Tropical Aquatics Pool Education
PO Box 818 • Palm Harbor, FL • 34683
T: 727-786-1912
thepoolclass@me.com
www.thepoolclass.com

Class Example Worksheets

Distance Conversion (page 23)

Feet = Number of Meters ✖ **3.28 feet/meter** =

Area Calculation (page 24)

Area = Length in Feet ✖ Width in Feet =

Temperature Rise Calculation (page 25)

BTU's = Volume In Gallons ✖ 8.33 ✖ Number °F Temperature Rise =

Grid Filter Area Calculation (page 23)

Filter Area = Length in Feet ✖ Width in Feet ✖ **2 Sides** ✖ Number of Grids

Filter Area =

Simple Pool Volume in Gallons (page 26)

Average Depth = Shallow Depth In feet + Deep Depth In feet **then ÷ by 2** =

Gallons = Length In feet ✖ Width In feet ✖ Average Depth In feet ✖ **7.5**

Gallons =

Class Example Worksheets

Complex Pool Volume in Gallons (page 28)

Avg. Depth Pool 1 = [Shallow Depth] + [Deep Depth] then ÷ by 2 = [ ]
In feet In feet

Gallons Pool 1 = [Length] ✖ [Width] ✖ [Avg. Depth Pool 1] ✖ 7.5
In feet In feet In feet

Gallons Pool 1 = [ ]

Gallons Pool 2 = [Length] ✖ [Width] ✖ [Avg. Depth Pool 2] ✖ 7.5
In feet In feet In feet

Gallons Pool 2 = [ ]

Total Gallons = [ ] + [ ] = [ ]
Gallons Pool 1 Gallons Pool 2 Total

Saturation Index Worksheet (page 67)

	Tested Value	Factor	Adjusted Value	Adjusted Factor
pH				
Temperature				
Calcium hardness				
Total Alkalinity				
Sub-total				
Total Dissolved Solids				
Saturation Index				

Class Example Worksheets

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Breakpoint Chlorination Worksheet (page 260)

Combined Chlorine = (Total Chlorine) _____ **minus** (Free Chlorine) _____ = (Combined Chlorine) _____

Breakpoint Chlorine = (Combined Chlorine) _____ ✖ **10** **minus** (Free Chlorine) _____ = _____

Desired Chemical Change

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Class Example Worksheets

Flow Rate Calculations (page 119)

Flow Rate = Volume (in Gallons) ÷ Turnover Rate (in Hours) ÷ by 60 =

Turnover Rate Calculations (page 119)

TOR = Volume (in Gallons) ÷ Flow Rate (in GPM) ÷ by 60 =

Filter Area Calculations (page 139)

Filter Area = Flow Rate (in GPM) ÷ Filter Media Rate (from page 139) =

Filter Media Rate Calculations (page 139)

Filter Media Rate = Flow Rate (In GPM) ÷ Filter Area (in Square Feet) =

Flow Rate Max per Filter Area Calculations (page 139)

Flow Rate = Filter Area (in square feet) ✖ Filter Media Rate (from page 139) =

Spa Water Replacement Interval (page 171)

Replacement Interval (Days) = Spa Volume (in Gallons) ÷ 3 ÷ Number (Users per Day) =

Tropical Aquatics Pool Education
PO Box 818 • Palm Harbor, FL • 34685
T: 727-786-1912
thepoolclass@me.com
www.thepoolclass.com

Homework Problems

1. What is the total surface area of a D.E filter that has 10 grids measuring 2 feet by 3 feet each? Each grid filters from both sides.
   ① 150 ft^2 ② 60 ft^2 ❸ 120 ft^2 ④ 180 ft^2

2. The BTU's necessary to raise the temperature of a 3,000 gallon spa from 86 °F to 102 ° F is:
   ❶ 399,840 ② 39,980 ③ 3,998 ④ 49,980

3. The flow meter reading is 225 GPM. The data plate of the filter states that the area is 680 ft^2. What is the actual operating Filter Media Rate?
   ① 3 GPM/Square foot ② 15 GPM/Square foot
   ③ 12 GPM/Square foot ❹ 0.331 GPM/Square foot

4. You had a fecal accident in your pool yesterday, and raised the chlorine level to 25 ppm. The chlorine level this morning is still at 18 ppm, and you wish to lower to 5 ppm before you open the pool. your pool is 45,000 gallons. How many pounds of Sodium Thiosulfate will be necessary?
   ① 1.2 ② 6 ③ 151.1 ❹ 9.5

5. Bathers are complaining about eye irritation. Your pool is 50,000 gallons. Your test kit measures the free chlorine at 4.5 ppm and the total chlorine at 7.0 ppm. How many pounds of Calcium Hypochlorite will be needed to reach breakpoint?
   ① 15.6 pounds ② 250 pounds ③ 2 pounds ❹ 12.8 pounds

6. You have an 80,000 gallon pool. What would be the flow rate for a 5 hour turnover?
   ① 222 GPM ❷ 267 GPM ③ 150 GPM ④ 285 GPM

7. You have an 60,000 gallon pool. You need to increase the total alkalinity in your pool from 70 ppm to 110 ppm. How many pounds of Sodium Bicarbonate will be needed?
   ① 336 pounds ❷ 33.6 pounds ③ 43.5 pounds ④ 68.2 pounds

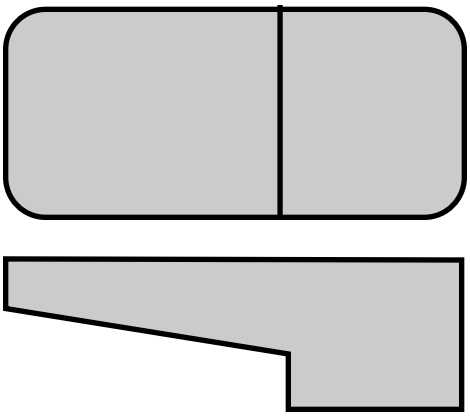
8. You have an 60,000 gallon pool. You need to increase the calcium hardness in your pool from 180 ppm to 250 ppm. How many pounds of Calcium Chloride (77% strength) will be needed?
   ① 25.2 pounds ② 30.7 pounds ③ 126 pounds ❹ 50.4 pounds

9. Your test kit readings are: pH of 7.1, a total alkalinity of 90 ppm, a calcium hardness of 200 ppm, a temperature of 84 °F, a total dissolved solids of 2,300 ppm and a cyanuric acid of 120 ppm. What is the Saturation Index?
   ① + 0.4 ② – 0.4 ③ + 0.7 ❹ – 0.8

HOMEWORK PROBLEMS

10. Your flow rate is 440 GPM. You wish to change from a sand filter to a vacuum D.E. filter. How many square feet of filter will be required at minimum?
    ❶ 220 ft^2 ② 176 ft^2 ③ 147 ft^2 ④ 37 ft^2

11. You have an 90,000 gallon pool. What would be the flow rate for a 4 hour turnover?
    ❶ 375 GPM ② 425 GPM ③ 350 GPM ④ 325 GPM



12. Your pool is 90 feet long and 40 feet wide. It is divided into 2 sections; a swimming area 60 feet long and a diving area 30 feet long. The swimming area has a constant slope from 3 feet to 8 feet. The diving area is a constant 12 feet deep. What is the volume in gallons?
    ① 108,000 gallons ② 100,650 gallons
    ❸ 207,000 gallons ④ 178,000 gallons

13. To increase pH, which of the following is NOT recommended?
    ① sodium bicarbonate ② Sodium carbonate
    ❸ Sodium bisulfate ④ sodium hydroxide

14. The highest concentration of water contamination exists at the:
    ① surge pit ② main drain ③ filter ❹ surface of the pool

15. After 3 turnovers, the percentage amount of water NOT filtered is:
    ❶ 5% ② 2% ③ 16% ④ 8%

16. Which government agency is responsible for “Employee-Right-to-Know” laws?
    ① CDC ❷ OSHA ③ CPSC ④ EPA

17. The pH of a pool will “bounce” when what problem exists:
    ① the total alkalinity is too high ② the pH is too high
    ③ the cyanuric acid is too low ❹ the total alkalinity is too low

18. The most common type of cyanuric acid test is:
    ① DPD ② TDS Meter ❸ Turbidimetric ④ Titration

Homework Worksheets

Grid Filter Area Calculation (page 23)

Filter Area = (Length in Feet) ✖ (Width in Feet) ✖ **2 Sides** ✖ (Number of Grids)

Filter Area =

Temperature Rise Calculation (page 25)

BTU's = (Volume In Gallons) ✖ 8.33 ✖ (Number °F Temperature Rise) =

Filter Media Rate Calculations (page 139)

Filter Media Rate = (Flow Rate In GPM) ÷ (Filter Area in Square Feet) =

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	**Actual Pool Volume**	**Desired Chemical Change**	**Total**
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Homework Worksheets

Breakpoint Chlorination Worksheet (page 260)

Combined Chlorine = (Total Chlorine) **Minus** (Free Chlorine) = (Combined Chlorine)

Breakpoint Chlorine = (Combined Chlorine) ✖ **10 minus** (Free Chlorine) = (Desired Chemical Change)

Amount of Chemical From Appendix B-2 or Product Label	**Actual Pool Volume**	**Desired Chemical Change**	**Total**
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
✖	✖	=	

Flow Rate Calculations (page 119)

Flow Rate = (Volume in Gallons) ÷ (Turnover Rate in Hours) ÷ **by 60** =

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	**Actual Pool Volume**	**Desired Chemical Change**	**Total**
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
✖	✖	=	

Homework Worksheets

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
✖	✖	✖	=

Saturation Index Worksheet (page 67)

	Tested Value	Factor	Adjusted Value	Adjusted Factor
pH				
Temperature				
Calcium hardness				
Total Alkalinity				
Sub-total				
Total Dissolved Solids				
Saturation Index				

Filter Area Calculations (page 139)

Filter Area = (Flow Rate in GPM) ÷ (Filter Media Rate from page 139) = _____

Homework Worksheets

Flow Rate Calculations (page 119)

Flow Rate = (Volume in Gallons) ÷ (Turnover Rate in Hours) ÷ **by 60** =

Complex Pool Volume in Gallons (page 28)

Avg. Depth Pool 1 = (Shallow Depth in feet) + (Deep Depth in feet) **then ÷ by 2** =

Gallons Pool 1 = (Length in feet) ✖ (Width in feet) ✖ (Avg. Depth Pool 1 in feet) ✖ 7.5

Gallons Pool 1 =

Gallons Pool 2 = (Length in feet) ✖ (Width in feet) ✖ (Avg. Depth Pool 2 in feet) ✖ 7.5

Gallons Pool 2 =

Total Gallons = (Gallons Pool 1) + (Gallons Pool 2) = (Total)

Worksheets To Be Used Only on Exam

Complex Pool Volume in Gallons (page 28)

Avg. Depth Pool 1 = (Shallow Depth, in feet) + (Deep Depth, in feet) then ÷ by 2 = ____

Gallons Pool 1 = (Length, in feet) × (Width, in feet) × (Avg. Depth Pool 1, in feet) × 7.5

Gallons Pool 1 = ____

Gallons Pool 2 = (Length, in feet) × (Width, in feet) × (Avg. Depth Pool 2, in feet) × 7.5

Gallons Pool 2 = ____

Total Gallons = (Gallons Pool 1) + (Gallons Pool 2) = (Total)

Flow Rate Calculations (page 139)

Flow Rate = (Volume, in Gallons) ÷ (Turnover Rate, in Hours) ÷ **by 60** = ____

Filter Area Calculations (page 139)

Filter Area = (Flow Rate, in GPM) ÷ (Filter Media Rate, from page 139) = ____

Saturation Index Worksheet (page 67)

	Tested Value	Factor	Adjusted Value	Adjusted Factor
pH				
Temperature				
Calcium hardness				
Total Alkalinity				
Sub-total				
Total Dissolved Solids				
Saturation Index				

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
↓	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
✖	✖	✖	=

Filter Media Rate Calculations (page 139)

Filter Media Rate = (Flow Rate in GPM) ÷ (Filter Area in Square Feet) =

Worksheets To Be Used Only on Exam

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Breakpoint Chlorination Worksheet (page 260)

Combined Chlorine = (Total Chlorine) **Minus** (Free Chlorine) = (Combined Chlorine)

Breakpoint Chlorine = (Combined Chlorine) ✖ **10 minus** (Free Chlorine) = (Desired Chemical Change)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Temperature Rise Calculation (page 25)

BTU's = (Volume In Gallons) ✖ 8.33 ✖ (Number °F Temperature Rise) =

Worksheets To Be Used Only on Exam

Chemical Adjustment Worksheet (page 260)

Amount of Chemical From Appendix B-2 or Product Label	Actual Pool Volume	Desired Chemical Change	Total
	÷ **10,000 gallons** From Appendix **B-2** or Product label	÷ _____ **PPM** From Appendix **B-2** or Product label	
	✖	✖	=

Grid Filter Area Calculation (page 23)

Filter Area = (Length in Feet) ✖ (Width in Feet) ✖ **2 Sides** ✖ (Number of Grids)

Filter Area =

Flow Rate Calculations (page 139)

Flow Rate = (Volume in Gallons) ÷ (Turnover Rate in Hours) ÷ **by 60** =