

# GUTSY

## The Card Game

Each of us has a community of microbes that lives in our gut. It is influenced by what we eat, drink, who we interact with and the medicines that we take. A diverse microbiome promotes good health.

Can you make the right decisions to be the first to diversify your gut microbiome?

### INSTRUCTIONS

#### Make Your Cards

**What You'll Need:**

- a printer
- regular paper
- card stock (optional)
- scissors

**What To Do:**

1. Print the instructions (p. 1-2 of PDF) on regular paper.
2. Print the cards (p. 3-11) on paper or cardstock.
3. If you'd like, print the pattern (p. 12) on the back of the cards.
4. Cut the cards using scissors. There are 54 cards total.
5. Grab your friend(s) and play!

#### Objective

Be the first to have 6 different microbes in your Gut at the end of your turn (excluding Pathogens)!

#### Setup

1. Give each player a **Player Guide**.
2. Remove the **4 Event cards**.
3. Shuffle and deal 6 cards to each player. This forms a player's Hand which is kept secret from the other players.
4. Shuffle the Event cards into the remaining cards to form the draw pile and place in the center of all players. (The discard pile will be created during the game next to the draw pile, face up.)
5. Each player chooses any **2 Microbe or Pathogen cards** from their Hand and places them face down in front of them. These cards will be the first 2 cards in their Gut.
6. When everyone is ready, all players reveal the 2 cards in their Gut.
7. The person who most recently ate a salad goes first.
8. You are now ready to play!

#### Card Types

There are four types of cards:

Microbe Cards (40)	Pathogen Cards (5)	Event Cards (4)	Quarantine Cards (1)

#### Card Elements

The diagram shows a card element for 'JOURNEY ABROAD' with the following components labeled:

- Action Icon:** An airplane icon.
- Action Name:** 'JOURNEY ABROAD'.
- Number of this Microbe in deck:** '3'.
- Action:** 'Draw 3 cards into your Hand. Play any 1 and discard any 1 from your Hand.'
- Microbe name:** 'VERRUCOMICROBIA'.
- Microbe image:** An illustration of a yellow, multi-lobed microbe.
- Rare or Common:** 'R' (Rare).
- Fun Fact:** 'Traveling to other countries can drastically alter your gut microbiome, at least temporarily.'

## How to Play GUTSY

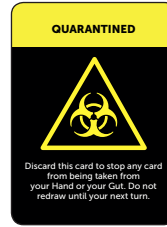
Each player takes turns being the Active player and will complete their entire turn before the next clockwise player becomes the Active player. There are 4 phases in a turn:

- 1. Health check:** If you have at least 1 Pathogen in your Hand, play 1 Pathogen into your Gut and skip to the third step; if your Gut already has 6 Microbes, you must discard one non-Pathogen card in your Gut to make space.
- 2. Play a card from your Hand:** In this phase you get to play a card to perform ONE of the following actions:
  - a. Build your gut:** If you have an empty slot in your Gut, you may add a new Microbe from your Hand into it. Duplicates are allowed but each card occupies its own slot. The action on this card is NOT played now. It is stored for future use (see next: Trigger stored action).
  - b. Trigger stored action:** If you have a Microbe card in your Hand with the same Microbe name as one in your Gut, you can trigger the action on the top of the card. **First**, perform the stored action on the Microbe in your Gut. **Second**, discard that card and place the matching Microbe from your Hand into the vacated spot in your Gut. If you can't perform the action, you can't trigger it.
  - c. Discard card:** Discard a card from your Hand if your Gut is full and you can't trigger an action.
- 3. Refill your Hand:** Draw card(s) into your Hand, one at a time. If an Event card is drawn, read, execute the action and then discard it. Continue drawing until you have 4 cards in your Hand.
- 4. Gut Check:** If you have 6 different Microbes (no Pathogens) in your Gut, the game has ended and you won! If not, but you are one card from winning, shout "I'm feeling Gutsy!" If the game has not ended, play continues with the player on your left and continues clockwise throughout the game.

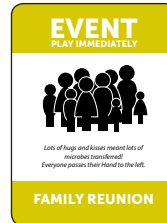
## Remember!

- When an Event causes you to lose a Microbe from your Gut, you may choose to discard a Pathogen.
- When the Draw pile is empty, shuffle the Discard pile to form a new Draw pile.
- The player who triggers the action decides on the target.
- Antibiotics can be used on any player's Gut, not just your own.

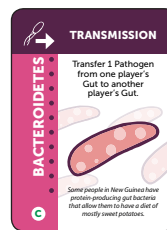
## Additional Actions & Card Rules



**QUARANTINE** can be used on another player's turn to negate an action played against you. That player's action is now forfeited. It can also be used on Events and even on your own turn.



**FAMILY REUNIONS** leave the player to the left of the active player with only 3 cards. That person should now draw up to 4 cards.



**TRANSMISSION** can still be used to transfer a Pathogen into another player's full Gut; in that case the player receiving the Pathogen should discard 1 random card to make room.

## Game Variants

### Epidemic!

In this variant, the game immediately ends if anyone has 3 Pathogens in their Gut.

### I Choose You!

In this variant, you may replace a matching Microbe in any player's Gut and trigger its stored action.

### Are You Going to Eat That?

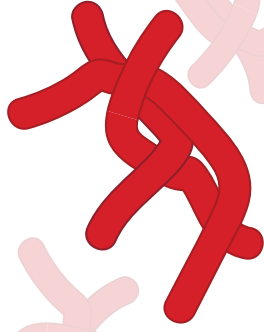
In this variant, you may ONLY replace matching Microbes in other players' Guts to trigger the action.

**Acknowledgments:** Gutsy was created by Susan Perkins (Curator & Professor, American Museum of Natural History), Barry Joseph (Associate Director for Digital Learning), and Eric Teo (pushurluck-podcast.com). Thanks to all the youth who assisted in its development through the Museum's Lang program: Adam, Aziza, Calliope, Dominika, Emily, Emma, Geeta, Gloria, Isaul, Jalen, Jose, Mari, Maria, Priscilla, Sabrina, William, Xiomara, and Melissa, and their instructor, Abbey Novia. Thanks to everyone who lent a hand in the Museum's Exhibition department and NCSLET (the National Center for Science Literacy, Education, and Technology), as well as all the play-testers, specifically Mike Patterson, the NYU Game Center, and all the unsuspecting Museum visitors who graciously shared their visit with us.



## ROGUE SCIENTIST

Choose 1 card from the discard pile and play it right away.



More than 30% of bacteria found in New York City subways were similar to species from human guts.



## TENERICUTES



## JOURNEY ABROAD

Draw 3 cards into your Hand. Play any 1 and discard any 1 from your Hand.



The name *Tenericutes* comes from the Latin for "soft skin," because they lack cell walls.



## TENERICUTES



### PLAYER GUIDE

#### On your turn:

**1. Health check:** If you have Pathogen cards in your Hand, play one into your Gut; skip to third step.

**2. Play a card:** Choose one, and only one, of the following:

- Build your Gut: Add a Microbe from your Hand into an empty slot in your Gut.
- Trigger stored action: Trigger a stored action in your Gut by replacing that card with the same type of microbe.
- Discard card: Discard a card from your Hand.

**3. Refill your Hand:** Draw cards until you have 4 cards in your Hand.

**4. Gut Check:** If you have 6 different Microbes in your Gut, you win!

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**SCIENTIST**

Take any card from the discard pile and place it into your Hand.

*Boosting populations of Akkermansia muciniphila in mice causes them to be less obese.*

**CYANOBACTERIA** **R**

**HORIZONTAL GENE TRANSFER**

Trigger any 1 action in your Gut without replacing that card.

*Some Japanese people contain genes in their gut microbes that help them digest seaweed.*

**CYANOBACTERIA** **R**

**JOURNEY ABROAD**

Draw 3 cards into your Hand. Play any 1 and discard any 1 from your Hand.

*Traveling to other countries can drastically alter your gut microbiome, at least temporarily.*

**VERRUCOMICROBIA** **R**

**TONGUE DEPRESSOR**

Choose 1 player to show you their entire Hand.

*Removing a bacterium called Helicobacter pylori from people's stomachs could make them hungrier—and eventually heavier.*

**CYANOBACTERIA** **R**

**SUPER ANTIBIOTIC**

Remove 3 cards (1 pathogen + 2 of any kind) from any 1 player's Gut.

*The average child in the U.S. takes one course of antibiotics per year.*

**CYANOBACTERIA** **R**

**SCIENTIST**

Take any card from the discard pile and place it into your Hand.

*Verrucomicrobia translates to "warty bacteria"—named because of the bumps on their cell surfaces.*

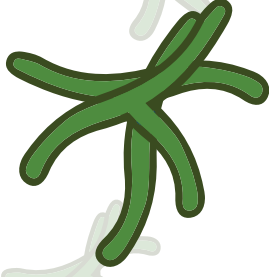
**VERRUCOMICROBIA** **R**



**HORIZONTAL GENE TRANSFER**

**ACTINOBACTERIA**

Trigger any 1 action on a card that is in your Gut without replacing that card.



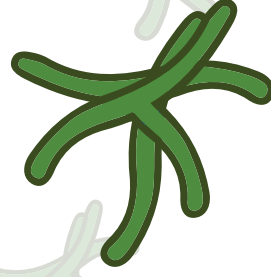
*Bacteria can exchange genes by temporarily merging and passing DNA from one organism to another.*



**SNEEZE**

**ACTINOBACTERIA**

Take 1 card at random from another player's Hand. They do not replace that card.



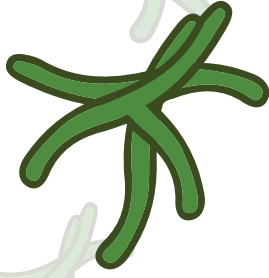
*Red meat proteins and fat feed gut bacteria that can cause heart disease.*

**FECAL TRANSPLANT**



**ACTINOBACTERIA**

Discard 1 card from your Gut and replace it with 1 card from another player's Gut.



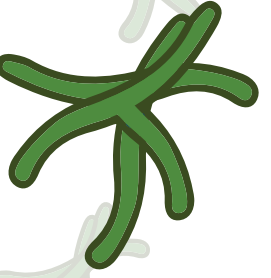
*Probiotics are foods that act like fertilizer for good microbes, causing them to multiply rapidly.*

**WEEKEND TRAVEL**



**ACTINOBACTERIA**

Draw 2 cards into your Hand. Discard any 1 card from your Hand.



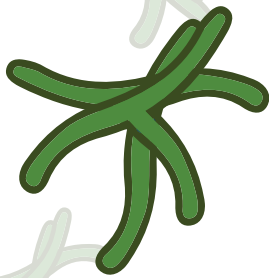
*You have more microbes in your body than there are stars in the Milky Way.*

**TONGUE DEPRESSOR**



**ACTINOBACTERIA**

Choose 1 player to show you their entire Hand.



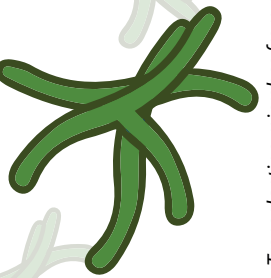
*Mother's milk contains sugars that feed the Bifidobacterium species in their infant's guts.*

**FECAL TRANSPLANT**



**ACTINOBACTERIA**

Discard 1 card from your Gut and replace it with 1 card from another player's Gut.



*Transplanting microbes from a healthy donor into someone with a chronic bowel disease is called a Fecal Microbiota Transplant.*



**WEEKEND TRAVEL**



**PROTEOBACTERIA**

Draw 2 cards into your Hand. Discard any 1 card from your Hand.



*Eating and drinking unfamiliar food and water can alter your gut microbiome for days or even years.*



**FECAL TRANSPLANT**

**PROTEOBACTERIA**

Discard 1 card from your Gut and replace it with 1 card from another player's Gut.



*Using gut microbes from a healthy person to treat disease dates back to 4th century China.*



**SNEEZE**

**PROTEOBACTERIA**

Take 1 card at random from another player's Hand. They do not replace that card.



*Proteobacteria come in a variety of forms. They're named after the Greek god Proteus who could change shapes.*



**FECAL TRANSPLANT**

**PROTEOBACTERIA**

Discard 1 card from your Gut and replace it with 1 card from another player's Gut.



*You swallow about 1 billion bacteria every day just in your saliva.*



**SUPER ANTIBIOTICS**

**PROTEOBACTERIA**

Remove 3 cards (1 pathogen + 2 of any kind) from any 1 player's Gut.



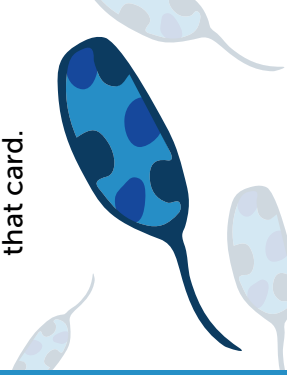
*A powerful new antibiotic called Teixobactin was discovered in 2014.*



**HORIZONTAL GENE TRANSFER**

**PROTEOBACTERIA**

Trigger any 1 action on a card that is in your Gut without replacing that card.



*There are 100 times more unique bacterial genes than unique human genes in your body.*



**BROAD-SPECTRUM ANTIBIOTICS**

FIRMICUTES



Remove 2 cards (1 Pathogen + 1 of any kind) from any 1 player's Gut.



*U.S. doctors prescribed 258 million courses of antibiotics in 2010—nearly one per person.*

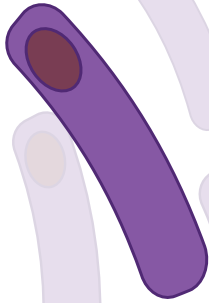


**NARROW-SPECTRUM ANTIBIOTIC**

FIRMICUTES



Remove 1 Pathogen from any 1 player's Gut.



*American microbiologist Selman Waksman coined the term "antibiotic" in 1942.*

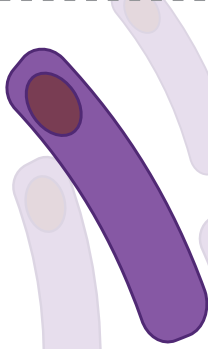


**KISS**

FIRMICUTES



Pick a player. Each of you simultaneously draws 1 card from each other's Hand.



*Each of your teeth has a different population of bacteria living on it.*



**BROAD-SPECTRUM ANTIBIOTICS**

FIRMICUTES



Remove 2 cards (1 Pathogen + 1 of any kind) from any 1 player's Gut.



*Broad-spectrum antibiotics work against many different kinds of bacteria, including the good ones.*



**NARROW-SPECTRUM ANTIBIOTIC**

FIRMICUTES



Remove 1 Pathogen from any 1 player's Gut.



*Alexander Fleming discovered penicillin in 1928 when he noticed mold growing in a Petri dish.*

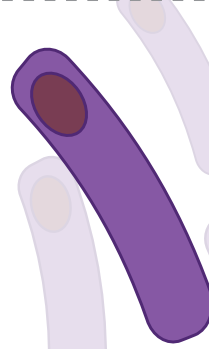


**KISS**

FIRMICUTES



Pick a player. Each of you simultaneously draws 1 card from each other's Hand.



*A "probiotic" is anything that contains live bacteria that are good for you.*



**KISS**

Pick a player. Each of you simultaneously draws 1 card from each other's Hand.

**BACTEROIDETES**

Bacteria in your mouth can make acid from sugar, which can give you cavities.

**KISS**

Pick a player. Each of you simultaneously draws 1 card from each other's Hand.

**BACTEROIDETES**

A single kiss can transfer up to 80 million bacteria between two people.

**TRANSMISSION**

Transfer 1 Pathogen from one player's Gut to another player's Gut.

**FIRMICUTES**

In your body, bacterial cells outnumber human cells by about 10 to 1.

**TRANSMISSION**

Transfer 1 Pathogen from one player's Gut to another player's Gut.

**FIRMICUTES**

There are more bacteria on one of your hands than there are people living on Earth.

**SALAD DIET**

Replace 1 common Microbe (C) in your Gut with 1 rare (R) Microbe from the discard pile.

**FIRMICUTES**

The Hadza people of Tanzania have incredibly diverse gut floras due to their high intake of fiber.

**OUT OF SOAP**

1 player randomly returns 1 card from Gut to Hand; if more than 4 cards in Hand, discard one.

**FIRMICUTES**

You and a random other person only share about 10% of the same kinds of microbes.



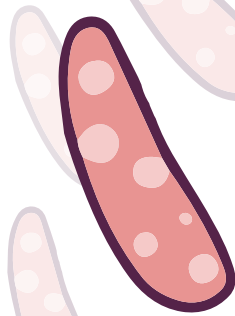


**BROAD-SPECTRUM ANTIBIOTICS**

**BACTEROIDETES**



Remove 2 cards (1 Pathogen + 1 of any kind) from any 1 player's Gut.



*Most antibiotics are isolated from microbes found in soil, which use these chemicals to battle one another.*

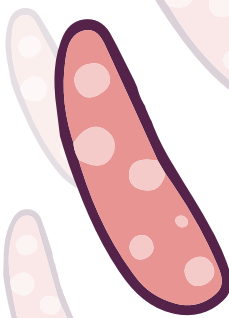


**NARROW-SPECTRUM ANTIBIOTIC**

**BACTEROIDETES**



Remove 1 Pathogen from any 1 player's Gut.



*Narrow-spectrum antibiotics target only certain kinds of bacteria.*



**SALAD DIET**

**BACTEROIDETES**



Replace 1 common Microbe (C) in your Gut with 1 rare (R) Microbe from the discard pile.



*Healthy foods, especially those rich in fiber, are key to having a diverse gut microbiome.*

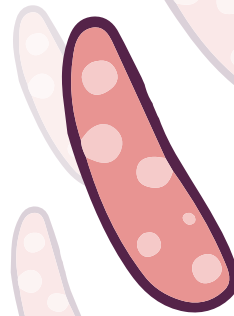


**BROAD-SPECTRUM ANTIBIOTICS**

**BACTEROIDETES**



Remove 2 cards (1 Pathogen + 1 of any kind) from any 1 player's Gut.



*Antibiotics don't work against viruses, like the cold or the flu.*



**NARROW-SPECTRUM ANTIBIOTIC**

**BACTEROIDETES**



Remove 1 Pathogen from any 1 player's Gut.



*All penicillin in use today descends from a moldy canteloupe in Peoria, Illinois.*



**OUT OF SOAP**

**BACTEROIDETES**



1 player randomly returns 1 card from Gut to Hand; if more than 4 cards in Hand, discard one.



*The bacteria in your gut weigh about the same as your brain—about three pounds.*

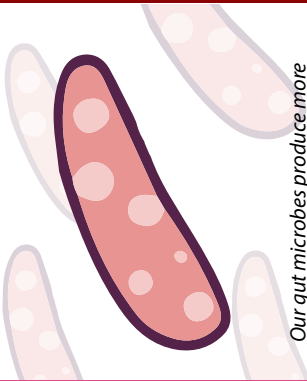


**BACTEROIDETES**



**TRANSMISSION**

Transfer 1 Pathogen from one player's Gut to another player's Gut.



Our gut microbes produce more than ten times the digestive enzymes that our own cells do.

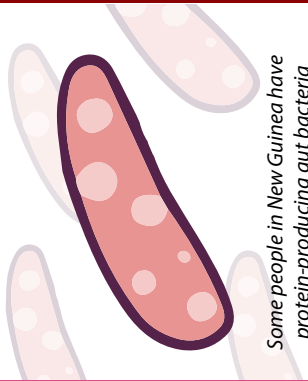


**BACTEROIDETES**



**TRANSMISSION**

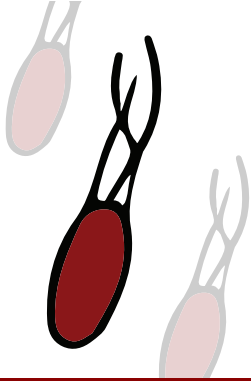
Transfer 1 Pathogen from one player's Gut to another player's Gut.



Some people in New Guinea have protein-producing gut bacteria that allow them to have a diet of mostly sweet potatoes.

**PATHOGEN**

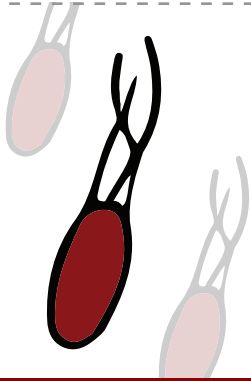
If you have 1 or more Pathogens in your Hand at the start of your turn, you must add one to your Gut.



*Campylobacter jejuni* is a pathogen that can be found in poultry, dairy, and produce.

**PATHOGEN**

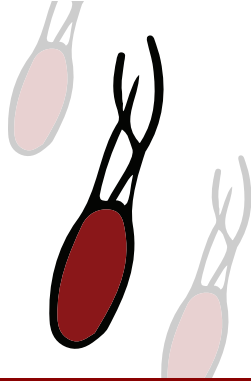
If you have 1 or more Pathogens in your Hand at the start of your turn, you must add one to your Gut.



*Vibrio cholerae*, which causes cholera, is often spread in contaminated water.

**PATHOGEN**

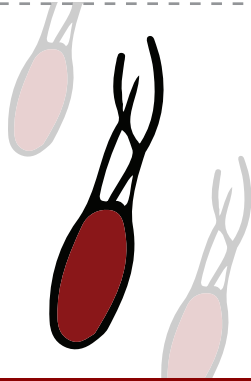
If you have 1 or more Pathogens in your Hand at the start of your turn, you must add one to your Gut.



*Salmonella typhi* causes millions of cases of typhoid fever every year.

**PATHOGEN**

If you have 1 or more Pathogens in your Hand at the start of your turn, you must add one to your Gut.



*Shigella flexneri*, a cousin of *E. coli*, can cause dysentery.



**DRUG-RESISTANT PATHOGEN**

If you have 1 or more Pathogens in your Hand at the start of your turn, you must add 1 to your Gut. You cannot remove this Pathogen using antibiotics.



*Clostridium difficile* is one of the most common nosocomial (hospital-acquired) infections in the U.S.

**QUARANTINED**



Discard this card to stop any card from being taken from your Hand or your Gut. Do not redraw until your next turn.

**EVENT**  
PLAY IMMEDIATELY



Families with dogs share more microbes with each other than those without. All players put their Hands into a pile. Shuffle the pile and redeal a new Hand to each player, starting with the player to the left of the person who drew this card.

**ADOPT A PUPPY**

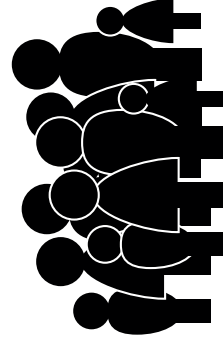
**EVENT**  
PLAY IMMEDIATELY



Unhealthy food leads to a less diverse microbiome. All players with 1 or more rare Microbe (R) in their Guts must discard 1 of them.

**FAST FOOD BINGE**

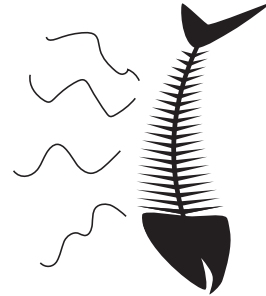
**EVENT**  
PLAY IMMEDIATELY



Lots of hugs and kisses meant lots of microbes transferred! Everyone passes their Hand to the left.

**FAMILY REUNION**

**EVENT**  
PLAY IMMEDIATELY



Everyone ate the same spoiled stuff. Each player discards any 1 card from their Gut.

**MASS FOOD POISONING**

