

Name: _____

Names of collaborators: _____

In this activity, we will divide into six groups, and each group will be assigned one of six countries, in the run-up to World War I (see *Joy*, p 19-21). You will investigate balanced and unbalanced triangles both from the perspective of your country, then from an outside perspective (looking at all the countries).

Objectives. (1) Understand the notions of “balanced” and “unbalanced” triangles by identifying them in diagrams representing networks of relationships. (2) Connect the notions of “balanced” and “unbalanced” triangles to negative numbers and give an intuitive explanation of why the product of two negative numbers is positive. (3) Work collaboratively to analyze information and explain concepts.

Instructions. We will start this activity together in class. First we will demonstrate two networks of relationships as a whole class. Then, you will work in your small groups to work on answering the questions below. If your group does not finish all the questions, you may continue working on the activity outside of class, either with your group or individually. The work you write on your paper should reflect your own understanding of the material. This activity will be one of two options for you to write about in your first report.

Basic Investigation

1. What is your country? _____
2. Look at the diagram of the Three Emperor’s League (1872-81).

Is your country a part of any triangles in this diagram? _____

- If so, list the triangles, and state whether each one is balanced or unbalanced.
- If not, describe at least one balanced triangle and one unbalanced triangle in this diagram.

3. Look at the diagram of the Triple Alliance (1882).

(a) Did your country make changes to its alliances or hostilities? _____

- If so, describe the changes.
- If not, describe at least one new alliance or hostility in the diagram.

(b) Did anything change in the triangles your country is a part of? _____

- If so, describe the changes.
- If not, describe at least one new or changed triangle in the diagram.

(c) Now look at the whole set of relationships (alliances and hostilities). Describe the change(s) that took place.

4. Look at the diagram of the German-Russian Lapse (1890).

(a) Did your country make changes to its alliances or hostilities? _____

- If so, describe the changes.
- If not, describe at least one new alliance or hostility in the diagram.

(b) Did anything change in the triangles your country is a part of? _____

- If so, describe the changes.
- If not, describe at least one new or changed triangle in the diagram.

(c) Now look at the whole set of relationships (alliances and hostilities). Describe the change(s) that took place.

Continued Investigation

5. Look back at the Three Emperor's League (1872-81). Make two lists, one of **all** the balanced triangles in the diagram and the other of **all** the unbalanced triangles in the diagram. Use these triangles to explain why the Three Emperor's League (1872-81) was unstable.

6. On page 19, Strogatz says, “the logic of balance matches the logic of multiplication.” Explain in your own words what this means. Use examples from the the Three Emperor’s League (1872-81) diagram.

Further Investigation

7. Look at the British-Russian Alliance (1907). Make two lists, one of **all** the balanced triangles in the diagram and the other of **all** the unbalanced triangles in the diagram. Use these triangles to explain why this situation is **stable**.

Above and Beyond

8. For each of the six diagrams on page 20, list all the balanced triangles and all the unbalanced triangles. (You have already done two of the six.)
9. For each of the five transitions (from the Three Emperors' League to the Triple Alliance, the Triple Alliance to the German-Russian Lapse, and so forth), describe the changes that took place. (You have already done two of the five.)
10. Explain in your own words how the **idea** of balanced and unbalanced triangles is helpful for describing and understanding the shifting alliances in the years leading up to World War I. (See page 21.)
11. We have used the idea of balanced and unbalanced triangles to analyze geo-political dynamics. Strogatz says, however, that this is an over-simplification of the real-life situation. What is the point of carrying out this analysis then?