**Activity 6.3.2 Cavalieri’s Principle**

1. Notice in the picture at the left, there are two stacks of DVD cases.

Photos by Patrick Honner, Mathematics Department, Brooklyn Technical High School

* 1. The stacks of DVDs in the picture on the left resemble a common three-dimension figure. What is its name?
  2. Keisha says that the two stacks in the picture at the left have the same volume. What assumption is she making? Do you agree?

* 1. In the picture at the right one of the stacks has been pushed over. Do the two stacks still have the same volume? Explain.
  2. If the vertical edges of a prism are perpendicular to the base, then the prism is called a **right prism.** Otherwise the prism is **oblique.** Which stack of DVDs resembles an oblique prism?

1. Take ten pennies and place them one on top of the other.

a. Sketch what you see in the space below.

b. Now make another stack of ten pennies, and “tilt” the stack by shifting each penny just a little bit in the same direction over the penny below it. Sketch what you see.

c . Did the volume of the stack of pennies change when you shifted them?

d. The original stack of pennies formed a **right cylinder.** What name would you give to the shifted stack of pennies?

e. Place the two cylinders next to each other. Imagine a plane that is parallel to the bases passing though each cylinder. What plane figures are formed by the intersection the plane with the cylinders?

f. What can you say about the areas of the figures formed when the plane parallel to the bases intersects the two cylinders?

1. Your teacher will provide each group with a can of play dough and some dental floss. Form a cone from the clay. With the floss, make cuts parallel to the base.
   1. Sketch your group’s shape arranged so that each piece is lined up directly above the piece below it:
   2. Now shift the pieces all slightly in the same direction from the piece below it: Sketch your shape below. Note that this is called an **oblique cone**.
   3. Did you change the volume when you shifted the pieces?
2. In this activity you have observed Cavalieri’s Principle. Cavalieri’s principal applies to two solid figures that have the same height and to planes parallel to the bases. Try stating Cavalier’s principle in your own words.