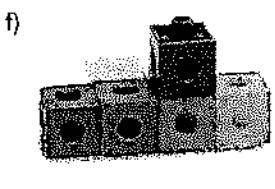
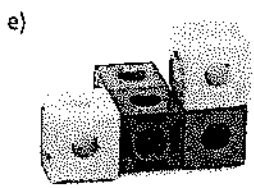
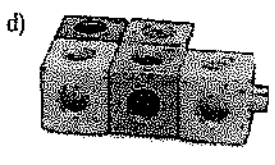
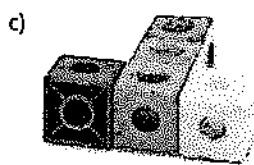
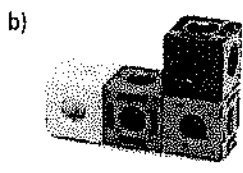
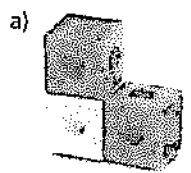


- The surface area of an object is the area of a net of the object. How would drawing a net help you determine the surface area of a composite object?
- In *Example 3*, why are the bases of the warehouse and office not included in the surface area?

Practice

Check

4. Make each composite object with cubes. Assume each face of a cube has area 1 unit². Determine the surface area of each composite object.



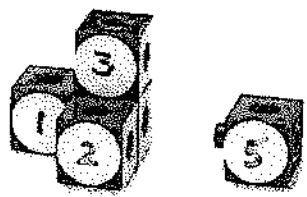
Apply

5. These are 1-cm cubes.



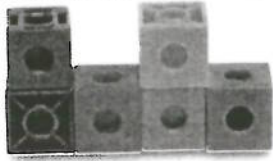
- Determine the surface area of the composite object formed by placing cube 4 on top of each indicated cube.
 - cube 1
 - cube 2
 - cube 3
- Why are the surface areas in part a equal?

6. These are 1-cm cubes.



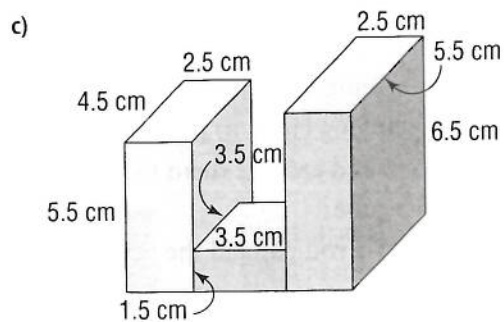
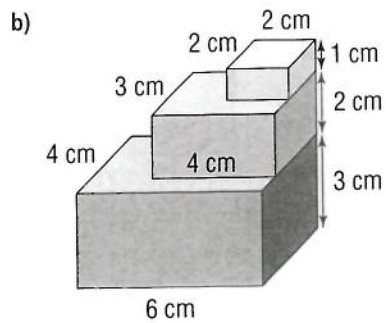
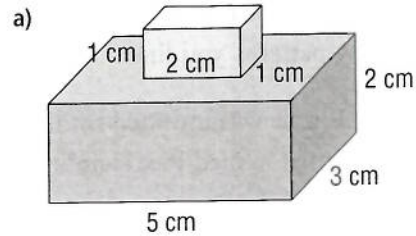
- Determine the surface area of the composite object formed by placing cube 5 on top of each indicated cube.
 - cube 1
 - cube 2
 - cube 3
- Why are all the surface areas in part a not equal?

7. Why could you not use 6 views to determine the surface area of this composite object?



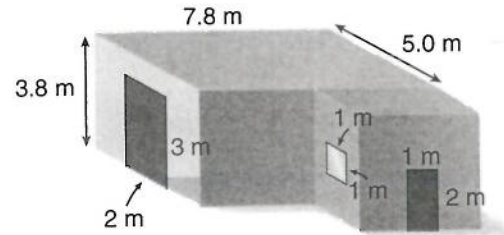
8. Determine the surface area of each composite object.

What effect does the overlap have on the calculation of the surface area?

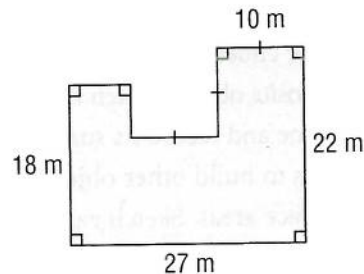


9. Work with a partner. Tape a tissue box on a shoebox to form a composite object.
- What is the area of the overlap? How did you calculate it?
 - Determine the surface area of the object.

10. **Assessment Focus** A garage has the dimensions shown. The attached shed has the same height as the garage, but is one-half as long and one-half as wide.



- What is the surface area of the building?
 - Vinyl siding costs $\$15/\text{m}^2$. The doors, windows, and roof will not be covered with siding. How much will it cost to cover this building with siding?
11. This is a floor plan of a building that is 8 m tall. It has a flat roof. What is the surface area of the building, including its roof?



12. Use 27 small cubes to build a large cube.
- Determine and record its surface area.
 - How many ways can you remove one cube without changing the surface area? Explain your work.
 - Suppose you painted the large cube. How many small cubes would have paint on:
 - exactly 1 face?
 - exactly 2 faces?
 - exactly 3 faces?
 - 0 faces?

blocks of ice.



- Suppose you have 30 blocks of ice measuring 25 cm by 50 cm by 100 cm. Sketch a castle with no roof that could be built with some or all of these blocks.
- Determine the surface area of your castle, inside and out.

Take It Further

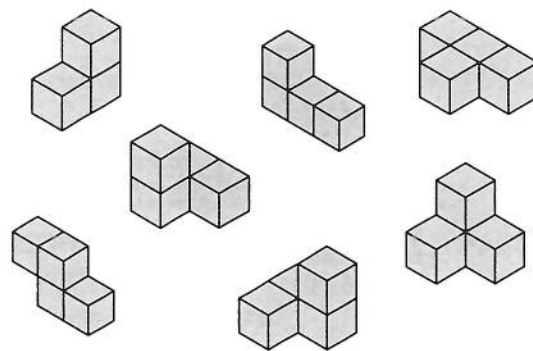
- Use 6 centimetre cubes.
 - Build a composite object. Sketch the object, then determine and record its surface area.
 - Use the cubes to build other objects with different surface areas. Sketch each object and record its surface area.
 - Determine all the different surface areas for a composite object of 6 cubes.
 - Describe the object with the greatest surface area. Describe the object with the least surface area.

Reflect

Why is it important to consider the areas of overlap when determining the surface area of a composite object? Include an example in your explanation.

- A pyramid-like structure is made with 1-m^3 wooden cubes. The bottom layer of the structure is a rectangular prism with a square base and a volume of 25 m^3 . The next layer has a volume of 16 m^3 . The pattern of layers continues until the top layer, which has a volume of 1 m^3 . Determine the surface area of the structure. Describe any patterns you find.

- The SOMA Puzzle was invented by a Danish poet and scientist named Piet Hein in 1936. The object of the puzzle is to arrange these 7 pieces to form one large cube:



- Determine the surface area of each piece.
- Use linking cubes to make your own pieces and arrange them to form a large cube.
- Suppose you painted the large cube. How many faces of the original 7 pieces would not be painted? How do you know?