Integrating Computer Science into Science Learning

A Partnership between Science from Scientists and Bloomington Public Schools

August 13, 2025

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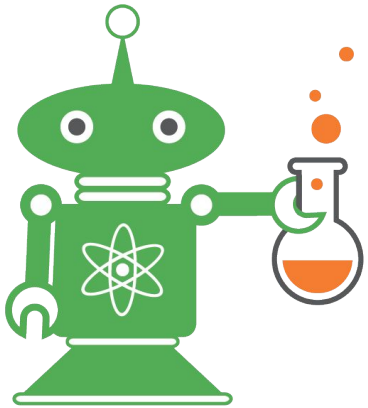
Agenda

- Introductions
- Why include computer science?
- Science activity - Colonies, Herds, Families and Flocks
- Computer science activity
- Reflection
- Group brainstorming activity
- Questions



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COMPUTER SCIENCE IMMERSION
BLOOMINGTON PUBLIC SCHOOLS

Why include computer science?

COMPUTER SCIENCE IS

ART & DESIGN

ENERGY

SECURITY

CLOUD TECHNOLOGIES

SUPPLY CHAIN & LOGISTICS

HEALTHCARE

AUTOMOTIVE TECHNOLOGY

SMART HOMES

EMPOWERING STUDENTS ■ DEVELOPING THINKERS ■ ENGAGING EXPERIENCES

Computer science is

Using the power of computers

To solve our problems

And express ourselves!

Computational Thinkers

Concepts

Logic
Predicting and analysing.

Evaluation
Making judgements.

Algorithms
Making steps and rules.

Patterns
Spotting and using similarities.

Decomposition
Breaking down into parts.

Abstraction
Removing unnecessary detail.

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Approaches

Tinkering
Changing things to see what happens.

Creating
Designing and making.

Debugging
Finding and fixing errors.

Persevering
Keeping going.

Collaborating
Working together.

Science Activity

Colonies,Herds, Families and Flocks

- 3rd grade lesson
- Science standard: Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size

Game Goal: Make and protect honey!

Team Roles

Gather

Build to Protect

Collect

Find out: What's Blooming?

Blues

Yellows and Pinks

Oranges and Reds

Get the flower!

Blues

Yellows and Pinks

Oranges and Reds

Trade both to get honey!

Card

+

Flower

=

Honey

Repeat as often as you can!

Which teams were able to gather the most honey? Why?

- Larger groups can collect and protect more honey
- A smaller fraction of the group needs to stay behind to protect the honey
- More group members are able to focus on collecting honey because the same sized structure can protect any amount of honey

Computer Science Activity

Computational Thinkers

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Blue Bots

3 Button Algorithms

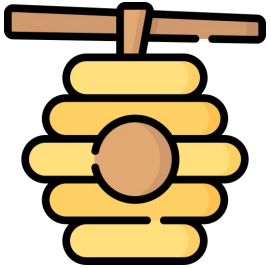
Materials

Blue Bot

Mat

Flower Card

Nest Card

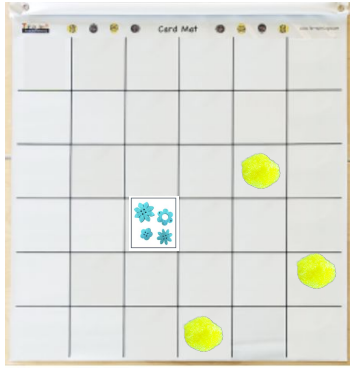


Flower

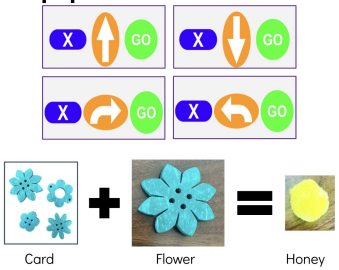
Honey (multiple)

Goal: Program a Blue Bot using an algorithm to collect honey.

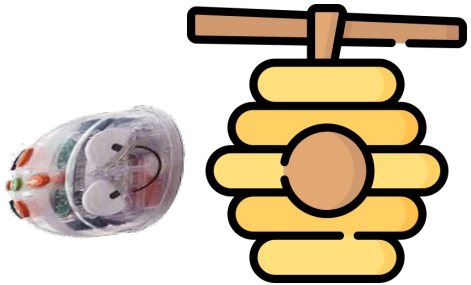
Put Supplies on Mat



Program 3 Button Algorithm to Collect Supplies in Order



Return Blue Bot to Nest



Repeat

Blue Bot Integration Reflection

Students gained confidence in programming the Blue Bot

Results of the SciSci activity and the CS activity matched

Students were excited and engaged with both activities

Compare and contrast both models

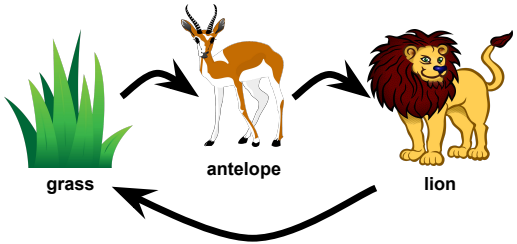
Add CS connections

What types of CS activities can you use to integrate with science activities?

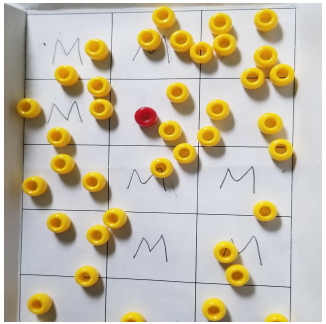
- Data collection/analysis
- Animation
- Algorithm design
- Conditional statements
- Blue Bot
- Scratch
- Raspberry Pi
- Makey Makey

ARDUINO

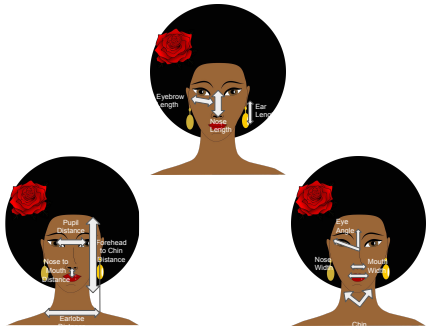
Science lessons



Food Webs



Spread of Infectious Disease



Biometrics

Name of Thrower_____

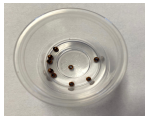
Data Table (circle where the bean bag landed for each toss)

Toss #	Part #1 Toss Results *No Goggles*		
1	Left	**Target**	Right
2	Left	**Target**	Right
3	Left	**Target**	**Right**
4	Left	**Target**	Right
5	Left	**Target**	Right
6	Left	**Target**	Right
7	Left	**Target**	Right
8	Left	Target	**Right**
9	Left	**Target**	Right
10	Left	Target	**Right**
Total	1	6	3

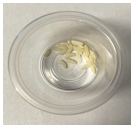
Toss #	Part #2 Toss Results *With Goggles*		
1	**Left**	Target	Right
2	**Left**	Target	Right
3	**Left**	Target	Right
4	**Left**	Target	Right
5	**Left**	Target	Right
6	**Left**	Target	Right
7	Left	**Target**	Right
8	**Left**	Target	Right
9	Left	**Target**	Right
10	**Left**	Target	Right
Total	8	2	0

Toss #	Part #3 Toss Results *No Goggles*		
1	Left	Target	**Right**
2	Left	Target	**Right**
3	Left	Target	**Right**
4	Left	**Target**	Right
5	**Left**	Target	Right
6	Left	**Target**	Right
7	Left	**Target**	Right
8	Left	**Target**	Right
9	Left	**Target**	**Right**
10	Left	**Target**	Right
Total	1	5	4

Experimenting with our Brains

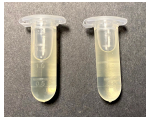


iron beads



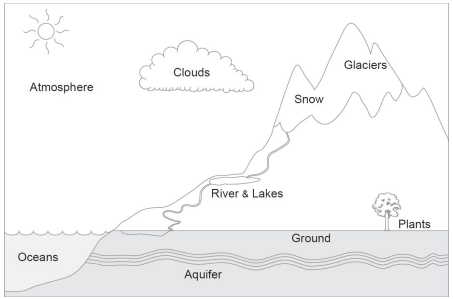
rice

water



oil

Separation of Substances



Water Cycle

With your group:

- Explore the science activity
- Choose 1-2 CS concepts and approaches
- Describe how those CS concepts and approaches could be integrated into the activity

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Share your ideas

Thank You!