RETA Curriculum

This Old Castle

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Email Workshop: This Old Castle

Instructor Agenda

8:30-8:40 Let’s Put The Pieces Together!
This exercise will simulate communication among the group members. Remove the edges from
a puzzle and give each participant a puzzle piece. Ask them to assemble the puzzle

8:40-9:00 Puzzling Questions!
What kind of communication was necessary to complete the puzzle? Did spokespersons or a
leader emerge? How did you organize yourselves or did you? Would have it been easier if you
had know each other to complete the puzzle? Would it have helped to see a picture of the puzzle?
How do you solve a problem with a group? How do you moderate that much information? How
is each piece important to the finished puzzle? Could pieces be left out?

9:00-9:20 Intriguing Interviews!
Partner with someone outside of your school district. Find something non-educational that you
have in common, personal interests, etc. Introduce your partner to the rest of the group. Allow 30
minutes for the whole group to introduce their partners.

9:20-9:35 Break

9:20-10:15 Email Tutorial
Have the participants work through one of the Email tutorials.

10:15-11:45 This Old Castle
Arrange participants in groups of 5 and introduce the task. Write each
group's (Knight) email address on the board.

11:45 -12:30 Lunch

12:30-2:30 This Old Castle: Calculating Upgrades
Have the groups work on the activity. Since groups have received all the tower measurements,
they can start calculating the volume, surface, and square feet of the entire castle.

This Old Castle: Estimations and Appraisals
Each group now has a final solution for the problem. Using a distribution list they will send
ONLY their answers to all groups.

2:45-3:00 Break

2:45 - 3:00 Looking At The Whole Picture
Can they figure out which group came up with the correct answer by communicating through
Email? (Back-up plan: regular group discussion).

3:00 - 3:30 Bridge to Practice
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Spring Spruce Up

As a resident of “This Old Castle”, your dream is to be a Knight – to march on the fields of battle for Princess Reta. However, currently your assignment is in the Castle Maintenance Department (CMD). The department is buzzing over the latest proclamation read over the castle PA system by Princess Reta:

“Hear Ye! Hear Ye! Spring Spruce Up is coming!
All inhabitants of This Old Castle are hereby
Notified that the annual Spring Spruce Up
Will begin immediately!
This year’s major projects will be to
Paint the outside walls of the castle and its towers,
Put new roofing on the towers, and
Install a cooling system.”

It seems that money is especially tight this year and Princess Reta has requested refurbishing estimates. Lord Tech, Duke of Education, who is in charge of CMD, is aware that particular staff members are awaiting an opportunity to prove themselves worthy of Knighthood. Thus, he has put forth a proposal to five of his workers:

“I have a cousin who owns a hardware store and has offered to sell Princess Reta supplies at cost, but he needs to know the exact amount of supplies that are required. In order to do this, measurements of the castle will need to be calculated. You will each be supplied with the most recent diagram of This Old Castle. The only other information I possess is that the doors and windows of the castle amount to 12% of the total wall area and one gallon of paint will cover 550 square feet. You will need to search the Records Storage Vault to find the information needed to accomplish this task. The first person who determines the necessary calculations will be granted Knighthood!”

You may communicate, via Email, with two others. You MAY NOT do a list distribution with your information. Good Luck! Knighthood awaits you!
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Knight 1

Long hours of searching through dusty boxes of papers in the Vault yields bits and pieces of information:

- **Cylinder**: Volume = $\pi r^2 h$
  Lateral area = $2\pi rh$

- **Hemisphere**: Volume = $\frac{2}{3}\pi r^3$
  Lateral area = $2\pi r^2$

- The Main Hall is 120 ft long.

- Swamp Cooler: $\text{cubic ft / min} = \frac{\text{Volume of room}}{2.5}$

- The Windows and Doors, which do not need to be painted, constitute 12% of the total lateral area of the castle.

You may communicate with **Knights 3 & 5**.

Armed with this information you set to work. You must accomplish the following:

1. Compute the lateral surface area of the castle and the walls of the tower.
2. Figure the number of gallons of paint needed.
3. Determine how many square feet of roofing material will be needed for the towers.
4. Compute the volume of the castle and all the towers.
5. According to the BTU’s, determine the number of swamp coolers needed to cool the castle.
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Knight 2

Long hours of searching through dusty boxes of papers in the Vault yields bits and pieces of information:

- **Cone:**
  - Volume = \( \pi \times \text{radius}^2 \times \text{height} \)
  - Lateral area = \( 2\pi \times \text{radius} \times \text{height} \)

- **West Tower:**
  - Bottom = cylinder
  - Apex = hemisphere

- **East Tower:**
  - Radius of the East Tower is 4 ft.

- **Main Hall:**
  - Width is 60 ft.

- **Roofing Shingles:**
  - 1 box of roofing shingles will cover 0.9 sq. ft.

- **Pythagorean Theorem:**
  - \( a^2 + b^2 = c^2 \) (c = hypotenuse — slanted side)

You may communicate with **Knights 1 & 4**.

Armed with this information you set to work. You must accomplish the following:

6. Compute the lateral surface area of the castle and the walls of the tower.
7. Figure the number of gallons of paint needed.
8. Determine how many square feet of roofing material will be needed for the towers.
9. Compute the volume of the castle and all the towers.

According to the BTU’s, determine the number of swamp coolers needed to cool the castle.
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Knight 3

Long hours of searching through dusty boxes of papers in the Vault yields bits and pieces of information:

- Rectangular Prism:  
  - Volume = length * width * height  
  - Lateral area = 2 * (length + width) * height

- \( \pi = 3.14 \)

- Heights of the North, South and West Towers apex = 4 ft.

- Height of the Main Hall is 30 ft

- Swamp coolers come in the following sizes:
  - 1400 cubic ft / min
  - 2800 cubic ft / min
  - 4000 cubic ft / min
  - 6500 cubic ft / min
  - 4500 cubic ft / min

You may communicate with Knights 2 & 5.

Armed with this information you set to work. You must accomplish the following:

10. Compute the lateral surface area of the castle and the walls of the tower.
11. Figure the number of gallons of paint needed.
12. Determine how many square feet of roofing material will be needed for the towers.
13. Compute the volume of the castle and all the towers.

According to the BTU’s, determine the number of swamp coolers needed to cool the castle.
Long hours of searching through dusty boxes of papers in the Vault yields bits and pieces of information:

- One gallon of paint will cover 550 sq. ft.
- Height of all the towers is 50 ft high.
- The base of the North Tower is 6 ft square.
- Rectangular Pyramid: \[ \text{Volume} = \frac{1}{3} \times \text{length} \times \text{width} \times \text{height} \]
  \[ \text{Lateral area} = 4 \times (\text{area of a triangle}) \]
  \[ \text{Area of a Triangle} = \frac{1}{2} \times \text{base} \times \text{hypotenuse} \]

You may communicate with Knights 3 & 1.

Armed with this information you set to work. You must accomplish the following:

14. Compute the lateral surface area of the castle and the walls of the tower.
15. Figure the number of gallons of paint needed.
16. Determine how many square feet of roofing material will be needed for the towers.
17. Compute the volume of the castle and all the towers.

According to the BTU’s, determine the number of swamp coolers needed to cool the castle.
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Knight 5

Long hours of searching through dusty boxes of papers in the Vault yields bits and pieces of information:
- Main Hall is a rectangular prism.
- The base of the South Tower is 4 ft square.
- East Tower: bottom = cylinder apex = cone
- North and South Tower: bottom = rectangular prism apex = rectangular pyramid
- The slant height of the pyramids can be found using the Pythagorean formula.

You may communicate with Knights 4 & 2.

Armed with this information you set to work. You must accomplish the following:

18. Compute the lateral surface area of the castle and the walls of the tower.
19. Figure the number of gallons of paint needed.
20. Determine how many square feet of roofing material will be needed for the towers.
21. Compute the volume of the castle and all the towers.

According to the BTU’s, determine the number of swamp coolers needed to cool the castle.
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Figure Answers

Bird's Eye View