

Lesson 1.1: Guessing Game Part 1

Objectives

In this lesson, students will:

- ❖ Gain an understanding of how to solve a problem using a set of questions
- ❖ Use pattern recognition
- ❖ Use patterns to decompose their problem.

Agenda

1. Introduction	5 mins
2. Finding patterns	10 mins
3. Guess what the teacher selected	10 mins
4. Guess Game	15 mins
5. Reflection Points	10 min
6. Wrap-up	5 min

Preparation

- Print student activity worksheet (one per student or student pair)
- Scissors
- Shapes cutout (Appendix A) for enough groups

Resources & Links

- Shapes printed and cut (Appendix A)
- (optional) Appendix B cut
- Video: What is [Computational Thinking](#)

1. Introduction



Explain to the students that today we are going to “group” pictures or images based on things they have in common. We will then define “patterns”

What is a “Yes” or “No” question? Let’s give some examples:

- Do you see a banana?
- Are you wearing glasses?
- Do you have a pencil for me?



Have some students share some examples of questions that can only be answered by Yes or No



Imagine that I have a set of cards in my hands and each card represents a colored shape. If I pick a one shape out of the deck and you need to guess which card I am holding, you could ask me a question like “Is it a blue heart filled up?” or “Is it a yellow square outline?”. It might take you a long time if you are not lucky to guess the correct answer. However, there is a way for you to get to the answer in a very effective way

Effective: We are being effective when we are working in a way that gets results, with little wasted effort.

During the next activities, we are going to learn how to guess a chosen shape from a deck of cards. In order to do that, we are going to proceed step by step by analyzing the possible answers and then define a series of questions (or steps) to get to the correct answer faster. This is what we called “**Decomposition**”. Decomposition is a way of thinking about a problem in smaller mini problems that we can solve one by one.

We will use our Decomposition super power throughout the lesson. [Write the word Decomposition on the side of the board and every time it will be used in the lesson, you will add a tick mark)

2. Finding patterns

The goal of this exercise is to make the students define the characteristics (or patterns) that make up each image (Color, shape, filled/outlined). Students will organize data presented to them, and analyze the data to find commonalities. This is called **Pattern Recognition**.

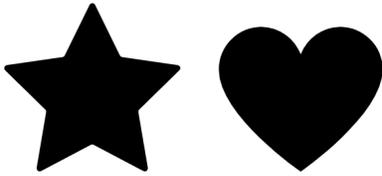
Group setup

Small group: Students are in a circle and all the cards using the shapes are put in the middle for all of them to observe

Large group: Students are subdivided into small groups with a set of cards with shapes that have all the traits

Ask the following questions to the students:

Find 2 images that have something in common for example, the 2 following images are both black



Ask students to make a list of what shapes could have in common:

- Their shape (heart, square, triangle, star, circle)
- Their color: Green, orange, blue, yellow, black, red
- If they are filled or just an outline

As a class, write on the board the list of patterns that have been found by the entire class.



Explain to students:

When you analyze the set of data (in this example the shapes) and you group them together when they have something in common, you are using your “Pattern Recognition” super-power.

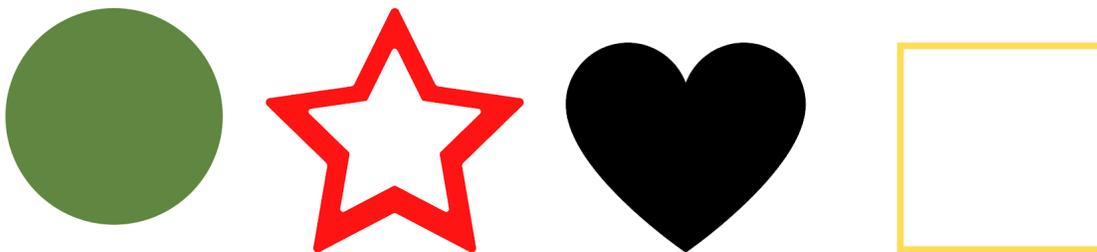
3. Guess what the teacher has selected



Tell the student that we are going to play a game: guess my card. Select only 4 cards that have the following variety:

- They are representing a different shape
- They are of different color
- 2 are filled shapes, 2 are just outlined

Here is a good example to start



The students should see all the 4 shapes projected in front of them. You have a set of cards in your hands representing these exact 4 shapes. You pick one and hide it from the students. Tell students to raise their hand and ask you a “Yes or No” question.

Write down each question that the students are asking until they guess the final answer.

Students are answering the following questions

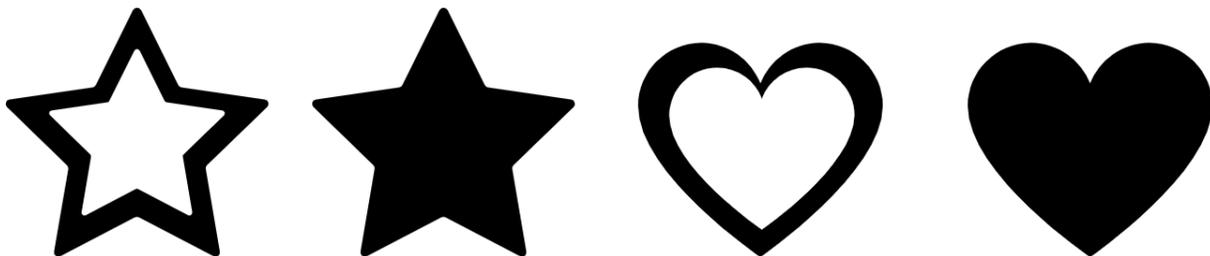
- How many questions did you ask in order to guess my card?
- What if we had asked the same questions but in a different order, could we have guessed the card faster?
- Did we ask questions about the patterns of the shapes? Why, why not?
- If we are very lucky, what is the lowest number of guesses we would need to guess my card?
- If we were very unlucky, what is the highest number of guesses we would need?

4. Student Activity

Students play the “Student Activity: Guess my shape”



Students are paired up for this activity. Using the Student Activity sheet, Student A chooses a shape (1,2,3 or 4) and does not reveal which one she chose. Student B asks Yes/No questions. The goal is that they guess the card using only 2 questions.



5. Reflection:



As a class, answer the following questions:

- Give an example of a Yes/No question you used during the activity

- Is it a good idea to ask as the 1st guess: “Is your shape #4 ?” (or “Is your shape the black heart filled?”) - Why? Why not?
- What were the patterns that the shapes could be grouped into for this activity?
- Why is it useful to group the shapes by patterns if we want to play the guessing game?

6. Wrap-up:



Today, you played a guessing game. It is similar to solving a problem. The problem you were asked to solve is to figure out which drawing had been selected. You had one restriction: you could only ask Yes/No questions. Computers often have this restriction and therefore, we act like computers trying to solve a problem. Next time, we will create instructions for our imaginary computer so that it can solve the same problem on its own. You used **decomposition** when you decided to break down the big question “What is your shape” into a set of yes/no questions. You have used **pattern recognition** if you asked a yes/no question about a pattern you noticed between a set of shapes.

7. Extensions:



Linking other topics:

- This lesson uses shapes of different colors, types, and fill patterns. The same lesson could be used with other sets of data
- Animals: patterns could be the classification of animals or the classification of their habitat
 - Computing systems and parts: patterns could be the colors of objects, their size, if there are accessories or main computers if they are an input/output device



Adding complexity for fast learners:

Make their set of data bigger and more diverse for their Student Activity. Make sure their set contains a certain pattern that is predominantly represented. Ask them to reflect on the type of questions they ask. Are there better questions to ask first?

In this example, they should ask if the shape is green. That will eliminate half of the shapes and you have 4 shapes left. If the shape is green, there is a good debate about what should be the next question: should we ask if it is a circle, eliminate another 2 shapes, or ask if the shape is outlined? Choosing the other question (outlined) could reveal the chosen shape or could leave us with 3 shapes. Is it better to take the risk or to stay safe?



Students with hearing impairments

Place the cards with the shapes face down on the board or a table. Draw the shape you are looking for. First, play the game where the student would ask one by one if the first card is the right shape, if not move to the next etc...

Reveal the shapes and show students how to group them in patterns. Use a sign for each pattern



Color pattern



Shape Pattern



Fill Pattern

Students then can ask their questions using Appendix B cutouts

Student Activity: Guess my shape.....



1



2



3



4

Game 1:

Name of the student choosing a shape: _____

Name of the student guessing: _____

- How many questions did you ask? _____
- Do you think you could have done better? Yes No

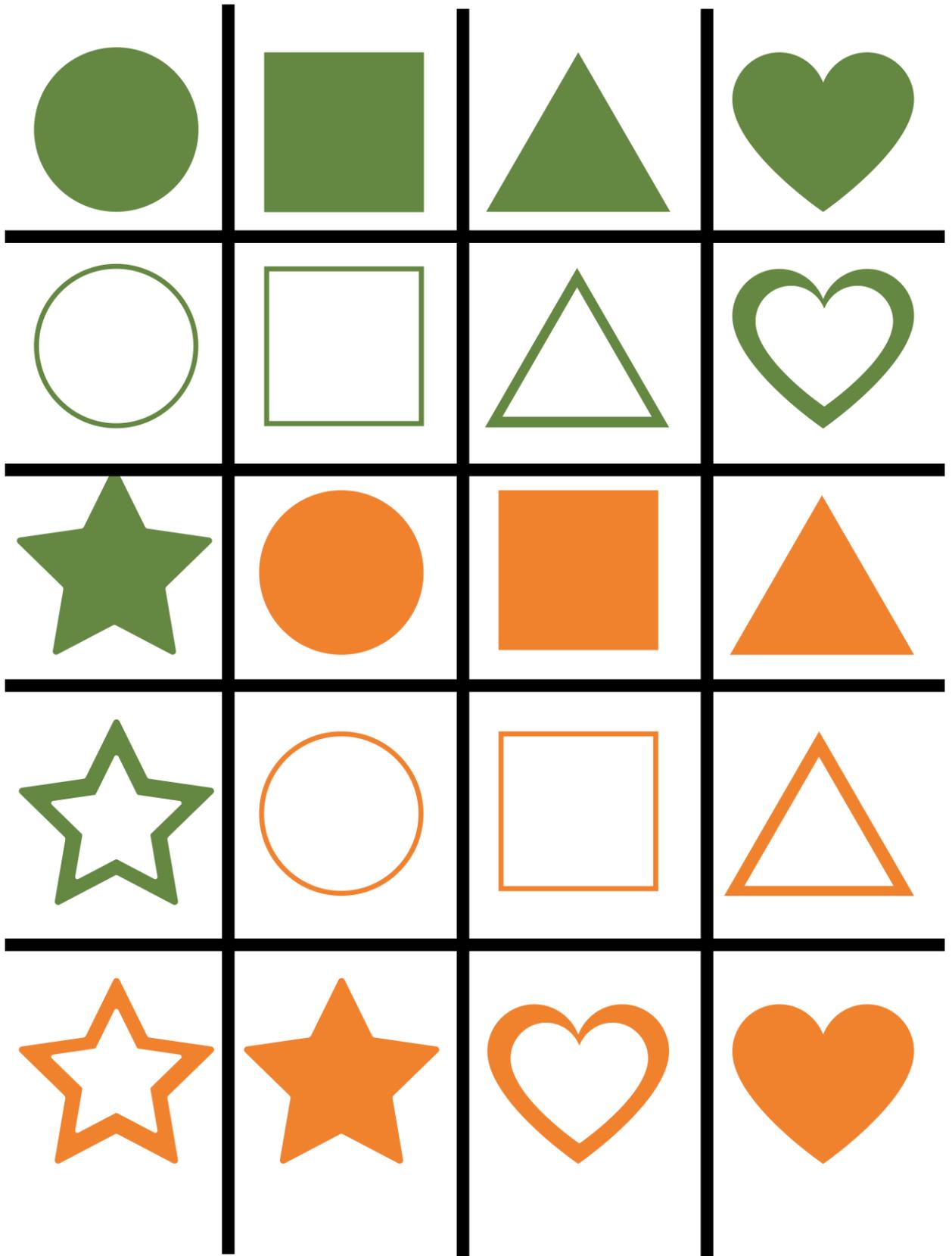
Game 2:

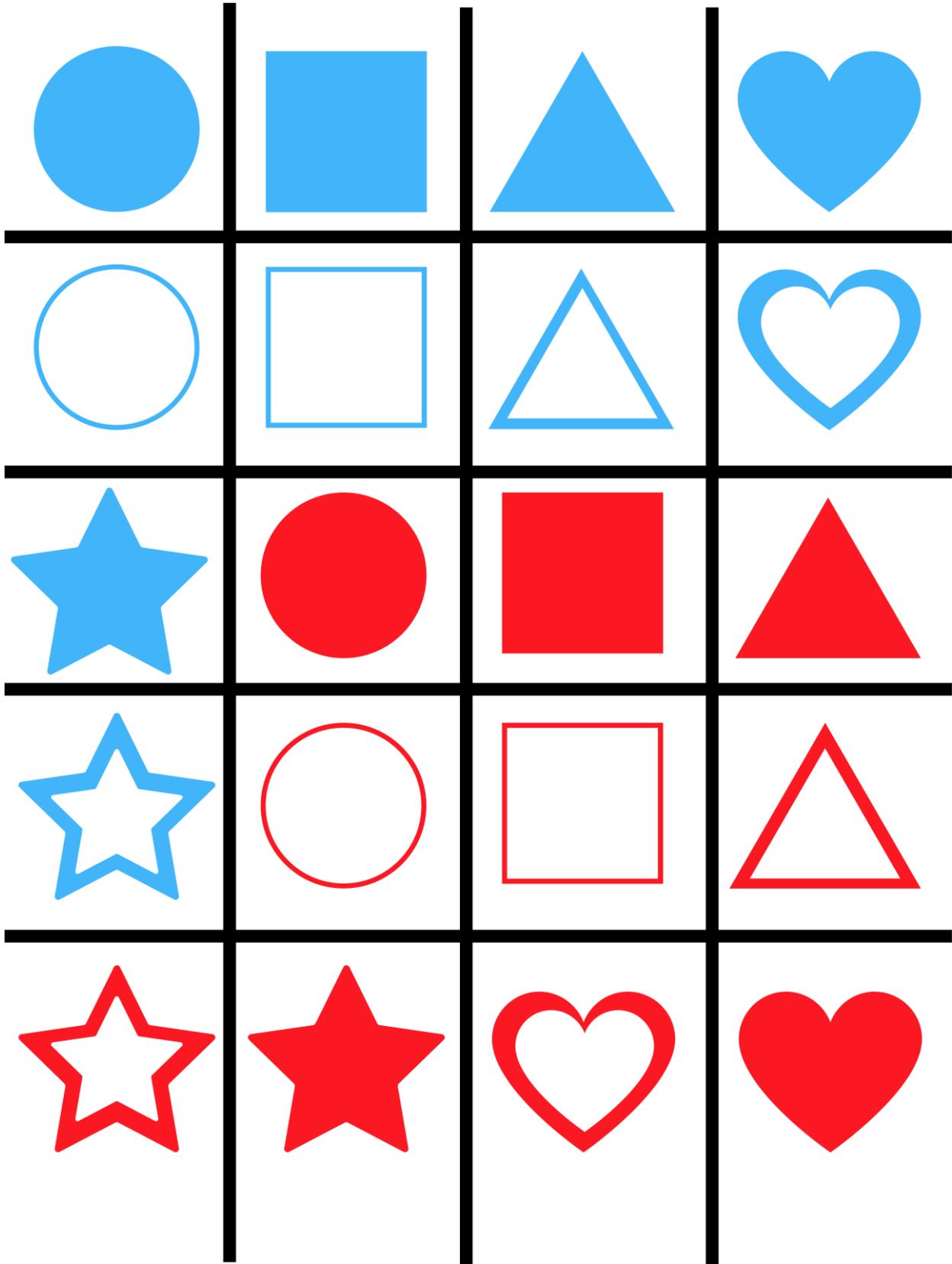
Name of the student choosing a shape: _____

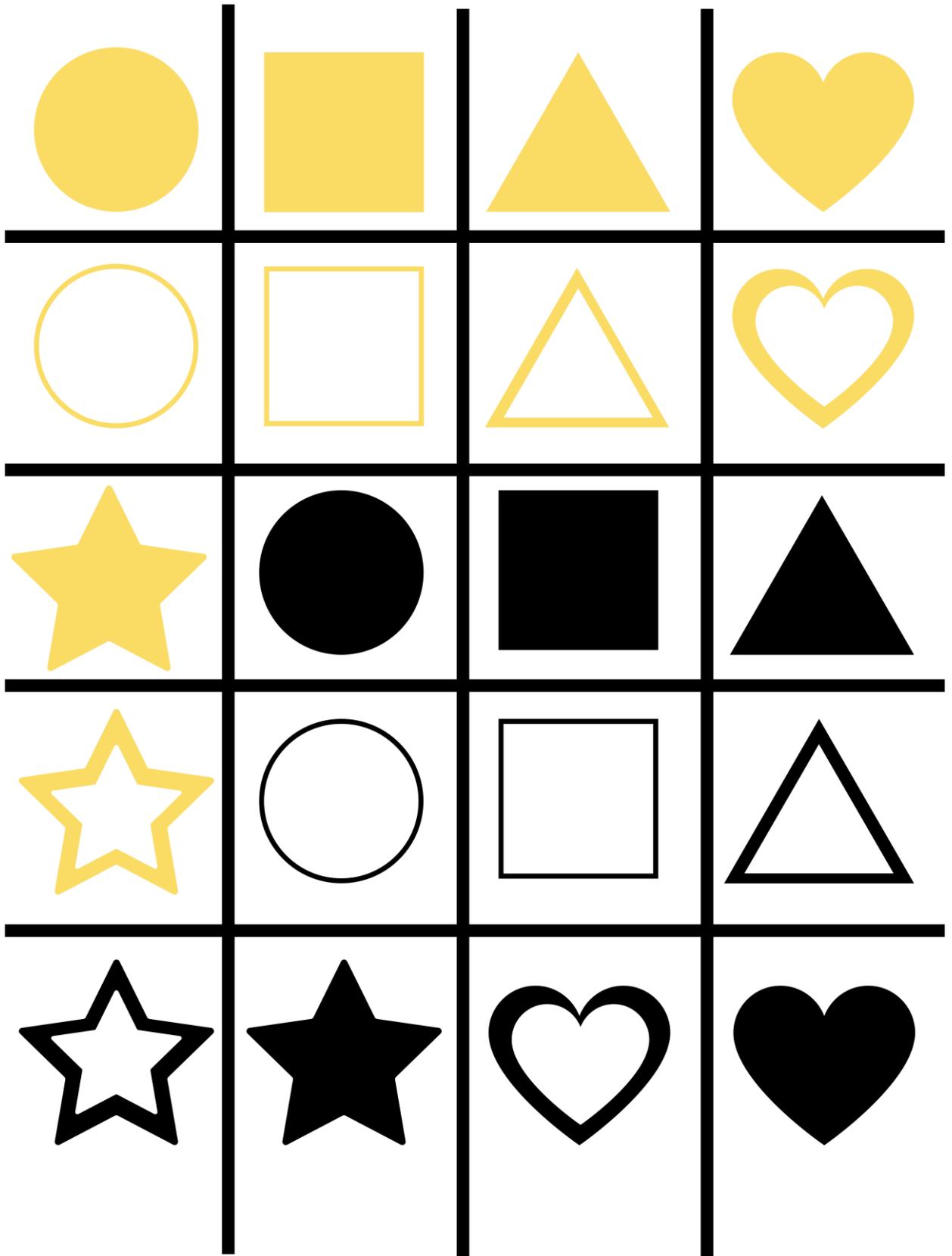
Name of the student guessing: _____

- How many questions did you ask? _____
- Do you think you could have done better? Yes No

Appendix A: Shapes cut-out







Appendix B: Using drawings for questions

Cut out shapes that students can use to ask Yes/No questions.

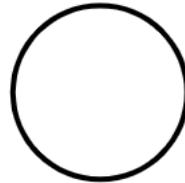
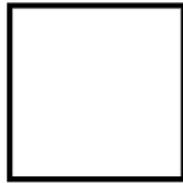
Shape questions:

Is it a star?

Is it a square?

Is it a circle?

Is it a heart?



Color questions: (Is the shape green? ...)



Fill questions: Is the shape filled? Is the shape outlined?

