Group Activities with Geometry Applications in a Prealgebra Class

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Designing Group Activities to Promote Engagement and Learning

January 20 2018
Outline...

1. Group activities from experts’ view

2. My Prealgebra Class Setting
   - Textbook
   - Students

3. Group Activities with a focus on Geometry Applications
   - Perimeter and Area
   - Volume and Surface Area

4. Assessment summary

5. Concluding remarks
Group activities from experts’ view...

There are five aspects of cooperative learning (or group activity) that drive its success

**Positive Interdependence:** Students must see that each group member’s efforts are important to both individual and team success.

**Promotive Interaction:** Students must empower each other by offering help, praise, feedback and resources.

**Accountability:** Each student must accept responsibility for fulfilling his or her role, helping the team reach its learning goals.

**Soft Skills Instruction:** Because students need to develop interpersonal skills to effectively work together, you should give lessons and activities about teamwork.

**Group Processing:** As a group, students should strategize how to meet their learning goals.

These aspects work slightly differently depending on which type of cooperative learning you use.

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My Prealgebra Class

Course: MATH-192: Basic Math & and Prealgebra (5 units), Fall 2017

Lecture: MTWTh 12:45–02:00pm


Homework: Via MyMathLab

Evaluation: Homework (15%), four tests (60%) and final (25%)
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The students

- 28 students registered; 25 being active; 2 international;
- 24 working full-time/part-time;
- lost their confidence in mathematics for sometime;
- need a motivation to push them forward!

My goal and priority:

- inspire the students to love learning mathematics;
- keep them engaged in classroom activities (more importantly, keep them coming to the class regularly!)
- equip the students with the tools they need for their future education.
The students

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The students
Activities

- Finding the perimeter and area of squares, rectangles, triangles, parallelograms and irregular shapes.
- Finding the volume and surface area of rectangular solids, cylinders;
- Pythagorean Theorem; Circles;
Using the white board:

**Definition:** The distance around the outside edges of any flat shape is called the **perimeter** of the shape.

**Examples:** Let students work individually on several examples while carefully providing them the concepts of squares, rectangles, triangles and parallelograms.

However, some difficulties arise...
Group activities:

Goals:

- Apply directly what they have learned from white board to real life situations;
- Get students talking and helping each other as a group;
- Of course, have more FUN!

How to conduct:

- Divide the students in group of three.
- Provide prepared materials including measuring tapes, objects with different shapes. (Warning: it might take you extra time to do so!);
- Tasks:
  - Identify and name the shapes of objects correctly;
  - Use provided tapes to find actual dimensions;
  - Evaluate perimeters and areas;
  - Then write a detailed report of activity.
Group Activities with a focus on Geometry Applications

Perimeter and Area

Activities in Prealgebra Class

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Group Activities with a focus on Geometry Applications

Perimeter and Area

Activities in Prealgebra Class

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Group Activities with a focus on Geometry Applications

Perimeter and Area

Activities in Prealgebra Class

Jan 2018
Learning outcomes observed

The students can

- Use the skills: rounding, estimating, arithmetic operations, etc;
- Learn how to find the height of triangles and parallelograms;
- Solve more difficult problems;
- Relate theoretical concepts to applications;
- Enjoy the activity (with some physical exercise).

My students are connected!
Learning outcomes observed

The students can

- Use the skills: rounding, estimating, arithmetic operations, etc;
- Learn how to find the height of triangles and parallelograms;
- Solve more difficult problems;
- Relate theoretical concepts to applications;
- Enjoy the activity (with some physical exercise).

My students are connected!
Short pause...
Group activities are set up similarly to the previous one. Also,

- I ask groups to bring objects: rectangular solids and cylinders;
- The activity is conducted outdoors;
- I prepare formula sheets and report sheets;
Outdoor Activity:
Outdoor Activity:
Outdoor Activity:
Assessment

For the final exam,

- No textbook, calculator or notebook allowed during the final;
- 25 active students → 25 taking the final!

I have placed only one question (out of 25) related to geometry applications:

What is the area of a rectangular that has the width of 12 ft and the length of 22 ft?
Assessment summary

- 12 Correct
- 13 Incorrect

48% Correct, 52% Incorrect
Analyzing the mistakes

In 13 incorrect answers, there are

- Using formula for perimeter (5);
- Using formula for triangle area (4);
- Using Pythagorean Theorem (1);
- Incorrect calculation (1);
- Create new formula: $2(22)^2 + 2(12)^2!$ (1);
- Leave empty (1);

Some challenges for the students: terminology, memory, ... In particular, it is not easy for them to distinguish geometric concepts.
Concluding remarks

- There are ways to keep students in even a prealgebra class actively engaged;
- Group activities are among the choices;
- It does not require much time and cost to create/design these fascinating activities;
- But, it does require your heart to do so!

Next question: How can I design/implement future activities to improve students’ learning?
There are ways to keep students in even a prealgebra class actively engaged;
Group activities are among the choices;
It does not require much time and cost to create/design these fascinating activities;
But, it does require your heart to do so!

**Next question:** How can I design/implement future activities to improve students’ learning?
Concluding remarks

Wrap up with students’ feedback

1. Please describe your impressions of your instructor’s effectiveness in:
   A. Teaching Style (e.g. ability to arouse student interest in the subject, etc.)
      - Mr. Anh is very good at building a relationship with his students and keeping them all involved.

   B. Knowledge of Subject
   1. Please describe your impressions of your instructor’s effectiveness in:
      A. Teaching Style (e.g. ability to arouse student interest in the subject, etc.)
      - He is a wonderful instructor who always makes learning Math fun.

   B. Knowledge of Subject
      - Funny, easy-going
      - make some activities (measure on real objects) to make students to be more interested about the lecture

I hope that my talk encourages/motives us, the educators, to use the designed instructional practices to “engage students in active learning and making this learning visible”²!

Thank you for your attention!

²Conference Flyer

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Concluding remarks

Wrap up with students’ feedback

1. Please describe your impressions of your instructor’s effectiveness in:
   A. Teaching Style (e.g. ability to arouse student interest in the subject, etc.)

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   B. Knowledge of Subject

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2 Conference Flyer

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