Schulich SCHOOL OF EDUCATION | NIPISSING UNIVERSITY

Lesson Plan Template

1. Lesson Plan Information	
Subject/Course: Mathematics	**Name:** Tom Vockeroth
Grade Level: 5	**Date:** December 1st 2010 **Time:**
Topic: Geometry and Spatial Sense	**Length of Period:** 60 minutes

2. Expectation(s)

Expectation(s) (*Directly from The Ontario Curriculum):*

- distinguish among prisms, right prisms, pyramids, and other three-dimensional figures;
- identify prisms and pyramids from their nets;
- construct nets of prisms and pyramids, using a variety of tools (e.g., grid paper, isometric dot paper, Polydrons, computer application).

Learning Skills *(Where applicable):*

3. Content

What do I want the learners to know and/or be able to do?

Properties of Polyhedra, a 3-D figure with faces made up of polygons:

- Number or type of faces
- Number of edges
- Number of vertices
- Parallelism

Prism properties: A prism is a solid geometric figure whose two ends are parallel and congruent polygons, called bases. Lines joining corresponding points on the bases are always parallel. The sides of prisms are always parallelograms. Prisms are named according to the shape of their base.

Right prism: The vertical edges of the prism are perpendicular to the edges of the base.

Pyramid properties: A pyramid is a polyhedron whose base is a polygon and whose other faces are triangles that meet at a common vertex. Pyramids are named according to the shape of their base.

Today learners will:

4. Assessment (collect data) / Evaluation (interpret data)
(Recording Devices (where applicable): anecdotal record, checklist, rating scale, rubric)

Based on the application, how will I know students have learned what I intended?

The teacher be using diagnostic assessment, and formative assessment, using anecdotal notes, to monitor the students knowledge and ability to use their knowledge to create nets.

5. Learning Context

A. The Learners

(i) *What prior experiences, knowledge and skills do the learners bring with them to this learning experience?*

In the primary grades, students learn to recognize and describe some geometric properties of three-dimensional figures, such as the number and shape of faces and the number of edges or vertices. For the most part, they explore these properties concretely, using models of three-dimensional figures, though they also begin to investigate nets of rectangular prisms.
Learning about geometric properties allows students to develop the concepts and language they need to analyze and describe three-dimensional figures, and to discover relationships between two- and three-dimensional geometry. Experiences in the primary classroom include identifying, comparing, sorting, and classifying figures according to their basic properties, and making connections between two-dimensional shapes and three-dimensional figures.

(ii) *How will I differentiate the instruction (content, process and/or product) to ensure the inclusion of all learners?* (Must include where applicable accommodations and/or modifications for learners identified as exceptional.)

B. Learning Environment

Regular Classroom

C. Resources/Materials

- Smartboard
- Pre-made smartboard lesson sheet.
- Polydron pieces
- Premade polydron tetrahedral prisms and pyramids
- Graph or dot paper

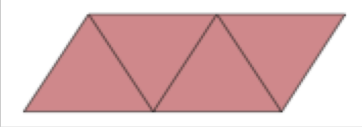
6. Teaching/Learning Strategies

INTRODUCTION
***How will I engage the learners?* (e.g., motivational strategy, hook, activation of learners' prior knowledge, activities, procedures, compelling problem)**

The teacher will tell the students that he decided that he doesn't want to use the textbook today. So, they can clear their desks of all books.

MIDDLE:
<u>Teaching</u>: *How does the lesson develop?*
How we teach new concepts, processes (e.g., gradual release of responsibility - modeled, shared, and guided instruction).

The teacher will show students the net for a triangular pyramid constructed from Polydron pieces.

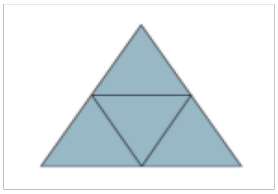


The teacher will ask students what an arrangement of two-dimensional faces is called (net). Ask students to predict the three-dimensional figure that will be created by folding the net. "How do you know?"
Try to elicit properties of the three-dimensional figure that are evident in the net – that is, the number and shapes of the faces. Ask students to be specific in identifying the two- dimensional faces – that is, equilateral triangular faces. Invite a student to test the prediction by folding the net.

Discuss the two names we use for this particular three-dimensional figure – triangular pyramid and tetrahedron. Discuss why the figure is named in both of these ways (pyramids are named for their base; polyhedra in general are named for the number of polygonal faces – tetra means "four").

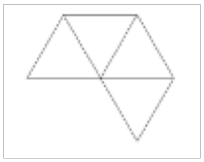
Unfold the net to form the same net you originally showed to the students. On a smartboard, draw the net for the tetrahedron, and display it.
Then ask: "Is it possible to arrange the faces differently and still end up with the same three- dimensional figure?" Invite another student to unfold the triangular pyramid to create a net that is different from the original one.

The student should construct a net made with 3 triangles surrounding one triangle.



If the student unfolds the figure to create the same net, only reflected and/or rotated, ask the class whether the net is, in fact, a different net. If necessary, rotate the net in your hands to allow the students to see that the net is actually the same one you started the activity with.

Draw the new net on the smartboard. Next, draw the following arrangement of triangular faces on the transparency:



Ask: "What about this arrangement of four triangular faces? Will it fold to make a triangular pyramid? Explain why it is or is not a net for a tetrahedron." (It is not a net, because two of the triangles will overlap when the arrangement is folded, and there will be no base.)

<u>Consolidation and/or Recapitulation Process</u>*: How will I bring all the important ideas from the learning experiences together for/with the students? How will I check for understanding?*

Explain to students that there are sometimes many different nets for a given three-dimensional figure. The triangular pyramid, or tetrahedron, has only the two shown above. Students will now explore different nets of another pyramid.

<u>Application</u>: What *will learners do to demonstrate their learning?* (Moving from guided, scaffolded practice, and gradual release of responsibility.)

The students will work in groups of 4, using polydron pieces, to create as many nets of a triangular prism as they can. Students will document their nets on a piece of graph paper. They will discuss amongst themselves whether

they are in fact making new nets, or duplicate nets.

CONCLUSION: ***How will I conclude the lesson?***

The teacher will ask the students what 3-D figures they learned about today, and ask them what properties they have.

7. My Reflections on the Lesson

What do I need to do to become more effective as a teacher in supporting student learning?

This lesson went very well. It gave me a good idea of what the students already knew in terms of 3-D objects. And they seemed to really enjoy working in small groups. This is the second day in a row that I have used problem based learning, and the students have already responded to it better today than they did yesterday. Their curiosity was apparent throughout the group work.

Some of the students continue to have difficulty working in a group. Next time I do group work I will ask students if they can tell me some tips to working in a group. I will then ask them for a fair way to share the work with manipulatives.

I will also get a student to repeat the activity instructions to me after I have said them once.