

LESSON TWO

BROKEN CIRCLES

COMPLEX INSTRUCTION GOAL(S): NO ONE IS DONE UNTIL EVERYONE IS DONE. PAY ATTENTION TO WHAT OTHERS NEED.

Activity: The object of this exercise is to put these pieces together in such a way that each member of your group ends up with a complete circle.

This activity has many authors. The original game, Broken Squares, was developed by Dr. Alex Bavelas (1973). Nancy and Ted Graves (Graves & Graves, 1985) and Elizabeth Cohen (1994) have provided enhancements.

There are three versions of the circles. For **younger children**, use the easier version of the circles. For **second through fifth grade**, use the middle version of the circles. **Middle through high school students** can work with the advanced circles. If you want to provide students with additional opportunities to practice noticing, there are also several variations of Broken Squares available at <http://web.stanford.edu/class/ed284/csb/>.

Preparation:

- Make one set of circles for each group of 3 (easiest version) or 4 (harder versions) students. (You can use the templates below, or download others from <http://web.stanford.edu/class/ed284/csb/>).
- Sort the pieces into envelopes (for example, if you are making the easiest version, the I's go into one envelope, the II's into another, and the III's into a third).
- Each group should get a set of 3-4 envelopes, depending on the number of group members, so that the number of envelopes/circles equals the number of group members.
- Write/project the rules so that everyone can see them, if appropriate.

Launch:

The easiest way to launch this activity is to read the directions to students, emphasizing the three rules (see text box below). Sometimes, modeling “pointing”, “hand signals”, and “taking pieces” can help students avoid those actions. Be sure to emphasize that no one is finished until everyone has a completed circle. Students may have a completed circle, but should

realize that one of their pieces may be needed to complete another person's circle. They need to be very observant about what other people in their group need.

Directions for Students:

The object of this exercise is to put these pieces together in such a way that each member of your group ends up with a complete circle.

- 1. No talking or other noises!**
- 2. No pointing or hand signals!**
- 3. No taking pieces. You may only give pieces to others.**

Teacher Moves: Circulate and monitor that students are remembering not to speak or use hand signals. Redirect students to the rules when necessary.

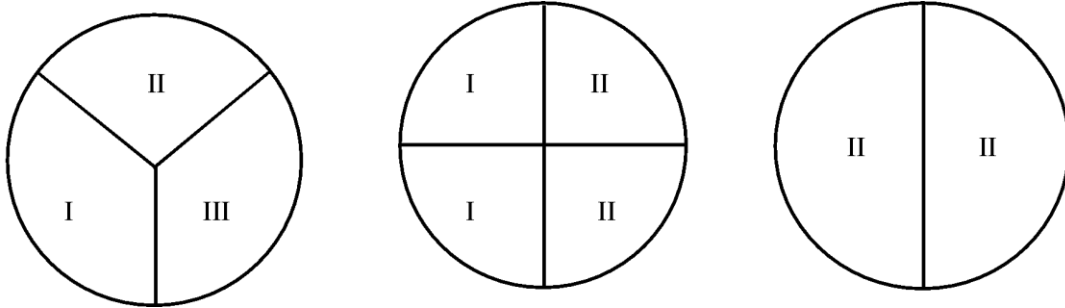
Debrief:

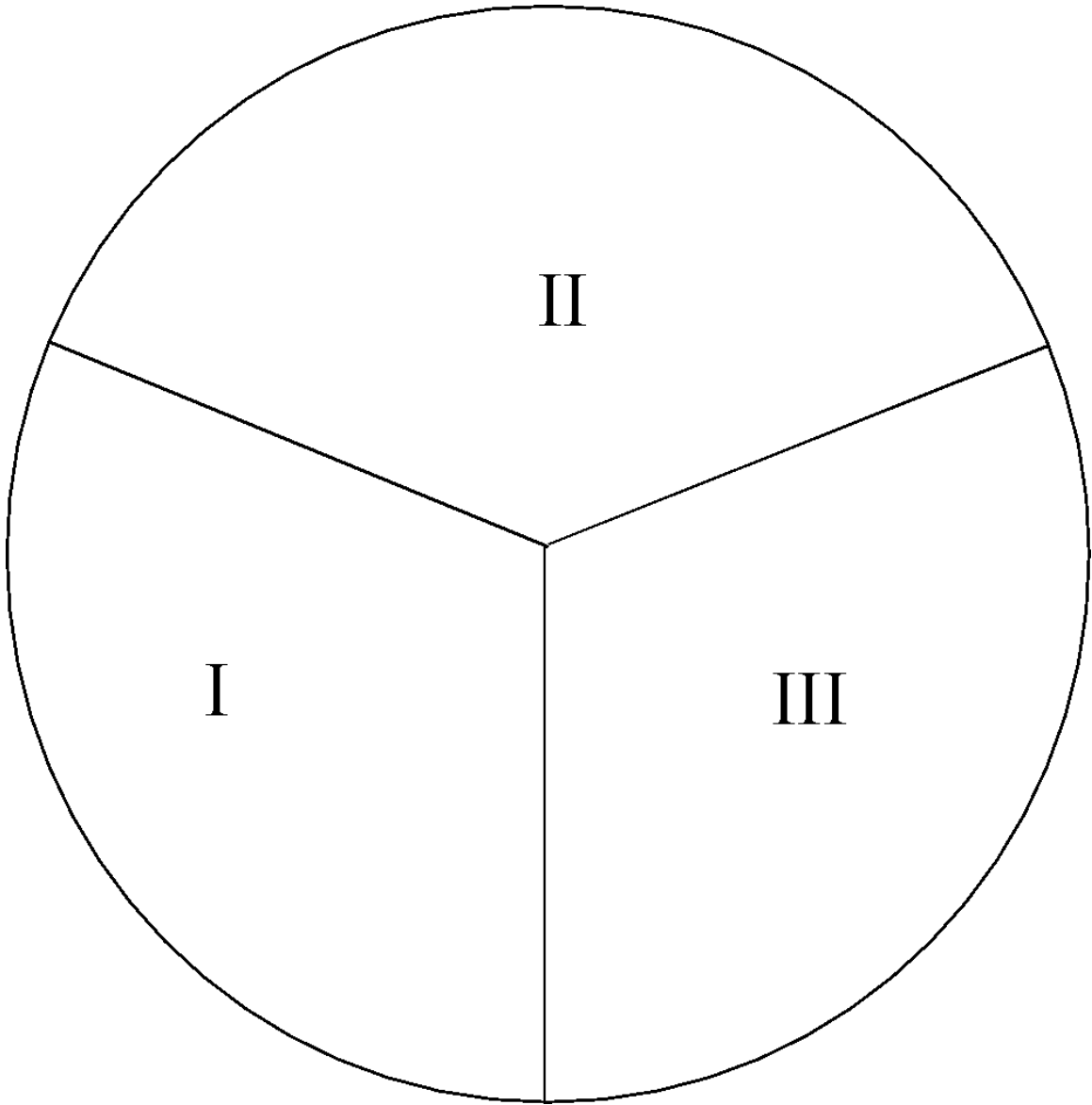
Discuss these questions with your students:

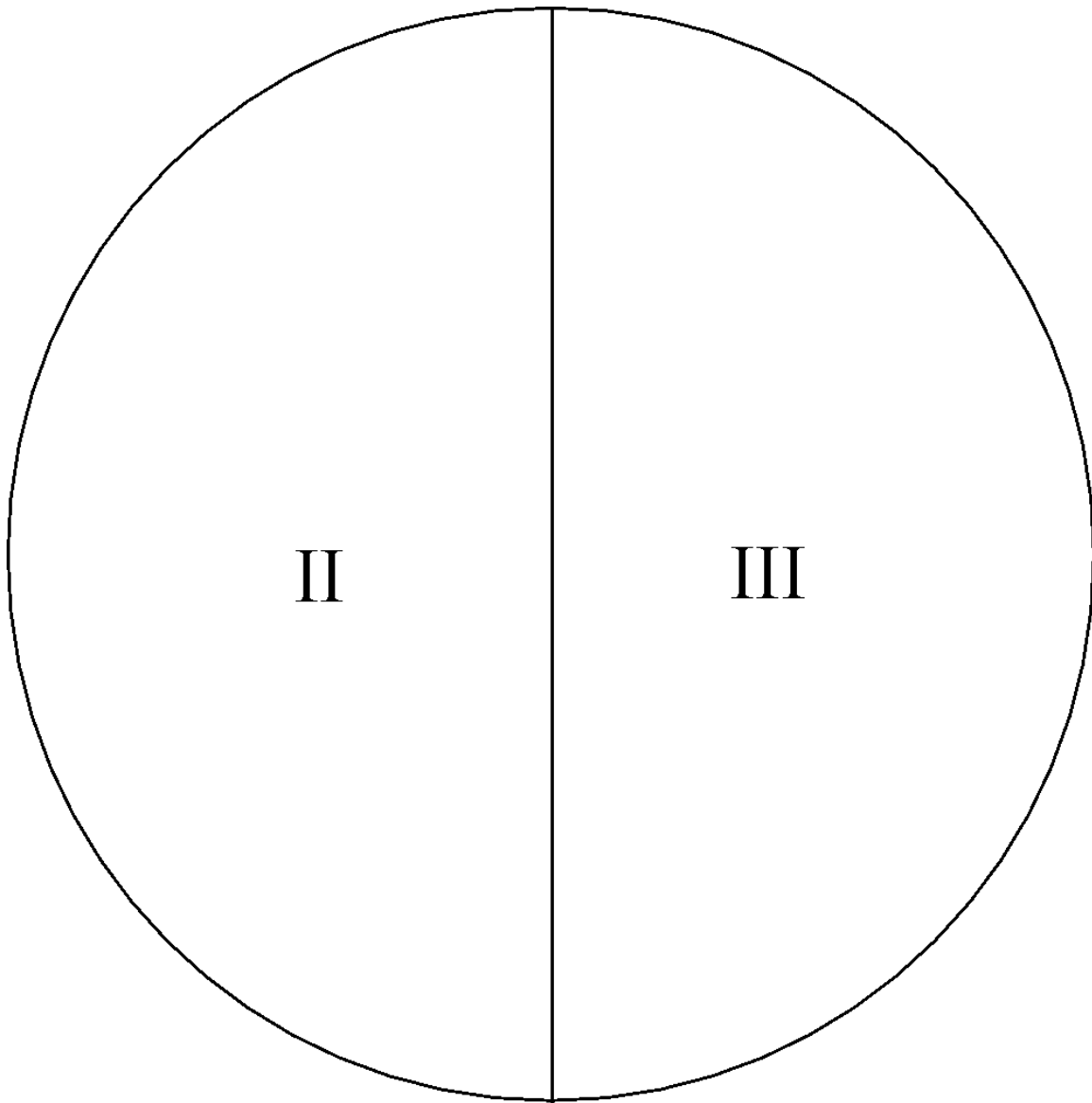
1. What do you think this game was about?
2. What helped your group succeed?
3. One of our classroom norms is that no one is done until everyone is done. How does this game show that norm? Why is that norm important for learning?
4. What happened when someone gave you a piece?
5. What was it like to help someone by giving them a piece?
6. What parts of this activity would you like to use as you work in groups doing math?

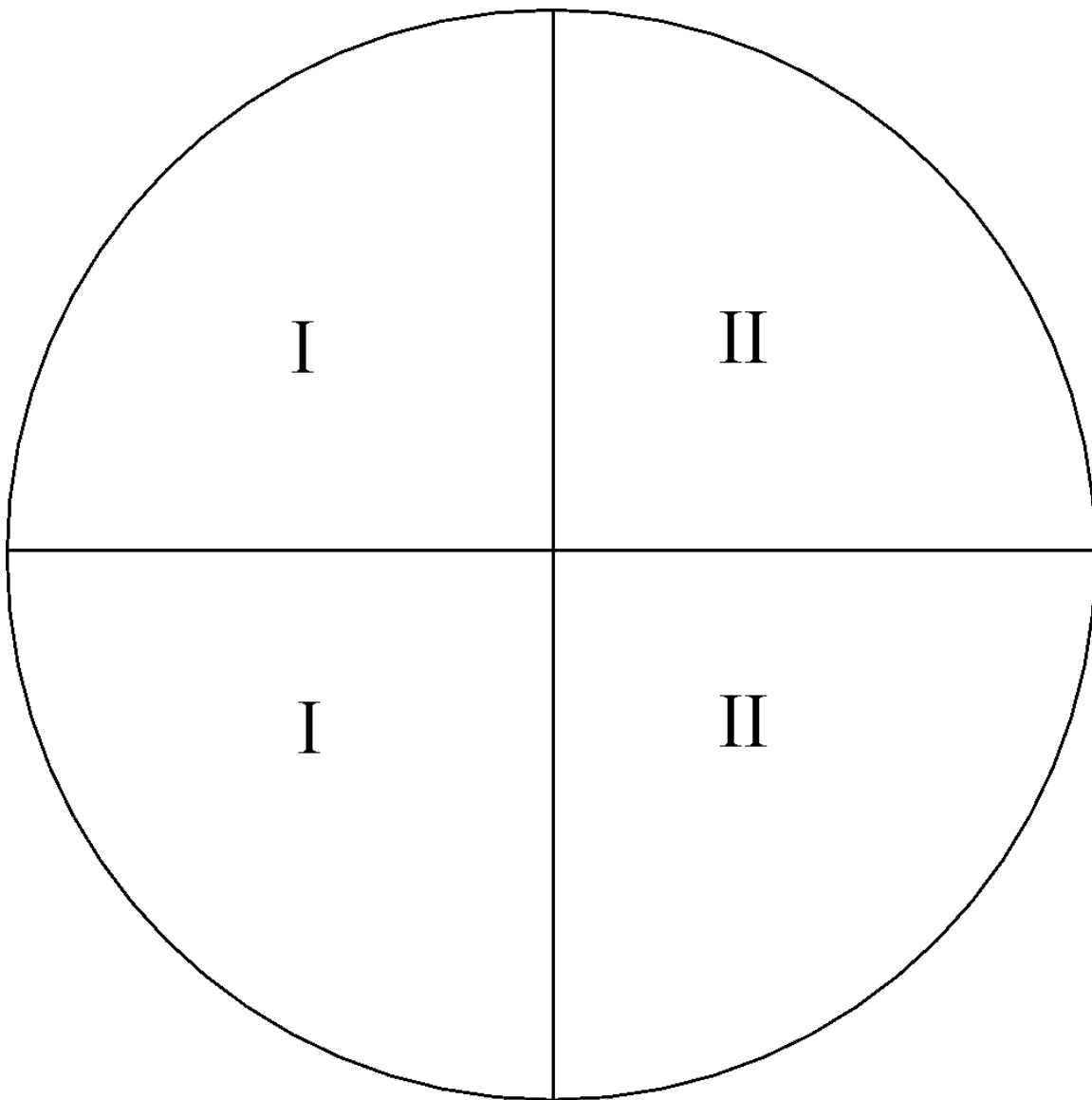
Simplest Broken Circles

This pattern is suitable for children 5-7 years old in groups of three. Sort the pieces into three envelopes (I, II, and III, as marked below) and give one envelope to each student. The summary figure given below indicates one solution; in this solution each player must give up some of his or her pieces to other players. The diagram shows how pieces held by players I, II, and III can be rearranged to form three circles. Two circles composed of a half and two quarters represents an alternative solution.



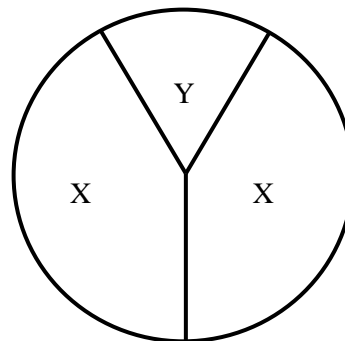
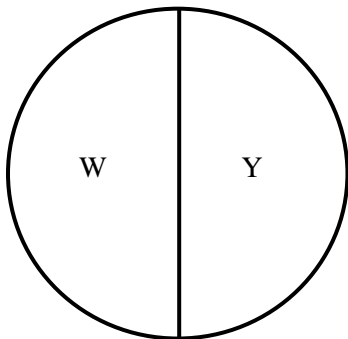
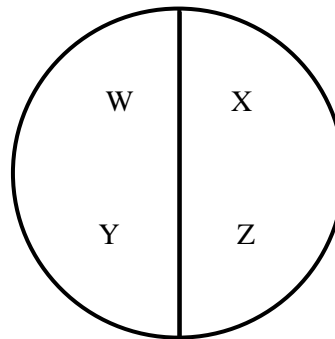
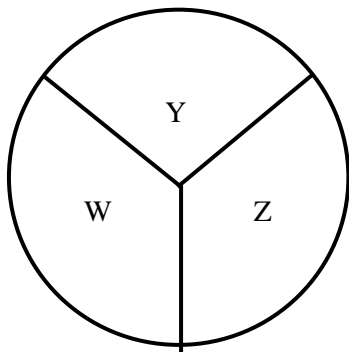


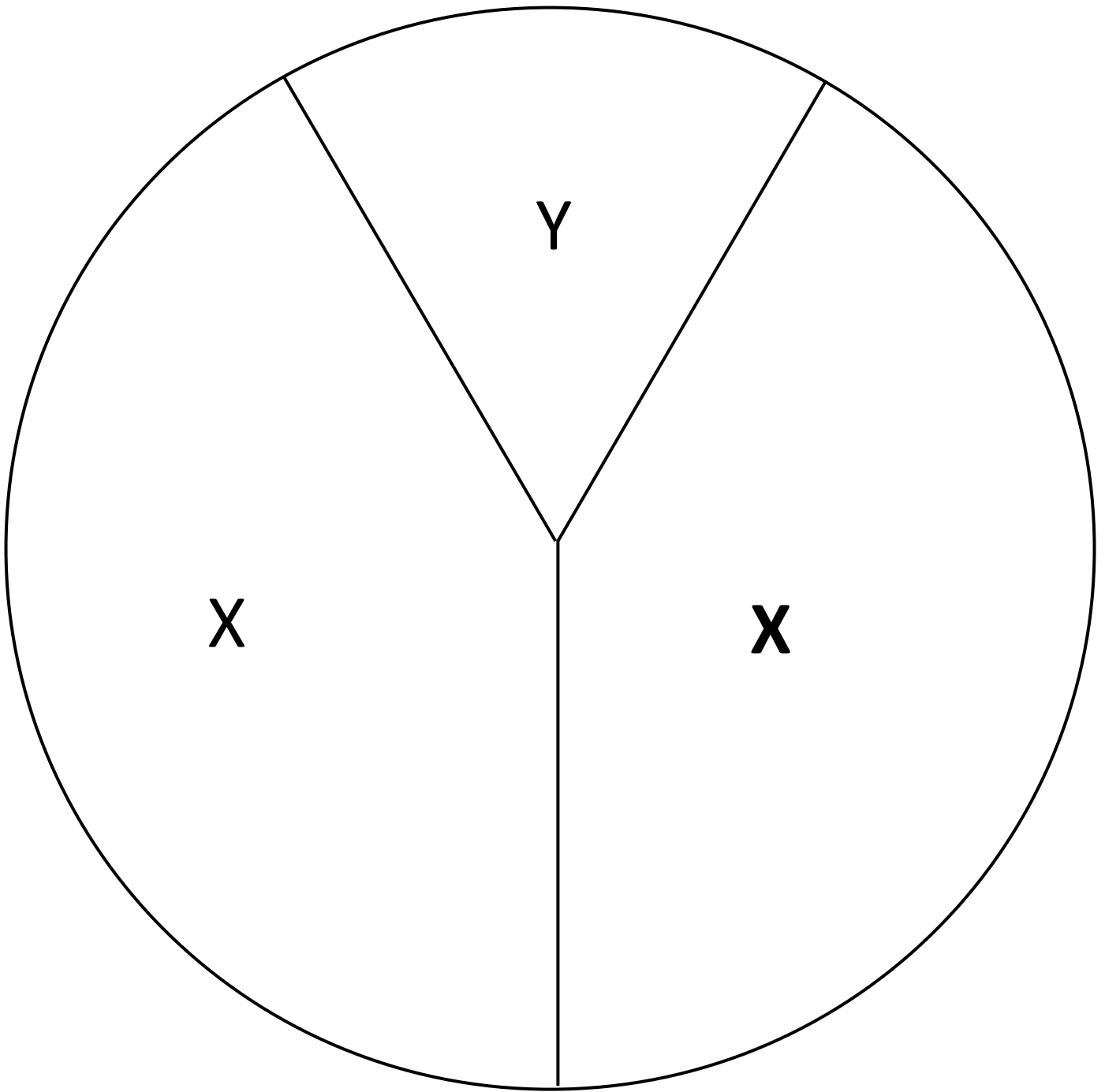


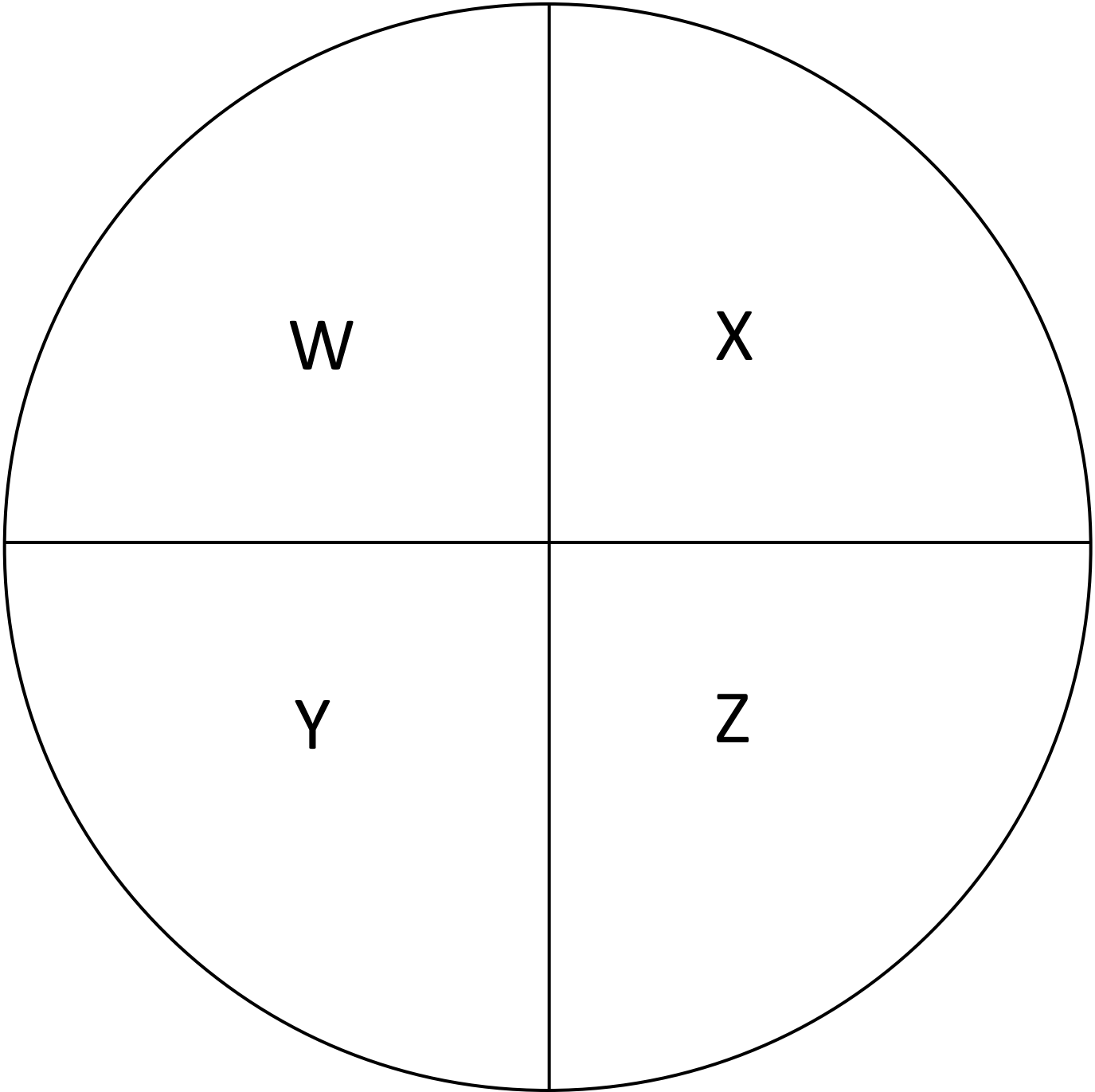


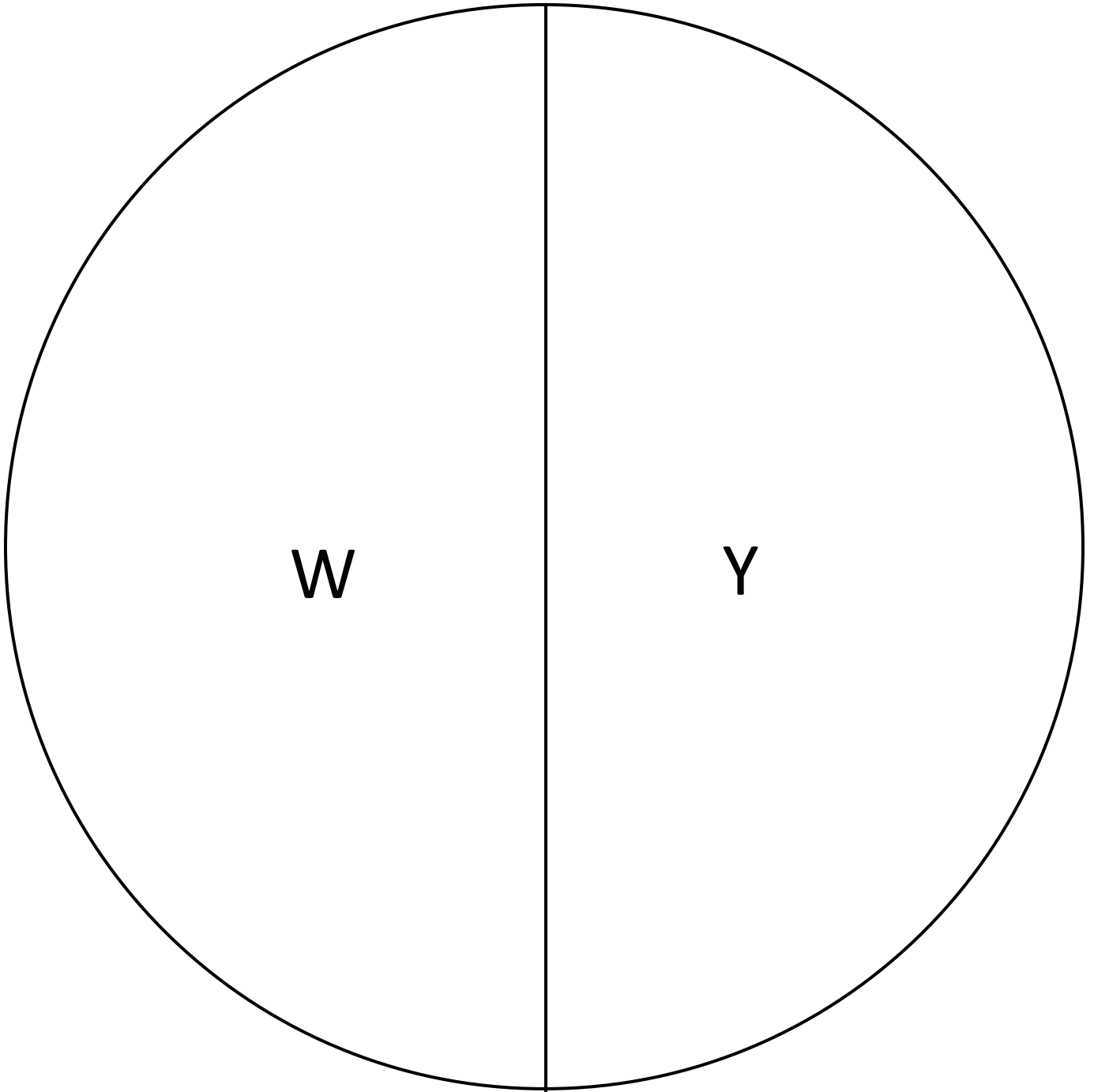
Simple Broken Circles

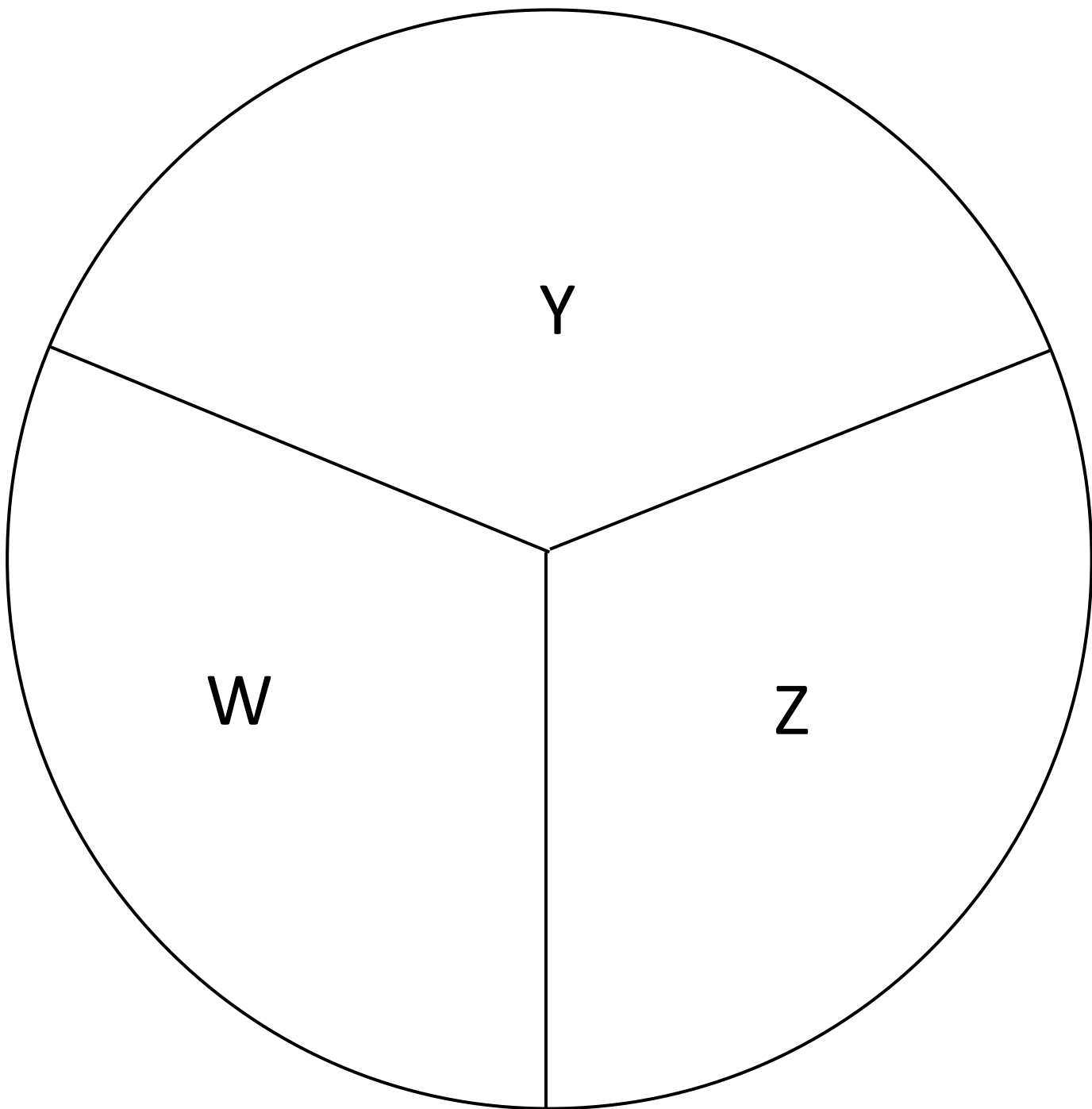
This pattern is suitable for children 8-10 years old in groups of four. Sort the pieces into four envelopes marked W, X, Y, and Z. The figure below indicates one solution. Ask the groups that finish first, "How many *other* ways of forming four circles can you discover?"





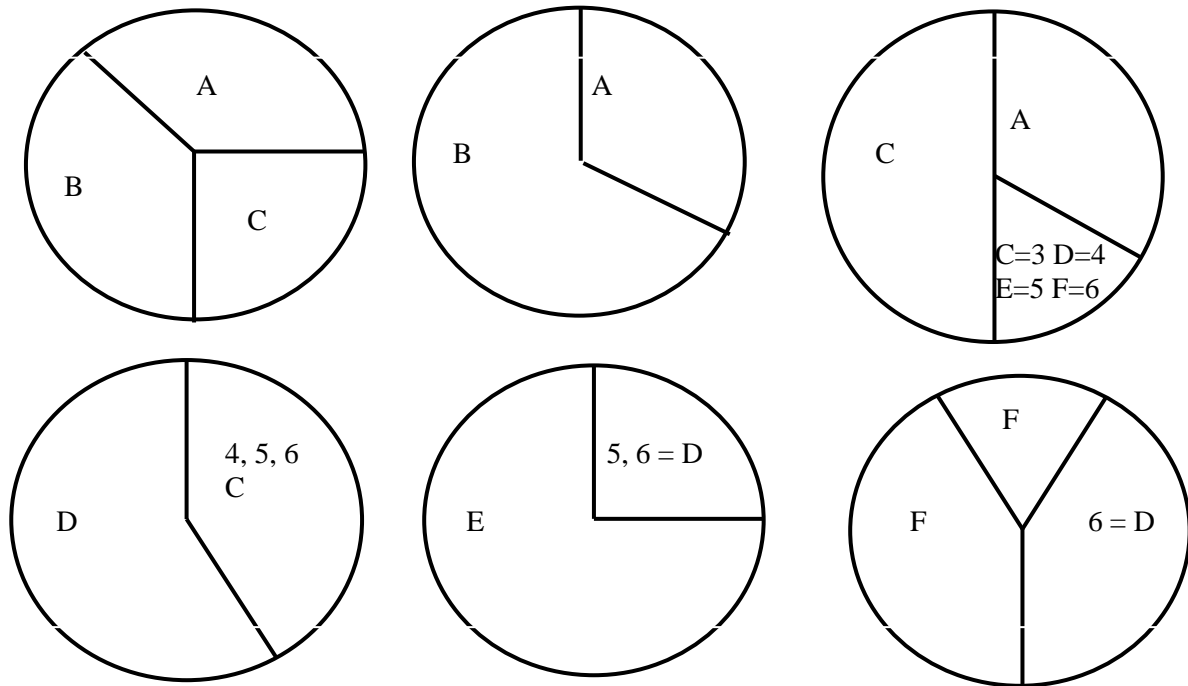






Advanced Broken Circles

This pattern is suitable for children 8 - 10 who have had some experience with simple Broken Circles. It may also be used as a first exercise with older children and adults.



Instructions For Making This Set of Broken Circles

Make your set (one per group) from cardstock or laminated for durability. Each set of six circles should be a different color, with the letters and numbers (indicating which pieces go into which envelopes for groups of different sizes) marked on the back of each piece. On the diagram above, the numbers indicate the group size, while the letters indicate the proper envelope.

1. Take all the pieces with only a letter on them and put them into envelopes marked with those letters. These never change regardless of group size.
2. The placement of the other four pieces varies with the size of your group. For example, if you are working with six person groups, then the piece marked 6-F goes into the F envelope. You would add the 6-E piece to the E envelope, the 6-D piece to the D envelope, and the 6-C piece to the C envelope. Repeat this pattern for each six-person group.

Although it is fairly easy on the spot to modify a set of six circles for groups of five or less, once you are familiar with the exercise, you may prefer to make up and label sets of varying sizes in advance. Then these can be quickly substituted where required.

