

# Infer

By Nicholas Schoichet  
www.inferdice.com  
nicholas@schoichet.com

*A cooperative game of inductive logic and scientific discovery.*

Players: 2-10 Play time: ~20 minutes

Work together as Researchers using dice to build experiments, test hypotheses, and ultimately publish theories to uncover a hidden Law of the Universe.

## Contents:

---

- **60** 12mm Dice, 20 each in 3 colors.
- **20** double-sided Result Markers. **O** / **X**
- **4** Publication Tokens.
- **Laws of The Universe** card deck.  
(For this prototype, a list will be provided.)



Laws of the Universe Test List

## Setup:

---

1. Place the dice within easy reach of all players.
2. Decide which player will be the Universe, who will be responsible for creating a secret Law only they know. They take the Result Markers.
  - Their goal will be to present the other players with a challenge while silently guiding them to success.
3. All other players take on the role of Researchers. Place the four Publication Tokens within easy reach of them.
4. The Universe shuffles the **Laws of the Universe** cards and draws one.
  - This card must be kept secret, but the Universe may refer to it at any time.
  - *Example Laws:* "There must be at least one orange die." "The sum of all dice must be ten." "There must be more odd dice than even dice." "There must be exactly three dice."
5. To begin the game, the Universe builds 2 experiments, each using 4 or fewer dice: One that follows the secret Law described on the card they drew, and one that does not. The Universe then places an appropriate Result Marker next to each: **O** for **follows**, **X** for **does not follow**.
  - An experiment is any grouping of dice created by a player.  
*See "Building an Experiment" in the next section.*

*For rules governing creating a Law of your own, consult the "Creating Laws" section in the Variants Section.*



# Play

The Universe takes no turns of their own. They set up the game and respond to the actions of the Researchers.

Researchers take turns either building experiments for the Universe to evaluate or publishing theories in an attempt to win the game.

Play begins with the Researcher who most recently read a scientific paper.

On their turn, the active Researcher may either **Build an Experiment** or **Publish a Theory**.

## Building an Experiment:

- The active Researcher grabs any number of dice from the supply and arranges them however they like in front of them.
- Once the active Researcher is satisfied with the construction of their experiment, the Universe considers whether it follows or does *not* follow their Law, placing the appropriate Result Marker next to the experiment: **O** for **follows**, **X** for **does not follow**.
- Experiments remain in play for the duration of the game for reference.
  - » Dice are limited, but with the consent of all Researchers a previous experiment may be deconstructed for parts. The Result Marker from a deconstructed experiment is removed from the game.

## Publishing a Theory:

- With the unanimous consent of all other Researchers, the active Researcher may spend a Publication Token to publish a Theory of the Law of the Universe.
- The active Researcher states their Theory aloud, and hands the Publication Token to the Universe. Before accepting it the Universe repeats back the Theory as they understand it, allowing the Researcher to adjust their language until everyone agrees on what exactly is meant.
- The Universe takes the Publication token and, if they can, disproves the Researcher's Theory by either:
  - » Building an experiment that **follows** the Researcher's Theory and marking that it does *not* follow the Law of the Universe.
  - » Building an experiment that does *not* follow the Researcher's theory and marking that it **follows** the Law of the Universe.
- **If the Universe is unable to disprove the Theory, everyone (including the Universe) wins!**
  - » The stated Theory does not need to exactly match the Law of the Universe. If the Universe cannot disprove it, then the two are likely logically similar.
  - » *Ex: The Law "All dice must be divisible by 2" and the Theory "There must be no odd dice" are logically the same.*
- Researchers may spend a Publication Token without providing a theory. In this case, the Universe may build any experiment they want. *Use this as a helpline if stuck!*

**If the Researchers spend their last Publication token without winning, or if the Universe has no remaining Result Markers and must place one, everyone (including the Universe) loses.**

## Talking:

- The Universe is silent and enigmatic. They may never verbalize their Law, offer clues, or provide direction to the Researchers. They may only ask or answer clarifying questions.
  - » *Ex: Asking if one die in an experiment is meant to be touching another, or answering whether 0 is considered even. (It is!)*
- Researchers are free (and encouraged!) to talk - discussing theories, advising on experiments they'd like to see, and bouncing ideas off each other.

**You are ready to play!**

# Reference

## Laws of the Universe:

---

A Law **may** involve any easily visible aspect of how dice relate to each other *within* an experiment.

- Fully Visible Top Dice Faces
- Number of Dice
- Color
- Groupings (*A group is one or more dice*)
- Touching / Not Touching
- Stacked / Touching Table
- Patterns / Sequences
- Majorities / Minorities / Parity
- Same / Different
- Even / Odd
- Mathematics (*Product/Sum/Factors/Primes/Formulae etc.*)

A Law **may not** involve aspects that are **external** to an experiment, or not easily visible to all players.

- Side Faces or Obscured Faces
- Reference to Other Experiments
- Reference to Result Markers
- Dice Directionality / Orientation
- Proximity to a Player
- Time
- Specific Areas of the Table or Room
- Distance Between Dice
- Cardinal Directions

## Advanced Concepts

### The Null Experiment

- During play a Researcher might create an experiment with nothing in it. This is valid! Judge it as you would any experiment.
- This can be a great way to test whether a Law *requires* something to exist, or if the Law is a *restriction* on what can exist.
  - » *Ex: The Null Experiment for "There must be at least one red die" would not follow the Law. The Null Experiment for "There must not be red dice" would follow the Law.*

### False Beats True

- If an experiment simultaneously follows and does *not* follow the Law, then the experiment does *not* follow the Law. (Partially following is *not* following)
  - » *Ex: Consider the Law "All blue dice must be 5s." An experiment with a blue 5 and a blue 3 would not follow the Law.*

### Vacuous Truth

- If a Law imposes a restriction that is not relevant to an experiment, that experiment follows the Law.
  - » *Ex: Consider the Law "All white dice must touch." An experiment with no white dice follows the Law.*
- It is true that all Sphinxes in my game group love playing Infer. (There are no Sphinxes in my game group.)

### Recognizing "And" / "Or" Clauses

- Researchers should keep a watchful eye on the overall pattern of results they're getting from their experiments:
  - » If most experiments do *not* follow, the Law likely includes an "and" clause.
  - » If most experiments follow the law, the Law likely includes an "or" clause.

# Advice

## For the Researchers:

---

### *Don't be afraid to use your Publications!*

If you find yourself stuck and out of ideas, consider publishing a theory that you may think is wrong, but that would be helpful to know for sure. Verifying assumptions is important, and by Publishing you allow the Universe to tag in and guide you in a new direction or disprove assumptions you hadn't realized you made.

Remember: All results are important!

Realizing the hidden Law requires discovering both **O** and **X** experiments to contrast.

## For The Universe:

---

*Once the game begins, your job is not done!*

Watch the assumptions of your Researchers carefully, and consider what experiments you might make to challenge their expectations and guide them. Every Publication is an opportunity for you to open their eyes to something they've missed.

.....

As the game goes on you may realize new implications of the Law you picked or encounter experiments that ask something you hadn't considered, requiring you to silently make a judgement call.

**Ex:** Consider the Law "Blue dice must be odd." It seems simple, but if a Researcher builds an experiment with no blue dice, would you mark it as following or not following?

**A.** Following the Vacuous Truth concept, if a Law imposes a restriction that is not relevant to the experiment, then the experiment follows the Law. There are no blue dice, therefore being odd or even is irrelevant.

**B.** On the other hand, if there are no blue dice in the experiment, then the value of blue dice in the experiment is 0 which is an even number. Therefore the experiment does not follow the Law.

Sometimes there won't be a "correct" way to respond. The important thing is to **stay consistent**. Consider what would make the most sense given how you've already marked other existing experiments.

.....

Remember: The Universe is silent and enigmatic.

Don't drop hints or apologize for your Law. *Let the Researchers struggle.*

Silence can be uncomfortable and you may worry the Researchers will burn out, but the puzzle *is* the game and silence can be the sound of minds at work.

Lean into the crunch; that's what Infer is all about! Let the struggle of applying inductive reasoning be forewarned, thematic, and humorous.

## Notes

### **What if someone needs to leave or wants to join mid-game?**

Infer is very fluid regarding player count. It does not disturb an ongoing game if a Researcher needs to leave or a new player wishes to join. When Infer is on the table, everyone in the room is playing whether they realize it or not.

### **What if an experiment gets accidentally nudged, moved, or changed?**

If someone accidentally changes an existing experiment, the Universe should pull back their Result Marker and say "This experiment has changed. Please re-create it." The Universe should then judge it as it is, even if it was put back differently.

### **Do the side faces of dice matter?**

No! Only fully visible top faces matter.

### **Does the color of dice stacked under other dice matter?**

Yes! Only the faces of dice with other dice stacked on top are irrelevant. Colors matter!

### **Are numeric sequences considered ascending or descending?**

Lines can be read both ways. There is no directionality in Infer. All experiments must be understandable by players regardless of where they sit around the table. Thus the sequence 1, 2, 3 is considered to be *both* ascending *and* descending. Depending on your viewpoint, both are true.

### **What happens if we run out of Dice?**

Dice are limited, but with the consent of all Researchers a previous experiment may be deconstructed for parts at any time. The Result Marker for a deconstructed experiment is removed from the game.

### **What happens if we run out of Result Markers?**

Result Markers are limited. If the Universe must place a Result Marker and cannot, everyone (including the Universe) loses.

---

### **What is inductive reasoning anyway?**

Inductive reasoning is the act of developing a theory from individual data points. We make many observations, recognize a pattern, and infer an explanation to describe it. In some ways it is the opposite of deductive logic which starts with an assumed theory from which we make specific observations. In the Scientific Method, inductive logic is used to form the hypotheses and theories that are then tested and applied through deductive reasoning.

### **What is a Scientific Law anyway?**

A Scientific Law is an observation about the universe based on experimentation that the Scientific community has a strong understanding of how to model, but little ability to explain *how* or *why*. Our current understanding of the Law of Gravity is so detailed that we can accurately predict anything from the drop of an apple to the movements of galaxies...but we don't understand yet *why* mass bends space-time. We simply observe that it *does*.

### **What is a Scientific Theory anyway?**

A Scientific Theory is an attempt to explain "*How*" and "*Why*" an element of the universe works the way it seems. The Theory of Evolution itself doesn't model the exact math of genomes or allow us to make precise predictions of the future. Rather, it *describes* the process of genetic selection and attempts to *explain* the systems that have shaped the natural world.

### **I prefer competitive games. Is there a game like this that's head to head?**

Yes! Check out the marvelous Zendo by Kory Heath, published by Looney Labs.

# Infer

*Variants*

## Basic Variants:

### Highlights:

---

- During setup, give the Universe 6 Highlight stones - 3 each in two colors.
- At any point, if the Researchers appear to be stuck and new ideas are no longer flowing, the Universe may begin placing Highlight stones next to experiments that they feel are particularly noteworthy.
- The two colors represent two different lines of communication.
  - » For example, the Universe might highlight two experiments in blue to draw attention to the way they compare, and another group of three experiments in red that they feel are worth looking at for a different reason.
- This is a subtle and silent way for the Universe to provide hints to the Researchers, giving them direction when they've lost momentum without taking away their "Aha!" moment.

### Publish or Perish:

---

- Add a 10 minute timer to the game, extended by five minutes each time the Researchers publish a theory.
- If the timer runs out, everyone (including the Universe) loses.
  - » This represents the publish-or-perish nature of scientific endeavors, and the scramble to produce results before funding runs out and/or media interest wanes.

### Silence:

---

- For the duration of the game no player may speak except while Publishing a Theory.
  - » Researchers are free to communicate non-verbally by pointing at experiments they feel are important, signaling numbers or colors they'd like the active Researcher to consider, and so on.
- Before Publishing a Theory, the active Researcher must first point at the Publication Tokens to ask for permission to Publish. If all other Researchers give a thumbs up, they may pick up the token and state their Theory following the standard rules.

### Asynchronous Play:

---

- Infer can be played asynchronously over time!
- Setup the game as you would normally, choosing a secret Law of the Universe and building one experiment that follows it and one that does not, leaving them out on a table.
- When a Researcher gets a free moment, they can consider the table and build a few experiments in a row, leaving them out for the Universe to judge at a later time. Play continues as normal, with players updating the game state as convenient.

### Compass Rose:

---

- New component! A compass rose that sits in the middle of the table and is never moved after initial placement.
- Each experiment is a self-contained universe, and cardinal directionality is relative to the rest of the experiment, not its position on the table.
  - » "There must be a Blue die in the north." Requires other dice present in the experiment for a blue die to be north of.

## Advanced Variant: Creating Your Own Laws

### ***Creating your own Law changes the nature of the Universe's role in the game.***

When playing with this variant, you are neither antagonistic nor allied with the Researchers. Your win condition is simply to craft a puzzle they enjoy.

### **The Law you create and the experiments you build should present a challenge for the Researchers, but you do ultimately want them to win.**

- It is tempting to make an esoteric Law to feel clever, but this frequently just leads to frustration.
- What may seem like a simple concept to someone who already knows it often still proves a challenge for those attempting to understand.
- Inductive reasoning is a difficult exercise – a Law doesn't need to be complex to be challenging.
- Don't worry about difficulty. Players frequently make life hard on themselves.

### **Instead of using the Law of the Universe deck, you may write your own with the following restrictions:**

- You must write your Law down. Once the game begins, you may not edit it.
- Use specific language such as "At least / Exactly / All / No" to define your Law.
  - » Ex: "There must be at least 2 Even dice."
- It should be possible to state your Law aloud without using the words "and," "or," or "If... then."
  - » Having an implicit "and" or "or" in the logic of your Law is likely fine, but if you have to explicitly say it aloud, then your Law may be too complicated.
    - » Technically the Law "There must be a red 2" implicitly means "There must be at least one red die and it must be a 2."
- While building your initial 2 experiments, each must still only use 4 or fewer dice.
  - » If players need to iteratively build Experiments with 5+ dice, you'll run out quickly.
  - » This also curbs complexity, preventing Researchers from being immediately overwhelmed.

### **Laws can be any combination of:**

- There must be / There must *not* be
- At least / At most / Exactly / All / No / More / Fewer
- Color / Number (fully visible top faces) / Number of dice / Touching / Groupings / Majority / Minority / Stacked / Same / Different / Unique / Formation / Pattern / Evens / Odds / Greater than / Less than / Sequences / Mathematics

---

### **Common Mistakes:**

#### ***"There must be two 2s."***

- » Try, "There must be exactly two 2s."

#### ***"Blue dice must touch unless they are even."***

- » Try "Odd blue dice must touch each other."

#### ***"There must be 6 dice."***

- » It must be possible to demonstrate your Law using 4 or fewer dice.



# Advanced Variant: Cheater

## New component:

Deck of Identity Cards comprised of 1 Teacher card, 1 Cheater card, and 2+ Student cards.

*This Variant is only for use with 4 or more experienced players.*

## Thematic change:

*The Universe is now The Teacher, and Researchers are now Students.*

## Setup:

Construct the Identity Deck by combining the Teacher card, the Cheater card, and enough Student cards for there to be one card per player.

1. Shuffle the Identity Deck and distribute one card face down to each player.
2. Each player looks at their card now, and may refer to it at any time as the game goes on.
3. The player who received the Teacher card reveals it to the table. Everyone else must keep their role a secret from all other players for the duration of the game.

## The Teacher will now:

1. Tell all other players to close their eyes.
2. Shuffle the Law of the Universe deck, draw one card, read it, and place it face up on the table in front of the other players.
3. Close their eyes and tell the player who received the Cheater Identity Card to wake up and read the face up Law of the Universe.
4. Count back from 10 before telling the Cheater to close their eyes again.
5. Open their eyes and take the Law of the Universe, flipping it face down.
6. Tell all players to open their eyes. Both the Teacher and the Cheater should now know the secret Law of the Universe while the identity of the Cheater remains secret.

*If a problem occurs (the Law doesn't make sense to the Cheater or they didn't have time to read it) the Cheater should immediately speak up and restart setup.*

The game begins as normal with the Teacher building 2 experiments, each using 4 or fewer dice. One that follows their secret Law and one that does not, marking each: **O** for **follows**, **X** for **does not follow**.

There are now two phases: **The Class** and **The Vote**.

## The Class:

- Start a 10 minute timer.
- All players cooperate to learn the Teacher's Law by **Building Experiments** and **Publishing Theories** following base Infer rules.
- Each time a Student publishes a Theory, add 5 minutes to the timer.
- **If the Students spend their last Publication token without succeeding, or the Teacher has no remaining Result Markers and must place one, or the timer runs out, everyone (including the Teacher and the Cheater) loses!**
- If the Teacher is unable to disprove one of the Student's Published Theories, stop the timer and move on to **The Vote**.

## The Vote:

- Start a 2 minute timer.
- In this phase all players (including the Teacher) openly discuss how The Class went, and who they believe is the Cheater.
- When time is up (or if everyone wants to call it early) all players vote. On the count of three each player points at the person they think is the Cheater.
- The player with most fingers pointing at them reveals their Identity Card. Ties are broken by whomever the Teacher is pointing at.
- **If that player is the Cheater, everyone except the cheater (including the Teacher) wins!**
- **If that player is not the Cheater, the Cheater wins alone!**

## Objective Summary:

- For the Student team (including the Teacher) to win, both the Teacher's Law and the Cheater's identity must be correctly guessed.
- For the Cheater to win, the Teacher's Law must be guessed, but the Cheater's identity must not.