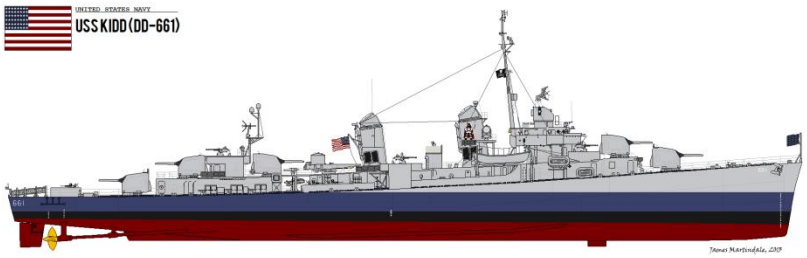
Weights, Measurements, & The USS KIDD



1. The USS KIDD is 376 feet long. Using the conversion tables, what is the total length of five (5) destroyers like the KIDD docked end-to-end as shown in meters?

2. The KIDD's fuel capacity is 3,250 barrels of oil. If the ship's fuel tanks are only a quarter of the way to full, how much more capacity do they have as measured in centiliters?

3. The KIDD displaces 2,050 tons when unloaded. She displaces 3,040 tons when fully loaded with fuel, water, ammunition, food stores, equipment, and the crew. How much is the difference between her loaded and unloaded displacements as measured in kilograms?

4. The USS KIDD can travel at a maximum speed of 37 knots. Her torpedoes can travel at a maximum speed of 83.34 kilometers per hour. What is the difference in maximum speeds between the KIDD and her torpedoes as measured in miles per hour?

5. The KIDD's evaporator can convert 12,000 gallons of sea water into fresh water each day. Doctors recommend that you drink eight 8-ounce glasses of water each day. Given that the KIDD carries a crew of 330 men, would the evaporator be capable of providing enough drinking water for the whole crew based on the daily recommendation?

6. In the novel 20,000 Leagues Under the Sea by Jules Verne, the characters traveled via the submarine NAUTILUS. The KIDD was designed to sail a distance of 6,500 nautical miles without refueling. If one (1) league equals 3,038 fathoms, how many times would KIDD have to refuel to travel the same distance as the NAUTILUS?

U.S. & Metric Units of Measurement

Linear Measure (length & distance)

U.S. System

12 inches (in.) =	1 foot (ft.)
3 feet =	1 yard (yd)
6 feet =	1 fathom
15 fathoms =	1 shot = 90 ft
5,280 feet =	1 land mile
6,076.11549 feet =	1 nautical mile

Metric System

1 millimeter (mm) =	1/1000 meter (m)
1 centimeter (cm) =	1/100 meter (m)
1 decimeter (dm) =	1/10 meter (m)
1 meter (basic unit of length)	
1 kilometer (km) =	1,000 meters (m)

Liquid Capacity Measure

U.S. System

16 fluid ounces (fl oz) =	1 pint (pt)
2 pints =	1 quart (qt)
4 quarts =	1 gallon (gal)
42 gallons =	1 oil barrel (bbl) (U.S.)

Metric System

1 millileter (mL) =	1/1,000 liter (L)
1 centileter (cL) =	1/100 liter (L)
1 decileter =	1/10 liter (L)
1 Liter (basic unit of capacity)	

Weight Measure

U.S. System

16 ounces (oz) =	1 pound (lb)
2,000 pounds =	1 ton (tn)

Metric System

1 milligram (mg) =	1/1,000 gram (g)
1 centigram (cg) =	1/100 gram (g)
1 decigram =	1/10 gram (g)
1 gram =	1/1,000 kilogram (kg)
1 kilogram (basic unit of weight or mass)	
1 metric ton =	1,000 kilograms

Speed Measure

U.S. System

1 knot =	1.151 land mile per hour (mph)

Metric System

1 knot =	1.852 kilometer per hour (kph)

Conversion Factors

Linear Measure Conversion (length & distance)

1 centimeter (cm) =	0.39 inch (in)
1 inch =	2.54 centimeters
1 meter (m) =	39.37 inches
1 foot =	0.305 meter
1 meter =	3.28 feet
1 yard =	0.914 meter
1 meter =	1.094 yards
1 fathom =	1.829 meters
1 shot =	27.43 meters
1 kilometer =	0.62 mile
1 mile =	1.609 kilometers

Liquid Capacity Measure

1 milliliter (mL) =	0.034 fluid ounce
1 fluid ounce (fl oz) =	29.6 millileters
1 quart (qt) =	0.946 liter (L)
1 liter =	1.06 quarts
1 gallon (gal) =	3.8 liters
159.6 liters =	1 oil barrel (bbl) (U.S.)

Weight Measure

1 gram (g) =	0.035 ounce (oz)
1 ounce =	28.35 grams
1 pound (lb) =	0.4536 kilogram (kg)
1 kilogram =	2.205 pounds
1 ton (tn) =	0.90 metric ton
1 metric ton =	1.10 tons

Speed Measure

1 kilometer per hour (kph) =	0.6214 land mile per hour (mph)
1 land mile per hour =	1.609 kilometers per hour

Teacher's Answer Key

1. The USS KIDD is 376 feet long. Using the conversion tables, what is the total length of five (5) destroyers like the KIDD docked end-to-end as shown in meters?

   Answer: 573.4 meters

   376 feet x 5 destroyers = 1,880 total feet
   1,880 feet x 0.305 meters = 573.4 meters

2. The KIDD's fuel capacity is 3,250 barrels of oil. If the ship's fuel tanks are only a quarter of the way to full, how much more capacity do they have as measured in centiliters?

   Answer: 38,902,500 centiliters

   3,250 barrels x 0.75 capacity = 2,437.50 barrels
   2,437.50 barrels x 159.6 liters = 389,025 liters
   389,025 liters x 100 = 38,902,500 centiliters

3. The KIDD displaces 2,050 tons when unloaded. She displaces 3,040 tons when fully loaded with fuel, water, ammunition, food stores, equipment, and the crew. How much is the difference between her loaded and unloaded displacements as measured in kilograms?

   Answer: 898,128 kilograms

   3,040 tons - 2050 tons = 990 tons (difference)
   990 tons x 2,000 pounds = 1,980,000 pounds
   1,980,000 pounds x 0.4536 kilograms = 898,128 kilograms

4. The USS KIDD can travel at a maximum speed of 37 knots. Her torpedoes can travel at a maximum speed of 83.34 kilometers per hour. What is the difference in maximum speeds between the KIDD and her torpedoes as measured in miles per hour?

   Answer: 9.21 mph

   83.34 kph x 0.6214 mph = 51.79 mph (torpedo max speed)
   37 knots x 1.151 mph = 42.58 mph (KIDD max speed)
   51.79 mph - 42.58 mph = 9.21 mph (difference)

5. The KIDD's evaporator can convert 12,000 gallons of sea water into fresh water each day. Doctors recommend that you drink eight 8-fluid-ounce glasses of water each day. Given that the KIDD carries a crew of 330 men, would the evaporator be capable of providing enough drinking water for the whole crew based on the daily recommendation?

   Answer: YES

   8 fluid ounces x 8 glasses = 64 fluid ounces
   64 fluid ounces x 330 men = 21,120 fluid ounces
   21,120 fluid ounces / 16 = 1,320 pints
   1,320 pints / 2 = 660 quarts
   660 quarts / 4 = 165 gallons per day to drink
   165 gallons (drink) < 12,000 gallons (evaporator)

6. In the novel 20,000 Leagues Under the Sea by Jules Verne, the characters traveled via the submarine NAUTILUS. The KIDD was designed to sail a distance of 6,500 nautical miles without refueling. If one (1) league equals 3,038 fathoms, how many times would KIDD have to refuel to travel the same distance as the NAUTILUS?

   Answer: 9.23 refuelings

   20,000 leagues x 3,038 fathoms = 60,760,000 fathoms
   60,760,000 fathoms x 6 feet = 364,560,000 feet
   364,560,000 feet / 6,076.11549 feet = 59,998.85 nautical miles
   59,998.76 nautical miles / 6,500 nautical miles = 9.23 refuelings