January 2003

SeaWorld/Busch Gardens

Splash of Math

4-8 Classroom Activities

Shamu Stadium Geometry

OBJECTIVE

The student will use knowledge of geometric objects to solve problems involving area and volume. He or she will examine and analyze a diagram and make calculations.

ACTION

1. Distribute copies of the *Shamu Stadium Geometry* funsheet.
2. Students work on their own or in groups to solve the problems, design another pool, and create a poster. (Note that none of these pools are simple geometric shapes; answers will be estimates. For problems 2 and 3, ask students to state their assumptions before doing their calculations.)

ANSWERS

2. volume of main pool, assuming it is a quarter-sphere and using r = 70

   $1/4 \times [(4/3)\pi r^3] = 1/4 \times [(4/3) \times 3.14 \times (70 \times 70 \times 70)] = 359{,}007$ ft^3
   359,007 ft^3 x 7.48 gallons per ft^3 = 2,685,369 gallons. Students may select an r value between 35 and 80; they may also choose to look at this pool as a half-cylinder and use the formula, $1/2 \times (\text{depth} \times \pi r^2)$.

   volume of each side pool: (120 x 75 x 15) = 135,000 ft^3
   135,000 ft^3 x 7.48 gallons per ft^3 = 1,009,800 gallons

   volume of medical pool: 40 x 25 x 8 = 8,000 ft^3
   8,000 ft^3 x 7.48 gallons per ft^3 = 59,840 gallons

3. Estimating surface area:
   main pool: $1/2 \times (\pi r^2) = 1/2 \times 3.14 \times (70 \times 70) = 7{,}693$ ft.^{2}
   two side pools: 2 x (120 x 75) = 18,000 ft.2
   medical pool: 40 x 25 = 1,000 ft.2
   TOTAL = 26,693 ft.^{2} in acres: 26,693 ft.^{2} x 1 acre/43,560 ft.^{2} = 0.6 acres

BACKGROUND INFORMATION

SeaWorld's Shamu Stadium pool complex is home to some of the world's most famous killer whales. At each of the four SeaWorld parks, killer whales inhabit the finest facilities possible. The Animal Welfare Act establishes habitat requirements for all oceanariums including SeaWorld. SeaWorld's facilities not only meet, but exceed these required guidelines. The killer whale habitats at SeaWorld parks are among the largest in the world.

MATERIALS

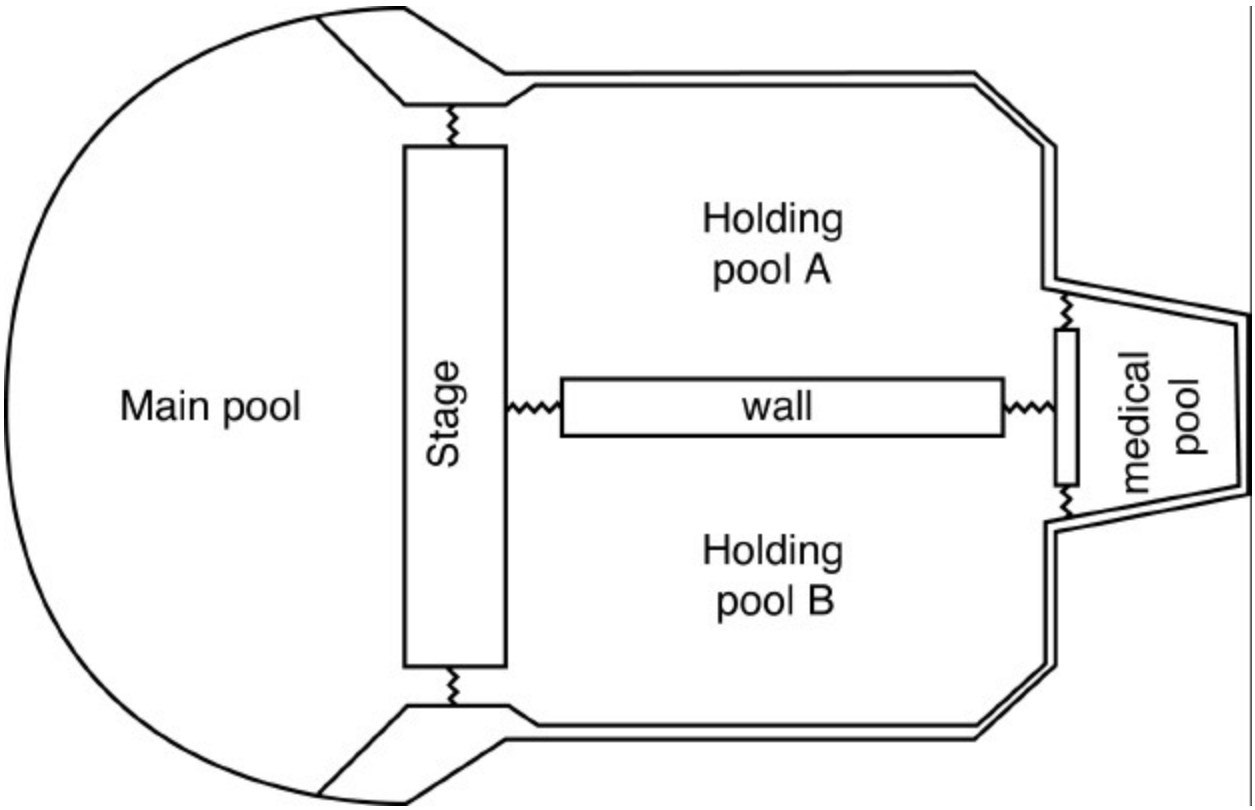
For each student:

- photocopies of **S***hamu Stadium Geometry* funsheet
- pencil
- paper
- calculator

Shamu Stadium is one of the largest marine animal pool in the world.

Name _____

Shamu Stadium Geometry



1. Label pool dimensions:

main pool	80 ft. x 165 ft. x 35 ft. deep
each side pool	120 ft. x 75 ft. x 15 ft. deep
medical pool	40 ft. x 25 ft. x 8 ft. deep

2. Estimate the volume of each pool in cubic feet and in gallons.
   (1 cubic foot of water = 7.48 gallons)

3. Estimate the water surface area in acres. (1 acre = 43,560 square feet)

4. On the back of this page, design another pool that connects to one of the side pools. What are the dimensions? How much water does it hold? What is it used for?

5. Design and illustrate a poster advertising the Shamu Show that includes reference to the pool size and/or shape.