Mathematical Modeling

Grade 4-9 Session
CEMC: Bringing Teachers Together Virtually
Tuesday, August 16 - 4:30pm
Gerry Lewis & Catherine Dias
#CEMCBTTV
Mathematical Modeling

- Definition
- Characteristics
- Examples
- Non-Examples
Models to Represent Math

A structured representation that illustrates mathematical ideas

“Manipulative or Tool”
Mathematical modelling is an iterative and interconnected process that is applied to various contexts, allowing students to bring in learning from other strands.

“Inquiry question”
Models to Represent Math VS C4: Mathematical Modelling

A structured representation that illustrates mathematical ideas

“Manipulative or Tool”

Mathematical modelling is an iterative and interconnected process that is applied to various contexts, allowing students to bring in learning from other strands

“Inquiry question”
The Process of Mathematical Modelling

Real-Life Situation

1. Understand the Problem
   - What questions need answering?
   - What information is needed?

2. Analyse the Situation
   - What assumptions do I make about the situation?
   - What changes, remains the same?

3. Create a Mathematical Model
   - What representations, tools, technologies, and strategies will help build the model?
   - What math concepts and skills might be involved?

4. Analyse and Assess the Model
   - Can this model provide a solution to the problem?
   - What are alternative models?

Share and Act Upon Model(s)
Sorting
About today
Assumptions
How can we travel the world?

How does our city grow?

How do you raise a pet?
Guiding Prompts

1. What ideas/questions would you predict from students?

2. What math is needed to address those ideas/questions?

3. What curriculum expectations or connections to other subjects?
<table>
<thead>
<tr>
<th>1. What ideas/questions would you predict from students?</th>
<th>2. What math is needed to address those ideas/questions?</th>
<th>3. What curriculum expectations or connections to other subjects?</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Where do most people live?</td>
<td>● Map reading</td>
<td>Grade 4 - E2.3 - Elapsed Time</td>
</tr>
<tr>
<td>● Which streets don’t have bus service?</td>
<td>● Time reading</td>
<td>Grade 4 - B2.8 - Whole Number Rates</td>
</tr>
<tr>
<td>● How often would the bus need to stop?</td>
<td>● Elapsed Time</td>
<td>Grade 4 - D1.2 - Collecting Data (frequency charts, stem-and-leaf)</td>
</tr>
<tr>
<td>● Are there times when it might be more busy or less busy?</td>
<td>● Tally charts (people at an intersection)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Rates (stops per hour)</td>
<td></td>
</tr>
</tbody>
</table>
Room 1 Topic: ___________________

<table>
<thead>
<tr>
<th>1. What ideas/questions would you predict from students?</th>
<th>2. What math is needed to address those ideas/questions?</th>
<th>3. What curriculum expectations or connections to other subjects?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Running the Inquiry

Types of Student Inquiry

By: @trev_mackenzie

Structured Inquiry
Students follow the lead of the teacher as the entire class engages in one inquiry together. Inspired by: Fitchman, 2011

Controlled Inquiry
Teacher chooses topics and identifies the resources students will use to answer questions.

Guided Inquiry
Teacher chooses topics/questions and students design product or solution.

Free Inquiry
Students choose their topics without reference to any prescribed outcome.

DIVE INTO INQUIRY
AMPLIFY LEARNING AND EMPOWER STUDENT VOICE

TREVOR MACKENZIE

Foreword by Alec Couros, PhD
Design a Room
Grade 4-5
Guided Inquiry 7.5 hours
Day 1
Walkaround, Idea storm,
Discussion about questions,
Assumptions
SITUATION:
Do a walkthrough of your school. Examine some of the classrooms, storage rooms, office spaces, and specialty rooms.
What do you notice?
What do you wonder?
Mathematical Modeling: Understand the Problem

Stage 1

A) PRESENT THE PROBLEM
CHALLENGE:
With a 20 000$ grant, choose a room in your school that you would like to redesign
Mathematical Modeling: Understand the Problem

Stage 1

B) ASKING GOOD QUESTIONS
What questions should we ask?

What information is needed to solve our problem?
<table>
<thead>
<tr>
<th>Questions</th>
<th>Room 215: Empty Classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do we have enough service for electricity for our gaming supplies, the tv, air conditioner? How much will every item cost? Will it go over the budget? Are our items appropriate for our school? did we buy games without violence? can we get the necessary items for a pet like food a bed? should we do a vote to paint the classroom pink, can we get enough bean bag chairs? Do we have enough space for lockers and flower pots? Will our students be less healthy with a boba vending machine and snack shop?</td>
<td>Can we add a shrek shrine? Can we add very cool lighting? Can we add a mini snack shop? Can we add a gaming section? Can we have lockers? Can we add aesthetic modern book area? Can we have a art wall? Can we have a TV? Can we have free wifi? Can we change the room into a student lounge? Do we need to put a schedule for who uses the lounge? Can we add a boba vending machine?</td>
</tr>
<tr>
<td>Can we add a air conditioner? Can we have a class pet? Can we have bean bag chairs? Can we have a couch? Can we have a flower pot? Do we have electricity? What snacks can we put for the station? Do we need to spend all the money? What games will we put for the section? Will we have room for everything? How much room do we have? What will the food cost? Where will everything be placed?</td>
<td></td>
</tr>
</tbody>
</table>
Mathematical Modeling: Analyze the Situation

A) SORTING QUESTIONS

B) ASSUMPTIONS
Assumptions

● The room has to stay the same size.
● The furniture must fit inside the door.
● Items have to make sense for 20,000 dollars.
● We probably won’t get any vending machines or a food station.
● Pets take a lot of energy to take care of so we won’t get one.
● The pets could harm the students if not in a proper place.
Day 2
Where’s the math?
Data Collection,
Create the Model
C) USING MATH TO ADDRESS QUESTIONS
What math is needed

- The math you need is addition, subtraction, area, perimeter, and multiplication.
- Addition to find how much money you spent.
- Subtraction to find out how much money you have left.
- Area and perimeter to find out how much room you have and how much room the furniture will take up.
- Multiplication to find out how many of each thing you will need.
Mathematical Modeling: Create the Model

CREATE THE MODEL: Data Collection
CREATE THE MODEL: Physical & Digital Drawings
Model

The width is 1043 cm

The length is 745 cm

The area is 777035 cm²
The perimeter is 3556 cm
Measurements

Length: 745 cm
Width: 1043 cm
Perimeter: 3556 cm
Area: 777035 cm²
How did we get our measurements?

We got our measurements by first finding how long the tape was which was 149 cm so then we put the tape on the floor and found out how many tapes it took to get to one wall to the other. Then we multiplied the number of tapes by the length of the measuring tape to find the length and width. We added all the sides to find the perimeter and then we multiplied the length and width to find the area. The length was 745 cm. The width was 1043 cm. The perimeter is 3556 cm and the area is 777035 cm².
Day 3
Review of Calculations, Shopping
CREATE THE MODEL: Data Collection
# Shopping List

<table>
<thead>
<tr>
<th>Item</th>
<th>Store</th>
<th>Price</th>
<th>Quantity</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couch</td>
<td>Ikea</td>
<td>$3000.00</td>
<td>2</td>
<td>$6000.00</td>
</tr>
<tr>
<td>TV</td>
<td>Walmart</td>
<td>$3200.00</td>
<td>1</td>
<td>$3200.00</td>
</tr>
<tr>
<td>Carpet</td>
<td>Ikea</td>
<td>$25.00</td>
<td>1</td>
<td>$25.00</td>
</tr>
<tr>
<td>Coffee table</td>
<td>Ikea</td>
<td>$40.00</td>
<td>2</td>
<td>$80.00</td>
</tr>
<tr>
<td>TV bench</td>
<td>Ikea</td>
<td>$70.00</td>
<td>1</td>
<td>$70.00</td>
</tr>
<tr>
<td>Chairs</td>
<td>Ikea</td>
<td>$250.00</td>
<td>5</td>
<td>$1250.00</td>
</tr>
<tr>
<td>Plants</td>
<td>Ikea</td>
<td>$17</td>
<td>6</td>
<td>$102</td>
</tr>
<tr>
<td>BeanBags</td>
<td>ikea</td>
<td>$30.00</td>
<td>3</td>
<td>$90.00</td>
</tr>
</tbody>
</table>

**FINAL TOTAL**  $10817.00

**Total With Tax**  $12223.21
How much money did you spend in total? How much money do you have leftover? Show your calculation

We spent $10817.00 but with tax it’s $12223.21. We have $7776.79 left.

6000+3200+25+80+70+1250+102+90=10817

20000.00-12223.21=7776.79

10817.00 x 1.13 = 12223.21
Day 4

Prepare presentation, review criteria, assessment as and of learning
Mathematical Modeling: Assess the Model

ASSESS THE MODEL: Prepare the presentation
Create your **PLAN**

**Presentation:**
- Clean use of text boxes and images - **YES** - NO
- Relevant images - **YES** - NO
- Appropriate colours, font sizes - **YES** - NO
- One slide - **YES** - NO

**Content:**
- Length, width, area measurements - **YES** - NO
- Appropriate units - **YES** - NO
- Evidence of operations with money - **YES** - NO
- Organized plan that relates to purpose - **YES** - NO
We choose room 215 to turn in to a student lounge. We measured the room to find the measurements. The length is 745 cm. The width is 1043 cm. The perimeter is 3556 cm and the area is 777035 cm². Next we got the furniture we needed for the lounge. We spent $10817.00 in total and with the tax it’s $12223.21. We have $7776.79 left over. The math we used was addition, subtraction, and multiplication. Addition to find the total cost of items and the perimeter, subtraction to find the amount of money we have left, and multiplication to find the tax and the amount of items. This is our redesigning plan.
Mathematical Modeling: Assess the Model

ASSESS THE MODEL: Assessment as learning
## Project Review

1: What did you think about the way you learned math this week?

| At the start I was excited we could go to other rooms and design the rooms | I thought it was interesting but it was a little difficult to. | I thought it was fun and something i never did with other teachers. |

2: What were your contributions to your team?

| I helped the team by choosing some of the items for design and some of the calculations for the team then i also did some of the presentation work | I did a lot of typing and found the measurements and prices of the items. I also created some good questions and wrote the assumptions. | Helped finding some of the items to put in the room 215. I made good questions, I also found the pictures for the presentation! |
## Project Review

### 3: Are you happy with your result? Why? Or what frustrated you with the project?

<table>
<thead>
<tr>
<th>I am happy on what we got since everything was balanced and I think everything make sense, our team did great work</th>
<th>Yes I am happy with the result since I think we completed everything well we finished in time.</th>
<th>I am happy with the result because everything went well in the project.</th>
</tr>
</thead>
</table>

### 4: What did you think about the mathematical modeling cycle?

| I thought that the mathematical cycle was kinda confusing and pretty easy | I thought some parts were boring and pointless but some parts were interesting and fun. | I thought some parts were boring and the rest were alright For me. |
ASSESS THE MODEL: Assessment of learning
Assessment of Learning

Name: ____________________________

Design a Room – Show all calculations - A

1. Calculate the area of the following room:
   
   6 m

   5 m

2. Calculate the area of the following room: The floor of the room has 24 tiles in one direction, and 18 tiles in the other direction. Each tile is a square that has a side length of 26 cm.

3. A) Your team decides to buy 8 chairs that cost 49.95 $ each and 3 tables at 149.25 $. What’s the total cost of the purchase?

   B) Your team started with a budget of 1000 $. How much money would be left after buying the chairs and tables?
Teacher Feedback
Teacher Feedback Interview- Navarette GR. 4/5

- Very engaging, novel, real life situations made it relevant and relatable for teachers and students.
- Students thought it was fun and were motivated to participate.
- Teacher appreciated the lessons/template/slides, that she can work off of and plan with,
- Easy to modify and change to do on her own in the future.
- The project allowed for review and check for understanding across multiple strands. This gives students an opportunity to apply their knowledge in real life and meaningful contexts.
- Teacher is interested in doing more project-based, mathematical modeling next year.
- Gerry coming in and leading/modeling is helpful when it is a NEW area of learning like MM, extra ppl in the room to support students is always helpful.

“I like this because it includes all students, even the two students who typically do not participate or have anxiety participating in the regular classroom and who are typically withdrawn. Students felt safe and included working when in a group on this project. By nature this type of project is differentiated for all, working in a group towards a goal rather than a closed task/assessment.”
What other directions could this have taken?
Design a Field Trip
Grade 8
Guided Inquiry 7.5 hours
Day 1

Presenting the problem,
Asking good questions,
Sorting questions
SITUATION:
Can you name five student-friendly locations in Toronto?
A) PRESENT THE PROBLEM
CHALLENGE:
You will plan and organize a field trip to a student-friendly location of your choice.
B) ASKING GOOD QUESTIONS
Question Storm!
How are we going to achieve this challenge?

What questions should we ask?

What information is needed to solve our problem?
In pairs, discuss the useful questions to gather the necessary information.
Remember we do not need to know the answers at this stage.

**QUESTIONS**

- How much will the trip cost?
- How many people are going on the trip?
- Can we take the TTC to our destination?
- How much will renting a bus cost?
- Which bus company should we hire for the job?
- How many adults are going for supervision?
- How long can our trip be? (day trip or multi-day trip?)
- Will the venue be open the day we want to go?
- Do any of the students have special needs e.g. dietary or mobility?
- Are there any special events happening at our destination on the day of our visit?
Mathematical Modeling: Analyze the Situation

A) SORTING QUESTIONS

B) ASSUMPTIONS
<table>
<thead>
<tr>
<th>OPEN QUESTIONS</th>
<th>CLOSED QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much will the trip cost?</td>
<td>Can we take the TTC?</td>
</tr>
<tr>
<td>Which bus company should we hire?</td>
<td>Will the venue be open?</td>
</tr>
<tr>
<td>How many adults are going to supervise?</td>
<td>How many people are going on the trip?</td>
</tr>
<tr>
<td>How much will the bus cost?</td>
<td>Do any students have special needs?</td>
</tr>
</tbody>
</table>
The following interview questions can be used to assess students in their awareness/ability to identify assumptions.

**MAKING ASSUMPTIONS**

<table>
<thead>
<tr>
<th>Questions</th>
<th>Student Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>What ideas did you think about that you decided not to research? Why?</td>
<td></td>
</tr>
<tr>
<td>What did you have to assume in order to start researching costs/facts?</td>
<td></td>
</tr>
<tr>
<td>Why did you make the choice (insert assumptions from previous question)?</td>
<td></td>
</tr>
</tbody>
</table>
Students may create any number of assumptions while brainstorming. The following list is an example of the possible assumptions students could make:

**POSSIBLE ASSUMPTIONS**

- I assume that the length of the trips will have to be the same... how long?
  - 1 day?
  - 2 days?
  - A model for both?
- I assume that we will have to take the bus.
- I assume that the further the trip the more the bus will cost.
- I assume that we can’t take a plane or the train.
- I assume that adults will be present to chaperone and for supervision.
- I assume that they will not have to pay for the trip.
- I assume that we will have different activities during the trip.
- I assume that we will have different activities during the trip.
- I assume that the costs of those activities will vary depending on the number of students.
- I assume that we will do a fundraiser to help with the cost.
- I assume that every student will pay the same amount.
Day 2
Where’s the math?
Data Collection,
Create the Model
Stage 2

C) USING MATH TO ADDRESS QUESTIONS
Where’s the math?

- Budget
  - Cost and expenses
- Ratios and divisions and fractions
- Probability (e.g. likelihood of rain)
- Distance - Length (km)
- Rates - Speed (km/hr)
- Multiplication to find the time
- Time and duration
CREATE THE MODEL:
Data Collection
Itineraries and Budgets
Data Management / Financial Literacy

Students used spreadsheets to organize data and calculate costs.

<table>
<thead>
<tr>
<th>Time</th>
<th>Description</th>
<th>Duration</th>
<th>Distance</th>
<th>Method of transportation</th>
<th>Budget per student</th>
<th>Total for 18 students</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:45 - 9:45</td>
<td>Travel time to destination</td>
<td>2 hours and 5 minutes</td>
<td>111 km</td>
<td>coach bus</td>
<td>$5.55</td>
<td>$100</td>
</tr>
<tr>
<td>9:45 - 10:30</td>
<td>Walk around the area</td>
<td>45 minutes</td>
<td>5 km</td>
<td>walking</td>
<td>lunch</td>
<td>$20</td>
</tr>
<tr>
<td>10:30 - 11:00</td>
<td>go to the falls</td>
<td>30 min</td>
<td>2 km</td>
<td>walking</td>
<td>boat for students</td>
<td>$0</td>
</tr>
<tr>
<td>11:00 - 11:45</td>
<td>Eat lunch at the rain forest cafe</td>
<td>45 minutes</td>
<td>0 km</td>
<td>walking</td>
<td>boat for teacher</td>
<td>$20</td>
</tr>
<tr>
<td>11:45 - 12:30</td>
<td>go to niagara speed way</td>
<td>45 minutes</td>
<td>0 km</td>
<td>walking</td>
<td>niagra speed way</td>
<td>$10</td>
</tr>
<tr>
<td>12:30 - 1:30</td>
<td>Free time around clifton hill</td>
<td>1 hour</td>
<td>1.5 km</td>
<td>walking</td>
<td>niagra speed way</td>
<td>$15</td>
</tr>
<tr>
<td>1:30 - 2:00</td>
<td>Eat snack at tim hortons</td>
<td>30 minutes</td>
<td>0 km</td>
<td>walking</td>
<td>tim hortons</td>
<td>$5</td>
</tr>
<tr>
<td>2:00 - 4:00</td>
<td>go under the falls</td>
<td>2 hours</td>
<td>0 km</td>
<td>boat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4:00 - 5:00</td>
<td>Free time around clifton hill</td>
<td>1 hour</td>
<td>1.5 km</td>
<td>walking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5:00 - 6:00</td>
<td>Get ready to leave</td>
<td>1 hour</td>
<td>0 km</td>
<td>walking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6:00 - 7:30</td>
<td>Home time</td>
<td>1 hour and 30 minutes</td>
<td>111 km</td>
<td>school bus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Day 3
Refine the process,
Prepare presentation
Mathematical Modeling: Assess the Model

Stage 4

ASSESS THE MODEL: Prepare the presentation
Infographics

1. Lesson on infographics

2. Students worked in their groups to create infographics
Infographics

The preparation of their infographics allowed the students to assess the quality of their research and to refine their work where needed.
Day 4
Review criteria, Presenting final work, Assessment as and of learning
Mathematical Modeling: Assess the Model

ASSESS THE MODEL: Assessment as learning
Extend your Learning: Assuming that there is 13% tax on each item in your budget, calculate the total cost of the trip. The school board has agreed to pay 21% of the total cost after taxes. What is the final cost for each student?

$$13\%\ of\ 50 = 6.50 \times 22 = 143$$
$$13\%\ of\ 7.50 = .97 \times 22 = 21.34$$
$$13\%\ of\ 2.14 = .27 \times 22 = 5.94$$
$$13\%\ of\ 10 = .13 \times 22 = 2.86$$
Total is $3060.42 with tax
And the school would be paying $642.68
## Project Review

1. What did you think about the way you learned math this week?

<table>
<thead>
<tr>
<th>Name: Lisa</th>
<th>Sara</th>
</tr>
</thead>
<tbody>
<tr>
<td>I learned that math had more to it other than budgeting and I gained a better view on financial literacy. This project made me realize that planning trips aren’t as easy as I thought and how much math comes in from probability, financial literacy, fractions, percents and more.</td>
<td>This week I learned the math could help a lot when planning out trips. Before this project I thought planning trips were really easy but now I have done it it is harder than I thought it would be, because you have to worry about the budget and other things. Planning the time is also pretty hard because you have to put things at good time because you don’t want it to be too long or to short.</td>
</tr>
</tbody>
</table>
## Project Review

2. What were your contributions to your team?

<table>
<thead>
<tr>
<th>Name: lisa</th>
<th>sara</th>
</tr>
</thead>
<tbody>
<tr>
<td>I worked on finding most of the information of how far it is to get to the places and how long it would take to get there. We both worked together very well because we all worked on different things.</td>
<td>I worked on mainly the theme/ decorations and helping my other partner add things to our infographic. I think we had a fair team and in general fun.</td>
</tr>
</tbody>
</table>
### Project Review

3. Are you happy with your result? Why? Or what frustrated you with the project?

<table>
<thead>
<tr>
<th>sara</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>I'm really happy with my results and the trip ideas we got. If this was my school trip i think the prices were fair and works well in our budget. This project was informational to us and i'm glad we gotta work this. It also took a lot of patience to find prices, a proper budget, student friendly trip, a way of transportation and how much each students would be charged.</td>
<td>I really happy with how the project came out because the infographic looks really good and the spreadsheets we both worked together so we finished really fast and it was very easy to finish. We also divided the work out very easily. At the end making the infographic was really fun because we both got to decorate the slide and putting all of the information on the slide was very easy too.</td>
</tr>
</tbody>
</table>
### Project Review

4. What mathematical tools did you use, and how did they help solve the problem?

<table>
<thead>
<tr>
<th>sara</th>
<th>Lisa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability, fractions, percents, and financial literacy were a big use during this project. Probability helped us determine / assume the weather that day, how much we are paying and more. Fractions helped us determine a certain amount of something to help us get a percentage or the other way around. Getting a percentage helps us assume how much students, how much time we will spend there and more. Financial literacy gave us our money answers our, budgeting and how much to charge students.</td>
<td>The mathematical tool that helped me put the most is addition because we all had to add the times together, the prices together, and the distances together. So for me addition helped me out a lot in this project.</td>
</tr>
</tbody>
</table>
Project Review

5. What did you think of the mathematical modelling cycle? (asking questions, making assumptions, modelling answers, and reviewing)

<table>
<thead>
<tr>
<th>sara</th>
<th>Lisa</th>
</tr>
</thead>
<tbody>
<tr>
<td>This cycle got us organized and on time for finding certain things. It's an amazing tool to help u keep things in place. All these steps help us conclude a good final answer.</td>
<td>This cycle help us organize all of the times for something of the things. It helps keep things in place and help find a good answer in the end.</td>
</tr>
</tbody>
</table>
Teacher Feedback
Teacher Feedback Interview- Couto GR. 7 / 8

The steps of the mathematical modeling cycle were well organized (organizing the questions, making assumptions, and then moving from there). The project was Inquiry based and had a lot of structure. The activities were accessible to everyone, including several students who are usually withdrawn for math support. These students were given the option of participating in the activity and they wanted to do so. In addition, mathematical students are going to do well, AND the students who are weaker in math can still contribute with ideas, organization, data collection, design of the final presentation etc..

As a criticism, the math could have been made more challenging. (We talked about how in a longer cycle this can be planned into the cycle and about specific examples for how more math could have been inserted into the cycle)

Mr. Couto likes the inquiry based model and would like to do similar projects in the future. He wasn't sure how the project was going to go, but he has a good group that is invested in everything they do. They are vocal and are used to doing group work. He suggests that having support, resources, and / or PD on mathematical modeling might help.

He prefers students to work in pairs, but acknowledges the challenge that happens when one of the group members is absent. He wonders about how groups should be made? (Strategic pairings vs random groups) In this instance the groups were self selected by the students.
Mathematical Modelling
Resources

Juicy Math Resources
Neil Casey @MrCasey27

OAME Ontario Math Support

Rabbit Math - Secondary Math

The RabbitMath Curriculum
Featured Activity: Lightening Growth

Mathematical modeling—mathematics interacting with the world—is a central theme of RabbitMath. We choose our models carefully—always with an eye to the power and aesthetic pull of the experience.
Mathematical Modeling
Summary of Stages

● Notice and Wonder
● Stage 1: State Problem and Ask Questions
● Stage 2: Make Assumptions, Where’s the Math
● Decide on the type of inquiry
● Stage 3: Create the Model, Data Collection
● Stage 4: Assess the Model
● Presentation
Conclusion: How did that feel?
This presentation:
https://docs.google.com/presentation/d/1-sQvNT-yKxo0dwq8Bf7lvOhqEnCDhC_iJ29bDjaLmmg/edit?usp=sharing

Question Storm:
https://padlet.com/lewisg5/oame2022

Breakout Slides:
https://docs.google.com/presentation/d/14MEsraYODKD6z59IzuMLUEbGBeImCcrmT5jD3dQ75O8/edit?usp=sharing

Student Slides Design a Room TEMPLATE
https://docs.google.com/presentation/d/1SK3ows6UFQT5_yqt50geNcYfDh0oUOYW7vhFaQOVUYs/copy?usp=sharing

JuicyMath
https://docs.google.com/document/d/1LvX8FKajAb576wfI3DFK1aJdF3UI81P5YNsoV-P1vU/edit

OAME Mathematical Modeling
https://ontariomath.support/?pg=results&type=subject&lang=EN&subject=Model

Rabbit Math
https://www.rabbitmath.ca/curriculum

Twitter:
https://twitter.com/GLewisOCT

Website: