# Activity

*-Ninja Clans-*

## Educational Goals

- Recognize and classify different plane figures (closed and open shapes, quadrilaterals, triangles, convex and non-convex polygons)
- Recognize and classify different angles (acute, obtuse, right)

## Key Features of the Targeted Competencies

- To decode the elements of the situational problem (C1)
- To apply different strategies in order to elaborate the solution (C1)
- To validate the solution (C1)
- To define the elements of the mathematical situation (C2)
- To mobilize and apply concepts and processes appropriate to the given situation (C2)
- To justify actions or statements by referring to mathematical concepts and processes (C2)
- To adopt the mathematical vocabulary (C3)
- To interpret or produce messages of a mathematical nature (C3)

## Concepts Used

- Plane figures' characteristics (open shape and closed shape)
- Polygons' characteristics (convex, non-convex, acute angles, obtuse angles and right angles)
- Characteristics associated to isosceles triangles and right triangles

## Materials

- Several copies of the game *Ninja Clans* provided in the appendix (one copy per team)

**Targeted Academic Levels**


**Targeted Competencies**


**Mathematical Field Concerned**

**Suggested Teaching Formula**

**Time Required**

Approximately 40 minutes

# Suggested Process

**Step 1: Introduction** (5 minutes)

Explain the activity's rules (refer to the Explanation Sheet) by showing examples of valid and non-valid ninja clans. Depending on the students' level, review some mathematical concepts necessary to solve the problem. In cycle two, it is advised to explain what an isosceles triangle is. Explain that when it is indicated that there is an acute angle, this means there is only one in the whole clan.

**Step 2: Solving the problem** (25 minutes)

Form teams of approximately 3 students and give each team the *Ninja Clans* activity's cards (see appendix 1). Let the students question each other and discuss the different possibilities. Go around the classroom and help the teams encountering difficulties by giving an example that works. While doing that, explain the logical reasoning. Ask questions to help the students' reasoning progress:

- Can this figure be part of this clan? Why?
- In this clan, only two acute angles are missing. Which figure would allow to complete this clan? By adding this new figure, is the clan still valid?
- Etc.

If needed, give clues to the whole class (refer to the strategy suggested in the Explanation Sheet).

**Step 3: Explain the solution** (10 minutes)

The solution is available in the Explanation Sheet and the clans are represented by different colours in appendix 2. Explain the solution by showing one possible solving strategy or invite a team of students to present theirs. For example, you can project appendix 1 on the interactive whiteboard and circle each clan with a different colour while explaining what allows to group them together.

## Short on Time?

Explain the activity to the students while giving them one game each. Then, they can keep it in their desk or their storage tray and try to find the solution once they have some spare time (when they finish an activity early, for example).

## Trick

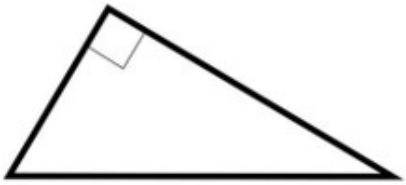
If you want to reuse this game or give a copy to each student, print it on coated paper-board or laminate the cards.

# Appendix 1

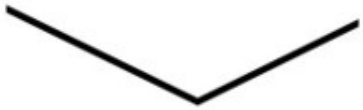
MY CLAN HAS FIVE ACUTE ANGLES

MY CLAN HAS FIVE ACUTE ANGLES

MY CLAN HAS TWO RIGHT ANGLES



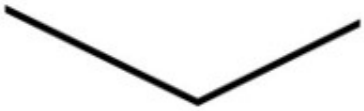
MY CLAN HAS TWO OBTUSE ANGLES



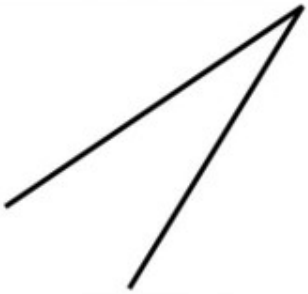
MY CLAN HAS TWO CONVEX CLOSED SHAPES

MY CLAN HAS TWO IDENTICAL SHAPES

MY CLAN HAS TWO ISOSCELES TRIANGLES

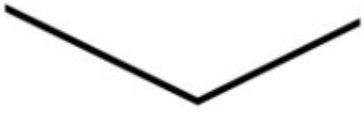


MY CLAN HAS TEN ACUTE ANGLES



MY CLAN HAS THREE OBTUSE ANGLES

MY CLAN HAS THREE CONVEX CLOSED SHAPES



MY CLAN HAS ONE CONVEX CLOSED SHAPE

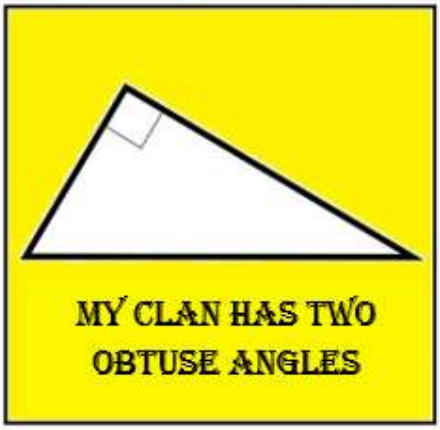
MY CLAN HAS ONE OPEN SHAPE

# APPENDIX 2

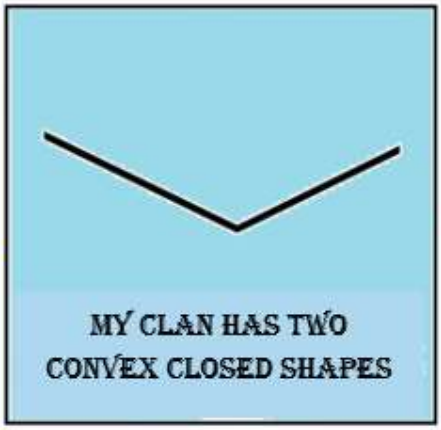
MY CLAN HAS FIVE ACUTE ANGLES

MY CLAN HAS FIVE ACUTE ANGLES

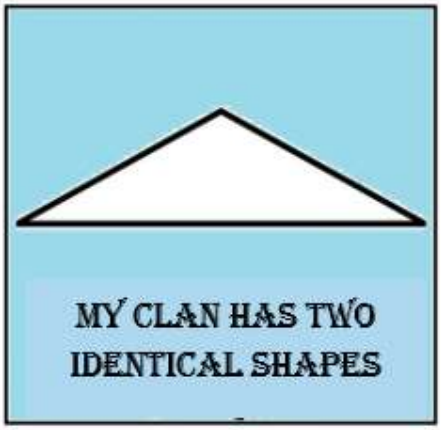
MY CLAN HAS TWO RIGHT ANGLES



MY CLAN HAS TWO OBTUSE ANGLES



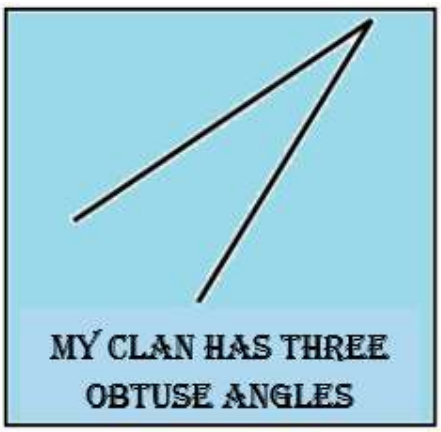
MY CLAN HAS TWO CONVEX CLOSED SHAPES



MY CLAN HAS TWO IDENTICAL SHAPES

MY CLAN HAS TWO ISOSCELES TRIANGLES

MY CLAN HAS TEN ACUTE ANGLES



MY CLAN HAS THREE OBTUSE ANGLES

MY CLAN HAS THREE CONVEX CLOSED SHAPES

MY CLAN HAS ONE CONVEX CLOSED SHAPE

MY CLAN HAS ONE OPEN SHAPE