

## Chapter 2

### Introduction to Logic and Sets

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#### Activity 1

##### Box 1

1. No. If there were green gumballs in the jar, it would be labeled correctly, but no jar has a correct label.
2. Red
3. No. If so, the jar labeled GREEN would have GREEN gumballs, but all labels are incorrect.
4. The correct label for the jar labeled Red - Green is Red, the correct label for the jar labeled Red is Green, and the correct label for the jar labeled Green is Red - Green.

##### Box 2

Greatest amount = \$1.19

Coins = 1 half dollar, 1 quarter, 4 dimes, 4 pennies

##### Box 3

State	Alabama	Alaska	Oklahoma	Minnesota
Flower	Camellia	Forget Me Not	Mistletoe	Lady's slipper
Bird	Yellowhammer	Willow ptarmigan	Flycatcher	Loon

Clues b, d, and c are the keys to solving the problem.

From b, we know that Alaska and forget me nots go together.

From d, we know that Alabama and yellowhammer go together.

From c, either camellia or lady 's slipper go with Minnesota. If camellia and Minnesota go together, then the state bird can't be the willow ptarmigan (clue e) or the loon (clue c) so it must be the flycatcher. But this would contradict clue a, so Minnesota, lady's slipper, and loons must go together.

##### Box 4

Two answers are possible. Freddie or Susie can be in either First or Fourth place.

First	Second	Third	Fourth
Yellow	Purple	Green	Red
Freddie or Susie	Liz	Joe	Susie or Freddie

**Activity 2****Box 1**

2. a. SRS, SRT, SRC, SRR (small, red, rhombus)  
LRS, LRT, LRC, LRR
  - b. 8
  - c. 32
3. a. SGS, SGT, SGC, SGR, LGS, LGT, LGC, LGR,  
SYS, SYT, SYC, SYR, LYS, LYT, LYC, LYR,  
SBS, SBT, SBC, SBR, LBS, LBT, LBC, LBR
  - b. The pieces are outside the loop.
4. a. Sample Responses: the set of blue pieces; the set of circles
  - b. You could pair up the pieces in set A with the pieces in set B to make sure there are no pieces left over in either set. That is, you could create a one-to-one correspondence between the elements of the two sets.
  - c. The set of pieces that are not large.

**Activity 3**

1. b. If the loops did not overlap, there would be no way to place the pieces that are Large AND Red.
2. a. (either) **RED or LARGE**
  - b. 20
3. a. **RED and LARGE**
  - b. 4
4. Sample Response: **Square and Circle**
5. Sample Response: **Triangle and Not Square** (The triangles are a subset of the pieces that are not square.)
6. a. 12
  - b. A
7. **Not Square and Blue**  
 Since both loops contain pieces that are large and pieces that are small, the labels do not involve size. There are two possibilities for the label for the loop on the left, Not Yellow (since it contains pieces with all the other colors) or Not Square (since it contains only circles, squares, and rhombi). Suppose the correct label is Not Yellow. Then the small red square would go in that loop. Since it isn't, the label for the left loop cannot be Not Yellow. Thus the label must be Not Square. Similarly, the label for the right loop could be Blue or Not Rhombus. However, if the label was Not Rhombus, then the small red square would be in the loop. Since it isn't, the label must be Blue.