BCS Mathlympics

Teacher Guide

Spring 2022

Overall Schedule for the Day

(See grade-specific schedule below for room numbers & teacher assignments.)

<table>
<tr><th></th><th>6th grade</th><th>7th grade</th><th>8th grade</th></tr>
<tr><td>Period 1</td><td colspan="3" rowspan="4">Students rotate through 4 morning activities by Cohort:
Basketball Shootout + Relax (auditorium if raining)
Hour of Code
Logic Puzzles
Unlock the Box / Math Games
Questions? Text Adam!</td></tr>
<tr><td>Period 2</td></tr>
<tr><td>Period 3</td></tr>
<tr><td>Period 4</td></tr>
<tr><td>Period 5</td><td colspan="3">Lunch / Crew</td></tr>
<tr><td>Period 6</td><td colspan="3">Competition (student assignments)</td></tr>
<tr><td>Period 7</td><td colspan="3">Reflection & 24 Competition
Awards announced via email</td></tr>
</table>

6th Grade - Schedule for the Day				
	Water **(pd 1 math)**	**Fire** **(pd 6 math)**	**Earth** **(pd 2 math)**	**Wind** **(pd 3 math)**
Period 1	**Hour of Code** Room 424	**Unlock the Box / Math Games** Room 425	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 426
Period 2	**Logic Puzzles** Room 426	**Hour of Code** Room 424	**Unlock the Box / Math Games** Room 425	**Basketball Shootout** Small Yard
Period 3	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 426	**Hour of Code** Room 424	**Unlock the Box / Math Games** Room 425
Period 4	**Unlock the Box / Math Games** Room 425	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 426	**Hour of Code** Room 424
Period 5	**Lunch / Crew** Remember to tell students where to go for period 6 competition			
Period 6	Competition (*see room schedule*)			
Period 7	**Reflection & 24 Competition** Room 424	**Reflection & 24 Competition** Room 425	**Reflection & 24 Competition** Room 423	**Reflection & 24 Competition** Room 426

Morning (pd 1-4)

Activity	Room	Teachers
Unlock the Box / Math Games	425 / 423	
Logic Puzzles	426	
Hour of Code	424	
Basketball Shootout	Small Yard	

Afternoon (pd 6)

Activity	Room	Teachers
5 x 5 Game	426	
Kahoot	424	
Origami	423	
Dots & Boxes	425	
Super Circles	425	

**During period 7, teachers & students who were in the Small Yard 1st period should report to 423 for the reflection circle.

7th Grade-Specific Schedule for the Day				
	Emerald **(pd 3 math)**	**Topaz** **(pd 8 math)**	**Sapphire** **(pd 1 math)**	**Ruby** **(pd 7 math)**
Period 1	**Hour of Code** Room 409	**Unlock the Box / Math Games** Room 412	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 407
Period 2	**Logic Puzzles** Room 407	**Hour of Code** Room 409	**Unlock the Box / Math Games** Room 412	**Basketball Shootout** Small Yard
Period 3	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 407	**Hour of Code** Room 409	**Unlock the Box / Math Games** Room 412
Period 4	**Unlock the Box / Math Games** Room 412	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 407	**Hour of Code** Room 409
Period 5	**Lunch / Crew** Remember to tell students where to go for period 6 competition			
Period 6	Competition (*see room schedule*)			
Period 7	**Reflection & 24 Competition** Room 409	**Reflection & 24 Competition** Room 412	**Reflection & 24 Competition** Room 414	**Reflection & 24 Competition** Room 407

Morning (pd 1-4)

Activity	Room	Teachers
Unlock the Box / 24	414 / 412	
Logic Puzzles	407	
Hour of Code	409	
Basketball Shootout	Small Yard	

Afternoon (pd 6)

Activity	Room	Teachers
5 x 5 Game	412	
Kahoot	409	
Origami	407	
Dots & Boxes	414	
Super Circles	414	

**During period 7, teachers & students who were in the Small Yard 1st period should report to 414 for the reflection circle.

8th Grade-Specific Schedule for the Day				
	The Finale **(pd 2 math)**	**Diamonds** **(pd 4 math)**	**Stargazers** **(pd 6 math)**	**Mo' Money** **(pd 7 math)**
Period 1	**Hour of Code** Room 404	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 408	**Unlock the Box / Math Games** Room 411
Period 2	**Unlock the Box / Math Games** Room 411	**Hour of Code** Room 404	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 408
Period 3	**Logic Puzzles** Room 408	**Unlock the Box / Math Games** Room 411	**Hour of Code** Room 404	**Basketball Shootout** Small Yard
Period 4	**Basketball Shootout** Small Yard	**Logic Puzzles** Room 408	**Unlock the Box / Math Games** Room 411	**Hour of Code** Room 404
Period 5	**Lunch / Crew** Remember to tell students where to go for period 6 competition			
Period 6	Competition (*see room schedule*)			
Period 7	**Reflection & 24 Competition** Room 404	**Reflection & 24 Competition** Room 413	**Reflection & 24 Competition** Room 408	**Reflection & 24 Competition** Room 411

Morning (pd 1-4)

Activity	Room	Teachers
Unlock the Box / Math Games	411 / 413	
Logic Puzzles	408	
Hour of Code	404	
Basketball Shootout	Small Yard	

Afternoon (pd 6)

Activity	Room	Teachers
5 x 5 Game	408	
Kahoot	404	
Origami	411	
Dots & Boxes	413	
Super Circles	413	

**During period 7, teachers & students who were in the Small Yard 1st period should report to 413 for the reflection circle.

Basketball Shootout	
Learning Target	I can practice mental math strategies
Overview	Students must mentally solve math problems in order to be able to shoot the basketball or kick the soccer ball. Points are awarded for the number of goals that are made within the 15 minute round.
Set-Up	Each of the half-cohorts will be at one of the three basketball hoops in the gym. cohorts may organize their team in any way they want. For example they could split the cohort into “the shooters” and the “solvers”.
Materials	3 Basketballs - one per cohort Three sets of math problems and answers. Phone timer
Directions	1. Teacher starts the timer for 10 minutes. 2. Give first math problem to “solver”. 3. As soon as the problem is correctly solved, give basketball to “shooter.” 4. Shooter takes as many shots as necessary until they score a basket. 5. Once a basket is made, the next math problem is given to the next “solver.” 6. Repeat process until the time is up. 7. Scorekeeper records the number of baskets made on the scoresheet. 8. After the half-cohort is done, they have general gym time. Then the other half-cohort completes the activity. The scores for both halves are added together and entered into the scoresheet.

Basketball Shootout

Grade	Cohort	POINTS SCORED
6th Grade	**Fire** (pd 2 math)	
	Water (pd 7 math)	
	Earth (pd 1 math)	
	Wind (pd 3 math)	
7th Grade	**Emerald** (pd 3 math)	
	Sapphire (pd 1 math)	
	Ruby (pd 7 math)	
	Topaz (pd 8 math)	
8th Grade	**Spades** (pd 7 math)	
	Clubs (pd 8 math)	
	Diamonds (pd 4 math)	
	Hearts (pd 2 math)	

Hour of Code	
Learning Target	I can be persistent in completing a self-led programming challenge (LightBot).
Overview	Hour of Code is a global movement that reaches tens of millions of students in 180+ countries to expose them to coding. Students (and teachers!) will be introduced to programming one of the many self-guided tutorials available. Students will arrange symbols on the screen to command their character to move. The list of symbols becomes more complicated as the lessons progress. While using such commands, players learn programming concepts like loops, procedures and more, without entering code in any programming language. Points for this activity are earned based on the completion.
Set-Up	One computer per student (and teachers, too, if you want to participate) Powerpoint projected on the SmartBoard
Materials	● Computers with internet access ● Powerpoint ● Headphones or earbuds (ideally, but not required)
Directions	**6th Grade** 1. Before passing out computers, go through the Powerpoint to share the Hour of Code story and inspirational video. 2. Students log into computers and go to Minecraft Hour of Code, choosing from one of two links: studio.code.org/s/aquatic/lessons/1/levels/1 (Voyage Aquatic) studio.code.org/s/hero/lessons/1/levels/1 (Hero's Journey) 3. Students should watch the introduction video and work to complete 12 challenges.If they don't have earbuds, help them make sure the volume is relatively low (or turn it off, sound isn't necessary for this activity). Students can help each other, but they should be clear that ***helping someone is different from doing it for them***. 4. Students earn one point for each challenge completed. **7th Grade** 1. Before passing out computers, go through the Powerpoint to share the Hour of Code story and inspirational video. 2. Students log into computers and go to the Flappy Bird website as shown in the PowerPoint: studio.code.org/flappy/1

	3. Students should watch the introduction video and work to complete 10 challenges. If they don't have earbuds, help them make sure the volume is relatively low (or turn it off, sound isn't necessary for this activity). Students can help each other, but they should be clear that ***helping someone is different from doing it for them***. 4. Students earn one point for each challenge completed. **<u>8th Grade</u>** 1. Before passing out computers, go through the Powerpoint to share the Hour of Code story and inspirational video. 2. Students log into computers and go to the Scratch Dance website as shown in the PowerPoint: studio.code.org/s/dance-2019/lessons/1/levels/1 3. Students should watch the introduction video and work to complete the 10 lessons, upgrading their dance video. If they don't have earbuds, help them make sure the volume is relatively low. Students can help each other, but they should be clear that ***helping someone is different from doing it for them***. 4. Students earn one point for each level completed, up to 10 points for completing and performing the final dance routine!
Scoring	To score this activity, count the total number of students who are present. Then add up the total points earned for each student using the attached score sheet. Ex: Total students = 21 Total points for cohort = 592 592 ÷ 21 = 28.19 Each cohort will be awarded based on where they finished relative to other cohorts in that grade. ● 1st place = 400 ● 2nd place = 300 ● 3rd place = 200 ● 4th place = 100
Notes for Future	Other activities for the future?: ● Create your own Google Logo (Scratch) ● Create your own Flappy Bird game (Scratch) ● MineCraft Scratch Tutorials (Scratch, several options) ● LightBot (needs iPads b/c Flash discontinued)

	• Hello World (maybe too basic for 7th/8th grade?) • Create a self-portrait using p5.js (probably a 2-hour session) • Robozzle (not shiny enough) • SpriteBox (needs iPads b/c Flash discontinued, worse than LightBot) • Turing Tumble (physical game, need $70 to purchase one set)

Hour of Code Score Sheet **COHORT NAME: _____**

Student Name	# of Challenges Completed		Student Name	# of Challenges Completed
Example: Scill Chan	***10***			
1)			17)	
2)			18)	
3)			19)	
4)			20)	
5)			21)	
6)			22)	
7)			23)	
8)			24)	
9)			25)	
10)			26)	
11)			27)	
12)			28)	
13)			29)	
14)			30)	
15)			31)	
16)			32)	
			Grand Total	

Unlock the Box (6th Grade)

Learning Target	I can persist in solving riddles and completing challenges to unlock a lockbox.
Overview	Students complete a series of riddles and challenges in order to unlock PDFs, physical locks, and a lockbox. Each completed activity is worth 10 points. Unlocking the box is worth 20. The problems inside the lockbox are worth an additional 10 points each, with the potential to earn 40 points before the box, 20 just from opening the box and 140 inside the box for a grand total of 200 points.
Set-Up	Each half-cohort will receive a lockbox closed with metal wire + 5-character lock, a 3-digit lock container, and projector attached to a computer with the Unlock the Box folder open. At the end of the time period, please close all locks that have been used back where they were and make sure the laptop has the PDFs locked again. This will lock as soon as you close the document.
Materials	● Laptop or mini-mac smartboard in each room ● Lockbox ● 5-character lock (on lockbox through wire) ● 3-digit lock container (attached to lockbox)
Directions	1. Each team is given three jigsaw puzzles to put together. Once together, they should solve each equation for x and put together answers to form a number (i.e. if answers are 5 and 34, the combination would be 534). This number is the code to unlock the PDF called "*Unlock the Box Activity 2 - Plot the points*." 2. *Unlock the Box Activity 2 - Plot the points* provides 10 sets of points to plot and connect on graph paper to form a set of numbers. These numbers form a phone number that students should call and listen to voicemail for next code for PDF of Activity 3. 3. *Unlock the Box Activity 3: Squares & Birthday* will give students two riddles - one is to determine how many squares are in a given figure; the other is to determine the birthdate of a person. Students should add the number of squares (e.g. 25) to the birth date (e.g. 5/16 = 516) to get the 3-digit code to open the lock attached to the box (e.g. 25 + 516 = 541).

	4. *Unlock the Box Activity 4: Caesar Cipher* gives students encoded text. Students need to read the example and decipher the text to determine the code to unlock the box itself. 5. *Unlock the Box Activity 5*: Inside the lock box will be 14 Puzzle Investigator Problems from CPMs CC1 book. Each PIP is a non-routine, multi-step problem designed to engage and challenge students. cohorts are encouraged to work in pairs and solve as many as they can before their time runs out. Each PIP will be worth an additional 10 points added to their final score.

Unlock the Box (7th Grade)

Learning Target	I can persist in solving riddles and completing challenges to unlock a lockbox.
Overview	Case of the Mondays
Set-Up	
Materials	• Laptop or mini-mac smartboard in each room • Lockbox • 5-character lock (on lockbox through wire) • 3-digit lock container (attached to lockbox) • Directional lock • 4-digit lock • Two lockboxes • Paper materials can be found here

Directions

Activity	"Breakout" action
Students come in and read "The Case of the Mondays" story. Box is locked with 4 locks (5 letter, 4 digit, directional lock, 3 digit) Out in the room are: -NO SCHOOL sheet - this is the clue for the 5 letter lock on the Big box, some students can work on this while others work on the Mercury Meme sheet -The text message - the clue for the directional lock) -The school calendar - the combo for the 4 digit lock -Mercury meme sheet -Pictures of Planets -Planet symbols with day length (although this is not labeled) 1. Students must match each symbol + day length to each planet. 2. Students must identify each planet (can be placed in order- taped to the board, to make it easier on students) 3. On the Mercury Meme sheet they fill in each day length and then convert it to the equivalent number of Earth Days. 4. Then they must use black light to illuminate 3 circled digits - those 3 digits (in order) will be the combo to	Answer key for Mercury Meme sheet can be found materials folder Combo to 3 digit lock - 721 Combo for 5 letter lock: LOREY Combo for the 4 digit lock: 7592 Combo for directional lock up, right, up, left, up

	the 3 digit lock.	
	YAY! Once inside the box there are a bunch of 3x3 Ken Kens that students can complete to earn extra points.	

Unlock the Box (8th Grade)

Learning Target	I can persist in solving riddles and completing challenges to unlock a lockbox.
Overview	Students solve an Alice in Wonderland-themed puzzle
Set-Up	See doc linked below.
Materials	• Laptop or mini-mac smartboard in each room • Lockbox • Directional lock • Paper materials can be found here
Directions	Directions & solution can be found here

Setup: • Dinosaur puzzle & two trifold boards (to flip puzzle over once solved) • SmartBoard with locked MS Word doc • Lockbox is locked with directional lock • "Alice in Wonderland" race clues hidden in the closet, window, SmartBoard, telephone Order to solve: 1. Students must assemble the dinosaur puzzle and flip it over. Then they have to solve the equation & expression and use them to open the password-protected Word doc. a. $-3(x+1) = x - 43$ b. $5^3 - \left(9^2 - \sqrt{100}\right) - 10011_{base\ 2}$ 2. The Word doc reveals an image called a snote. It secretly contains 4 words that can be easily read when viewed from an extreme angle. (Which foreshortens the words.) a. Give students a second to try to figure it out from the image on the SmartBoard, but then give them the printed paper, which is much easier to view from the edge. 3. Hidden in those four spots are clues to a puzzle race. By solving the clues it will reveal the order the racers finished. The racers are named after suits of cards, and those suits correspond to the four directions on the directional lock.	Combo to Word doc - 1035 Words are: Window Closet Telephone SmartBoard Combo for directional lock: right, left, down, up (spades, diamonds, clubs, hearts)
YAY! Once inside the box there are three more puzzles that students can complete to earn extra points (essentially tie-breakers vs. other teams who open the box)..	

Logic Puzzles!

Learning Target	I can use logical and mathematical reasoning to solve puzzles.
Overview	Students will work through a series of KenKen puzzles, Sudoku puzzles and other logic puzzles. Completed, correctly-solved puzzles earn points. More difficult puzzles earn more points.
Set-Up	Students have pencils and are spread out at desks.
Materials	• Puzzles • Pencils • Timer • Answer keys Additional Puzzles: • Rubik's cube (worth 50 points)
Directions	1. Explain to students the three different puzzles that they have to choose from: Ken Kens, Sudoku, other logic puzzles. 2. Review how to complete KenKen puzzles with students: How to KenKen Show video of how to complete a KenKen or you can show the students yourself. 3. Review how to do Sudoku with students: Show students video of how to complete a Sudoku puzzle or you can show the students yourself. 4. It's up to teacher discretion if you want to assign students specific puzzles or ask students which puzzles they want to complete. Teachers can set up different stations for different puzzles. It is not essential that all students attempt to solve every type of puzzle. 5. As students are completing puzzles, teachers should score each **INDIVIDUAL** puzzle. For example, if 3 students complete the same KenKen puzzle, it still only counts as one puzzle in terms of scoring. 6. If there is not enough time to get the grand total for the cohorts during the period, that's okay. Just make sure to tally the number of individual puzzles completed.

HOW TO PLAY KENKEN®

1. Fill in each square with a single number. In a 3x3 grid, use the numbers 1 through 3. In a 4x4 grid, use the numbers 1 through 4. In a 5x5 grid, use the numbers 1 through 5…and so on.
2. Do not repeat numbers in any individual row or column. For example, in a 3x3 grid, each column and each row should be filled in with the numbers 1, 2, and 3, with no duplication.
3. Each heavily outlined set of squares is called a "cage." The numbers in each cage must combine (in any order) to produce the target number indicated in the top corner by using the mathematical operation next to the target number.
4. A number may be repeated within a cage as long as it is not in the same row or column.

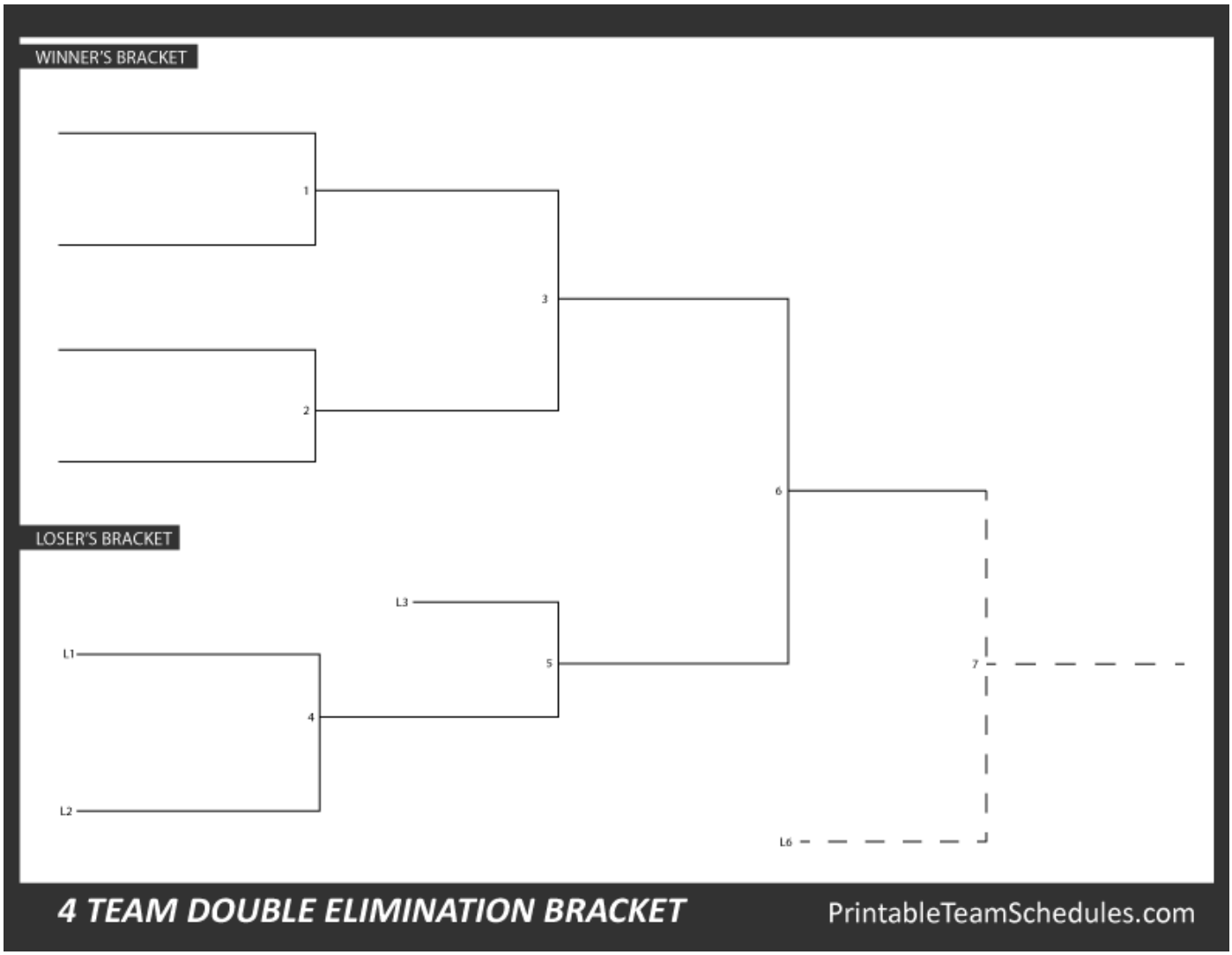
HINTS

1. First fill in single box cages, called "freebies," with the number in the top left corner.
2. Note the candidates (all possible numbers for each square) for each remaining square and then determine the correct numbers by math, logic, and process of elimination.
3. Each puzzle has one unique solution.

LOGIC PUZZLE SCORE SHEET **COHORT NAME: _____**

	Tally for each UNIQUE puzzle completed		**Total**
3 x 3		**5 points each**	
4 x 4		**10 points each**	
6 x 6		**25 points each**	
7 x 7		**30 points each**	
Logic Puzzles #1 - #12		**25 points each**	
Sudoku		**50 points each**	
Solved a Rubik's Cube? (can only do once)		**50 points**	
		GRAND TOTAL:	

Event: _____ **Grade: _____**


WINNER'S BRACKET
1
2
3
6
LOSER'S BRACKET
L1
L2
4
L3
5
7
L6
4 TEAM DOUBLE ELIMINATION BRACKET
PrintableTeamSchedules.com

Mathlympics: Reflection Circle

Directions: Before you begin the reflection circle, have students complete the reflection questionnaire (see next page, copies will be provided).

Opening Quote: Invite a student to read: “Smooth seas never made skilled sailors.”

First Round: What does the opening quote mean to you?

Framing: This morning your cohort went through a series of challenges together. You also had individual challenges to tackle. This afternoon you represented us against other cohorts in a bunch of competitions.

Rounds: Ask as many / whichever rounds of questions you’d like. Feel free to make up your own!

- **Recommended:** Where did you see yourself or other people practicing habits of scholarship or exemplifying the core values? (Note: ask students to list out HoS and core values before asking this question.)
- Which activity do you think you were most successful? What helped you succeed?
- Which activity do you think you were least successful? What held you back?
- What activity did you like the most/least and why?
- When did _____ (cohort name) work together best? What helped that happen?

Check-Out: (optional) On a scale from 1-10, with 10 being the best, how are you feeling now?

Email to send to out

(remember to update all the links to this year's docs)

Hi everyone,

We're so excited for the 4th annual LG mathlympics! **Physical materials** will be in your room & mailboxes in the morning. **Digital materials** are linked below. Here are some notes on the day:

Schedules are posted in the hallways. Working in pairs, each person is responsible for

- One morning activity (run periods 1-4 with each of the 4 cohorts),
- Crew / Lunch
- One 6th period competition,
- Short reflection circle (with the cohort you had 1st period)
- 24 Competition via Zoom

Tell students:

- **4th period:** go to normal lunch / Crew
- **Lunch / Crew:** which room and competition to go period 7
- **6th period:** go to the room they started in (unless they started with the Free Throw Challenge, then they would go to ***426/414/413*** if they're in ***6/7/8th grade***, respectively)

Links:

- Teacher packet
    - Schedules for the day (hung in hallway)
    - Digital copy of morning activities
- 6th period student assignments (paper copies in your mailbox, tell your kids where to go during Crew lunch)
- Student presentation
- Spreadsheet enter scores
    - Morning activities each have their own tab to enter scores, which will then transfer into the main tab
- Google drive folder with digital copies of **everything**

6th period competitions: Have students compete in cohorts to determine ranking within the grade. First place is worth 100 points, second is 75, third is 50, fourth is 25. Don't worry too much about this activity. The main goal is to facilitate friendly competition. If you're having trouble keeping track of all the winners / scores, just keep track of what you can.

Please remember to take pictures and share afterward! We always get lots of good ones from Mathlympics :)

Strength in Numbers!