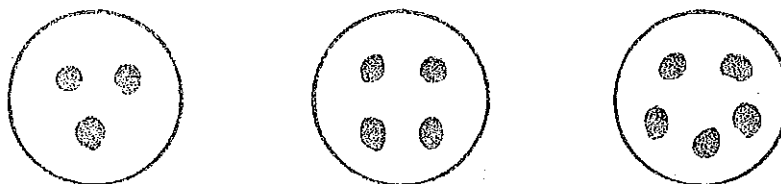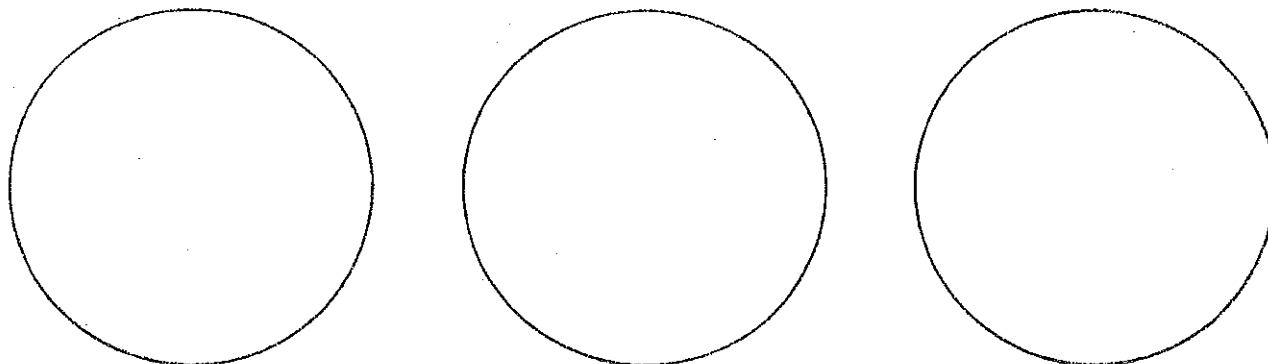1. Take 12 pebbles. Make 3 piles like this.

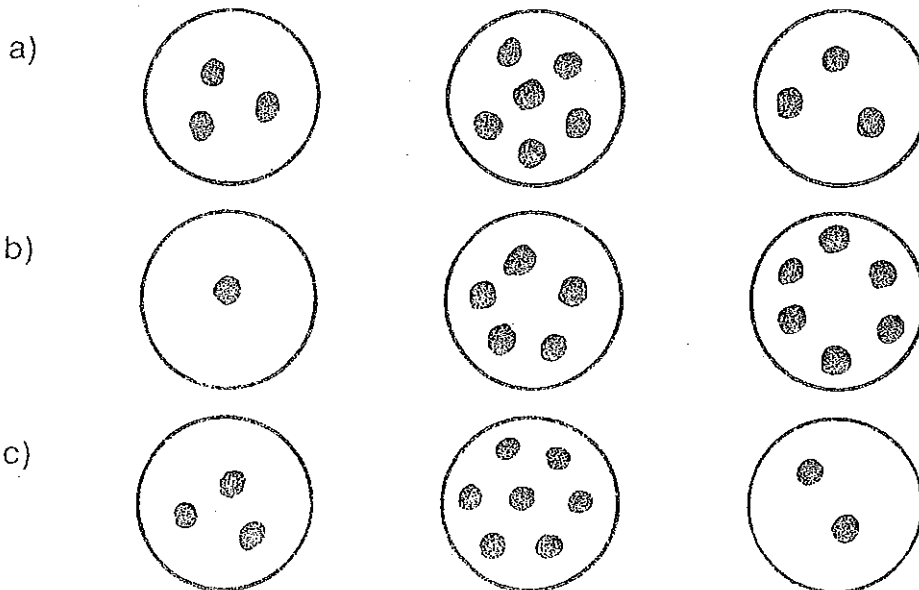Now move 1 pebble so that each pile has 4 pebbles.

Do it here.

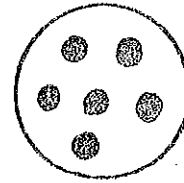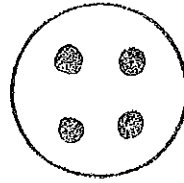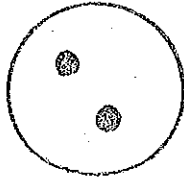2. Take 12 pebbles. Make 3 piles like this.

This time you have 2 moves. On the first, move 1 pebble. On the second, move 2 pebbles from 1 pile to another. Try to rearrange the pebbles into 3 equal piles. Use the 3 circles above.

3. Now use the same rules and try these combinations.

a)

b)

c)

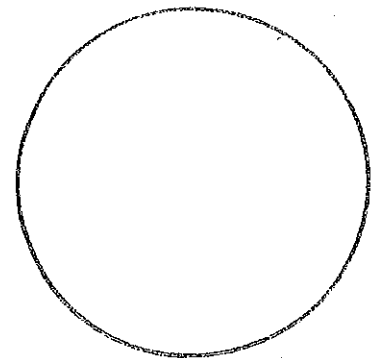Take 12 pebbles. Make piles of 2, 4, and 6 pebbles like this.

Now you have 3 moves.

First: Move 1 pebble.

Second: Move 2 pebbles.

Third: Move 3 pebbles.

Try and make 3 piles of 4 pebbles after the 3 moves.

Take 12 pebbles. Start with piles of:

1. 1, 3, 8

2. 3, 4, 5

3. 1, 10, 1

4. 0, 3, 9

5. 2, 8, 2

6. 3, 6, 3

7. 1, 4, 7

8. 0, 5, 7
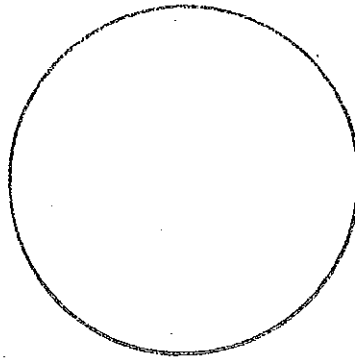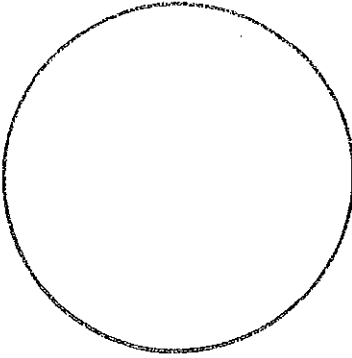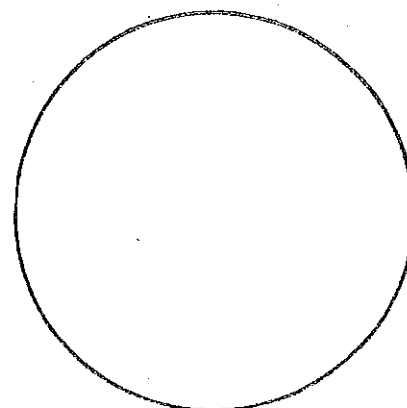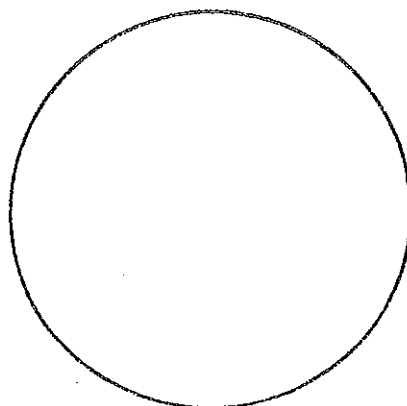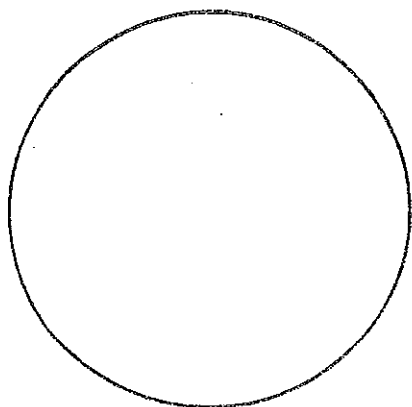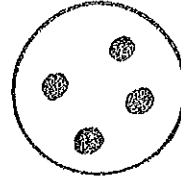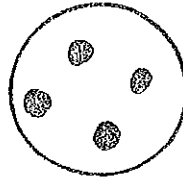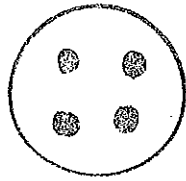
You have 3 moves.

First: Move 1 pebble.
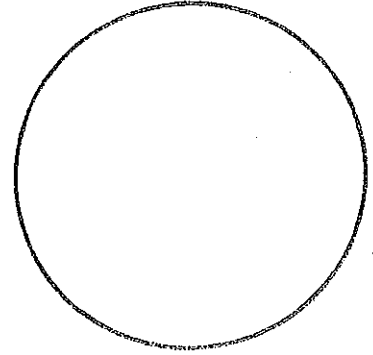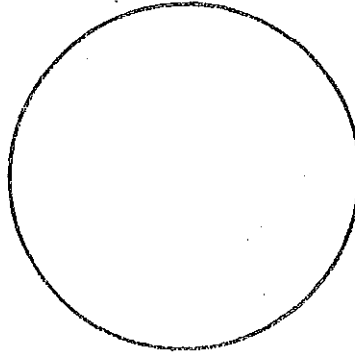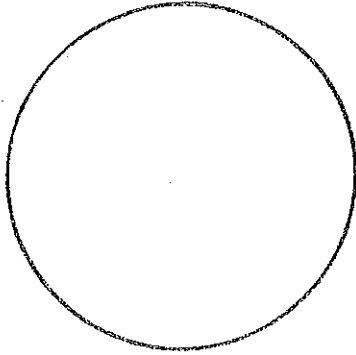
Second: Move 2 pebbles.

Third: Move 3 pebbles.

Try and make 3 piles of 4 pebbles after the 3 moves.

1. Start with 3 piles of 4 pebbles each.

Move 1 pebble on the first move. Move 2 pebbles on the second move, 3 on the third, and so on. Can you go on for 12 moves and end up with 12 pebbles in 1 pile and no other piles?

2. Start with 3 piles of 4 pebbles each. Use the same moves as above. What is the fewest number of moves it takes to get the 12 pebbles in 1 pile and no other piles?

3. Start with a pile of 12 pebbles and no other piles. Can you get back to 3 piles of 4, 4, and 4 pebbles moving 1 pebble the first time, 2 pebbles the second, and so on?

Counting 4
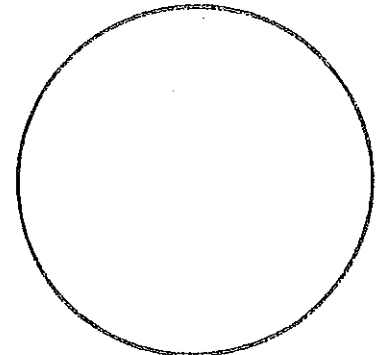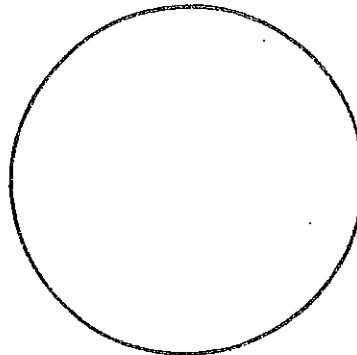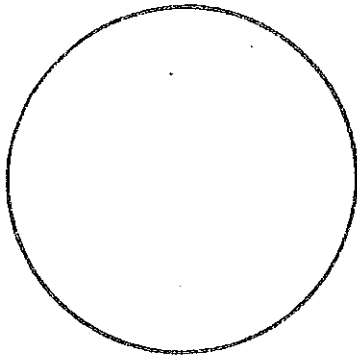
PILE ON   A game for 2 players

Make 3 piles with 4 pebbles in each pile.
On each move a player must move pebbles from only 1 pile to another.

On the first move, the first player must move 1 pebble.
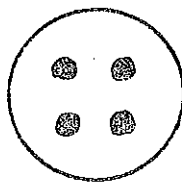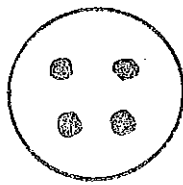On the second move, the second player must move 2 pebbles.
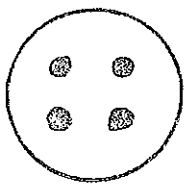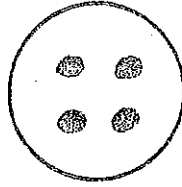On the third move, the first player must move 3 pebbles.
On the fourth move, the second player must move 4 pebbles, and so on.

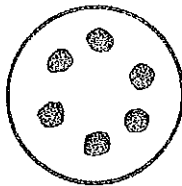The first player who cannot move loses the game.

Sample game:
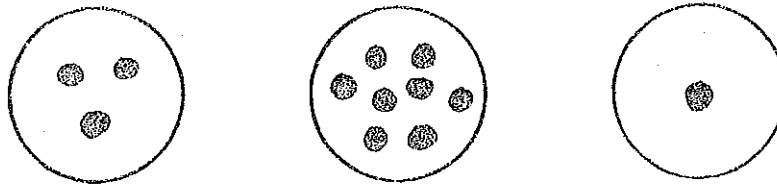
START

First player moves 1 pebble.

Second player moves 2 pebbles.

First player moves 3 pebbles.

Game continues until 1 player cannot make a move with the correct
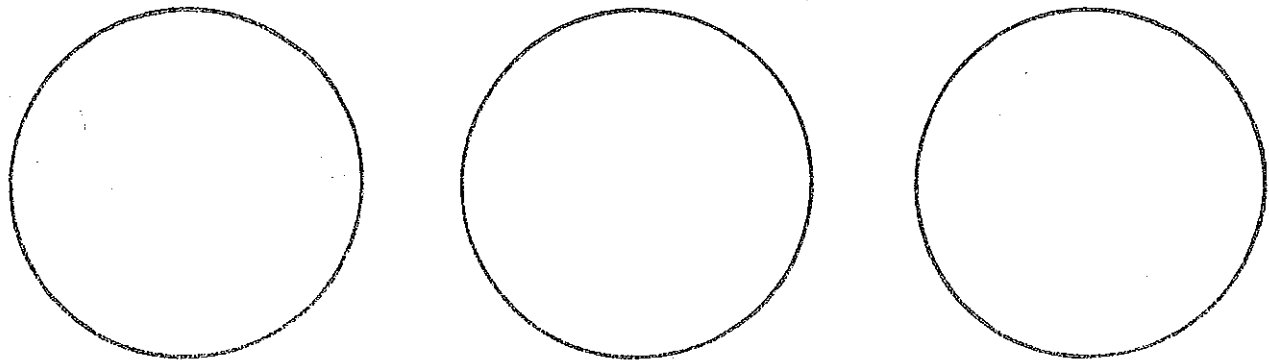number of pebbles.

1. Take 12 pebbles. Start with them in piles of 3, 8, and 1, like this.

On each move you may add to a pile the number of pebbles already in that pile. For example, you could take 3 from the pile of 8 and add them to the pile of 3. Or you could take 1 from the pile of 3, or 8, and add it to the pile of 1.
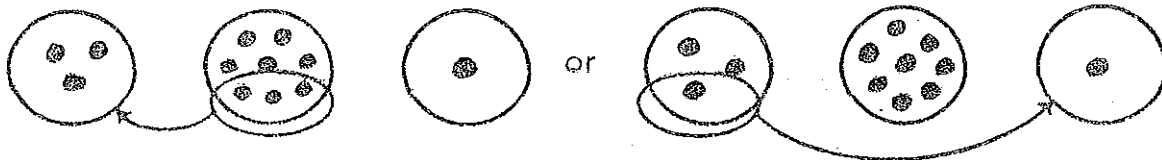
Try to make 3 piles of 4 pebbles each in 3 moves.

2. Now do the same thing, starting with piles of:
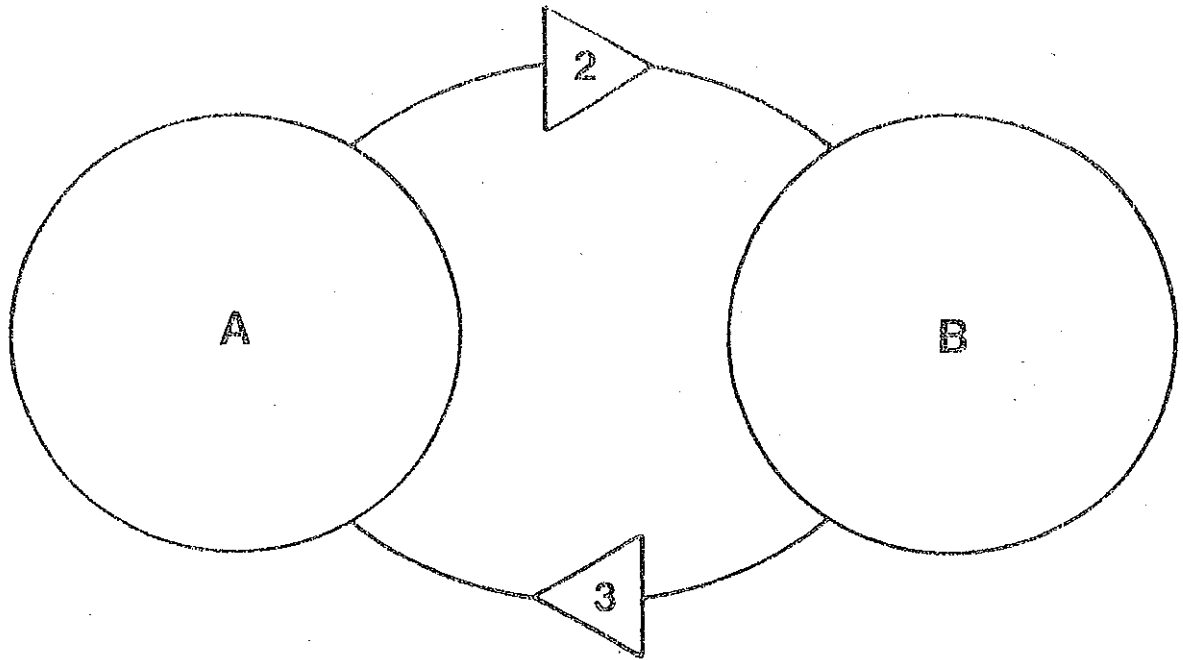   a) 2, 9, 1

   b) 2, 7, 3

3. Do the above activities again moving different numbers of pebbles each move.

   Can each of them be done in a different way?

   Can you do 2b in just 2 moves?

1. Put 5 pebbles in circle A. Can you get all the pebbles from A to B? You may move pebbles in groups of 2 along the ⫸2⫸ route and in groups of 3 along the ⫷3⫷ route in the directions shown by the arrows.

2. Now start with 7 pebbles in A. How many moves does it take to get all the pebbles to B?

3. Start with 5 pebbles in circle B. Can you get them all to A? What is the fewest number of moves it takes?

4. Start with 7 pebbles in B. Move them all to A. What is the fewest number of moves it takes?