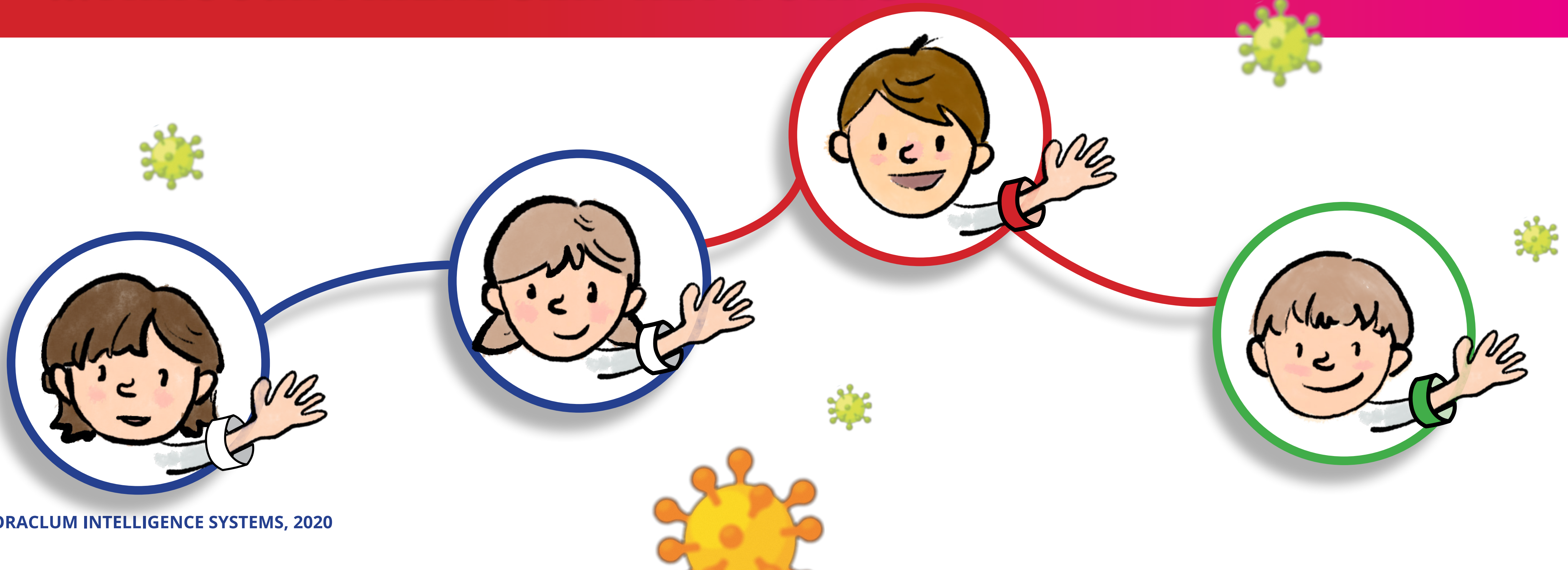


INDOOR GAME FOR CHILDREN: HOW DISEASES SPREAD

...THROUGH FRIENDSHIP NETWORKS



PREPARATIONS

This game is a useful addition to educational topics such as:

- Why do we get sick?
- What are viruses and microbes?
- How do they spread?
- How does a body fight against them?
- How can we protect ourselves against such diseases?

In order to play this game, you will need to do the following pre-steps and provide required props:

- Each player crafts three paper bracelets: one white, one red and one green
- Each player needs to be able to read and understand numbers on a six-sided dice
- Each player gets one dice or the entire group uses at least P number of dices (to make the game go faster)
- Prepare tokens that will be used by infected players for counting the game rounds (e.g. paper cut outs of flowers or stars)
- Describe to players how the numbers in each round will be visualized with histogram (explained in the appendix)

PREPARATIONS

During the game, the players will interchangeably wear three colored paper bracelets:



White bracelet
(identifies a healthy person
which is not immune)



Red bracelet
(identifies a sick/infected
person)



Green bracelet
(identifies a healthy
and immune person)

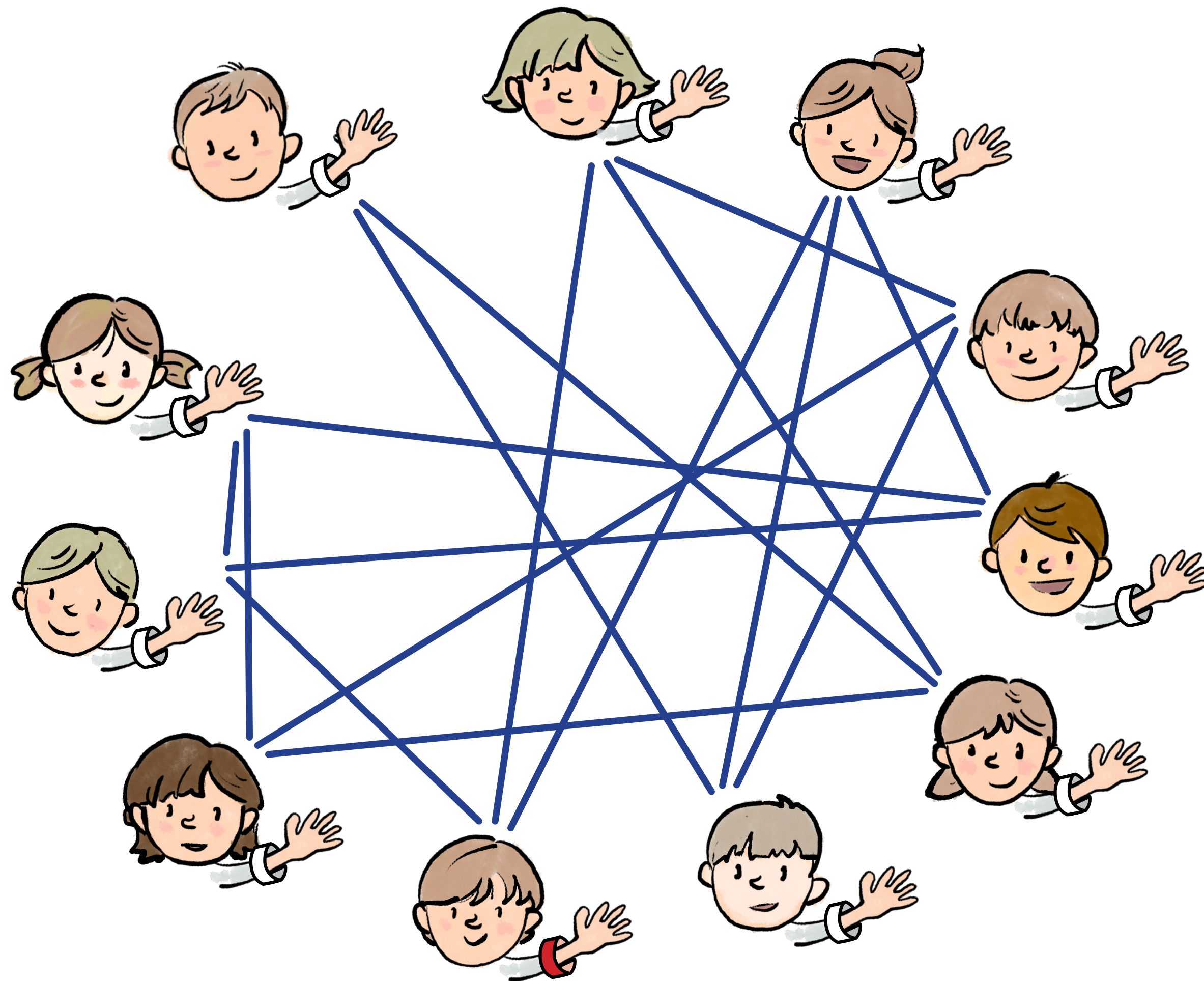
SETTING UP THE GAME PARAMETERS

The game has a couple of parameters that control progression of the number of infected and the number of recovered players:

K = probability of a disease transmission: use value 1,2,3,4 or 5

N = duration of illness: use N=4 or similar

INTRODUCTORY STEP – PART ONE

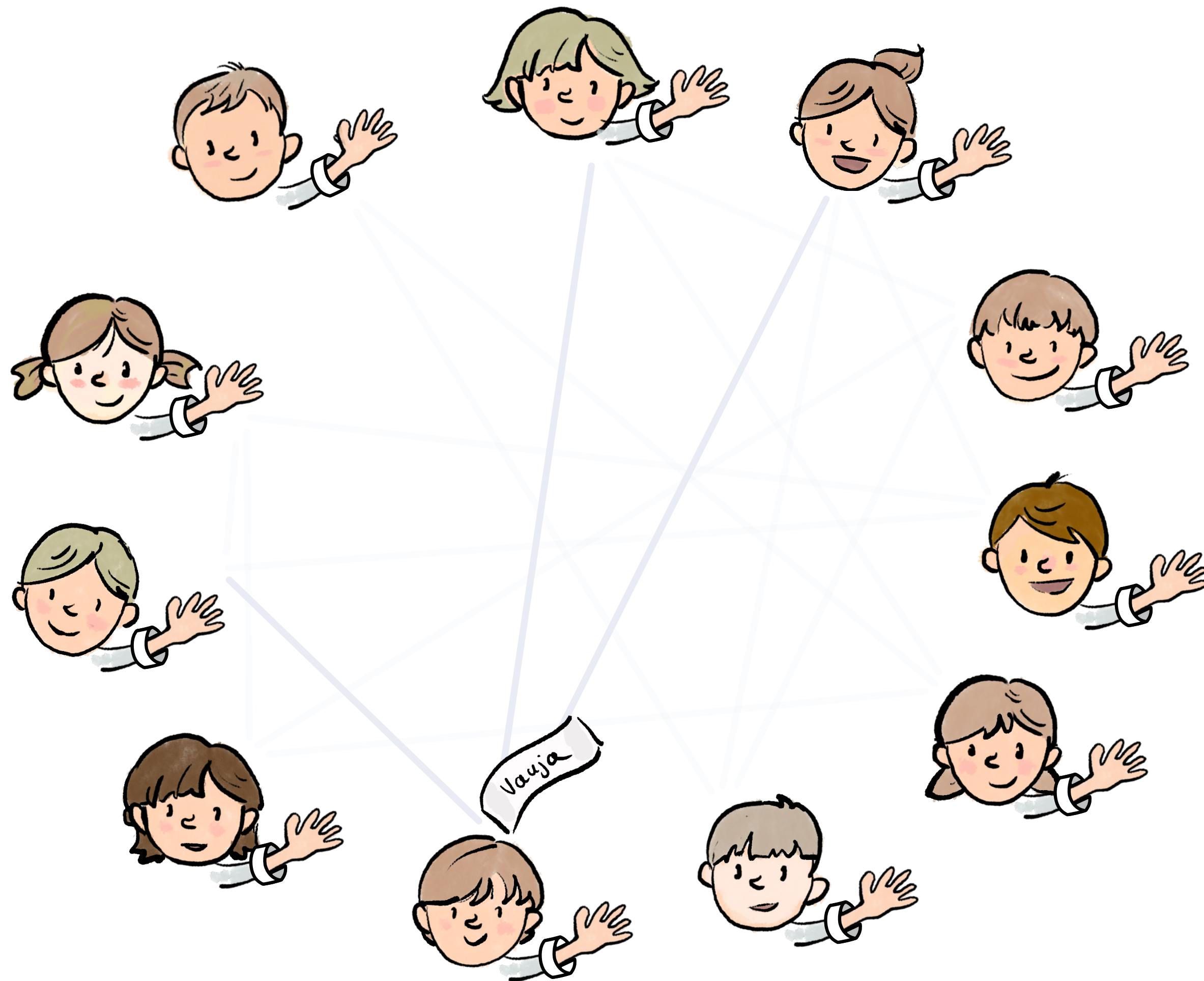


The game requires a network of contacts between players. This network can be configured in advance or created with a separate mini-game. See additional instructions on how to create game-appropriate network graph.

You will need to create a representation of each player in the game (i.e. picture of a player or a paper slip with a player's name). After that you will need to represent connections between players, usually by drawing lines/edges between player representations using prepared or created graph.

This network of contacts shows how players can infect each other.

INTRODUCTORY STEP – PART TWO



All players form a circle.

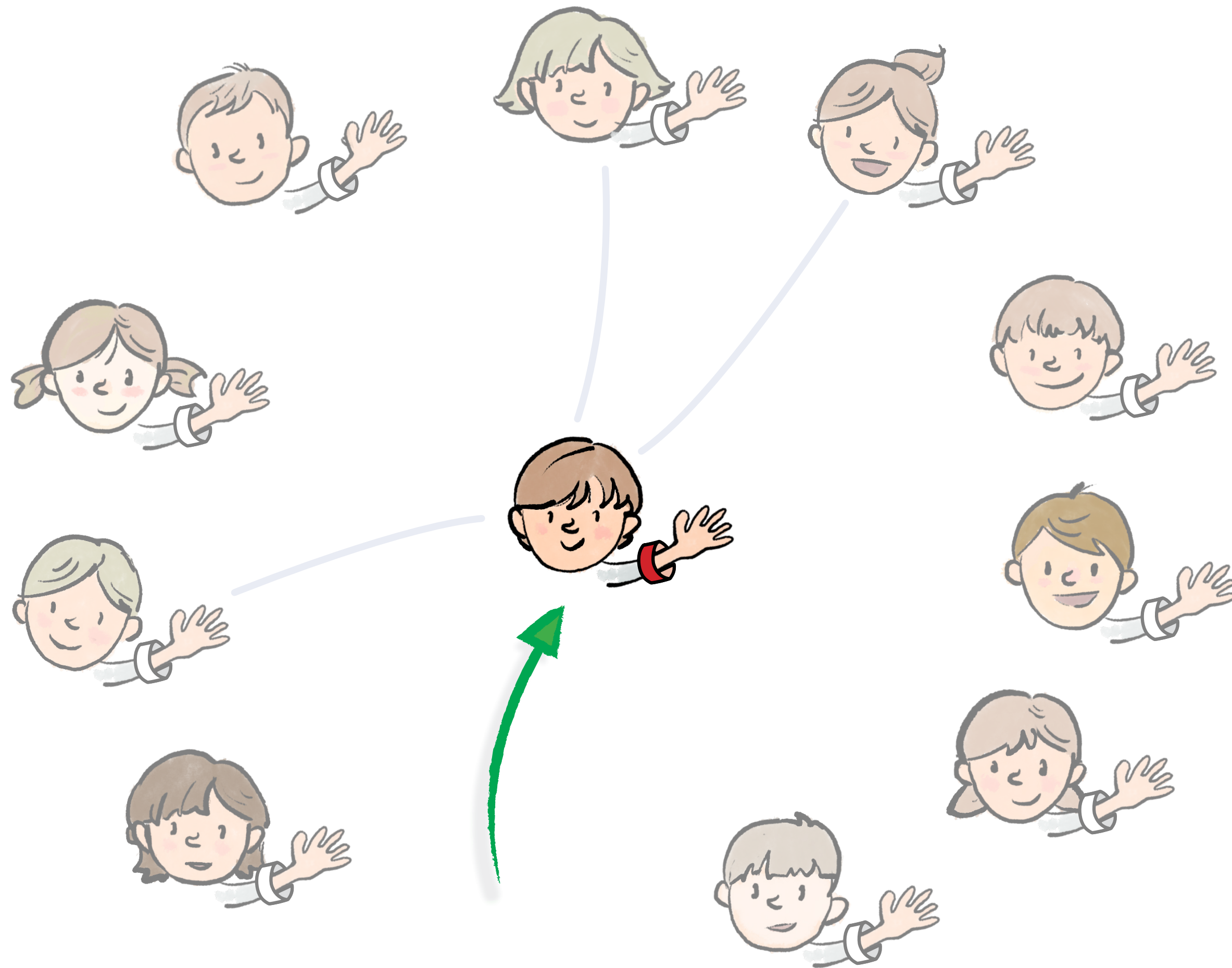
Each player puts on a white bracelet.

The game host has a bag with the names of all players in the game. Each name is written on a piece of paper.

The game host then takes a random piece of paper from the bag: the name on this piece is the name of the first infected player.



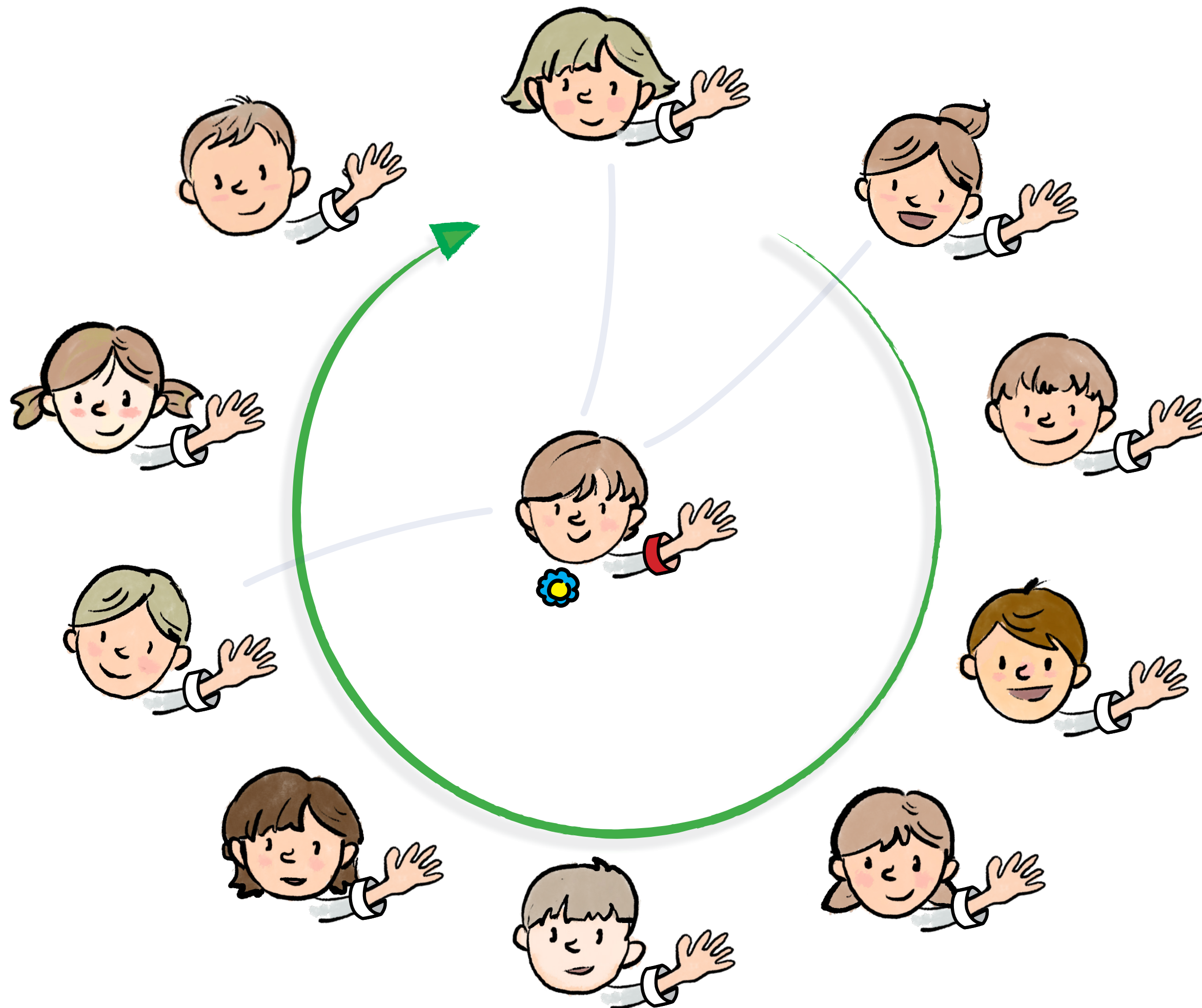
INTRODUCTORY STEP – PART THREE



The first infected player replaces their white bracelet with a red one and sits in the middle of the circle.

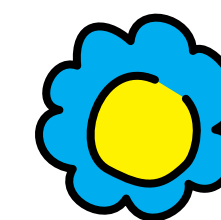
Each infected player waits for N game rounds in a recovery in order to become healthy again.

1ST STEP

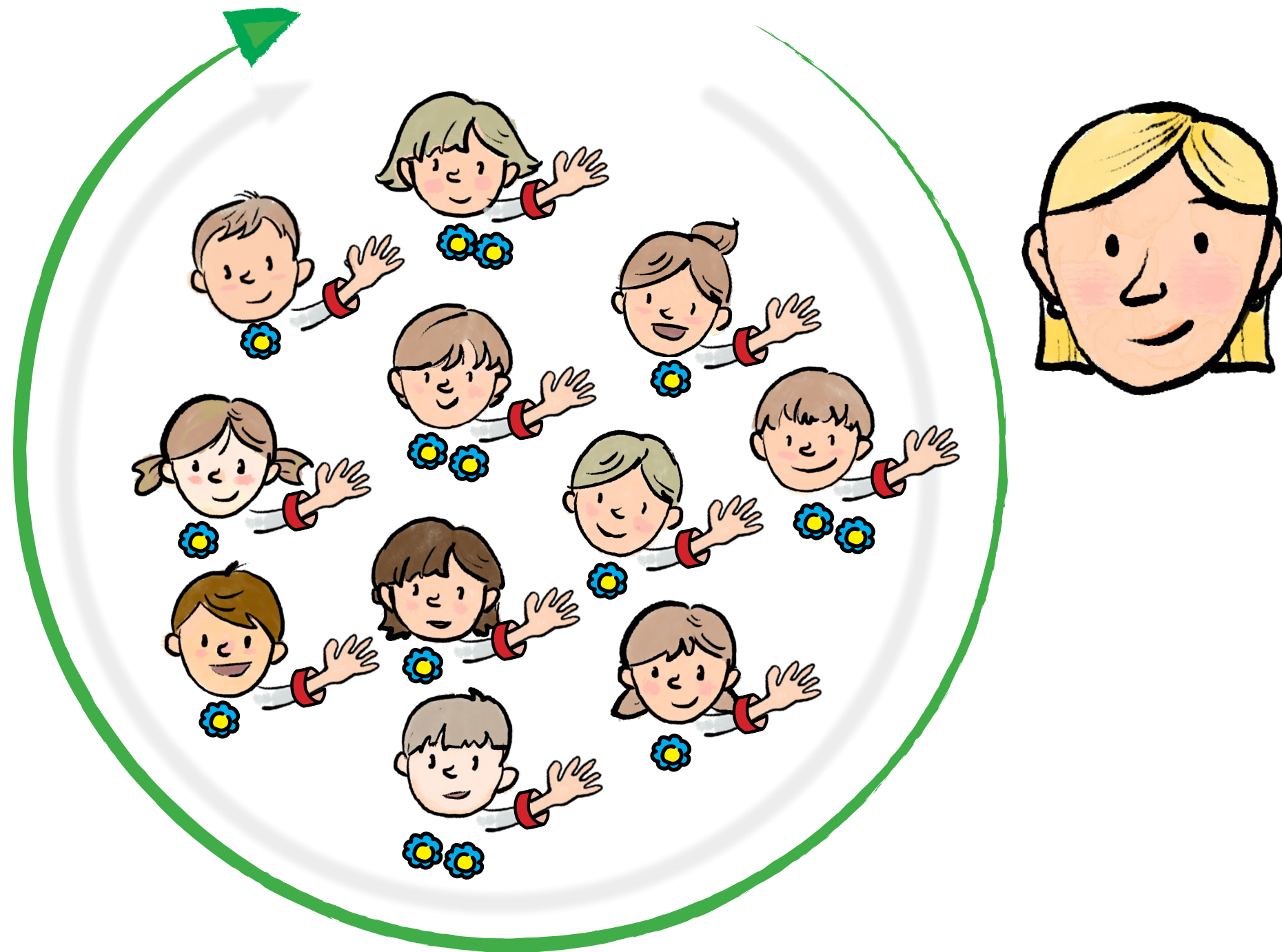


Players that are not wearing a red bracelet walk one full lap around the infected players sitting in the center. After that they stop and sit down.

Each infected player sitting inside the circle gets one token that marks a round they spent sitting in a recovery:



1ST STEP: NOTE 1

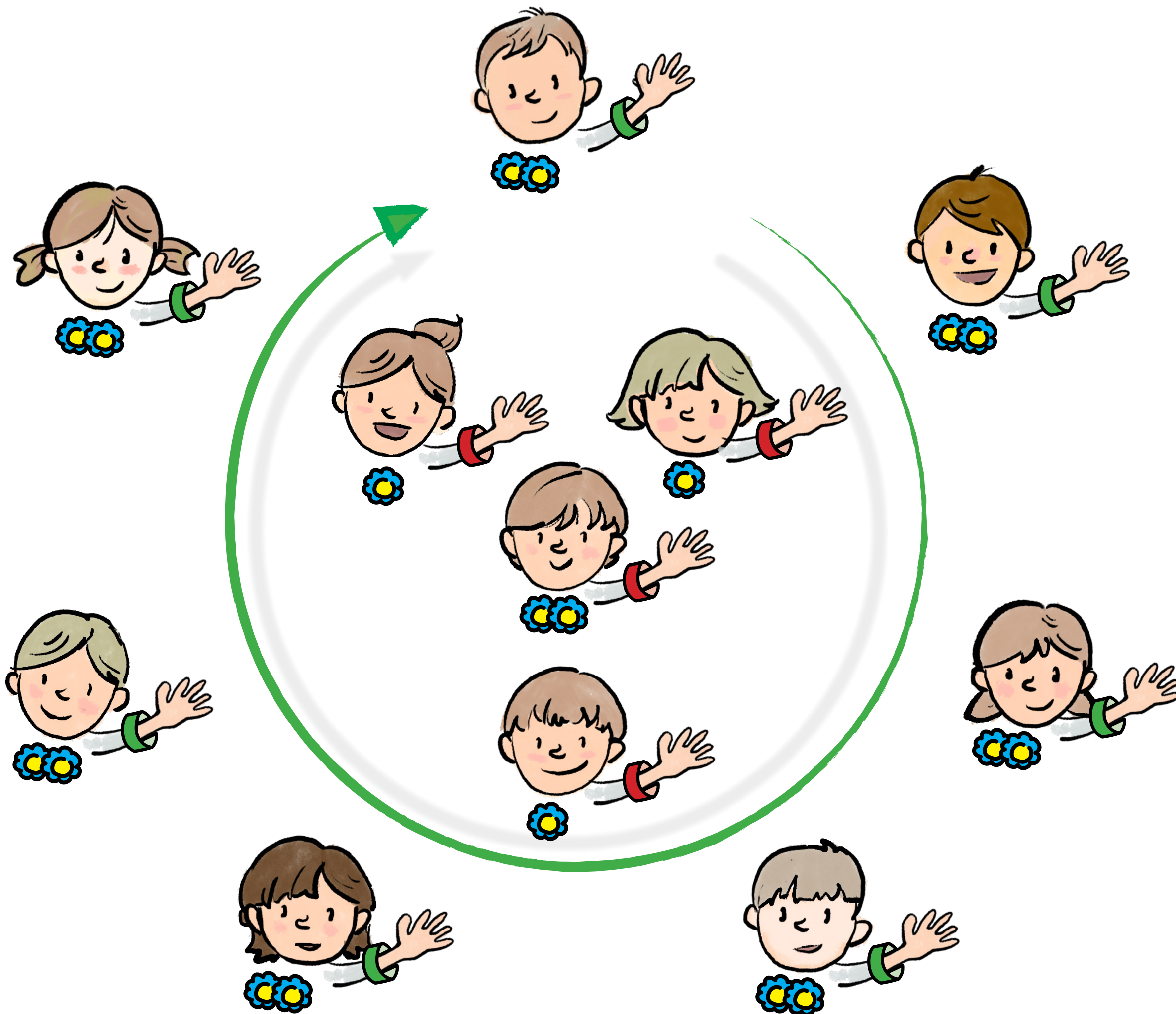


If every player in the game in an ongoing round is marked as infected (i.e. wearing a red bracelet), the game host then walks one lap around the group.

After that, each infected players gets one token that marks that round (a round they spent sitting in a recovery).

The game than skips to the fifth step.

1ST STEP: NOTE 2

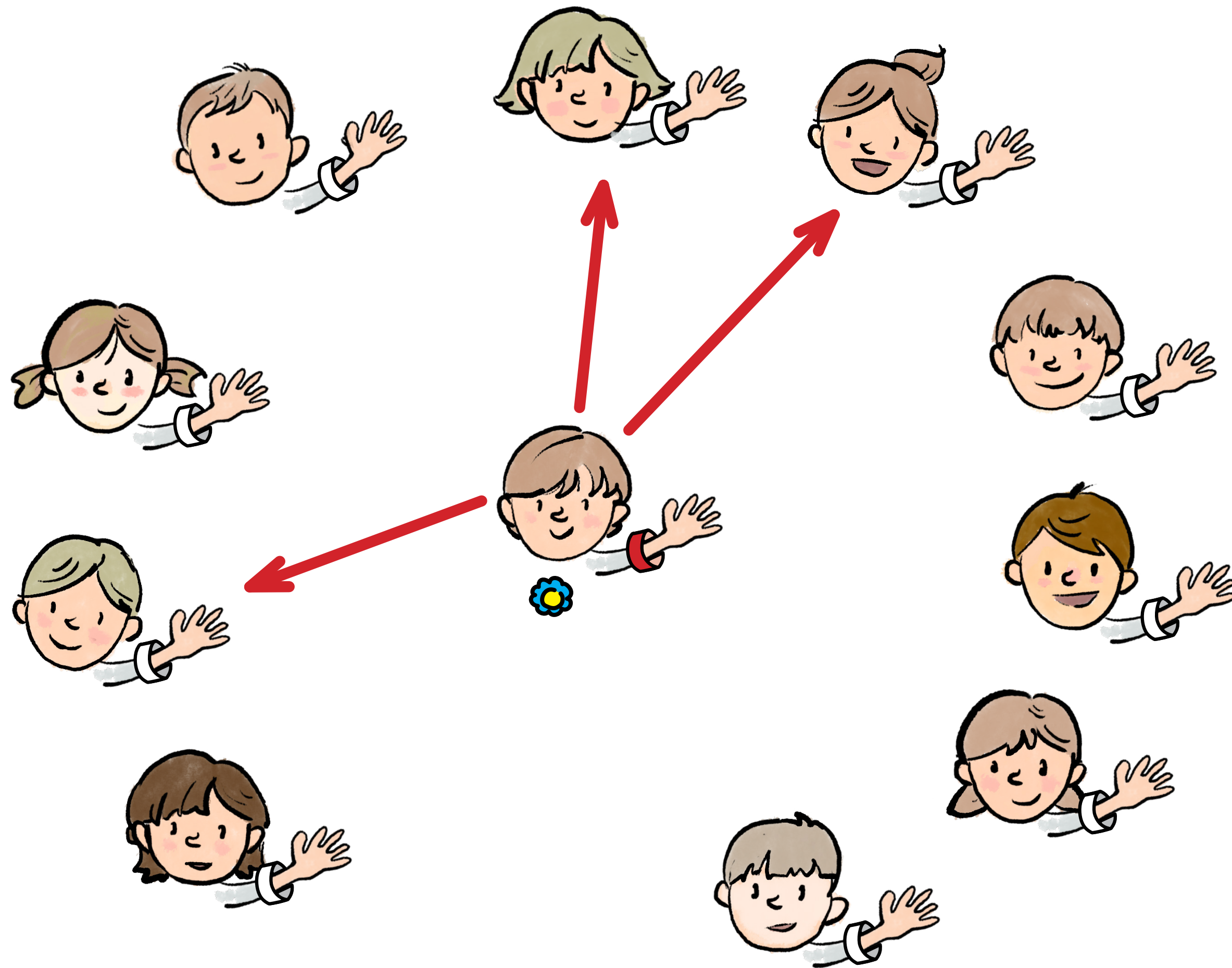


If there are no players wearing a white bracelet, then *all* players walk one lap.

After that, each infected players gets one token that marks that round (a round they spent sitting in a recovery).

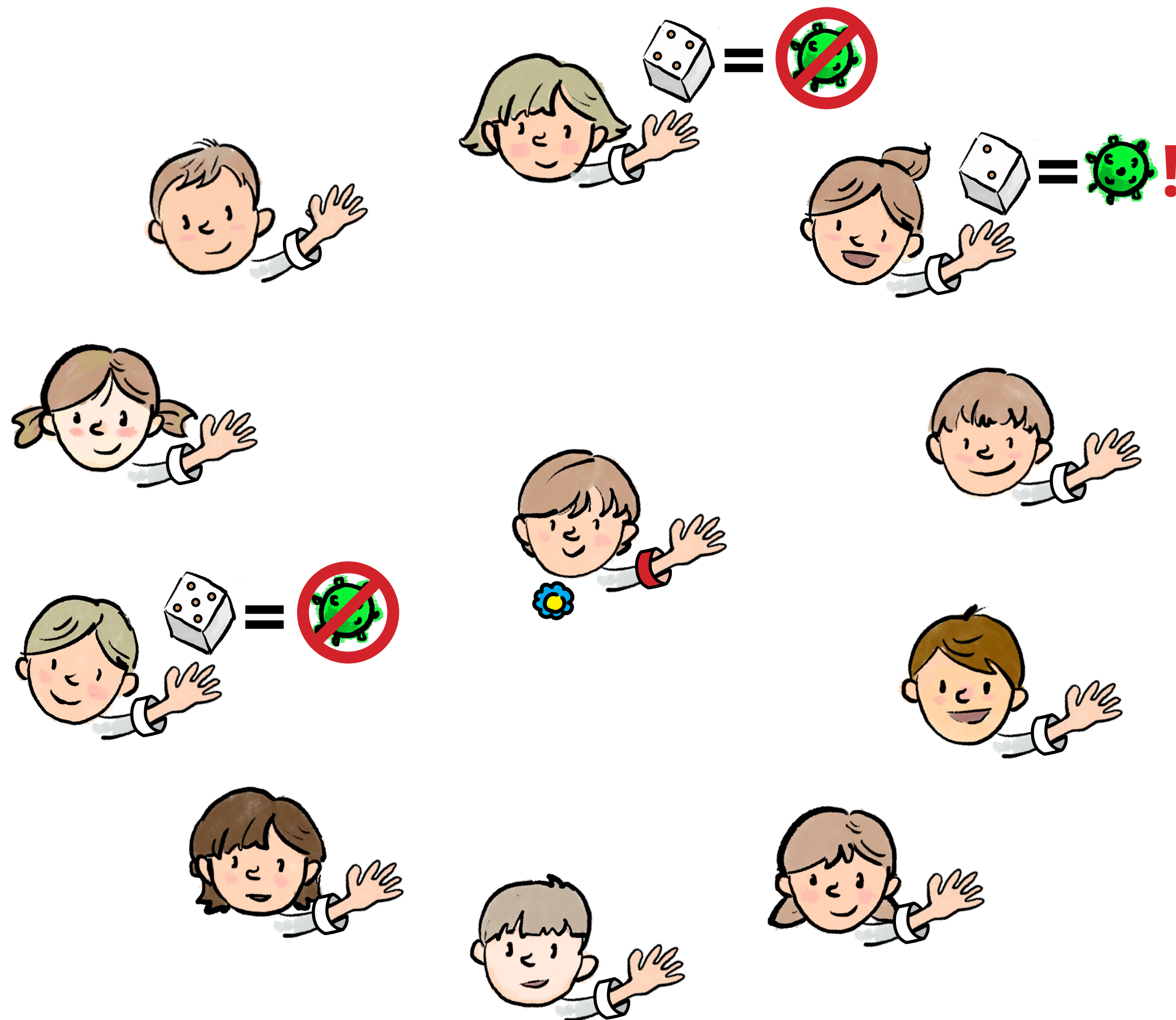
The game than skips to the fifth step.

2ND STEP



We check the network of connections (the large paper sheet with names/pictures and lines between them) and find all the players that are connected with the newly infected one.

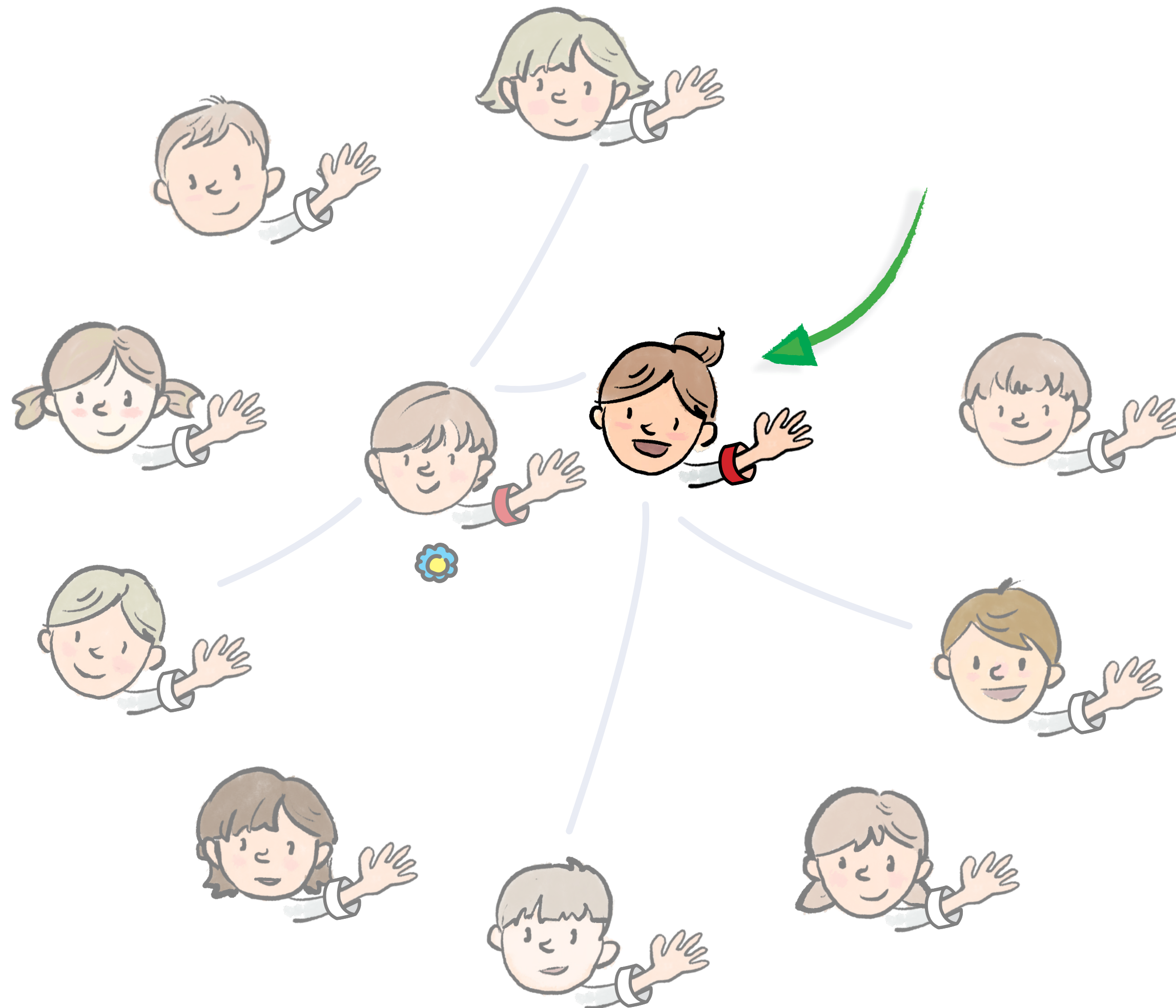
3RD STEP



Each selected players rolls a dice. Rolled value will determine whether the player is infected or not.

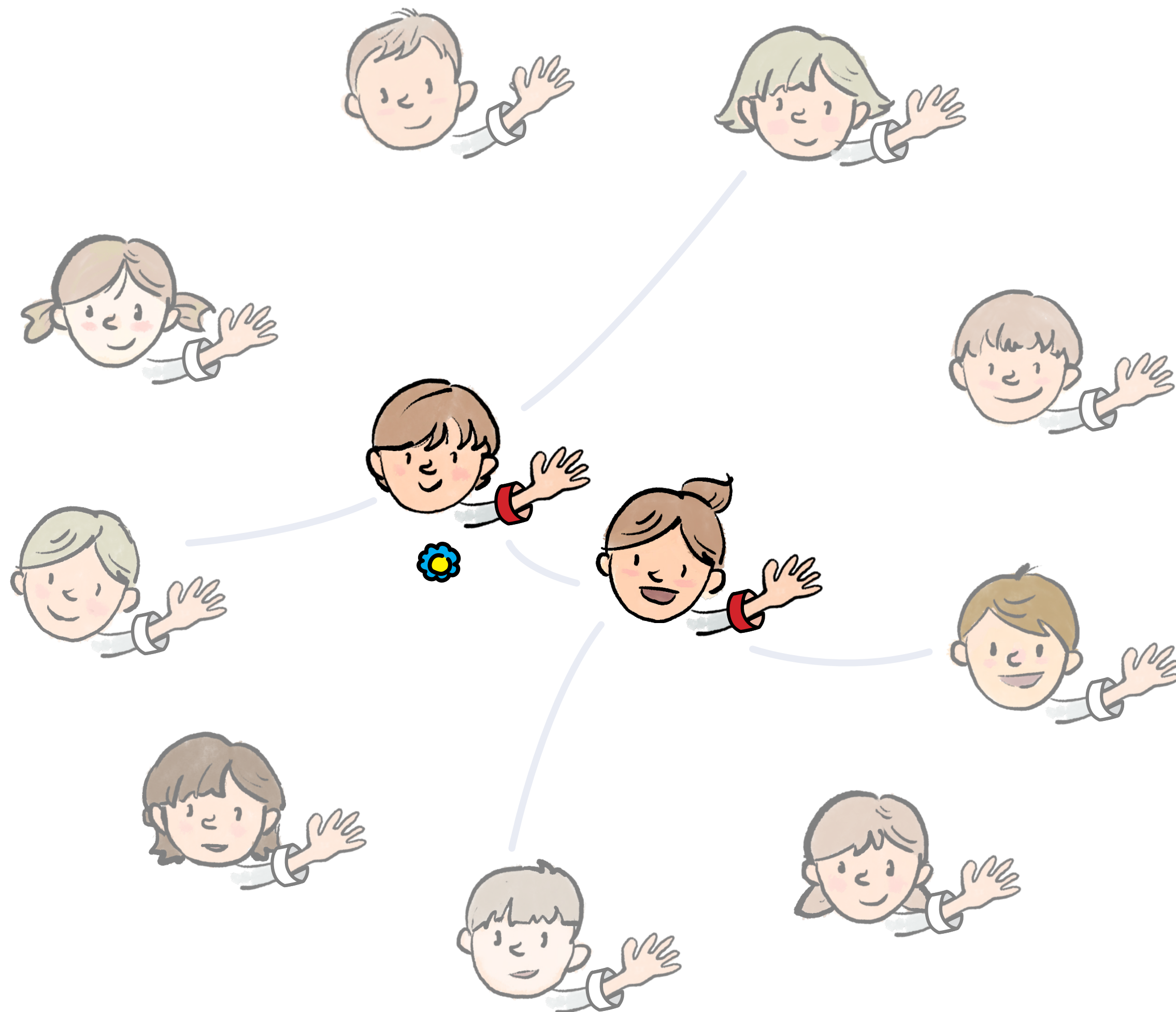
If a rolled value is *less than or equal to K*, then the player is marked as infected.

4TH STEP



Each newly infected player puts on a red bracelet and sits in the middle of the circle.

5TH STEP

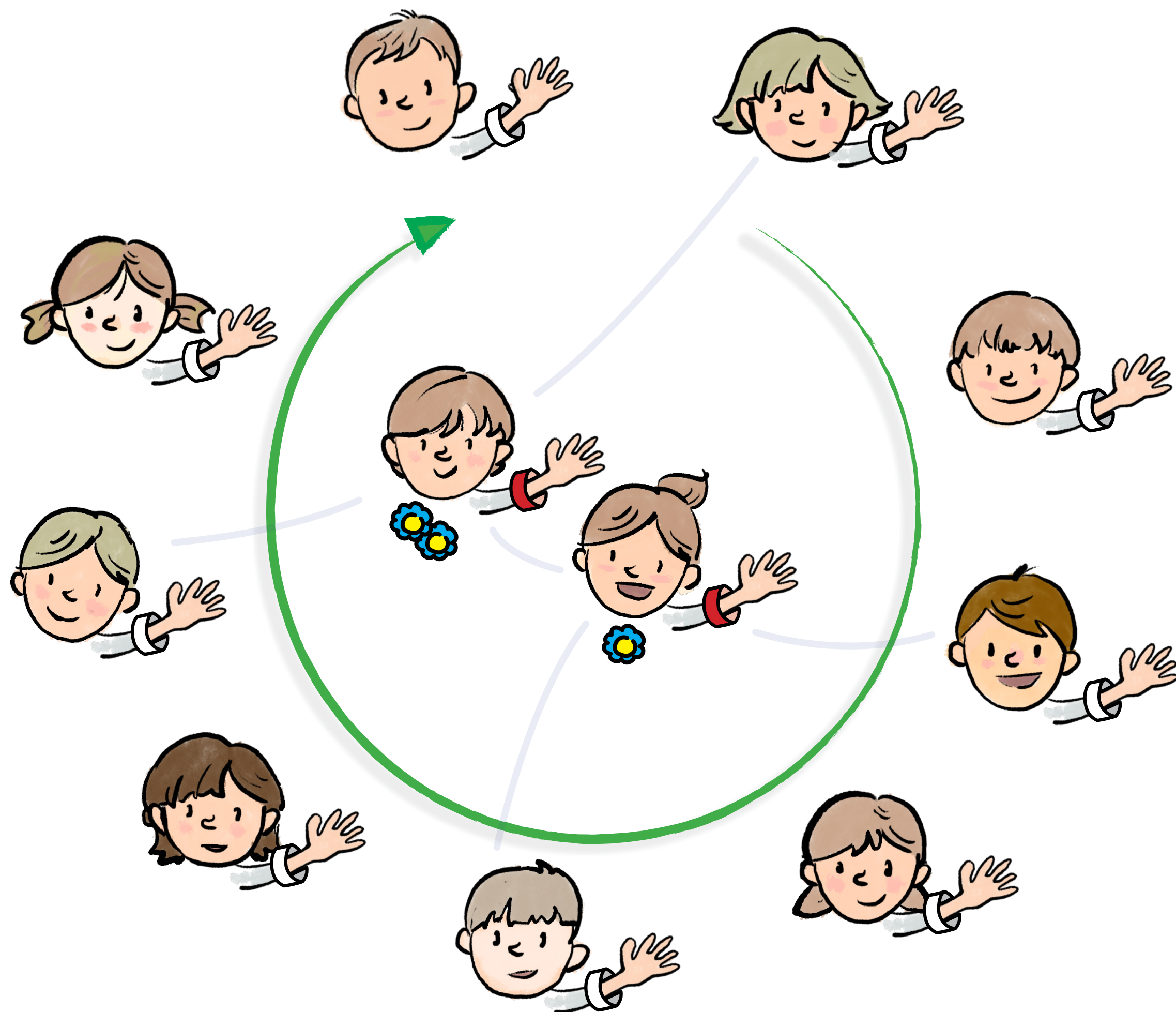


The game host checks if there are any infected players with N tokens sitting in the middle of the circle.

If there are, then each of those players replaces their red bracelet with a green one and returns into the circle with healthy players.

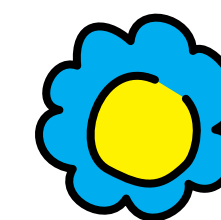
After this step one round is completed and the game goes back to the 1st step.

1ST STEP (ROUND 2)

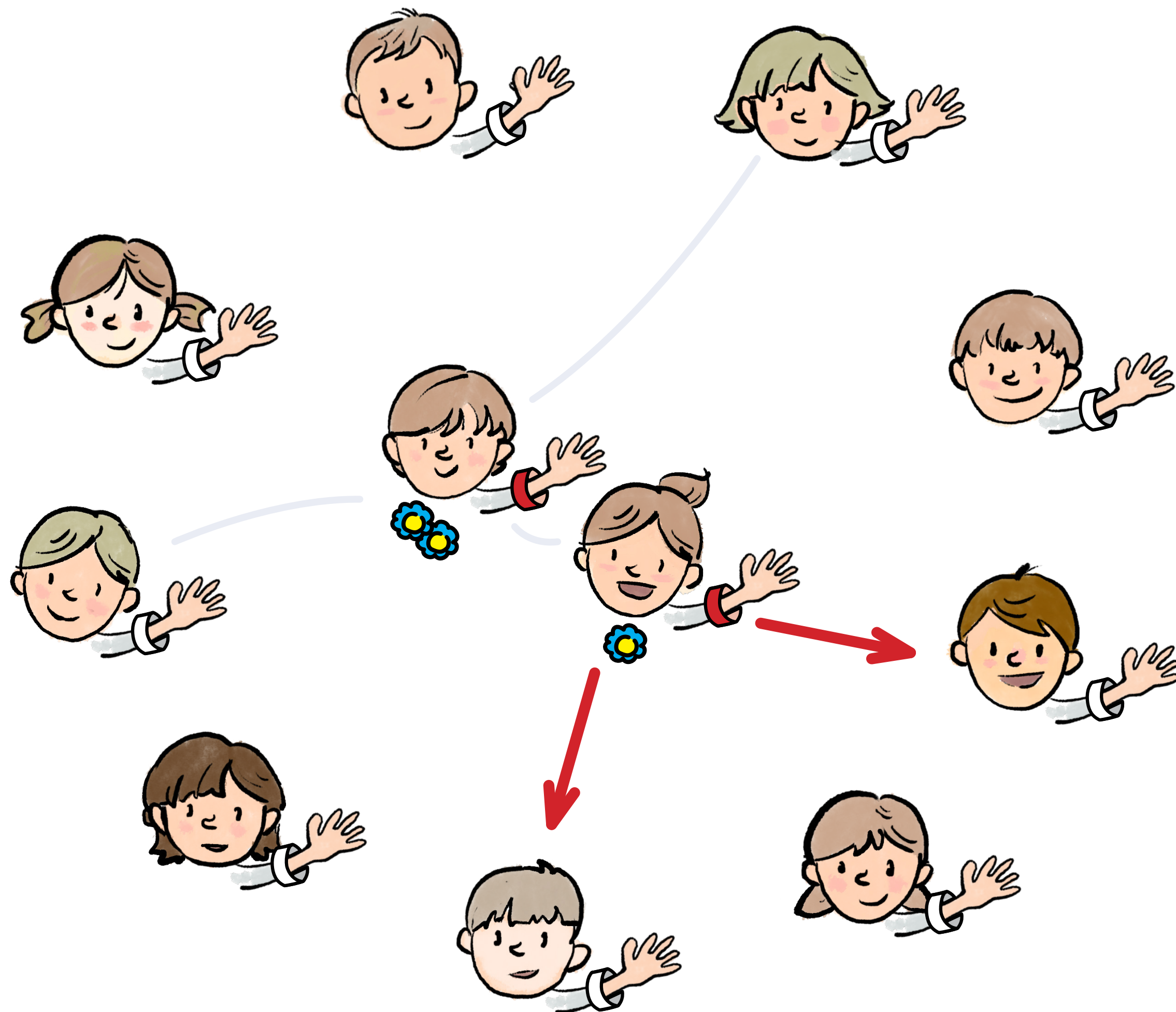


Players that are not wearing a red bracelet walk one full lap around the infected players sitting in the center. After that they stop and sit down.

Each infected player sitting inside the circle gets one token that marks a round they spent sitting in a recovery:

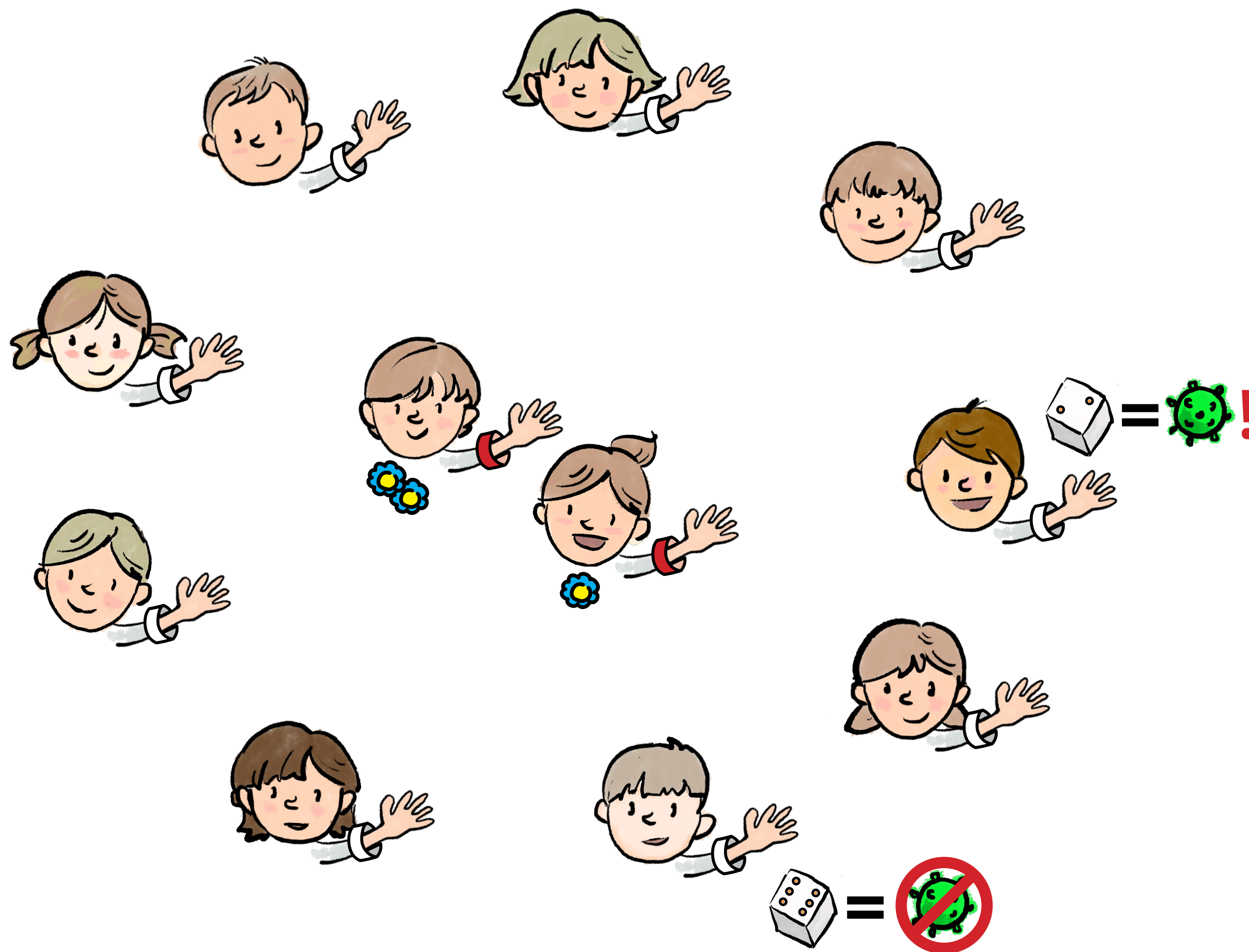


2ND STEP (ROUND 2)



We check the network of connections (the large paper sheet with names/pictures and lines between them) and find all the players that are connected with the newly infected one.

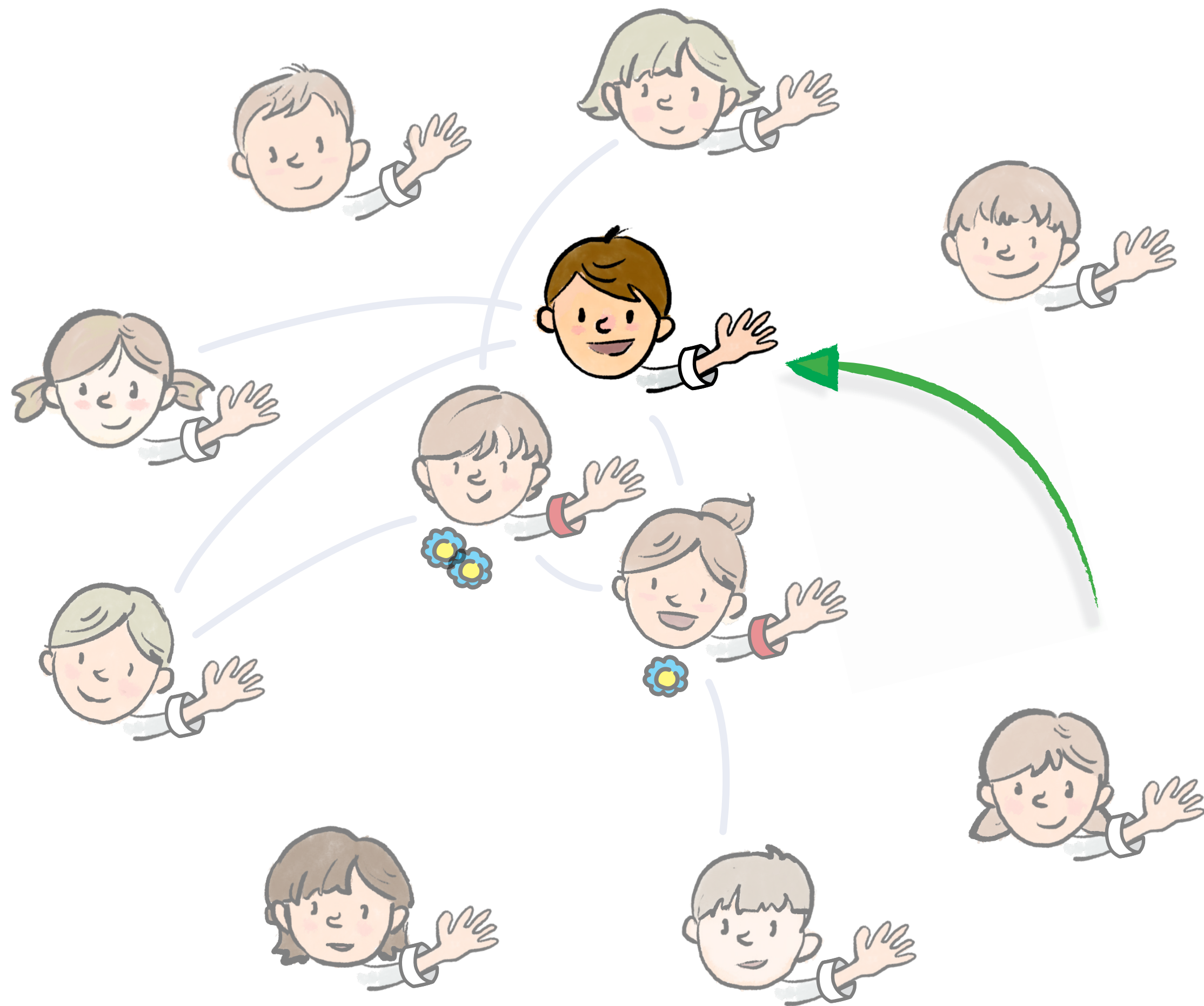
3RD STEP (ROUND 2)



Each selected players rolls a dice. Rolled value will determine whether the player is infected or not.

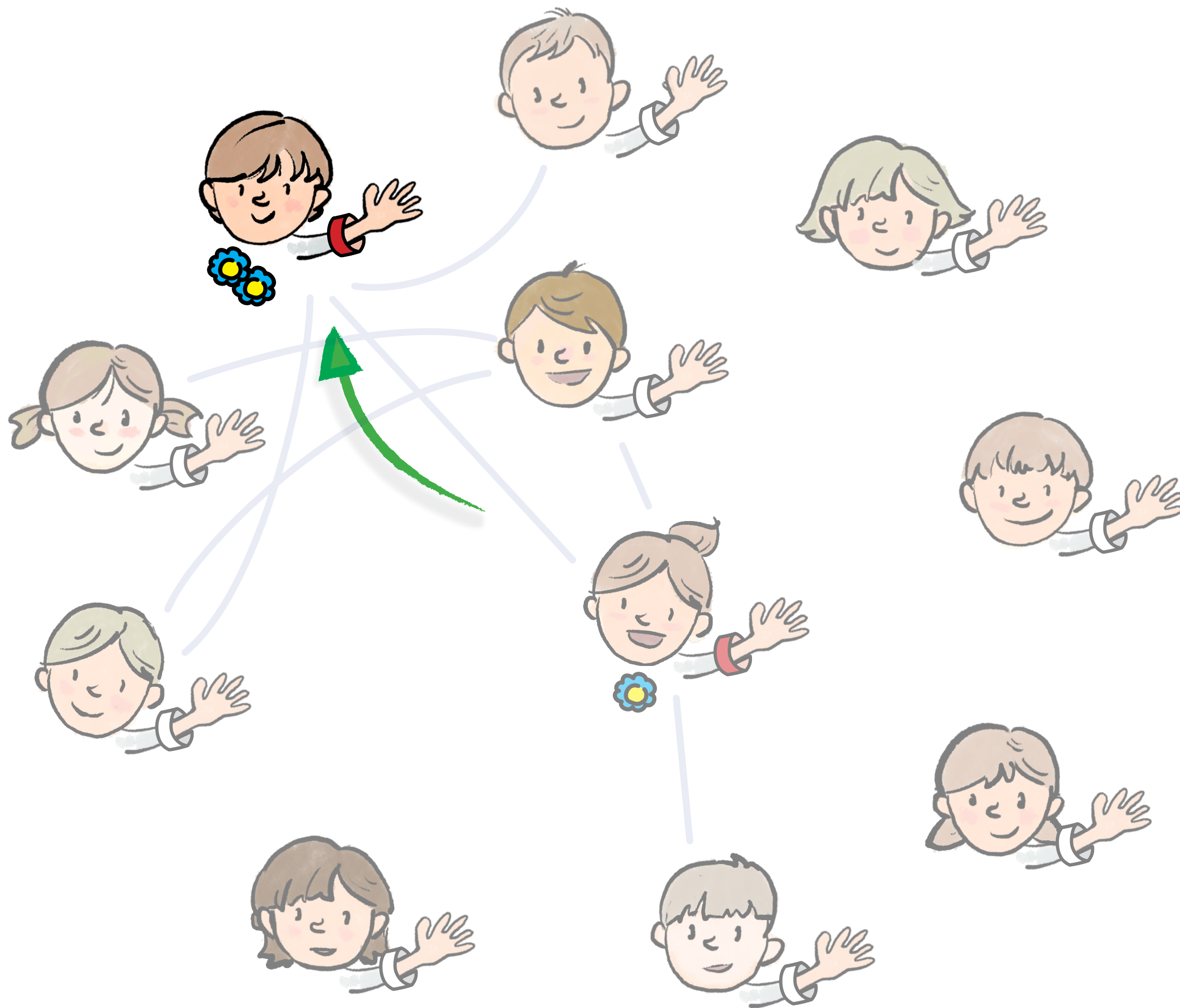
If a rolled value is *less than or equal to K*, then the player is marked as infected.

4TH STEP (ROUND 2)



Each newly infected player puts on a red bracelet and sits in the middle of the circle.

5TH STEP (ROUND 2)

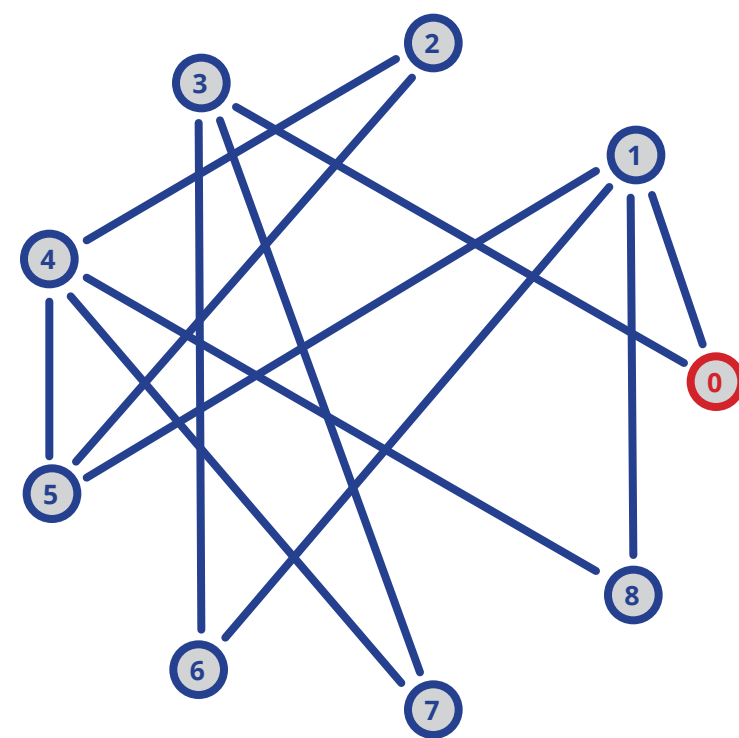


The game host checks if there are any infected players with N tokens sitting in the middle of the circle.

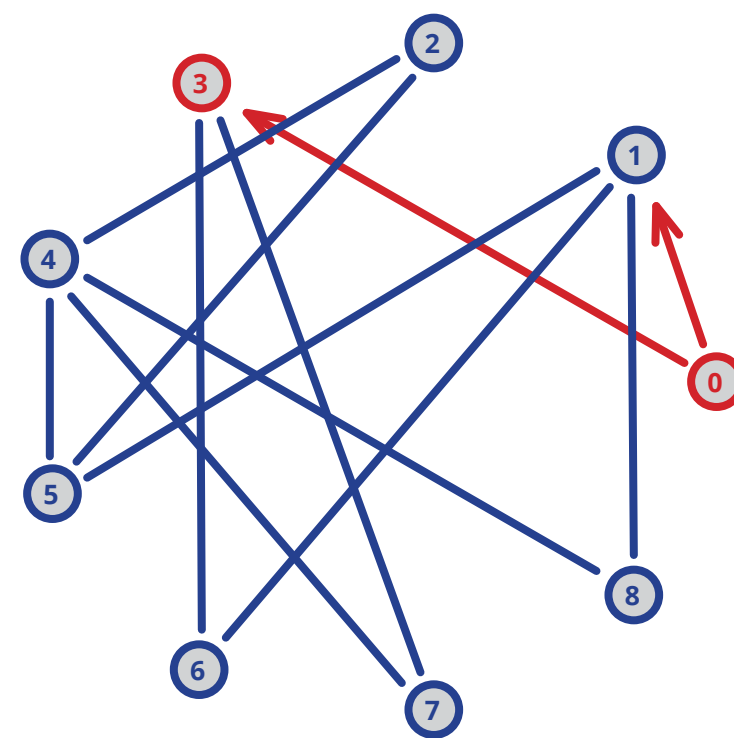
If there are, then each of those players replaces their red bracelet with a green one and returns into the circle with healthy players.

After this step one round is completed and the game goes back to the 1st step.

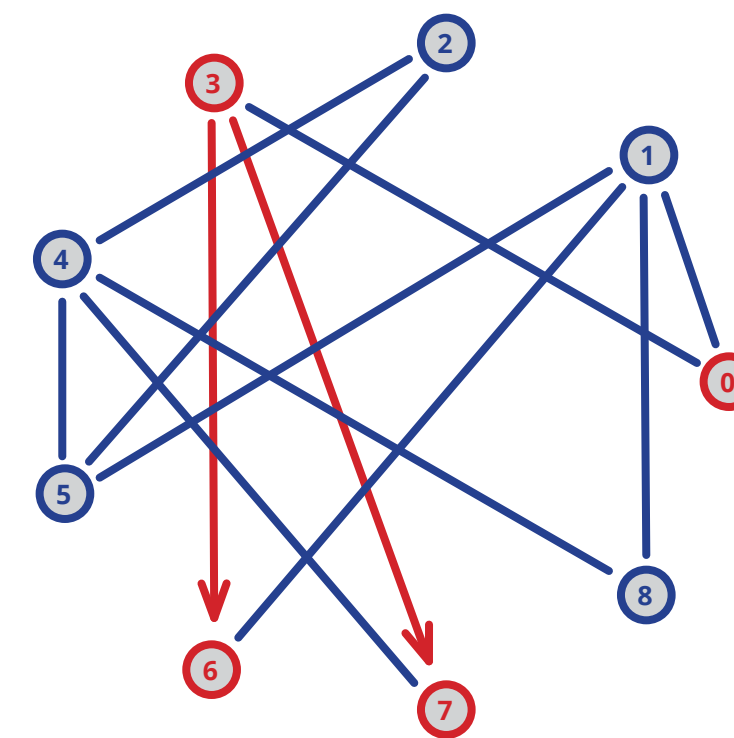
PLAYTHROUGH EXAMPLE



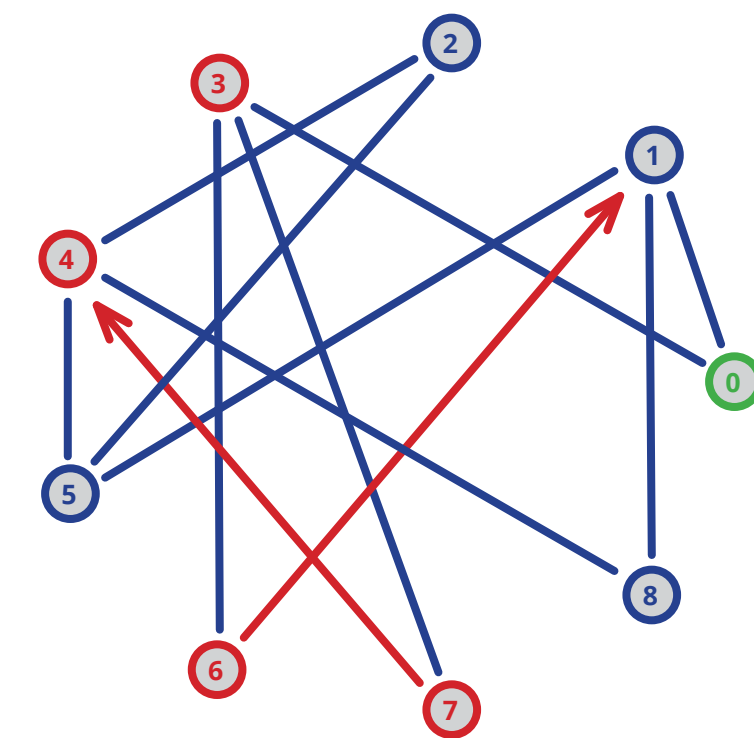
Introductory step



Round 1

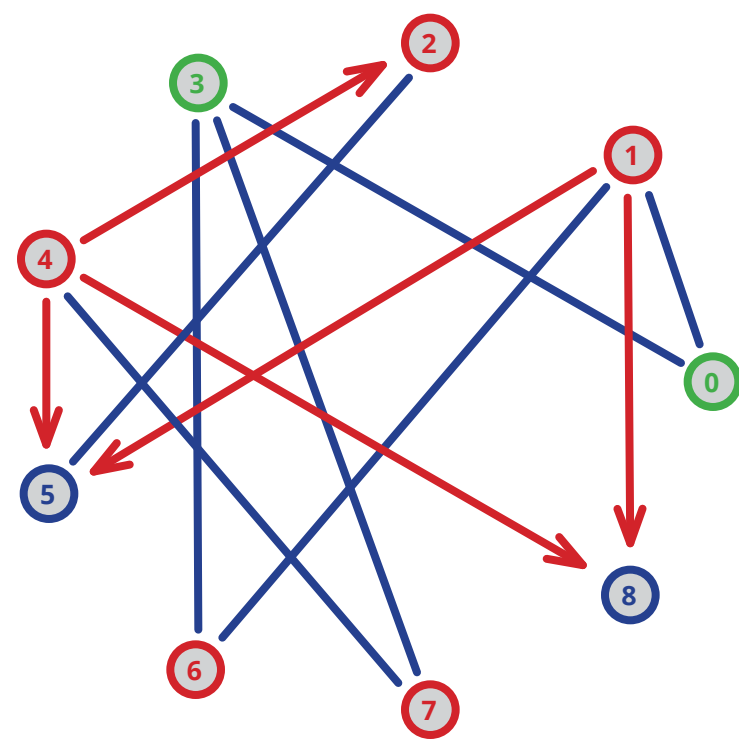


Round 2

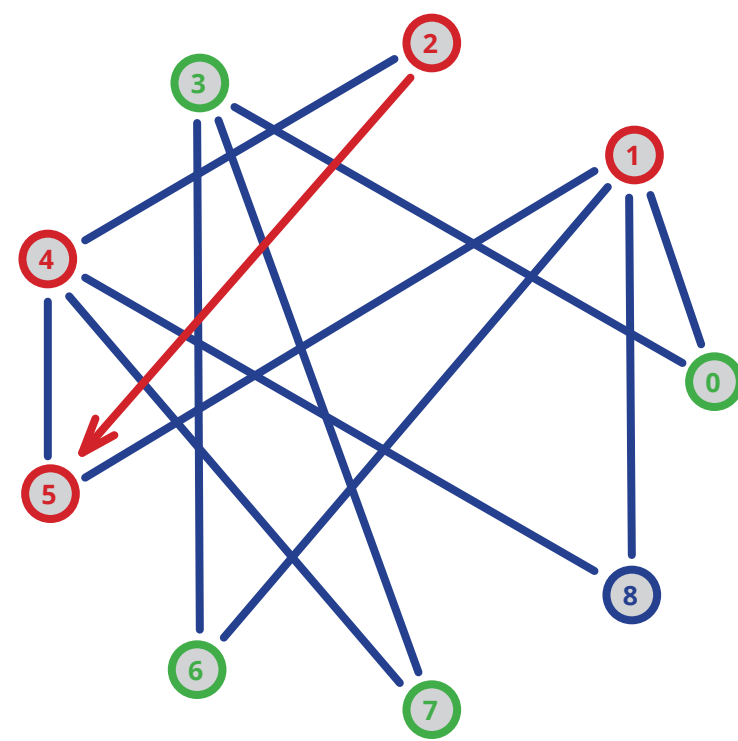


Round 3

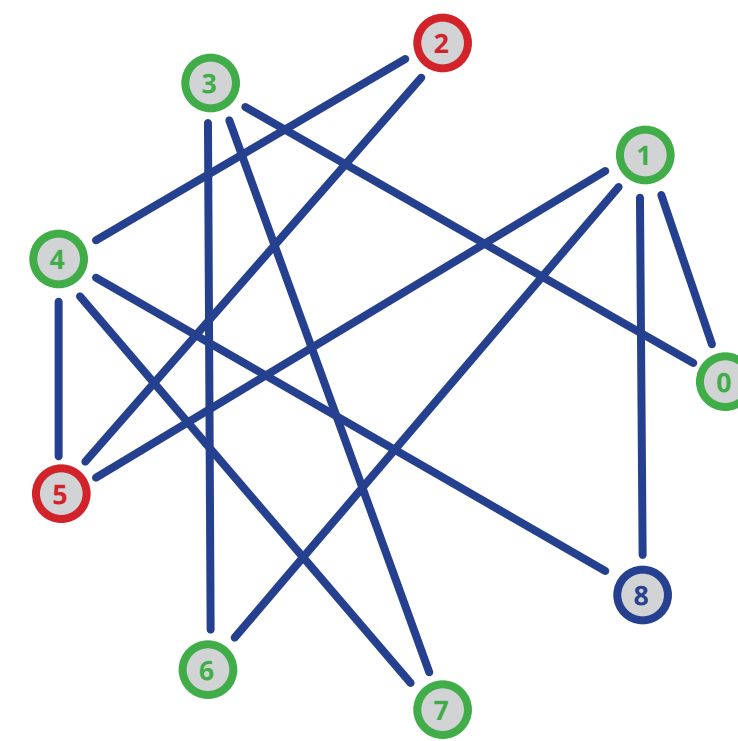
PLAYTHROUGH EXAMPLE



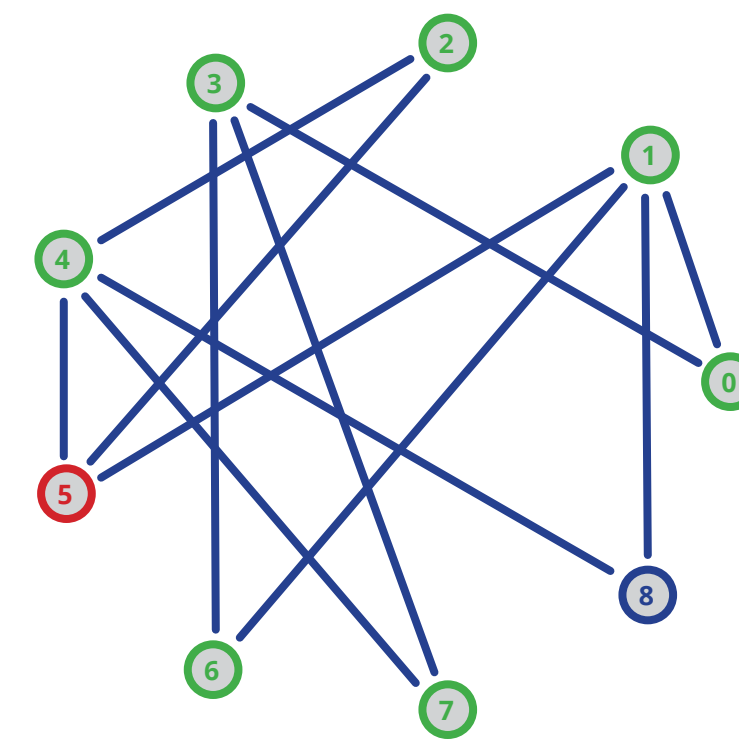
Round 4



Round 5

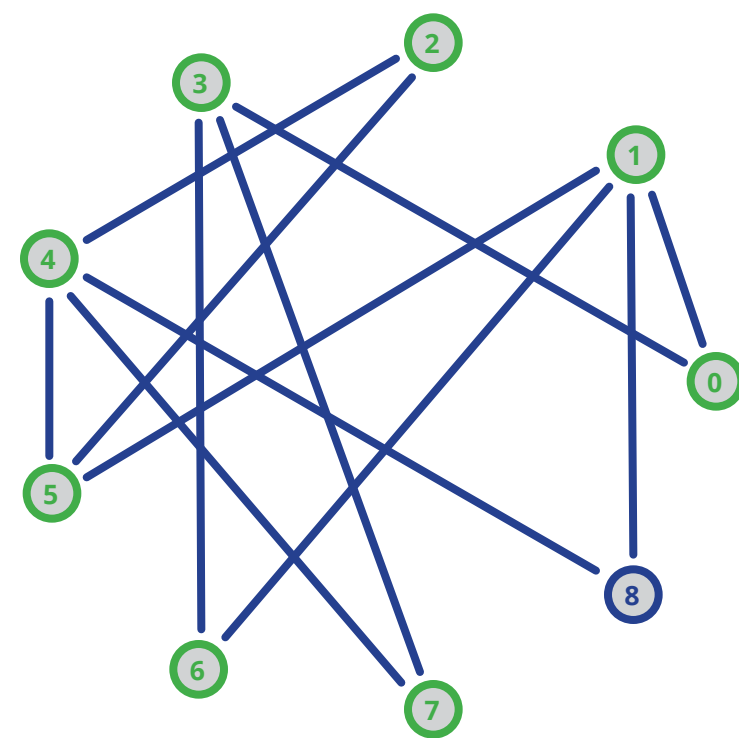


Round 6

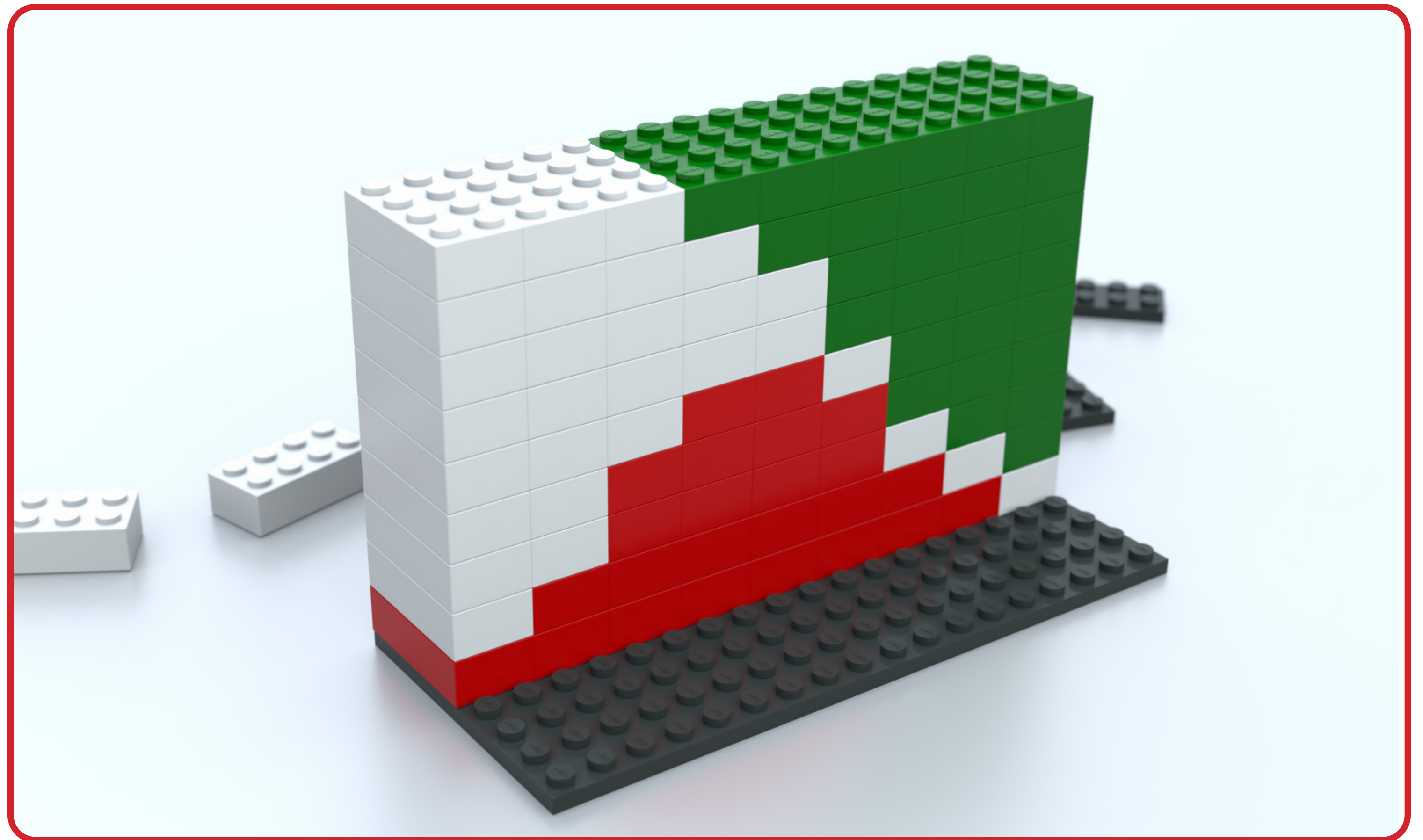


Round 7

PLAYTHROUGH EXAMPLE



Round 8



Total number of kids in the game = 9,
probability of disease transmission $K=4$, duration of illness $N=4$

WHAT DID WE LEARN?

The importance of the network of contacts:

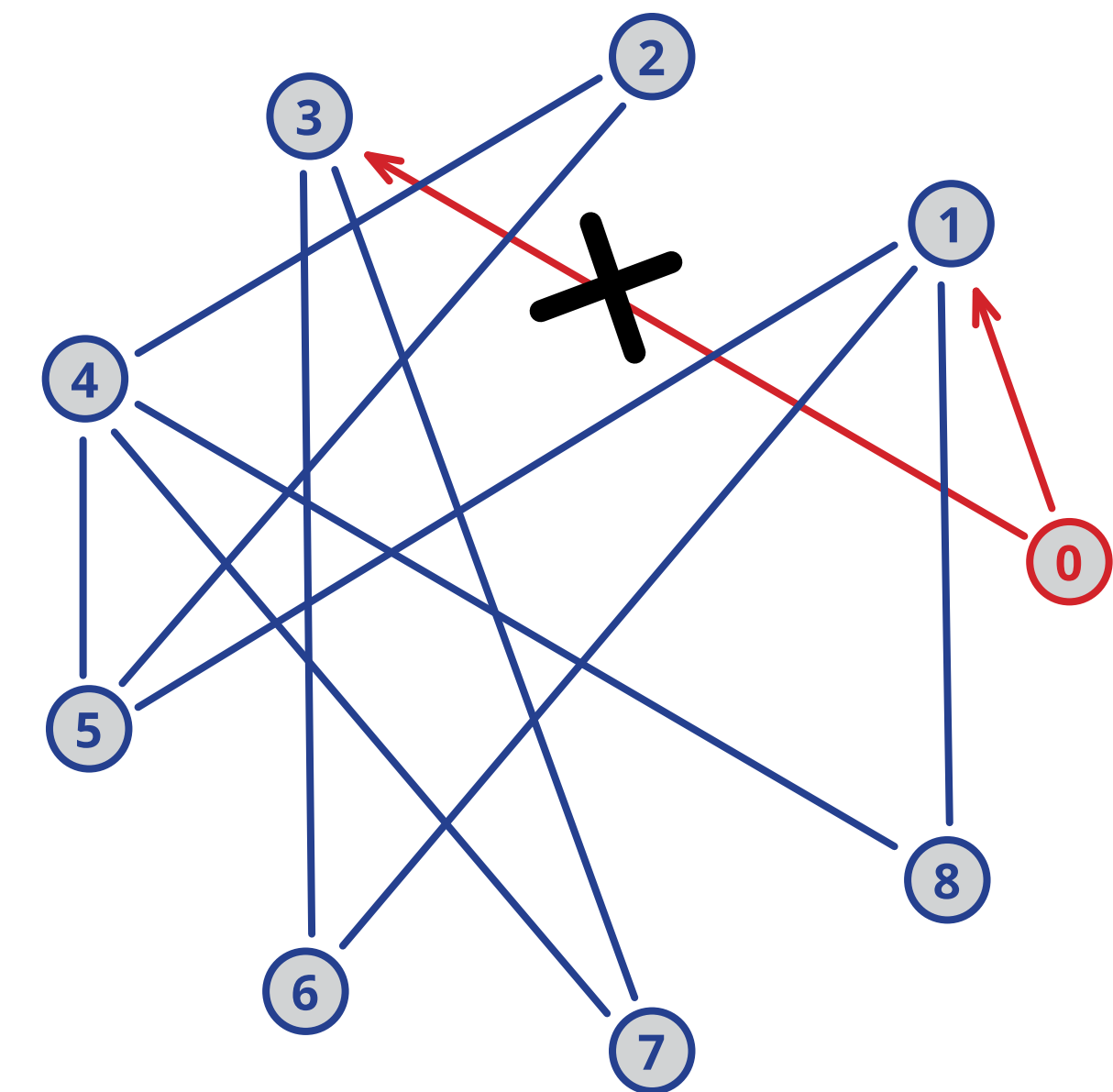
Spread of a infectious disease is made possible by the social contacts between the infected. The way we socialize and how often we socialize influence the spread of infectious diseases.

Coincidence and unpredictability:

Details can affect whether a disease will turn into an epidemic or not. For example, ROUND 1 in the example of a playthrough could have ended without infecting person 3 and the spread would have been over in few turns just by chance. But we can also see how one infected person can cause a large epidemic.

Statistics and predictability:

In real life, situations like these are constantly taking place around us. Therefore, when scientists study the spread of a disease, they play a lot of games like this one - using computers and observing possible outcomes and consequences of the disease spread, whether it is something fairly certain or unlikely. This allows them to make decisions about what needs to be done to curb and stop the spread.



WHAT DID WE LEARN?

If you have played several games, each with a different network:

The importance of the number of contacts: infectious diseases spread quickly and infect many players when the number of contacts between players is large. This is why we have to stay at home during dangerous pandemics so as not to spread the infection to others. Kindergartens and schools are places where many children come into contacts with other children (dense network of contacts) so infectious diseases spread much quickly there.

"Curve smoothing": we want to avoid everyone getting sick at once because then hospitals become overrun and doctors can't help everyone. That is why it is important during those situations to stay at home and reduce the number of social contacts (i.e. reducing the density of network connections). Infected persons then transmit diseases to much smaller number of people, thus reducing the overall number of infected at the same time, while making the epidemics last longer.

If you have played games with different values of parameter K :

The importance of hygiene and masks: when we come into contact with an infected person, we need to protect ourselves with protective gear like masks and gloves and thus reduce the chance of getting infected (number K).

If you used networks that include vaccinated players:

The importance of vaccines: vaccinated children wear green bracelets at the beginning of the game. Those players cannot get infected and in effect they reduce the chances of infections spreading through the network of contacts.

If you have played the same game/network multiple times:

The role of chance: each time we play the game, it is possible that the disease will spread in a different way through the network of contacts. We see how chance plays a big role, but also how such games explore many possible outcomes of the spread of infection.



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