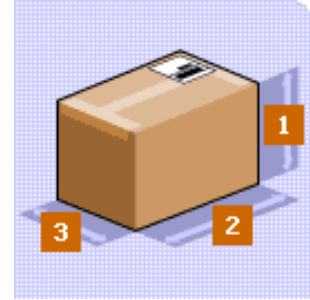


TDL Math:

Warehouse Shipping – Dimensional Weight Calculations



Industry: Transportation, Distribution, & Logistics (TDL)

Content Area: Mathematics

Core Topics: Using formulas, calculating volume and dimensional weight, solving multi-step problems

Objective: Students will be able to calculate dimensional (volumetric) weight in order to determine the billable weight of shipments and solve multi-step shipping problems.

Materials included:

Instructor's notes

Scenario: Warehouse Shipping

Student worksheets

Quiz

Answer Keys

Industry Overview:

According to the U.S. Department of Labor, employment in the transportation and material movers industry is expected to grow approximately 8.6% between 2012 and 2022.* The transportation, distribution, and logistics (TDL) industry is comprised of a vast array of jobs, ranging from dock workers and delivery drivers to warehouse managers and logisticians. Mathematics and literacy skills are essential for students who plan to pursue a career in this field. TDL employees, including warehouse and distribution workers, must have the ability to use formulas and perform accurate mathematical calculations in their daily work.

* Source: http://www.bls.gov/emp/ep_table_101.htm Employment Projections program, U.S. Department of Labor, U.S. Bureau of Labor Statistics

Instructor's notes:

- The purpose of this module is to help students develop and apply math skills in a TDL workplace setting. The learning activities were designed to be incorporated throughout multiple instructional periods as math concepts are taught in a TDL context.
- After completing the module, students should be able to:
 - Calculate the volume of packages and loaded pallets
 - Calculate the dimensional weight of packages and loaded pallets
 - Calculate the billable weight for shipping orders
- **Setting the stage:** Provide students with background information about the typical responsibilities of warehouse and distribution center employees. You may want to have students use the occupational outlook handbook, O*NET and/or other relevant websites to research the job responsibilities, educational/training requirements, salary, etc. for TDL positions that interest them. In addition, you could have students view videos depicting typical warehouse and distribution center operations. (See links below)

Bureau of Labor Statistics – Occupational Outlook Handbook:

<http://www.bls.gov/ooh/>

Occupational Information Network (O*NET)

<http://www.onetonline.org/link/summary/43-3021.02>

<http://www.onetonline.org/link/summary/43-5111.00>

Distribution Center Operations:

<https://www.youtube.com/watch?v=e9RR17JDdSI>

- **For Activity 1:** Explain the formula used to calculate volume. Work the scenario examples with the class. Have students work the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 1**.
- **For Activity 2:** Explain the formula used to calculate dimensional weight. You may want to show this short video outlining the steps to calculate dimensional weight.
<https://www.youtube.com/watch?v=V05Wk4rkWok> Work the scenario examples with the class. Have students complete the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 2**.
- **For Activity 3:** Explain the steps to determine the billable weight for shipments. Work the scenario examples with the class. Have students complete the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 3**.
- **Assessment: Quiz – Warehouse Shipping Calculations**

Workplace Scenario:

You are a billing clerk at *BSP Warehouse & Distribution, Inc.* Your company provides storage and shipping services for several vendors throughout the Midwest. Like many delivery companies, BSP uses dimensional (volumetric) weight to determine the billable weight for the products it transports. One of your responsibilities is to calculate the dimensional weight of shipments and then compare this amount to the actual weight in order to determine the billable weight for orders.

Activity 1: Calculating Volume

The first step in determining the dimensional weight of a shipment is to calculate the volume of the order. Each time you receive a shipping order, you obtain the length, width, and height of the packages or pallets from the warehouse packer. You use these dimensions to calculate the volume of the shipment.

The formula to calculate volume is: **Volume = Length x Width x Height**

Note: Volume is always written in cubic units

Example 1: Calculate the volume for the following package.

$$18'' \text{ L} \times 10'' \text{ W} \times 8'' \text{ H} \rightarrow \mathbf{V = L \times W \times H} \rightarrow 18 \times 10 \times 8 = 1440 \text{ cubic inches or (in}^3\text{)}$$

Practice 1: Calculate the volume for the following packages.

$$20'' \text{ L} \times 14'' \text{ W} \times 12'' \text{ H}$$

$$24'' \text{ L} \times 18'' \text{ W} \times 15'' \text{ H}$$

Most of your customers order large quantities of products that are shipped on pallets. For these orders, you calculate the volume of an entire loaded pallet.

Example 2: Calculate the volume for the following pallet.

$$48'' \text{ L} \times 40'' \text{ W} \times 60'' \text{ H} \rightarrow \mathbf{V = L \times W \times H} \rightarrow 115,200 \text{ in}^3$$

Practice 2: Calculate the volume for the following pallets.

$$48'' \text{ L} \times 40'' \text{ W} \times 65'' \text{ H}$$

$$36'' \text{ L} \times 36'' \text{ W} \times 80'' \text{ H}$$

You received the following customer orders. Calculate the volume of each package.

1. Item #1001 with case dimensions of 12" L x 15" W x 10" H.
2. Item #1002 with case dimensions of 20" L x 13" W x 12"H
3. Item #1003 with case dimensions of 15" L x 10" W x 8" H.
4. Item #1004 with case dimensions of 18" L x 14" W x 6" H

Calculate the volume for each of the following loaded pallets.

5. Item #1005 with pallet dimensions of 48" L x 40" W x 75" H
6. Item #1006 with pallet dimensions of 48" L x 40" W x 84" H
7. Item #1007 with pallet dimensions of 36" L x 36" W x 72" H
8. Item #1008 with pallet dimensions of 42" L x 42" W x 76" H
9. Item #1009 with pallet dimensions of 48"L x 40" W x 70"H
10. Item #1010 with pallet dimensions of 48" L x 40" W x 66" H

Activity 2: Calculating Dimensional Weight

Dimensional weight is based on volume; that is, the amount of space a package or pallet occupies in relation to its actual weight. The formula to calculate the dimensional weight of a shipment is to divide the volume in cubic inches by the **dimensional factor of 166** to obtain the dimensional weight in pounds.

Note: The result is always rounded up to the next whole pound.

Dimensional weight formula:
$$\frac{\mathbf{L \times W \times H}}{\mathbf{166}} = \text{Dimensional weight in pounds}$$

Example 1: Calculate the dimensional weight of the following package.

Package with the dimensions 16" L x 14" W x 12" H

Step 1: Calculate the volume: $16 \times 14 \times 12 = 2688 \text{ in}^3$

Step 2: Divide the volume by 166: $2688 \div 166 = 16.2 \text{ lbs.}$

Step 3: Round up to the next whole unit: $16.2 \rightarrow \underline{17 \text{ lbs.}}$

Practice 1: Calculate the dimensional weight of the following package.

Package with the dimensions of 18" L x 15" W x 10" H

Example 2: Calculate the dimensional weight of the following pallet.

Pallet with the dimensions 48" L x 40" W x 62" H

Step 1: Calculate the volume: $48 \times 40 \times 62 = 119,040 \text{ in}^3$

Step 2: Divide the volume by 166: $119,040 \div 166 = 717.1$

Step 3: Round up to the next whole unit, if necessary: $717.1 \rightarrow \underline{718 \text{ lbs.}}$

Practice 2: Calculate the dimensional weight of the following pallet

Pallet with the dimensions of 42" L x 42" W x 80" H

You received the following orders this morning. Calculate the dimensional weight for each order as indicated.

1. Item #2001 with case dimensions of 15" L x 12" W x 10" H.

2. Item #2002 with case dimensions of 19" L x 14" W x 12"H

3. Item #2003 with case dimensions of 18" L x 10" W x 8" H.

4. Item #2004 with case dimensions of 16" L x 13" W x 11" H

5. Item #2005 with pallet dimensions of 48" L x 40" W x 65" H

6. Item #2006 with pallet dimensions of 48" L x 40" W x 80" H

7. Item #2007 with pallet dimensions of 36" L x 36" W x 76" H

8. Item #2008 with pallet dimensions of 42" L x 42" W x 70" H

9. Item #2010 with pallet dimensions of 48" L x 40" W x 68" H

10. Item #2009 with pallet dimensions of 42" L x 42" W x 65" H

Activity 3: Calculating Billable Weight

Billable weight is the weight used to charge a customer for a shipment. The dimensional weight is calculated and compared to the actual weight of a shipment to determine which is greater; the higher weight is the billable weight, and is used to calculate the shipping cost of an order.

Example 1: A customer orders 50 cases of item #1300. The order is loaded onto one pallet. Each case weighs 15 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 72" H. Calculate the actual weight and the dimensional weight, and identify the billable weight for this order.

Step 1: Calculate the actual weight: $50 \times 15 + 45 = \underline{795 \text{ lbs.}}$

Step 2: Calculate the dimensional weight: $48 \times 40 \times 72 \div 166 = 832.8 \rightarrow \underline{833 \text{ lbs.}}$

Step 3: Compare the actual and dimensional weights to identify the billable weight: 833 lbs.

Practice 1: A customer orders 80 cases of item #1301. The order is loaded onto one pallet. Each case weighs 10.5 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 84" H. Calculate the actual weight and the dimensional weight, and identify the billable weight for this order.

Example 2: A customer has a shipment of 3 pallets. Pallet #1 contains 40 cases. Each case weighs 22 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 75". Pallets #2 and #3 contain 60 cases each. Each case weighs 10 lbs. and each pallet weighs 45 lbs. Both of these loaded pallets are 48" x 40" x 60". Calculate the actual weight and the dimensional weight for each pallet, and the actual weight and the billable weight for the entire order.

Pallet 1: Actual weight: $40 \times 22 + 45 = \underline{925 \text{ lbs.}}$

Dimensional weight: $48 \times 40 \times 75 \div 166 = 867.5 \rightarrow \underline{868 \text{ lbs.}}$

Pallets 2 & 3: Actual weight: $60 \times 10 + 45 = \underline{645 \text{ lbs.}}$

Dimensional weight: $48 \times 40 \times 60 \div 166 = \underline{694 \text{ lbs.}}$

Actual weight of the order: $925 + 645 + 645 = \underline{2215 \text{ lbs.}}$

Billable weight of the order: $925 + 694 + 694 = \underline{2313 \text{ lbs.}}$

Practice 2: A customer has a shipment of 3 pallets weighing 650 lbs., 640 lbs., and 820 lbs. All 3 pallets have the same dimensions of 48" x 40" x 62". Calculate the actual weight, the dimensional weight, and the billable weight for this order.

You received the following orders this morning. Perform all the calculations necessary to determine the billable weight for each shipment.

1. A customer orders 100 cases of item #3001. The order is loaded onto one pallet. Each case weighs 8 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 80" H. What is the actual weight, the dimensional weight, and the billable weight for this shipment?
2. A customer has a shipment of 4 pallets weighing 750 lbs., 740 lbs., 780 lbs., and 820 lbs. All 4 pallets have the same dimensions of 42" x 42" x 76". Calculate the actual weight, the dimensional weight, and the billable weight for this order.
3. A customer has a shipment of 2 pallets. Pallet #1 contains 25 cases; each case weighs 28 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 72". Pallet #2 contains 40 cases; each case weighs 16.5 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 70". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?
4. A customer orders 300 cases of item #3004. The order is loaded onto 6 pallets of 50 cases each. Each case weighs 14.5 lbs. and each pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 78". Calculate the actual weight, the dimensional weight, and the billable weight for this shipment.
5. A customer has a shipment of 3 pallets. Pallet #1 contains 30 cases; each case weighs 24 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 65". Pallet #2 contains 60 cases; each case weighs 12 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 79". Pallet #3 contains 40 cases; each case weighs 18 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 82". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?

You received the following customer orders today. Perform all the calculations necessary to determine the billable weight for each shipment.

1. A customer ordered 1 case of item #4001. The package weighs 68 lbs. and has dimensions of 32" L x 26" W x 21" H. Calculate the dimensional weight and identify the billable weight for this order.
2. A customer orders 80 cases of item #4002. The order is loaded onto one pallet. Each case weighs 9 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 84" H. What is the actual weight, the dimensional weight, and the billable weight for this shipment?
3. A customer has a shipment of 5 pallets weighing 786 lbs., 795 lbs., 832 lbs., and 820 lbs. 843 lbs., All 5 pallets have the same dimensions of 48" x 40" x 80". Calculate the actual weight, the dimensional weight, and the billable weight for this order.
4. A customer has a shipment of 2 pallets. Pallet #1 contains 30 cases; each case weighs 22 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 72". Pallet #2 contains cases 64; each case weighs 13 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 78". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?
5. A customer has a shipment of 3 pallets. Pallet #1 contains 70 cases; each case weighs 11 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 73". Pallet #2 contains 55 cases; each case weighs 15 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 79". Pallet #3 contains 40 cases; each case weighs 21 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 83". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?

Practice Problems

Answer Key

Activity 1

Practice 1: Volume = 3360 in³

Volume = 6480 in³

Practice 2: Volume = 124,800 in³

Volume = 103,680 in³

Activity 2

Practice 1: $20 \times 15 \times 10 = 3000 \text{ in}^3$

$3000 \div 166 = 18.1 \rightarrow$ 19 lbs.

Practice 2: $42 \times 42 \times 80 = 141,120 \text{ in}^3$

$141,120 \div 166 = 850.1 \rightarrow$ 851 lbs.

Activity 3

Practice 1: Actual weight: $80 \times 10.5 + 45 =$ 885 lbs.

Dimensional weight: $48 \times 40 \times 84 \div 166 = 971.6 \rightarrow$ 972 lbs.

Billable weight: 972 lbs.

Practice 2: Actual weight: $650 + 640 + 820 =$ 2110 lbs.

Dimensional weight: $48 \times 40 \times 62 \div 166 = 717.1 \rightarrow$ 718 lbs.

Billable weight: $718 + 718 + 820 =$ 2256 lbs.

You received the following customer orders. Calculate the volume of each package.

1. Item #1001 with case dimensions of 12" L x 15" W x 10" H. = 1800 in³
2. Item #1002 with case dimensions of 20" L x 13" W x 12"H = 3120 in³
3. Item #1003 with case dimensions of 15" L x 10" W x 8" H. = 1200 in³
4. Item #1004 with case dimensions of 18" L x 14" W x 6" H = 1512 in³

Calculate the volume for each of the following loaded pallets.

5. Item #1005 with pallet dimensions of 48" L x 40" W x 75" H = 144,000 in³
6. Item #1006 with pallet dimensions of 48" L x 40" W x 84" H = 161,280 in³
7. Item #1007 with pallet dimensions of 36" L x 36" W x 72" H = 93,312 in³
8. Item #1008 with pallet dimensions of 42" L x 42" W x 76" H = 134,064 in³
9. Item #1009 with pallet dimensions of 48"L x 40" W x 70"H = 134,400 in³
10. Item #1010 with pallet dimensions of 48" L x 40" W x 66" H = 126,720 in³

You received the following orders this morning. Calculate the dimensional weight for each order as indicated.

1. Item #2001 with case dimensions of 15" L x 12" W x 10" H.
 $15 \times 12 \times 10 \div 166 = 10.8 \rightarrow \underline{11 \text{ lbs.}}$
2. Item #2002 with case dimensions of 19" L x 14" W x 12" H
 $19 \times 14 \times 12 \div 166 = 19.2 \rightarrow \underline{20 \text{ lbs.}}$
3. Item #2003 with case dimensions of 18" L x 10" W x 8" H.
 $18 \times 10 \times 8 \div 166 = 8.7 \rightarrow \underline{9 \text{ lbs.}}$
4. Item #2004 with case dimensions of 16" L x 13" W x 11" H
 $16 \times 13 \times 11 \div 166 = 13.8 \rightarrow \underline{14 \text{ lbs.}}$
5. Item #2005 with pallet dimensions of 48" L x 40" W x 65" H
 $48 \times 40 \times 65 \div 166 = 751.8 \rightarrow \underline{752 \text{ lbs.}}$
6. Item #2006 with pallet dimensions of 48" L x 40" W x 80" H
 $48 \times 40 \times 80 \div 166 = 925.3 \rightarrow \underline{926 \text{ lbs.}}$
7. Item #2007 with pallet dimensions of 36" L x 36" W x 76" H
 $36 \times 36 \times 76 \div 166 = 593.3 \rightarrow \underline{594 \text{ lbs.}}$
8. Item #2008 with pallet dimensions of 42" L x 42" W x 70" H
 $42 \times 42 \times 70 \div 166 = 743.9 \rightarrow \underline{744 \text{ lbs.}}$
9. Item #2010 with pallet dimensions of 48" L x 40" W x 68" H
 $48 \times 40 \times 68 \div 166 = 786.5 \rightarrow \underline{787 \text{ lbs.}}$
10. Item #2009 with pallet dimensions of 42" L x 42" W x 65" H
 $42 \times 42 \times 65 \div 166 = 690.7 \rightarrow \underline{691 \text{ lbs.}}$

You received the following orders this morning. Perform all the calculations necessary to determine the billable weight for each shipment.

- A customer orders 100 cases of item #3001. The order is loaded onto one pallet. Each case weighs 8 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 80" H. What is the actual weight, the dimensional weight, and the billable weight for this shipment?

Actual: $100 \times 8 + 45 = \underline{845 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 80 \div 166 = 925.3 \rightarrow \underline{926 \text{ lbs.}}$
 Billable weight = 926 lbs.
- A customer has a shipment of 4 pallets weighing 750 lbs., 740 lbs., 780 lbs., and 820 lbs. All 4 pallets have the same dimensions of 42" x 42" x 76". Calculate the actual weight, the dimensional weight, and the billable weight for this order.

Actual: $750 + 740 + 780 + 820 = \underline{3090 \text{ lbs.}}$
 Dimensional: $42 \times 42 \times 76 \div 166 = 807.6 \rightarrow 808$; $808 \times 4 = \underline{3232 \text{ lbs.}}$
 Billable: $808 + 808 + 808 + 820 = \underline{3244 \text{ lbs.}}$
- A customer has a shipment of 2 pallets. Pallet #1 contains 25 cases; each case weighs 28 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 72". Pallet #2 contains 40 cases; each case weighs 16.5 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 70". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?

Pallet 1 Actual: $25 \times 28 + 45 = \underline{745 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 72 \div 166 = 832.8 \rightarrow \underline{833 \text{ lbs.}}$
 Pallet 2 Actual: $40 \times 16.5 + 45 = \underline{705 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 70 \div 166 = 809.6 \rightarrow \underline{810 \text{ lbs.}}$
 Actual Total: $745 + 705 = \underline{1450 \text{ lbs.}}$ Billable Total: $833 + 810 = \underline{1643 \text{ lbs.}}$
- A customer orders 300 cases of item #3004. The order is loaded onto 6 pallets of 50 cases each. Each case weighs 14.5 lbs. and each pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 78". Calculate the actual weight, the dimensional weight, and the billable weight for this shipment.

Actual: $50 \times 14.5 + 45 = 770$; $770 \times 6 = \underline{4620 \text{ lbs.}}$
 Dimensional: $48 \times 40 \times 78 \div 166 = 902.2 \rightarrow 903$; $903 \times 6 = \underline{5418 \text{ lbs.}}$
 Billable: 5418 lbs.
- A customer has a shipment of 3 pallets. Pallet #1 contains 30 cases; each case weighs 24 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 65". Pallet #2 contains 60 cases; each case weighs 12 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 79". Pallet #3 contains 40 cases; each case weighs 18 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 82". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?

Actual #1: $30 \times 24 + 45 = \underline{765 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 65 \div 166 = 751.8 \rightarrow \underline{752 \text{ lbs.}}$
 Actual #2: $60 \times 12 + 45 = \underline{825 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 79 \div 166 = 913.7 \rightarrow \underline{914 \text{ lbs.}}$
 Actual #3: $40 \times 18 + 45 = \underline{885 \text{ lbs.}}$ Dimensional: $48 \times 40 \times 82 \div 166 = 948.4 \rightarrow \underline{949 \text{ lbs.}}$
 Total Actual: $765 + 825 + 885 = \underline{2575 \text{ lbs.}}$
 Total Billable: $765 + 914 + 949 = \underline{2628 \text{ lbs.}}$

You received the following customer orders today. Perform all the calculations necessary to determine the billable weight for each shipment.

- A customer ordered 1 case of item #4001. The package weighs 68 lbs. and has dimensions of 32" L x 26" W x 21" H. Calculate the dimensional weight and identify the billable weight for this order. $32 \times 26 \times 21 \div 166 = 105.3 \rightarrow$ 106 lbs. Billable: 106 lbs.
- A customer orders 80 cases of item #4002. The order is loaded onto one pallet. Each case weighs 9 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" L x 40" W x 84" H. What is the actual weight, the dimensional weight, and the billable weight for this shipment? Actual: $80 \times 9 + 45 =$ 765 lbs.
Dimensional: $48 \times 40 \times 84 \div 166 = 971.6 \rightarrow$ 972 lbs. Billable: 972 lbs.
- A customer has a shipment of 5 pallets weighing 786 lbs., 795 lbs., 832 lbs., and 820 lbs. 843 lbs., All 5 pallets have the same dimensions of 48" x 40" x 80". Calculate the actual weight, the dimensional weight, and the billable weight for this order.
Actual: $786 + 795 + 832 + 820 + 843 =$ 4076 lbs.
Dimensional: $48 \times 40 \times 80 \div 166 = 925.3 \rightarrow 926$; $926 \times 5 =$ 4630 lbs. Billable: 4630 lbs.
- A customer has a shipment of 2 pallets. Pallet #1 contains 30 cases; each case weighs 22 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 72". Pallet #2 contains cases 64; each case weighs 13 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 78". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?
#1 Actual: $30 \times 22 + 45 =$ 705 lbs. Dimensional: $48 \times 40 \times 72 \div 166 = 832.8 \rightarrow$ 833 lbs.
#2 Actual: $64 \times 13 + 45 =$ 877 lbs. Dimensional: $48 \times 40 \times 78 \div 166 = 902.2 \rightarrow$ 903 lbs.
Actual Total: $705 + 877 =$ 1582 lbs. Total Billable: $833 + 903 =$ 1736 lbs.
- A customer has a shipment of 3 pallets. Pallet #1 contains 70 cases; each case weighs 11 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 73". Pallet #2 contains 55 cases; each case weighs 15 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallets are 48" x 40" x 79". Pallet #3 contains 40 cases; each case weighs 21 lbs. and the pallet weighs 45 lbs. The dimensions of the loaded pallet are 48" x 40" x 83". What is the actual weight and the dimensional weight for each pallet? What is the actual weight and the billable weight for the entire order?
#1 Actual: $70 \times 11 + 45 =$ 815 lbs. Dimensional: $48 \times 40 \times 73 \div 166 = 844.3 \rightarrow$ 845 lbs.
#2 Actual: $55 \times 15 + 45 =$ 870 lbs. Dimensional: $48 \times 40 \times 79 \div 166 = 913.7 \rightarrow$ 914 lbs.
#3 Actual: $40 \times 21 + 45 =$ 885 lbs. Dimensional: $48 \times 40 \times 83 \div 166 = 867.5 \rightarrow$ 868 lbs.

Total Actual: $815 + 870 + 885 =$ 2570 lbs.
Total Billable: $845 + 914 + 885 =$ 2644 lbs.