

Science and Technology

Culminating Performance Plan

 1. *Science and Technology: Structures and Mechanisms –
Everyday Structures*

 2. *Grade One*

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3. Enduring Understandings

- 1) **Students will understand that** structures have distinctive characteristics.
- 2) **Students will understand that** structures meet specific needs by designing and making structures.
- 3) **Students will understand that** structures have different characteristics and different ways of being made as well as recognize and use some of the systems in the home or at school.

4. Essential Questions

1) Interpretation

How do the different materials available around us, affect the types of structures that are built? (1,2,3,4,6,7,9,10,11,15,17,20)

2) Explanation

What are the functions of certain structures and their corresponding characteristics? (5,9,11,15,16,21)

(E.g., different types of buildings need different types of sizes, materials and have specific functions – apartment building, small house, police station, and gas station)

3) Application

How would you build Petiteville using the designing and building techniques that you've learned? Demonstrate these skills by building a structure.
(7,8,11,12,13,14,18,19)

4) Empathy

How would it feel to be really, really small? How would it feel to be the Small family living in a city that you don't fit into? (15,20,22)

5) Self-Knowledge

How is your life affected by the everyday structures that surround you?
(12,13,14,22)

6) Perspective

How do people adapt their structures to suit their needs (climate)? (12,13,15,20)

E.g., show different types of structures in different climates, like houses, police stations, fire stations, in the Northwest Territories, PEI, BC etc...



5. Related Curriculum Areas

Science: Everyday Structures

O1, O2, O3: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22

Health and Physical Education: Active Participation

O3: S2, S3, S6

Arts: Visual Arts

O1: S5, S8

Arts: Drama and Dance

O2: S12

Mathematics: Measurement

O1, O2, O3, O4: S1, S2, S3, S4, S6, S12

Mathematics: Data Management and Probability

O1: S2, S3, S4

Mathematics – Patterning and Algebra

O1: S2

Mathematics: Geometry

O1, O2: S1, S2, S3, S4, Ss5, S16

Language: Writing

O1: S8

Language: Reading

O1, O2, O3: S5, S6

Social Studies: Canada and World Connections

O1, O2, O3: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10, S11, S11, S12, S13, S14, S15, S16, S17, S18, S19, S20, S21, S22

**6. Assessment and Evaluation**

The purpose of the culminating performance plan is for the students to demonstrate their understanding and proficiency in the general expectations stated above. The specific expectations that will be addressed in the culminating performance are as follows:

Science: Everyday Structures

O1, O2, O3: S6, S7, S12, S13, S14, S16

Arts: Visual Arts

O1: S9, S11

Language: Writing

O1: S1, S3, S5, S6, S7, S8

Social Studies: Canada and World Connections

O2: S19

Several methods will be used in assessing both the process and the product of the culminating performance plan.

Process assessment methods:

Process assessment methods will be of two kinds. The first kind will be a peer/group checklist, which will be given periodically in order to monitor students' behaviors. A second method will be journal writings, in which students will express difficulties, interests, and attitudes about the project.

Product Assessment methods:

There will be two rubrics and a checklist. One rubric will focus on assessing the promotional invitation; grammar, punctuation, spelling and creativity will be assessed. The second rubric will focus on the actual construction of the product, the choice of materials, the overall aesthetic effect of the structure. A checklist will assess the design of the structure focusing on completeness, creativity and whether research and thought were present in the design process.



7. Culminating Performance

Help build Petiteville

Mr and Mrs Small, their two children Teeny and Weeny and their little dog Spot have moved to Ottawa. But Ottawa is much too big. Yesterday Weeny got lost and Spot was almost stepped on. They need to live in a city that is small and safe. Can you help them? Can you create a city for the Small family?

Small groups will design and build structures (houses, buildings, community buildings, etc...) that look like the structures they see everyday, but they must be scaled so that the Small family can live in them. Classroom materials, as well as items collected by students and the teacher will be used to create the city. In order to build a fully functioning city for the Smalls, the children must build structures that match the needs of the Small family and future members of Petiteville. Structures will be assigned to students randomly.

Students will be placed into groups of two. Each pair of students will participate in four learning activities. Students will first take on the role of designer; they will draw a blueprint of their structure and include a list of all required materials. The second learning activity will place students into the role of researcher. They will research their structure. They will research the necessary features of their structure, the design, and the required materials. This information can be obtained through investigating, books, brochures, and magazines, the Internet etc. The third learning activity is the Promoter activity, in which students will produce an invitation promoting their structure and Petiteville to potential Petiteville community members. This invitation can be produced on a teacher created computer template.

After the completion of the three learning activities, students will book a conference time with their teacher. They will present (informally) their proposal to the teacher. This is a time for teacher feedback. Those that have successfully completed the three learning activities will be permitted to complete the assignment.

The last learning activity is the actual construction of the structure. Students in pairs will produce one building structure that fits the requirements of

their research and includes all relevant features. All completed structures will be put together to create the Petiteville community. Students in their groups (pairs) will present (informally) their structure to the class, the Small family and potential Petiteville community members.

G – Builders Wanted! You have been hired by the Petiteville builders. The Petiteville community has some new guests: the Small family. The only thing is, these guests are very, very small. The whole class will participate in building a fully functional model of a community to scale for the Small family and potential members of the Petiteville community.

R – You as Petiteville designers/builders will create a functional community for the Small family and future Petiteville community members.

A – The audience for this project is the Small family and potential Petiteville community members.

P – Your team will research, design, promote and build a structure for the Petiteville community. This structure must include all relevant features, be to scale to fit the Small family's needs and be visually appealing.

E – Your product and presentation must meet the following criteria:

Product: an assigned structure for Petiteville

- Blueprint of their structure and include a list of all required materials.
- Students will produce an invitation (created on computer template) promoting their structure and Petiteville to potential Petiteville community members.
- Produce one building structure that fits the requirements of their research and includes all relevant features.

Model Used for Inquiry and Design:

The students will use the S.P.I.C.E. model for inquiry and design while working on the culminating performance.

Situation- Mr. And Mrs. Small are not safe in Ottawa. They are just too small. They need a community that is better suited for them. A community that is much smaller. They need a new house and all of the building that are found in a community. Hopefully once Petiteville is built, other small families will become members of the Petiteville community.

Problem- As designers and builders, you need to consider the needs of the Small family, what type of structure would be best suited to their new environment, as well as consider how their other communal needs will be met.

Investigate- First, we will do some research using the internet, books, encyclopaedias, magazines, television, radio, newspapers, etc to discover what is necessary to build a community. The students will experiment with different types of materials to make structures, as well as discuss and consider the different types of community functions and services (police stations, hospital, school, bank, stores, roads, water, electricity, etc) that will need to be fulfilled for the Small family to survive.

Construct- Students will work with a partner to research design, advertise and construct a part of the community. Designer will design the blueprints of their part of the community and determine what supplies will be used. Researcher will explore the function of their building and what makes up the buildings (ex. Fire station needs a garage and a pole). Advertiser will create invitations to promote Petiteville to other potential community members. Builders will be responsible to construct their part of the city using the following materials: paper, pencils, crayons, scissors, glue, straw, pipe cleaners, pins, plasticine, junk (boxes, tubes, etc), wooden stir sticks, paint, wood, markers, plastic stir sticks, popsicle sticks, construction paper, tissue paper, cardboard, plastic bags, saran wrap, toothpicks, tape, sparkles, glitter, stickers, gift wrap, etc.

Evaluate- Once the class begins the research and design process, the teacher and students will begin to see how Petiteville will be built. We will be able to see whether some changes might be needed, or whether additional buildings should be built. At this time before the constructions of the buildings Petiteville will be reassessed by student-teacher conferencing.



8. Technology

Students will take three pictures of their buildings in progress. They will begin by taking a picture of the materials they will need to build their building. They will take a picture of their building at the halfway point and will take the last picture of their building when it is completed. These pictures will be used as part of the invitation promoting their structure and Petiteville.

Students in the role of promoter will produce an invitation promoting Petiteville using an invitation computer template to be created by the teacher.



9. Inclusive Education

Adaptations for exceptional children:

Attention deficit hyperactivity disorder (ADHD):

Adaptations for children with attention deficit hyperactivity disorder (ADHD) must address the three primary characteristics of ADHD: impulsivity, hyperactivity, and distractibility. For those children having trouble doing too many tasks at one time, or remembering instructions, we will break up the task of

building the house over several days; we will provide checklists so that tasks are done sequentially, and provide a peer tutor (students are already in partners). Instructions will be transmitted verbally as well as visually. Since this culminating performance is a hands on experience, students with ADHD will be busy with various hands on activities that will focus their attention making completion of the task inevitable. Distractions will be minimized because the students are active participants in their learning process.

Extending the Culminating Performance

Those who finish their tasks early will have the option of taking on the role of either consultants or helpers to other students. These students will have the option of painting their structures in elaborate ways, or allow them to create another structure to add to the community, either in the form of another community structure, or simply an addition to an existing structure (e.g., a garage of a house, bedrooms in the house, outdoor pool). We will also allow these students to help the teacher in creating “extras” for Petiteville (e.g., trees, roads, parks, lawns, fences, street signs, etc). As more formal extensions to the activity, students may write stories about the Small family. Students may also have the option of drawing Petiteville from different perspectives, the end result of which would be a large poster/picture of the city.

Considerations for different learning styles:

This culminating performance is suited for visual, tactile/kinaesthetic learners because it is hands on, students will be active learners. Students will have a visual representation of the dynamics of a community through the various activities. Activities are varied (research, hands on construction, writing tasks, creative, and artistic) enabling students to experience a variety of learning opportunities and movement throughout the classroom. This culminating performance is an authentic project, which places students in real life professions/roles to solve a realistic dilemma.



10. Learning Experiences

- Create tools, exploring tool use
- Three little pigs –dramatic presentation
- City Mouse/Country Mouse –comparing different living situations
- Games: Oregon Trail –Pioneer computer game, Tetris, Jenga, London Bridge, Snakes and Ladders (phys-ed)
- Build an icehouse; build gingerbread house –whole class activity
- Students will individually or small group make a popsicle stick house – using only glue
- Lego Block Center
- Community workers –explore professions that build structures –architect, construction worker, engineer –bring speaker to class
- Brainstorm what materials are required to build a house
- Geography –exploration of communities

- Make a paper-origami house
- Make a house booklet, one page for each room in the house, plus an information sheet on it
- Excursion outside to see different houses, various community places, check to see their shapes, combinations of shapes
- Make house pictures with shapes
- Make house cut outs with nets (practice fine motor skills)
- Make patterns with shapes
- Classify structures
- Sorting structures and materials by function

Construction of Product Rubric

Level 1	Level 2	Level 3	Level 4
Ineffective construction of structure.	Moderately effective construction of structure.	Effective construction of structure.	Highly effective construction of structure.
Rarely used appropriate natural and manufactured materials to make structures.	Occasionally used appropriate natural and manufactured materials to make structures.	Frequently used appropriate natural and manufactured materials to make structures.	Always used appropriate natural and manufactured materials to make structures.
Rarely used tools appropriately when joining various materials.	Sometimes used tools appropriately when joining various materials.	Frequently used tools appropriately when joining various materials.	Always used tools appropriately when joining various materials.
Scale of structure has major inaccuracies.	Scale of structure is inaccurate.	Scale of structure is generally accurate.	Scale of structure is accurate.
There is no aesthetic appeal to the house.	There has been an attempt to make the house look appealing.	The structure is appealing.	The structure is aesthetically appealing.
Structure falls below expectations.	Structure approached expectations.	Structure met expectations.	Structure exceeded expectations.

Design of Structure

Design of Structure Checklist	YES	NO
Blueprint of structure is complete.		
Blueprint of structure is original and creative.		
Blueprint of structure is neat.		
A list of supplies is included.		
Supplies are appropriate.		
Design of structure includes all relevant features.		
Function of structure is clearly explained.		
Evident structure has been researched.		
Design of structure well thought out.		

Promotional Invitation Assessment

	Achievement falls much below the standard.	Achievement approaches the standard.	Achievement meets the standard.	Achievement exceeds the standard.
Written in simple, complete sentences				
Used a period at the end of a statement.				
Correctly spelled words identified by the teacher.				
Used phonics to spell unfamiliar words.				
Used capitals to begin sentences and to differentiate certain words				
Used words from their oral vocabulary as well as less familiar words from class- displayed word lists				
Used computer template to create invitation.				
Clear explanation of structure.				
Clearly explains function of structure.				
Creative use of computer and design				
Creative content.				
Invitation clearly promotes Petiteville.				

