Coding Quests Rotation Stations

Building A Compassionate Community of Computational Thinkers and Learners

CS for All Teachers Community
Ambassador - Naomi Harm
CS for All Teachers Community Ambassador and Teacher Friend in Learning

Naomi Harm

- CS for All Teachers Community Ambassador
- STEM Innovation Specialist
- Google Certified Educator
- Makey Makey Ambassador
- LEGO Education Master Educator

Creative Inclusive Opening
Computational Thinking (CT) is a problem-solving process. This broad problem-solving technique includes four elements: decomposition, pattern recognition, abstraction and algorithms. This is where you break down problems into distinct parts, look for similarities, identify the relevant information and opportunities for simplification, and create a plan for a solution.

Recipes, instructions for making furniture or building blocks sets, playing in sports, and online map directions are all examples of computational thinking represented as algorithms.

What is a creative example of how you have modeled a CT teaching strategy with students or educators?

Add your problem solving CT ideas to your grade level Jamboard on the white space using a post-it note and/or supportive image.

And that’s exactly what Sarabella did when she placed the most spectacular collection of doodles and daydreams right on top of her head.

“So that’s what you’ve been thinking!” said the kids in awe. Lulu saw unicorns, and Xavi saw spiders. Dylan saw a cat, a snake, and a feather, while Nate reported seeing clouds with a touch of bad weather.

“A penny for your thoughts, Mr. F,” said Sarabella.

“I think,” said Mr. F with a smile, “your thoughts are worth more than all the pennies in the world.”
6 Hat Thinking - Design Challenge
6 Hat Thinking - Jamboard Activity Template

SIX THINKING HATS + ONE

FACTS
White Hat: (Neutral Objectivity)
Neutral and objective, concerned with data, facts, figures, and information.

EMOTION
Red Hat: (The Emotional View)
The intuitive view, hunches, “gut”, and feeling.

BENEFIT
Yellow Hat: (Logical Positive)
Optimistic, sunny, and positive, covers hope.

IDEAS
Green Hat: (Creativity)
Associated with energy, fertility, growth, creativity, and new ideas. Switches around the normal superiority of the black hat.

PLANNING
Blue Hat: (Process Control)
The organizing hat (start and finish); controls the use of the other hats.

JUDGMENT
Black Hat: (The Logical Negative)
Careful and cautious, the “judgement” hat.

INVESTED
Royal Hat: (The Owner)
Committed and invested. Subjectively seeking objectivity.
6 Hat Thinking - Design Challenge

*Design a K-Cup hat that best reflects - the unique individual YOU!*

2. No design limits - creativity is a must.
3. Collaboration is key - chatter it up!
4. Make your hat come to life with an eyebombing personalized element.
5. Share and reflect on your 6 hat thinking story of the unique individual YOU!
6 Hat Thinking - Unique Individual You Reflection

Reflection directions of the unique individual YOU!

1. You will be assigned a Google Slide number.
2. On your assigned numbered Google Slide, you will add your K Cup creation photo and share your unique individual YOU story through your copy of the template.
3. -> Make your own copy of this template <-

*Teacher & student examples of what others have created.

Group 1 Examples  Group 2 Examples  Group 3 Examples
But, day after day, I kept trying...
Coding Quests
Rotation Stations
Station #1
Rotation Station #1

Block-based Coding and Robotics

Hands-on Unplugged Coding Activity
1. Create a word search grid with painters tape. Add up to 9 letters in each separate space.

2. Use the Dash robot, the launcher kit, and Wonder Workshop Blockly app to code the path, spell a 3 letter word, and shoot a basket.

3. When you land on the last letter of the word you have chosen to spell, launch a ball from the Dash robot launcher kit to earn the point value on the cup.

4. Point Values: Each word spelled correctly is valued at number of letters in the word. (Ex. hat = 3, path = 4) Earn extra points by coding the path of the word and landing a ball into one of the three point valued cups. Enjoy!

How to videos: Blockly App & Launcher Kit Assembly
1. Design a skee ball ramp with a maximum 20% slope from cardboard materials and supplies, and strong enough to support the weight of the Dash robot.

2. Use the Dash robot, the launcher kit, and Wonder Workshop Blockly app to code the skee ball path.

3. Launch a ball from the Dash robot launcher kit - from the top of the slope - without having the Dash robot fall off the top of the ramp.

4. Earn points by landing a ball into one of the 3-point valued cups.
1. Explore the new Hands-on coding blocks and review its contents.

2. With a teammate, create an algorithm through the series of sequence blocks.

3. Now walk the physical coding algorithm path to represent your solution.

4. Extension: Design a story algorithm with the coding blocks, and recreate your own creative writing story.

https://www.handsoncoding.org
**STEM Role Cards**

Cut out the cards and assign them to students or use a random draw in each group. You can use all five jobs, or you can pick and choose the jobs you would like to use! You may want to laminate these cards for durability!

<table>
<thead>
<tr>
<th>STEM Role Cards</th>
<th>Challenge Captain</th>
<th>Materials Master</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Make decisions for the team.</td>
<td>• Gather materials for the team.</td>
</tr>
<tr>
<td></td>
<td>• Provide encouragement and support to team members.</td>
<td>• Organize materials for the team as needed.</td>
</tr>
<tr>
<td></td>
<td>• Make sure other team members are doing their jobs correctly.</td>
<td>• Understand and communicate the correct use for each of the materials for the challenge.</td>
</tr>
<tr>
<td></td>
<td>• Help other team members do their jobs if needed.</td>
<td>• Make sure other team members are using the materials correctly.</td>
</tr>
<tr>
<td></td>
<td>• Record information on the lab sheet for the team.</td>
<td>• Request additional materials if needed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Testing Coordinator</th>
<th>Chief Architect</th>
<th>Rapid Reporter</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Coordinate tests needed to check success for the team.</td>
<td>• Coordinate building for the team.</td>
<td>• Share the ideas used by team in order to complete the challenge with the whole class.</td>
</tr>
<tr>
<td>• Decide when tests of ideas are needed during the challenge.</td>
<td>• Decide which ideas to use during the challenge.</td>
<td>• Explain the solution the team used to solve the challenge.</td>
</tr>
<tr>
<td>• Determine when team is successful (based on test results) in the challenge.</td>
<td>• Suggest when a test may be needed in the challenge.</td>
<td>• Explain challenges faced by the team during the challenge.</td>
</tr>
<tr>
<td>• Make sure team is testing for success in the challenge correctly.</td>
<td>• Make sure team is building safely at all times.</td>
<td>• Answer any questions from classmates about the challenge.</td>
</tr>
</tbody>
</table>
Station #2
Rotation Station #2

Unplugged Engineering Design Challenge

Paper Fortune Tellers
Fortune Tellers are a great way to learn about probability, if – then statements, analog vs. digital algorithms etc.
The purpose: To give everyone a voice, share an idea and also to have a written record of their unique thoughts and idea documented.

How to: The speaking participant writes on a single sheet of paper their idea, while stating their idea aloud as they write. The sheet of paper keeps circulating around the group after each person speaks.

Clarifying questions: Only two follow-up questions may be asked. Response from the speaker should be less than 1 minute for each question, to add clarity, detail, conciseness to summary to their thoughts.

Time required: 1-2 minutes per person in group.
Rotation Station #3
Rotation Station #3

Magical Coding Recipes Guide

https://www.instructables.com/Magical-Coding-Recipes
As a large group watch the "What Is Code?" from Girl Scouts Troop 8863 as cooking video to provide background knowledge and learning context of how a cooking recipe is a series of sequential steps to create an algorithm.

Students will write a program to represent their cooking recipe in sequential steps to represent their unique algorithm onto a recipe card or 4x6 or 5x7 cardstock paper.
Example Recipe Slide Deck to Use to Share the Learning

This is our dream team!

Carlos V.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor.

Mariel S.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor.

Oscar M.
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aenean commodo ligula eget dolor.

Here is an example template to create a collaborative collection of magical coding.

Here is the SidesMania website for more FREE template choices.
Rotation Station #4
Rotation Station #4

Unplugged Coding and Engineering Design Challenges

STEM Mystery Bag Challenges
Rotation Station #4

- **Help Harry**
- **Marble Run**
- **Pom Pom Launcher**
- **Straw Rockets**
- **Parachuting Paratroopers**
- **Nature Journal**

### Directions

- You have a choice of three different mystery bags to choose from to complete a STEM task.

- With your dynamic duo or transformative trio teammate(s):
  - **Open** and take out the contents,
  - **Explore** the contents in the bag,
  - **Read** the clues,
  - **Design, create & test** a new prototype,
  - **Respond** to the learning task protocol
  - **Place all the contents** back into the bag

- Enjoy the fun-filled learning!
Engineering Design Protocol

- Have students complete a mystery bag task with a partner or individual task.

- Next, as a collaborative student team, or individual - have students summarize their learning process by responding and sketching within a personalized STEM design thinking journal, to document their learning journey.

- Online equivalent: Students are asked to reflect, sketch and add digital artifacts through their personalized design thinking summary hyperdoc.

STEM Student Journal Printable
Rotation Station #5
Challenge #5

Meet The Coding and Engineering Mentor Superstars!
Design Challenge #5

Meet the Engineering Mentors

Directions

- Watch and listen to three different SciGirls Superstar - “engineering mentor” stories.

- Pay attention to the storyline of how these women superstars became interested in their STEM careers.

- Look for examples that have impacted their career choices- a personal interest, people relationships, and learning connections.
Give One - Receive One EduProtocol

1. Watch: Students watch a SciGirls Superstar segment. No writing allowed yet…..

2. Think/Share: The whole class or table group discuss the segment. No writing allowed yet….. (The time is to actively listen to peer understandings and gain new ideas and perspectives).

3. Reflect: Students are able to include the new information in their learning through reflecting/sketchnote through the Give One - Receive One EduProtocol. They will summarize and pose new questions with a peer on a STEM learning passion and connecting through FlipGrid video chat.

Give One - Receive One EduProtocol
Rotation Station #6
Rotation Station #6

Design Your Own “Passion to Purpose” CS or STEM Challenge
Challenge #6

Directions

- Go to the “Passion to Purpose” link.
- Fill out the text fields according to your education passions.
- Submit your answers and see the results.
- Now take the results and create an engineering design challenge to use in your classroom tomorrow.
3-2-1 Flip Your Thinking and “WHY” Protocol

1. Three
After the lesson, students record three pondering questions they still have about the material or learning experience.

2. Two
Next, students record two things that they found interesting and they share their why.

3. One
After the lesson, have the student record one mind blowing learning moment, that the student has learned from the lesson or from a student.
Creative Optimistic Closing
Triangle - Square - Circle Exit Ticket Learning Reflection

Confidence in Your Understanding

Drag your response HERE

I completely understand the concept presented, and feel confident in my ability to coach my peers.

I somewhat understand the concepts presented, and feel okay with my ability, and I will review the new learning.

I am currently finding this concept today to be challenging to understand and want to revisit this learning with you.

I am feeling frustrated and I do not understand the concept today. I need help with a peer coach to see, hear and learn the concept in another way.

Triangle Points

What are 3 critical points that connected the learning for you and supported your triangle thinking from start to finish success?

Point #1

Point #2

Point #3

Circle Thoughts

What thoughts or questions are still "circling" in your head?

Describe in words and pictures your thinking and questions here.

Square Ideas

What ideas from today are squared away in your thinking to build your knowledge and new learning confidence?

Type your learning message here...

Created by @NaomiHarm
Adapted from https://www.theteachertoolskit.com
Supportive Resources
Curriculum and Standard Resources

Back to School CS Mixer Video
Coding Quests Presentation
Connecting the CS Learning Dots
Dash and Dot Fairytale Adventures
How To Engage More Girls In Computer Science
ISTE Computational Thinking Competencies
ISTE Standards Students
NGSS For ALL Students
San Francisco Unified Computer Science PK-12 Scope and Sequence Framework
Welcome to the block party- CS coding activities to kick off the hour of code
Support Resources and Learning Extensions

Shared EduProtocols
3-2-1 Flip Your Thinking and Why EduProtocol
Collection of Ideas and Clarifying Questions EduProtocol
Give One - Receive One EduProtocol

Support Resources and Learning Extensions
Ambitious Science
Computational Thinking - 50 Curriculum Resources
Elementary Engineering Projects for Kids
Engineer Your Path
Hands-on Engineering Projects for MS Students
Group Work: Designing For Student Participation
Meet the Engineering Mentors
Passion to Purpose Game
Shark Fortune Teller
STEM Student Journal Printable
STEM Student Job Roles
Student Talk Protocols and Flowcharts
Let’s Continue the Learning Conversation

CS for All Teachers Community

https://www.csforallteachers.org
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► Participate in free webinars
► Access free resources

https://csforallteachers.org/user/register
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