programs using block code.</p> <p>Activity B – Students learn how to write programs using text code. (extension)</p> <p>Activity C – Students write and optimize programs to complete a series of tasks</p> <p>Literacy and Gizmos (Programmable Rover) and Task Card</p>
 <p>Number Line Frog Hop</p> <ul style="list-style-type: none"> • New Learn Alberta Link • ExploreLearning Link 	<p>Live a frog's life as you hop along the number line in search of flies.</p> <p>Sample Task: Create instructions for Freddie to get the flies with the least number of hops.</p> <p>Settings: Move Freddie to 15, add flies at 9,25 ,27</p> <p>Repeat with other settings and increase the number of flies for difficulty.</p> <p>Assessment Ideas: Students provide their instructions and explain their process for completing the task.</p>	<p>This Gizmo lesson materials are aligned to math curriculum for teaching addition and subtraction on a number line.</p>
 <p>Pattern Finder</p> <ul style="list-style-type: none"> • New Learn Alberta link • ExploreLearning link 	<p>Observe frogs jumping on coloured lily pads.</p> <p>Task: Compare the purple and red frogs. Find, test, and reason about patterns you see in their jumping. How are they similar? How are they different? How did you figure this out?</p> <p>The task can be completed whole group, in partners, or independently.</p> <p>Assessment Ideas:</p> <p>Abstraction - For the task, students identify important details and unimportant details in the simulation.</p>	<p>Literacy and Gizmos (Pattern Finder) and Task Card</p>



City Tour (Coordinates)

- [New Learn Alberta Link](#)
- [ExploreLearning Link](#)

Go sightseeing in fictional cities all over the world. Navigate around these cities on a grid-like city map using coordinates and logic.

Sample Task: Some landmarks are shown on the map. For others, you are only given the coordinates. Can you find all of them?

- Do Activity B: Scavenger Hunt
- [City Tour Task Card](#)

Assessment Ideas: What patterns did you notice on how the coordinate map worked? (x-value east/west; y-value north/south) What information is most important in completing the scavenger hunt? What process did you use to complete the scavenger hunt? If you were unable to find a location, how did you revise your navigation?

The Student Exploration sheet (SES) contains two activities:

Activity A – Students learn to write the coordinates of a point and find a point based on its coordinates.

Activity B – Students practice their coordinate skills by participating in a scavenger hunt in several cities

Extend: A closely related skill is finding the latitude and longitude of a point on a map. Extend this activity by having students use longitude and latitude to find locations on a map of Alberta.



Elevator Operator

- [ExploreLearning Link](#)

Operate an elevator in an old apartment building.

Task:

Gizmo Settings: Show People, Drive, Evening

1. Independently create a program for the elevator operator that will pick up and drop off everyone in the building at the correct floor. Make a screenshot.

2. In small groups: One person will read out loud the instructions from the program using “up, stop, down” directions to your group. The group members will complete the Evening elevator run following the directions provided.

3. *Discuss:* Was each group member able to recreate your program? How do you know? Why or why not? (least amount of time on elevator and waiting for elevator for each person)

4. *Discuss:* Was the program optimized? Why or why not? If not, how can it be optimized?

Warm up with prior knowledge questions:

[Prior Knowledge Questions](#)

1. What are instructions?
2. What process can you use to create instructions to pick up a pen from my desk?
3. Try it!
4. Did the instructions work on the first time? Explain.

Discuss that instructions are directions that can be followed. They can be given in various forms, including verbal, written, visual or audio.



Honeybee Hive

- [New Learn Alberta Link](#)
- [ExploreLearning Link](#)

Program the robotic bee to create a waggle dance to help the bees find enough food to save the hive!

Task: Students will design a waggle dance to communicate the location of pollen to other bees.

[Task Card: Honeybee Hive](#) - Pollen Collection with a Waggle Dance

Assessment Ideas:

Write a clear set of instructions to perform a waggle dance. Describe how your waggle dance design uses abstraction (explain what details you keep and which you ignore)

The Student Exploration sheet contains three activities, activity B and C best develop computational thinking skills.

Activity B – Students design waggle dances to tell the other bees where to find food.

Activity C – Students learn how bees use the position of the sun to navigate.



Flood and Storm-Proof Homes

- [ExploreLearning Link](#)

Build a home to survive a flood or a hurricane and protect the people inside.

Task: Choose materials and a design for the foundation, frame, walls, and roof of the house. Test your house in a flood or storm and see how well your design worked. Redesign as necessary.

Assessment Ideas:

Students document their process (screenshots, recording, notes)

Students will use an iterative process to complete the task.

The Student Exploration sheet contains two activities:

- Activity A – Students build a house to best survive a flood.
- Activity B – Students build a house to best withstand a hurricane.



Earthquake-Proof Homes

- [ExploreLearning Link](#)

Design a house to withstand an earthquake and protect the people living inside.

Task: Choose the design and materials for a foundation, frame, walls, and roof. Test each house in an earthquake and assess the damages. Try to arrive at a house design that results in the least damage. the house as needed.

Assessment Ideas:

Consider using the [Task card](#) or a student activity to structure the activity.

Have students document their process with screenshots/video or notes.

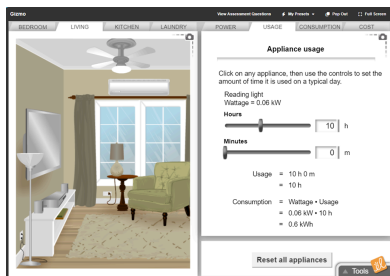
Students will use an iterative process to complete the task.

The Student Exploration sheet contains three activities:

- Activity A – Students observe how an earthquake can damage a house.
- Activity B – Students build a house to best withstand an earthquake.
- Activity C - Students compare damage at two building sites: bedrock and landfill.

[Literacy and Gizmos - Earthquake Proof Homes](#)

[Task card](#)



Household Energy Usage

- [ExploreLearning Link](#)

Explore the energy used by many household appliances and design a plan to reduce energy usage and costs.

Task: How much energy does your household consume? Make estimates for how long each item is used on a daily basis to determine consumer costs and environmental costs. Design a plan to reduce costs. What strategies can you use to reduce your electricity bill?

Assessment ideas:

Students create a table to communicate their estimates and predicted reduction in usage and costs.

The Student Exploration sheet contains two activities:

Activity A – Students compare the wattage, energy consumption, efficiency, and cost of three types of lights.

Activity B – Students estimate their usage of various appliances, and use this data to approximate their total household energy usage and cost.

Additional Resources:

- [Alberta Professional Learning Consortium](#)
 - Computer Science Resources
 - Cross-curricular connections

Resources compiled by Karen Blumhagen, Customer Success Manager, Alberta ExploreLearning

Questions? Please email: [Karen Blumhagen](#)