

Preparation Notes

Please review and customize this deck to prepare it for use. Some notes:

- These professional learning (PL) materials (slide deck and accompanying handout) are being offered in editable forms so that you may make adjustments to better support the specific work happening in your school or district.
- For the 2024–25 school year, student work samples are not provided for most sessions. The facilitator will need to collect or create student work samples when implementing these materials during 2024–25.
- These PL materials are designed to easily accommodate remote delivery:
 - A [Jamboard template](#) is provided to facilitate discussion of student work; the facilitator will need to make a copy of this and be ready to share the link with participants as noted in the deck.
 - Text that can be readily pasted (marked with “—”) into a video call chat feature is included when participants need to reference the handout.
 - There are placeholders for handout links to be shared with participants in the notes field of selected slides; the facilitator will need to add a link to the handout where indicated by “[insert link].”

M151 Overview

XQ Badge Project PL Series Baseline Session

Month XX, XXXX



Welcome!

Community Builder:

Let's create a photo collage.

Please share an image that captures you as a learner.

Outcomes and Agenda



Participants will be able to:

- Explain the content and practice expectations for the M151 badge
- Analyze tasks through the lenses of (1) content and practice expectations and (2) learning principles
- Analyze student work for evidence of learning

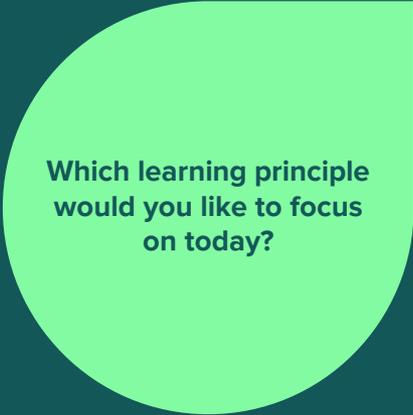


Agenda:

- Task 1: Expectations and Learning Principles
- Task 1: Student Work
- Task 2: Expectations and Learning Principles
- Task 2: Student Work
- Closing

Learning Principles

1. Engage with cognitively demanding tasks in heterogeneous settings.
2. Engage in social activities.
3. Build conceptual understanding through reasoning.
4. Have agency in their learning.
5. View mathematics as a human endeavor across centuries.
6. See mathematics as relevant.
7. Employ technology as a tool for problem-solving and understanding.



**Which learning principle
would you like to focus
on today?**

01

Exploring the Content

What comes to mind?
What knowledge and skills
should students learn to
earn this badge?



Come off mute
or put your
thoughts in the
chat!

What's the Story of these Standards?

Selected Common Core Standards for Mathematics High School – Geometry

Apply geometric concepts in modeling situations

1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).★
2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).★
3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

Explain volume formulas and use them to solve problems

1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.
3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.★

Visualize relationships between two-dimensional and three-dimensional objects

4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

**How would you synthesize these?
What are the key takeaways
for students?**

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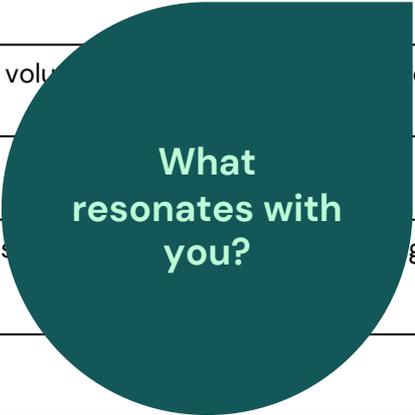
Share your thinking!

M151 Content and Practice Expectations

151.a	Engage in the modeling cycle.
151..b	Use geometric shapes, their measures, and their properties to describe objects.
151..c	Apply concepts of density based on area and volume in modeling situations.
151..d	Apply geometric methods to solve design problems.
151..e	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
151..f	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
151..g	Solve real-world problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
151..h	Use the Pythagorean Theorem to solve right triangles in applied problems.
151..i	Use a geometry model to determine values of interest in a real-world problem.

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151..d	Apply geometric methods to solve design problems.
151..e	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, and volume of a cone.
151..f	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
151..g	Solve real-world problems involving area, volume, and surface area of two- and three-dimensional figures, including triangles, quadrilaterals, polygons, cubes, and right prisms.
151..h	Use the Pythagorean Theorem to solve right triangles in applied problems.
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What
resonates with
you?

M151 Content and Practice Expectations and Indicators

Content and Practice Expectations	Indicators Choose an artifact where you...
151.a: Engage in the modeling cycle (performance assessment).	i. engage with the full modeling cycle (problem, formulate, compute, interpret, validate, revise as necessary, report).
151.b: Use geometric shapes, their measures, and their properties to describe objects.	i. represent a context, situation, or object from outside mathematics as a mathematical object
	ii. explain how the mathematical object(s) represent the real-life context, situation, or object
	iii. use properties of the mathematical object to determine quantities of interest and interpret those values within the context



What new
insights do you
have?

Let's Investigate

Choose at least one task to explore:

- Roses for Rosa
- Ready to Run

Which content and practice expectations are evident in each one?

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Choose at least one task to explore:

- Roses for Rosa
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Come off mute
or put your
thoughts in the
chat! What did
you find?

What's the Same?

What's Different?

1. How do these content and practice expectations align to ways you've taught this topic before?
2. How are they different?

**Come off mute
or put your
thoughts in the
chat!**

Inequity Is our Reality

“And by 2018, problems with the pipeline through math courses and tests were persisting. Despite the implementation of new state standards and tests, just 31 percent of students were meeting or exceeding standards in math, compared with 56 percent in English.” (Daro & Asturias, 2019)

Source: <https://justequations.org/resource/branching-out-designing-high-school-math-pathways-for-equity>

We Must Lead the Movement

How can this approach give space for what math can be?

Is math...?

- About getting one right answer, the teacher's way
- Irrelevant
- About doing procedures
- Independent work
- Something my teacher made up
- Formulaic

Or could be math...?

- About using multiple strategies flexibly
- Connected to the real-world in ways that make sense
- About understanding and applying
- Collaborative work
- Lived across continents and centuries
- Novel, challenging problems

02

Task 1: Expectations and Learning Principles

Let's Do Some Math!

Rosa and her family are planning for her Quinceañera. Each of the 15 tables at Rosa's reception will have a centerpiece—a cylindrical glass vase filled one-third of the way with glass marbles holding a rose in place.

- The glass vases are 10 inches tall with a 4 inch diameter.
 - Rosa can choose between marbles that are 12mm or 16mm in diameter.
 - The 12mm marbles cost \$11.99 for 340 pieces; the 16mm marbles cost \$11.99 for 140 pieces.
1. If Rosa chooses 12 mm marbles, how many bags will she need? How many bags will she need if she chooses 16 mm marbles?
 2. Rosa's budget for the centerpiece is \$250. She spent \$110 on vases. Will she be able to stay within her budget?

Do the task as a student would. Jot down any reflections that you have as you do the math!

Content and Practice Expectations

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Choose 1-2 Content and Practice Expectations that student work could give evidence of.

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151.b: Use geometric shapes, their measures, and their properties to describe objects.

Learning Principles

In M151 Modeling with Geometry, students will employ the following learning principles:

- Engage with cognitively demanding tasks in heterogeneous settings (LP 1).
- Engage in social activities (LP 2).
- Build conceptual understanding through reasoning (LP 3).
- Have agency in their learning (LP 4).
- View mathematics as a human endeavor across centuries (LP 5).
- See mathematics as relevant (LP 6).
- Employ technology as a tool for problem-solving and understanding (LP 7).

Learning Principles

Which of these principles does this task lend itself to? Which ones can the task be easily adapted to accommodate?

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Learning Principles

Share what
you came up
with!

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03

Task 1: Student Work

What is the impact of our labels?

“The history of classifying people by intelligence and ability is inextricably intertwined with the eugenics movement and anti-egalitarian ideas, structures, and practices (Oakes et al., 1997). Given these roots, it should not be surprising that ability labels continue to be applied in ways that reflect and reproduce social hierarchies based on race, gender, dis/ability, language, and class (Martin 2009). ...

This matters at the level of broad social organization (e.g., representation in STEM fields) and at the scale of individual students and their access to opportunities, resources, and identities as learners and doers of mathematics as valuable and valued members of our society.”

–National Council of Teachers of Mathematics

Round 1: What do you notice?

Jot down one thing you notice about this piece of student work..

Janine is planning on creating a water-based centerpiece for each of the 14 (13 circular and 1 rectangle) tables at her wedding reception. She is planning on purchasing 3 different sized vases. The first vase will have a radius of 4cm and a height of 20cm. The second vase has a radius of 8cm and a height of 40cm. Finally, the third vase has a radius of 16cm and a height of 80cm. The vases cost 3, 6, and 12 dollars respectively. She intends to fill them halfway with water and then add a variety of colored marbles until the waterline is approximately three-quarters of the way up the cylinder. She can buy bags of 100 marbles that are 12mm in radius for \$4. She has a budget of \$200 for her centerpieces.

1. How much would it cost for Janine to only use the smallest size vase?



$$\text{Price of vase} = \$3 \times 14 = \$42$$

$$\text{Number of marbles} = \frac{251.327}{7.238} = 34 \text{ marbles}$$

$$\text{Price of 34 marbles} = 34 \times \$4 = \$136$$

$$14 \text{ vases} \times \$14 = 19.6$$

$$\text{Total} = 42 + 19.6 = \$62.1$$

2. How much would it cost for Janine to only use the middle size vase?



$$\text{Price of medium vase} = \$6 \times 14 = \$84$$

$$\text{Number of marbles} \Rightarrow 278$$

$$\text{Total price of marbles} = \$155.68$$

$$\text{Total price of middle sized vase} = \$84 + 155.68$$

$$\Rightarrow \$239.68$$

3. Janine has decided that she would like a mixture of the small and medium vases at the guest tables (circular tables) and 1 large vase for the wedding party table (rectangular table). On the chart on the next page, determine which tables will get small vases, and which will get medium vases. Label the ones with small vases with an S, and the ones with medium vases with an M.

4. Determine the cost of your design. Did you stay on budget? Show your work.

$$\text{Cost of large vase} = \$12$$

$$\text{Total marbles in large vase} \Rightarrow 2225 \text{ marbles}$$

$$\text{Total price of marbles in vase} \Rightarrow \$89$$

$$\text{Total cost of large vase} \Rightarrow \$12 + \$89 = \$101$$

$$\text{Total cost} = 101 + 682 + 479.36 = \$1262.36$$

I went over the budget

$$\text{Cost of 11 small vases} \Rightarrow 11 \times \$62 = \$682$$

$$\text{Cost of 2 small vases} \Rightarrow 2 \times \$239.68 = \$479.36$$

Round 1: What do you notice?

Jot down one thing you notice about this piece of student work..

Come off mute and share what you saw!

2. Rosa's budget for the centerpieces is \$250. Will she be able to stay within her budget?

$$\begin{array}{l} \underline{16\text{mm Marbles}} \\ 17 \text{ Bags} = \\ 17 \cdot 11.99 = \boxed{\$ 203.83} \end{array}$$

$$\begin{array}{l} \underline{12\text{mm Marbles}} \\ 11 \text{ Bags} = \\ 11 \cdot 11.99 = \boxed{\$ 131.89} \end{array}$$

She will be able to stay within her budget either way because \$203.83 (for the 16mm Marbles) and \$131.89 (for the 12mm Marbles) each price is less than \$250.

Humanizing Assessment

Feedback helps us remember that learning is messy, in the best possible way! Every moment in the classroom is an opportunity to gather street data on the cognitive complexities of learning– the aha moments, the stumbling blocks, the bursts of creativity, the spirals of self-doubt and shame, the neurological effects of stress and trauma. Rather than contribute to our understanding of what's getting in the way for students, grades often create added stress and emotional pressure, particularly for children with learning differences and those struggling to catch up to grade level. (Safir and Dugan, 2021, p. 117)

Source: Safir, Shane, and Jamila Dugan. *Street Data: A Next-Generation Model for Equity, Pedagogy, and School Transformation*. Corwin, 2021.

Criteria for Success

Conference and Provide Revision Support	Accept with Revision	Accept
<p>The student's artifact shows an emerging understanding of the expectations of the indicator(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of the indicator(s).</p>	<p>The student's artifact is approaching a full understanding of the expectations of the indicator(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.</p>	<p>The student's artifact demonstrates evidence that they have met the expectations of the indicator(s).</p>

What resonates with you? What questions surface for you?

Round 2: What evidence of learning is there?

151.b: Use geometric shapes, their measures, and their properties to describe objects.

Let's examine some work together:

Conference and Provide Revision Support

The student's artifact shows evidence of an emerging understanding of the expectations of the indicator(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of the indicator(s).

Accept with Revision

The student's artifact shows evidence of approaching a full understanding of the expectations of the indicator(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.

Accept

The student's artifact demonstrates evidence that they have met the expectations of the indicator(s).

Examining Student Work

The image shows a digital workspace for reviewing student work. At the top, there are three options: "Conference and Provide Revision Support", "Accept with Revision", and "Accept". On the left is a vertical toolbar with icons for drawing, erasing, pointing, Jamboard, image insertion, lasso selection, text insertion, and a zoom tool. The "Jamboard" icon, which shows a document with a pencil, is circled in green, and a large green arrow points from a callout box to it. The callout box is a dark green rounded rectangle containing the text "Put your thoughts on the Jamboard!". In the bottom right corner of the workspace, there is a circular label that says "Work Sample 1".

Example #1 — Jamboard Frame 2



Let's compare
notes

Janine is planning on creating a water-based centerpiece for each of the 14 (13 circular and 1 rectangle) tables at her wedding reception. She is planning on purchasing 3 different sized vases. The first vase will have a radius of 4cm and a height of 20cm. The second size vase has a radius of 8cm and a height of 40cm. Finally, the third vase has a radius of 16cm and a height of 80cm. The vases cost 3, 6, and 12 dollars respectively. She intends to fill them halfway with water and then add a variety of colored marbles until the waterline is approximately three-quarters of the way up the cylinder. She can buy bags of 100 marbles that are 12mm in radius for \$4. She has a budget of \$200 for her centerpieces.

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$$\begin{aligned} \text{Price of small vase} &= \$3 \times 14 = \$42 \\ \text{Price of 34 marbles} &= 34 \times \$4 = \$136 \\ \text{Number of marbles} &= \frac{251.327}{7.238} = 34 \text{ marbles} \end{aligned}$$

$$\begin{aligned} 14 \text{ vases} &= 100 \times 14 = 1400 \\ \text{Total} &= 42 + 136 = \$178 \end{aligned}$$

2. How much would it cost for Janine to only use the middle size vase?



$$\begin{aligned} \text{Price of medium vase} &= \$6 \times 14 = \$84 \\ \text{Number of marbles} &= 278 \\ \text{Total price of marbles} &= \$155.68 \\ \text{Total price of middle sized vase} &= \$84 + 155.68 = \$239.68 \end{aligned}$$

3. Janine has decided that she would like a mixture of the small and medium vases at the guest tables (circular tables) and 1 large vase for the wedding party table (rectangular table). On the chart on the next page, determine which tables will get small vases, and which will get medium vases. Label the ones with small vases with an S, and the ones with medium vases with an M.

4. Determine the cost of your design. Did you stay on budget? Show your work.

$$\begin{aligned} \text{Cost of large vase} &= \$12 \\ \text{Total marbles in large vase} &= 2225 \text{ marbles} \\ \text{Total price of marbles in vase} &= \$89 \\ \text{Total cost of large vase} &= \$12 + \$89 = \$101 \end{aligned}$$

$$\begin{aligned} \text{Total cost} &= 101 + 682 + 479.36 \\ &= \$1262.36 \end{aligned}$$

I went over the budget.

$$\begin{aligned} \text{Cost of 11 small vases} &= 11 \times \$62 \\ &= \$682 \end{aligned}$$

$$\begin{aligned} \text{Cost of 2 small vases} &= 2 \times \$239.68 \\ &= \$479.36 \end{aligned}$$

Example #2 — Jamboard Frame 3

Let's compare notes

Janine is planning on creating a water-based centerpiece for each of the 14 (13 circular and 1 rectangle) tables at her wedding reception. She is planning on purchasing 3 different sized vases. The first vase will have a radius of 4cm and a height of 20cm. The second size vase has a radius of 8cm and a height of 40cm. Finally, the third vase has a radius of 16cm and a height of 80cm. The vases cost 3, 6, and 12 dollars respectively. She intends to fill them halfway with water and then add a variety of colored marbles until the waterline is approximately three-quarters of the way up the cylinder. She can buy bags of 100 marbles that are 12mm in radius for \$4. She has a budget of \$200 for her centerpieces.

1. How much would it cost for Janine to only use the smallest size vase?
 $3 \times 14 = 42 \in \text{just vases}$

2. How much would it cost for Janine to only use the middle size vase?
 $V = 1004.8 \rightarrow 1 \text{ one vase} \rightarrow 4 \text{ v} = 251.2$
 $(6 \times 14 = 84)$
 $V = \frac{8038.4}{4} = 2009.6$
 7.23 cm
 1.2 cm
 7.23 cm
 $= 278 \times 14 = 39 + 84 = \240

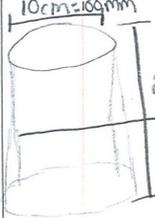
3. Janine has decided that she would like a mixture of the small and medium vases at the guest tables (circular tables) and 1 large vase for the wedding party table (rectangular table). On the chart on the next page, determine which tables will get small vases, and which will get medium vases. Label the ones with small vases with an S, and the ones with medium vases with an M.
 $S = 62 \div 14 = 4.43 \times 6 = 26$
 $M = 240 \div 14 = 17.14 \times 7 = 120$
 $Y = 64307.2$
 $\frac{16076.8}{4} = 2224$
 $22.24 \div 4 = 5.56$
 $92 + 12 = 104$

4. Determine the cost of your design. Did you stay on budget? Show your work.
 $26.58 + 120 + 104$
\$ 250.58
 No we didn't stay on budget

Example #3 — Jamboard Frame 4

Let's compare notes

1. If Rosa chooses 12mm marbles, how many bags will she need? How many bags will she need if she chooses 16mm marbles?

$10\text{cm} = 100\text{mm}$

 $25\text{cm} = 250\text{mm}$
 $\frac{1}{3} = 8\frac{1}{3}\text{cm} = 8\frac{1}{3}\text{mm}$
 $\frac{12\text{mm}}{0} = \frac{16\text{mm}}{0}$

$10\text{mm} = 1\text{cm}$
 $\frac{12}{0} = \frac{16}{0}$
 $V = \frac{\pi r^2 h}{3}$
 $V = \frac{\pi (50)^2 \cdot 250}{3}$
 $V = 625,000\pi$
 $V = 208,333\frac{1}{3}\pi\text{mm}^3$

$V = \frac{4}{3}\pi 6^3$
 $V = 288\pi\text{mm}^3$
 do I need to worry about the space between?

$\frac{208,333\frac{1}{3}\pi\text{mm}^3}{288\pi\text{mm}^3}$
 $V = 723\frac{41}{108}$ marbles needed - for 12mm • 15cps
 Rosa needs ~33 packs of 12mm marbles.
 Rosa needs ~33 packs of 16mm marbles

$V = \frac{4}{3}\pi 8^3$
 $V = \pi\text{mm}^3$
 $V = \frac{682^2}{3}\pi\text{mm}^3$

$\frac{208,333\frac{1}{3}\pi\text{mm}^3}{682\frac{2}{3}\pi\text{mm}^3}$
 Marbles for one piece → $= 305\frac{3}{16} \cdot 15$
 $= 4577\frac{163}{120}$
 140

Three Key Components of the Math Badging System

- Content and Practice Expectations
- Learning Principles
- Criteria for Success

Which one excites you the most?

What one will have the greatest impact on students?

What questions surface for you?



**Come off
mute or share in
the chat!**

04

Task 2: Expectations and Learning Principles

Let's Do Some Math!

Task 2: Design a Controller Prompt

Part 1: Design a Controller

You are a small business owner, and you will create a new controller design for your favorite gaming system. You plan to sell your controller on an online store to reach a greater market.

- 1. Sketch a design of the controller. Consider the shapes you'll use in your redesign: a prism, cone, pyramid, or some combination of these shapes [or any three-dimensional geometric figure you can describe.]*
- 2. Determine the dimensions. How much material will this design need?*
- 3. Explore how companies are approaching eco-friendly products. What did you learn? Why might this be important?*
- 4. What do you want to aspire to as you reflect on the design of your product?* Invite students to revisit and redesign their item.

Part 2: Design a Package

Your job is to design an eco-friendly package for shipping the controller you designed.

- 1. Explore how other products are currently packaged. How eco-friendly are the current designs? How can the current design be improved upon? What elements in your analysis would make the packaging more eco-friendly?*
- 2. Design an eco-friendly way to package the controller you imagined in Part 1. Make note of packaging shape and dimensions.*
- 3. Draft a presentation that illustrates the design of the controller and packaging.*
Within your presentation
 - a. prove the controller fits*
 - b. share how your design is more eco-friendly than what is currently used*
 - c. share the benefits and drawbacks of packaging items like your design compared to the ones we see in stores*

Do the task as a student would. Jot down any reflections that you have as you do the math!

Content and Practice Expectations

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Content and Practice Expectations

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- 4. What do you want to aspire to as you reflect on the design of your product?* Invite students to revisit and redesign their item.

Part 2: Design a Package

Your job is to design an eco-friendly package for shipping the controller you designed.

- 1. Explore how other products are currently packaged. How eco-friendly are the current designs? How can the current design be improved upon? What elements in your analysis would make the packaging more eco-friendly?*
- 2. Design an eco-friendly way to package the controller you imagined in Part 1. Make note of packaging shape and dimensions.*
- 3. Draft a presentation that illustrates the design of the controller and packaging.*
Within your presentation
 - a. prove the controller fits*
 - b. share how your design is more eco-friendly than what is currently used*
 - c. share the benefits and drawbacks of packaging items like your design compared to the ones we see in stores*

151.d: Apply geometric methods to solve design problems.

Learning Principles

In M151 Modeling with Geometry, students will employ the following learning principles:

- Engage with cognitively demanding tasks in heterogeneous settings (LP 1).
- Engage in social activities (LP 2).
- Build conceptual understanding through reasoning (LP 3).
- Have agency in their learning (LP 4).
- View mathematics as a human endeavor across centuries (LP 5).
- See mathematics as relevant (LP 6).
- Employ technology as a tool for problem-solving and understanding (LP 7).

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Which of these principles does this task lend itself to? Which ones can the task be easily adapted to accommodate?

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**Share what
you came up
with!**

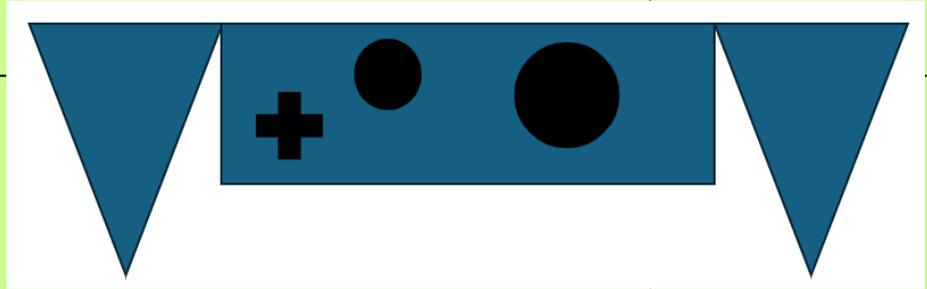
05

Task 2: Student Work

Round 1: What do you notice?

Jot down one thing you notice about this piece of student work..

Come off mute and share what you saw!



The controller fits

- Proof: This is because they controller is smaller than the size of the cardboard box.
- This is because the controllers volume is 45.864in and the surface area is 29.6223in squared.
- The box is

Round 1: What do you notice?

Jot down one thing you notice about this piece of student work..

Come off mute and share what you saw!

Part 1: Design Phase (Option 1—Game Controller)

You are a small business owner and you will create a new controller (or gaming device) for your favorite gaming system. You plan to sell your product on an online store to reach a greater market.

1. Consider the **qualities** that make a controller effective for gaming and identify design elements that may hinder its usability.
2. Create a rough **sketch** of your controller or gaming device design.
Consider the shapes you'll use in your redesign: a prism, cone, pyramid, or some combination of these shapes for any three-dimensional geometric figure you can describe.]
3. Determine the **size/dimensions** of your product.

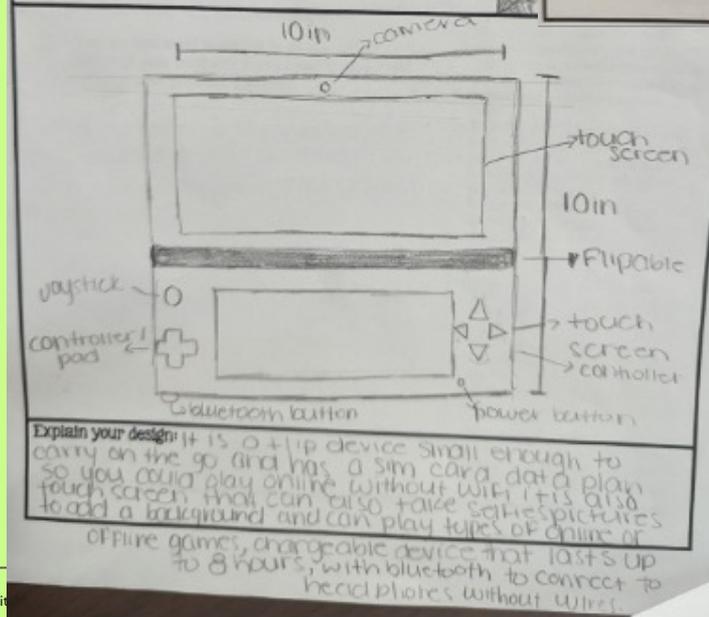
Part 3: Material Estimate

1. How much material will this design need?

- plastic
- glass
- rubber
- batteries
- wireless connectivity
- vibration motor
- wires

2. What is the cost estimate?

around \$300



Explain your design: It is a flip device small enough to carry on the go and has a sim card data plan so you could play online without wifi. It is also touch screen that can also take screenshots to add a background and can play types of online or offline games, chargeable device that lasts up to 8 hours, with bluetooth to connect to head phones without wires.

Round 2: What evidence of learning is there?

151.b: Use geometric shapes, their measures, and their properties to describe objects.

Let's examine some work together:

Conference and Provide Revision Support

The student's artifact shows evidence of an emerging understanding of the expectations of the indicator(s). After conferencing and additional instruction/learning, the student may provide a revised or different artifact as evidence of the indicator(s).

Accept with Revision

The student's artifact shows evidence of approaching a full understanding of the expectations of the indicator(s). The artifact may contain execution errors that should be corrected in revision. The student may revise the selected artifact or submit a different artifact.

Accept

The student's artifact demonstrates evidence that they have met the expectations of the indicator(s).

Examining Student Work

The image shows a digital workspace interface for reviewing student work. At the top, there are three buttons: "Conference and Provide Revision Support", "Accept with Revision", and "Accept". On the left side, there is a vertical toolbar with several icons: a pencil, an eraser, a mouse cursor, a document icon (highlighted with a red circle and a red arrow), a photo icon, a circle icon, a text box icon, and a scissors icon. In the center of the workspace, a large red callout bubble contains the text "Put your thoughts on the Jamboard!". In the bottom right corner, there is a red circular badge with the text "Work Sample 1".

Example #1 — Jamboard Frame 5

Let's norm our feedback

Part 1: Design Phase (Option 1—Game Controller)

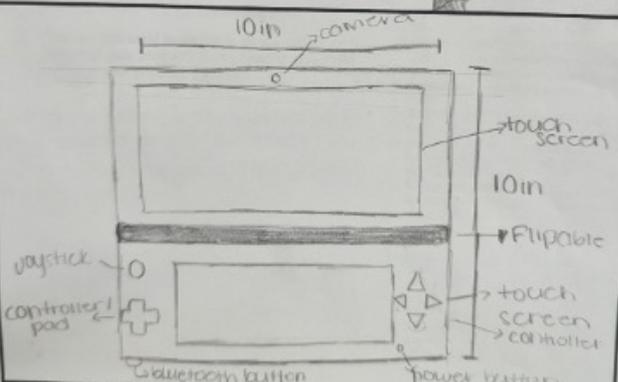
You are a small business owner and you will create a new controller (or gaming device) for your favorite gaming system. You plan to sell your product on an online store to reach a greater market.

1. Consider the **qualities** that make a controller effective for gaming and identify design elements that may hinder its usability.
2. Create a rough **sketch** of your controller or gaming device design.
Consider the shapes you'll use in your redesign: a prism, cone, pyramid, or some combination of these shapes for any three-dimensional geometric figure you can describe.]
3. Determine the **size/dimensions** of your product.

Need Inspiration:



Consider old and current gaming controllers and handheld gaming devices



Explain your design: It is a flip device small enough to carry on the go and has a sim card data plan so you could play online without wifi. It is also a touch screen that can also take self-portraits to add a background and can play types of online or offline games, chargeable device that lasts up to 8 hours, with bluetooth to connect to headphones without wires.

Part 3: Material Estimate

1. How much material will this design need?
 - plastic
 - glass
 - rubber
 - batteries
 - wireless connectivity
 - vibration motor
 - wires
2. What is the cost estimate?
around \$300

Example #2 — Jamboard Frame 6

Let's norm our
feedback

Design a Controller

Part 1: Design a Controller

You are a small business owner, and you will create a new controller design for your favorite gaming system. You plan to sell your controller on an online store to reach a greater market.

1. Sketch a design of the controller. Consider the shapes you'll use in your redesign: a prism, cone, pyramid, or some combination of these shapes [or any three-dimensional geometric figure you can describe.]

$$C = 2\pi \cdot 3 = 18.85$$



$$\pi \cdot 3^2 = 28.27$$

$$V = 28.27 \text{ in}^3$$

$$SA = 28.27 + 28.27 = 56.54 + 18.85$$

↓
75.4 in²

2. Determine the dimensions/size of your product. How much material will this design need? What do you estimate the cost to be?

75.4 in²
Diameter of bin ~~that~~ of material.
Probably \$20.00 1 inch thick

3. Explore how companies are approaching eco-friendly products. What did you learn? Why might this be important?

I learned that there are tons of materials that are eco friendly. This is important because it's better for the earth.

4. What do you want your controller to do as you reflect on the design of your product? Explain your thought process for the controller designed. Also identify any design elements that may hinder its usability.

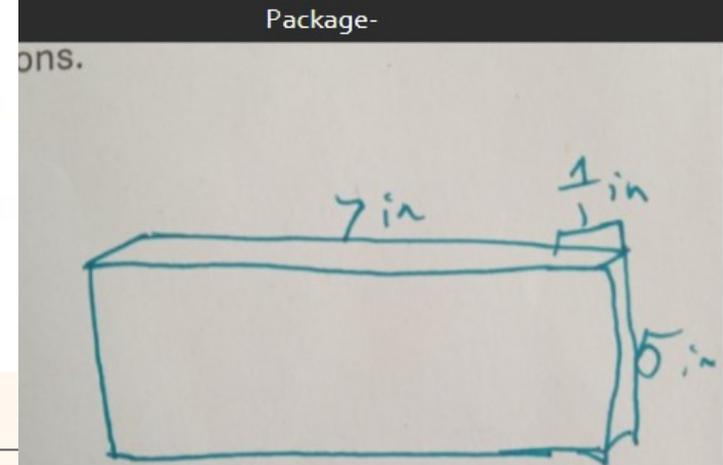
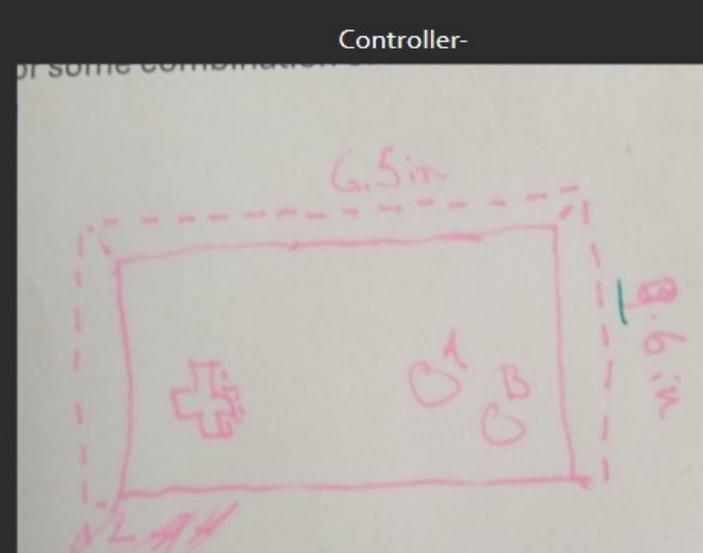
I want it to work for people to be beneficial. It's a fun shape. The circle shape is a little off. you would just have to get used to it.

Example #3 — Jamboard Frame 7

Let's norm our
feedback

Controller Fits?

- The box is rounded to the nearest tenth so the controller can fit snugly with some protective packaging.
- By the controller being 6.5X4.6X.5, and the box being 7X5X1, the controller will fully fit, and have extra room.
- The controller has a volume of 14.95 inches³ meanwhile the box has a volume of 35 inches³.
- The controller has a surface area of 70.9 inches² and the box has a surface area of 94 inches².
- The controller also has an area of 29.9 inches² meanwhile the box has an area of 35 inches².



Let's Hear Some Reflections

What kinds of support will students need to demonstrate evidence of learning?

Has your thinking changed at all on how to implement this task? If so, how?

**Come off
mute or share in
the chat!**

06

Closing

What Are Your Takeaways?

Choose one question to respond to:

1. Which content and practice expectation are you most excited about? Why?
2. Which learning principle are you most excited about connecting to M151 content? Why?
3. What impact do you think using a portfolio system will have on your students? Why?