

Project Pop Box

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Workplace and Apprenticeship Mathematics 10

St. Joseph High School

Project Pop Box

SUMMARY

Your task, as a group, will be to design a more efficient pop box. You will validate your design with surface area and volume calculations. **It is not necessary to design a box that holds 12 cans:** In fact, as designers, you can make any design decision that you like *provided that* you can logically justify why the design is more effective.

Your group will brainstorm, take accurate measurements, develop nets, construct a prototype, and write a sales pitch for your design.

Keep in mind that commerce relies on more than mathematical efficiency. If your goal is to sell more pop, rather than to save cardboard, design your box accordingly.

STAGES

- Brainstorming / proposal
- Measurements
- Net
- Calculations
- Construction
- Sales pitch

FINAL PRODUCT

At the end of the process, your group will submit a portfolio that includes:

- A proposal
- A life-size net of the box, labeled with all measurements
- Calculations of the surface area
- Calculations of the volume (total et empty space)
- A sales pitch explaining, in 250 words or less, why your design is more effective than the pop boxes currently on the market
- A life-size prototype

All final work must be neat, easy to read, and organized in a logical fashion.

Group Contract

Group Members:

Our Agreement

- We promise to **listen** to each other's ideas with respect.
- We promise to complete assigned work **to the best of our abilities**.
- We promise to **ask for help** if we need it.
- We promise to **share responsibility** and **workload** during all steps of the project.
- We promise to submit work that is **our own**.

If someone in the group breaks one or more of these promises, the group has the right to call a meeting with the teacher and ask the person to follow the rules.

If the group member continues to break these promises, the teacher has the right to remove the student from the group, **who will then be required to submit their own project**.

Date: _____

Signatures of group members:

Project Pop Box Calendar 2017

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
September 17	September 18	September 19	September 20	September 21 Checkpoint: Brainstorming & Proposal	September 22	September 23
September 24	September 25	September 26	September 27 Checkpoint: Measurements & Net	September 28	September 29	September 30
October 1	October 2 Checkpoint: Calculations	October 3	October 4	October 5 Checkpoint: Calculations & Sales Pitch	October 6	October 7
October 8	October 9 TRADE SHOW <i>The End</i>	October 10	October 11	October 12	October 13	October 14

Project Pop Box

Checkpoint Rubric: Brainstorming and Proposal

Date: _____

Teacher Signature: _____

Expectations not met

Expectations

Expectations met or exceeded

Brainstorming

The group worked together to choose a design that everyone is satisfied with. They spent time and effort considering different options and their various advantages and disadvantages.

Documentation

The group supplies documentation (in rough draft form) of their developing ideas. They are logically organized and include commentary.

Proposition

The group's proposal is detailed and complete, explaining clearly why the design was chosen (mathematical, economic, and/or aesthetic reasons).

Diagram of proposed box

A diagram of the proposed box has been sketched, clearly detailing the various facets of the proposed design.

Organisation

The proposal (description and diagram) is clear, easy to read, and organized in a logical fashion.

Project Pop Box

Checkpoint Rubric: Measurements and Net

Date: _____

Teacher Signature: _____

Expectations not met

Expectations

Expectations met or exceeded

Net (WA10.3, WA10.4)

The group provides a clearly and neatly drawn life-size net that includes all components necessary to create the proposed design.

Measurements (WA10.3, WA10.4)

The group provides all necessary measurements such that the net can be easily reproduced (e.g., lengths, widths, radii, etc.) in SI units.

Details

The net includes all details that are necessary to create a functional and realistic design, including flaps and a handle.

Precision (WA10.3, WA10.4, WA10.9)

The net has been carefully drawn using the necessary tools (e.g., ruler, compass, protractor). Lines that should be parallel are parallel, and the group can explain how to verify whether this is the case.

Curriculum outcomes:

WA10.3: Demonstrate understanding of measurement systems, including the Système International (SI).

WA10.4: Demonstrate understanding of linear measurement, including units in the SI system of measurement.

WA10.9: Demonstrate understanding of angles, including drawing and sketching angles, reproducing and constructing angles, and relating angles to parallel, perpendicular, and transversal lines.

Project Pop Box

Checkpoint Rubric: Calculations

Date: _____

Teacher Signature: _____

Expectations not met

Expectations

Expectations met or exceeded

Surface area (WA10.5)

The group provides an accurate calculation of the surface area of the box, in SI units. All components of the box have been taken into account, including flaps. All work is shown.

Volume of box (WA10.4)

The group provides an accurate calculation of the volume of the box, in SI units. All work is shown.

Empty space (WA10.4)

The group provides an accurate calculation of the empty space in the box, in SI units. All work is shown.

Organisation

The calculations are complete and organized in a logical fashion. Headings (e.g., "Volume of a Can") make the work easy to follow.

Curriculum outcomes:

WA10.4: Demonstrate understanding of linear measurement, including units in the SI system of measurement.

WA10.5: Demonstrate understanding of area of 2-D shapes and surface area of 3-D objects including units in SI systems of measurement.

Project Pop Box

Checkpoint Rubric: Construction

Date: _____

Teacher Signature: _____

Expectations not met

Expectations

Expectations met or exceeded

Working design

The box has been fully constructed and assembled. It holds the planned number of cans.

Visual appeal and precision

The box has been constructed with care; attention to detail is evident in all aspects of the final product. It is clear that the group spent time creating a quality product using the necessary tools (ruler, protractor, etc.)

Checkpoint Rubric: Sales Pitch

Date: _____

Teacher Signature: _____

Persuasion

The group presents well-developed, convincing arguments to “sell” their design. They speak to the aesthetics, efficiency, and economics of the design, among other relevant aspects.

Knowledge of the product

The group responds to questions in a way that demonstrates their comprehensive knowledge of their design. It is clear that the group has considered the various advantages and drawbacks of the box.

Preparation

The group has provided a role to each member during the presentation. The presentation is clear and coherent. It is clear that the group has spent some time preparing in advance.

Project Pop Box Daily Log

Date: _____

Attendance:

Work summary:

Goals for tomorrow:

Difficulties/issues to resolve:

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