**Lesson Plan Design**

**Lesson Plan Title, and your name:** Build a Swimming Pool Erica

 **Audience Enter grade level (& special student group if applicable):** 5th grade

 **Enter time duration of the entire lesson:** 180 minutes

 **Big Idea(s)/Essential Question(s):** A water park needs help designing its new pools.

 **Enter learning goal(s) in the form of a question(s):** What will be the volume of the pool? What will be the dimensions?

**Objectives(s) Enter Your Objective(s) and correlation to district standards (state,Common Core, other):**

[CCSS.Math.Content.5.MD.C.4](http://www.corestandards.org/Math/Content/5/MD/C/4/) Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

[CCSS.Math.Content.5.MD.C.3](http://www.corestandards.org/Math/Content/5/MD/C/3/) Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

[CCSS.Math.Content.5.MD.C.5](http://www.corestandards.org/Math/Content/5/MD/C/5/) Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

[CCSS.ELA-Literacy.W.5.1](http://www.corestandards.org/ELA-Literacy/W/5/1/) Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Technology Standard 6: Locate and organize information from a variety of sources and media. (1.3.2)

**Props & Materials Enter props/materials/equipment/any learning handouts:**Challenge: You’ve been hired to design a new water park. The park needs to include: a kiddie pool, a lap pool, and a diving pool. The park is restricted to a (1,000 x 800 square piece of land).

* Support struggling students with perimeter & area info (4th grade standard)
* Graph paper
* Pool Survey
* Computers
* Internet

**Activities/Tasks/Procedures:
Lesson 1:** Research

1. Students complete survey about pools (ie: when people design swimming pools, what math skills do they need to apply?)
2. Propose challenge
3. Create a plan (ie: what is your water park called? How do you want to lay it out?)
4. Students develop questions they need to answer (ie: depth, width, and length requirements for a lap pool, kiddie pool & dive pool)
5. Students research questions

**Lesson 2:** Calculations

1. Calculate the dimensions (length, width, & depth) and volumes of each pool.
2. Sketch the pools on graph paper.
3. Add a stipulation: The governors office announced: due to the water restriction, the total volume of water cannot exceed 25,000 cubic feet.
4. Analyze dimensions and sketches. Make modifications.
5. Add a stipulation: only two pools can be rectangular prisms. The 3rd pool must be an irregular prism (ie: 2 rectangular prisms, triangular prism, or cylinder).
6. Analyze dimensions and sketches. Make modifications.
7. Evaluate popularity. Research popular sizes and shapes of pools. (ie: how many laps does a lap pool typically have? How is a kiddie pool typically formatted)
8. Write an opinion paragraph: what makes your water park stand out.

**Lesson 3:** Create a presentation

1. Create a proposal: Now that you’ve established your pools shapes and sizes, you need to present your plan to the city council. Your proposal must include visuals of each pool (dimensions & volume), a layout of the park, and your opinion paragraph.

**Any Special Reminders:**Lap pool requirements: depth 5 ft, length 25 yards, width 5 ft/lane

Kiddie pool requirements: depth 24 in

Dive pool requirements: depth 15 ft, length & width 20 ft

**Enter anything you want to remember to pay attention to:**Check in with groups on the pool requirements they found.

Differentiation:

* Extension: the lap pool and dive pool need a sloped floor. Add a slide with a pool.
* Additional Support: provide dimensions.

Assignment # 5-A:

I taught the second lesson with a small group this week. I ended up providing students with the pool requirements in Washington state due to lack of time. We had a good discussion on what good shapes and sizes of pools are (ie: a pool with a depth of 1 foot, length of 30 feet, and width of 5 feet is not favorable but more square shapes). They were excited with the idea that they’d create a water park and were eager to begin. After providing the stipulations, some students struggled to persevere with the thought they’d have to keep redoing their work. In the future, I would provide different levels of challenges. For students who need a challenge, I would give them the stipulations initially and I could add cost factors (ie: for each sq. foot you need to pay $5, your maximum budget is $400,000). For students who need additional support, I would have them focus on building one lap pool within a certain volume limit (ie: no greater than 3,000 sq. ft.). I had students begin to create their presentation. One student found it easiest to create the models on Word then Snip them to PowerPoint. Another drew pictures and scanned them onto PowerPoint. When creating the project, I was hoping to find a resource that allowed students to plug in numbers to create a 3D rectangular prism for each pool, however, I was unsuccessful. I think this would be a helpful tool for ELs or struggling students. They could manipulate the numbers and visually identify the changes (ie: a 3x1x7 vs. a 7x3x1 pool). In the future, I would create a template to support students, including dimensions of lap pool, kiddie pool, dive pool & specific requirements (ie: the size of the water park lot). I think this lesson helped kids connect volume to a real life situation and see how modifying the numbers can impact the use of the pool.