Name	*Players*	*Extra Stuff*	*Style*	*Stashes*
IceTowers	3-5	none	Turnless, Stacking	*
Thin Ice	2+	none	Building, Party	*
Zendo	3-5	60 stones	Inductive, Puzzle	3
Martian Backgammon	2	dice, 3 coins	Luck-based, Race	2
Volcano	1-4	none	Puzzle, Positional	6
Martian Chess	2,4	chessboard	Colorblind Chess	3
RAMbots	2-4	chessboard	Program, Predict	4
Pikemen	2-4	chessboard	Pointing Chess	*
Zagami	4	chessboard	Consume, Exploit	4
Icehouse	3-5	none	Turnless, Strategy	*
Homeworlds	2-6	cards	Space Opera	4
Gnostica	2-5	tarot deck	Territorial, War	*

* = *1 stash per player*

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Jake's Overview of the Games

The first two games are the fastest to learn and require just one stash per player. We recommend you start with those two and then move on to whichever games interest you.

IceTowers has no turns and no board. Players stack their pieces on each other's towers, take pieces from the middles of towers, and split towers in two. Although there are no turns, neither speed nor dexterity is required. Three to five players take about 10 minutes to play a game, longer as they improve.

Thin Ice is a party game of building precarious structures. Players make separate piles of pieces on top of three base pieces, without using simple stacking. Everyone adds more pieces each turn, and the person with the last pile standing wins. Two or more players take a minute to play the first time; but once they get the hang of it, games take about 10 minutes.

Many people count this next game as their favorite Icehouse game; some even say it's their favorite game of any type.

Zendo is a logic game that requires three or more people and three different types of markers. One player becomes the Master, who thinks up a secret rule; the other players are Students, who take turns setting up groups of pieces in order to figure out the rule. As the game progresses, the Students will earn guessing stones which they can spend to try to guess the rule. The first student to guess the rule correctly wins. A game can take 5 minutes, or more than an hour, depending on the rule difficulty.

The next two games are played on a 5 x 5 grid of 1" squares, but it's easy enough to visualize this grid if you don't have a board.

Martian Backgammon is a fast two-player game that needs just two stashes and two dice. Several small objects are also used to define the center of the game's imaginary 5 x 5 grid. It's similar to Earth Backgammon, but shorter and easier, and has other differences, like the ability to move backwards. Games typically last less than 15 minutes.

Volcano requires six stashes and is played on a 5x5 grid formed by making a square with 25 stacked groups of pyramids. Players take turns "erupting" these stacks, collecting pieces that land on

Zendo

by Kory Heath

Does a Dog have Buddha-nature?
This is the most serious question of all.
If you answer yes or no
You lose your own Buddha-nature.

       - Ancient Zen Koan

Zendo is a game of logic in which one player, the Master, creates a rule that the rest of the players, as Students, try to figure out. They do this by building and studying configurations of Icehouse pieces. The first person to guess the rule wins.

Stuff You Need

- 3-5 players (one will be the Master, the others are Students)
- 5-60 minutes
- 3-4 stashes
- Glass stones or marking chips, of 3 different colors (about 20 of each)

Setup

Choose someone to be the Master; the other 2-4 players are Students. Put all of the stones in front of the Master; the black and white stones are "marking stones," and the stones of the third color are "guessing stones." Give each student a black and a white stone, to serve as "answering stones." Put all of the Icehouse pieces near the playing field, within everyone's reach. The Master should then choose a rule and create two initial koans.

Koans

Over the course of the game everyone will be setting up different configurations of one or more Icehouse pieces on the table. Each configuration is referred to as a "koan," pronounced "KO-ahn." Koans can be set up in any fashion, as long as they don't touch other objects or koans.
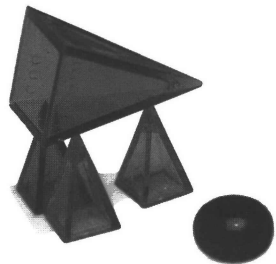
Choosing a Rule

When you are selected to be the Master, your first task is to come up with a secret rule that will be used during this game of Zendo. According to your rule, some koans will "have the Buddha-nature," and others will not. For the students, the object of the game is to try to figure out what your secret rule is. As the Master, your job is to act as facilitator; you are not actually a player, and you are not in competition with any of the players.

An example of a simple rule is "a koan has the Buddha-nature if and only if it contains one or more green pieces." An example of a very difficult rule would be "a koan has the Buddha-nature if and only if it contains an odd number of pieces pointing at other pieces." You are also allowed to create "negative" rules: "a koan does not have the Buddha-nature if it contains exactly three pieces touching the table, otherwise it does." At the end of these rules-of-play are some examples of good Master's Rules for your first games, and notes about certain kinds of rules that are not allowed.

Initial Koans

As the Master, start the game off by building two koans in the middle of the playing field. One should have the Buddha-nature according to your rule; place a white stone next to it. The other should not; place a black stone next to it. You will be marking all of the koans in this way throughout the game. Choose a player to go first. Play proceeds clockwise.
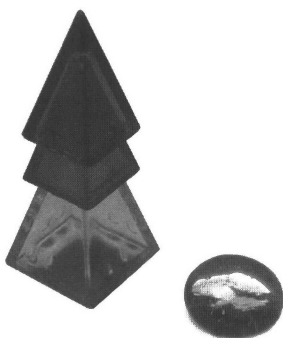
Turn Order for Students

1. Build a Koan

Create a new koan using one or more pieces from the global stash.

2. Call "Master" or "Mondo"

If you call "Master," the Master will immediately mark the new koan with a black or white stone. If you call "Mondo," all students must guess if the

new koan has the Buddha-nature or not. Pick up your own answering stones and hide your answer (black or white) in one fist. Hold that fist out over the playing field, and wait for all of the other students to do the same.

When everyone is ready, reveal. The Master will mark the koan with the correct answer, and will award a guessing stone to each player who answered the Mondo correctly.
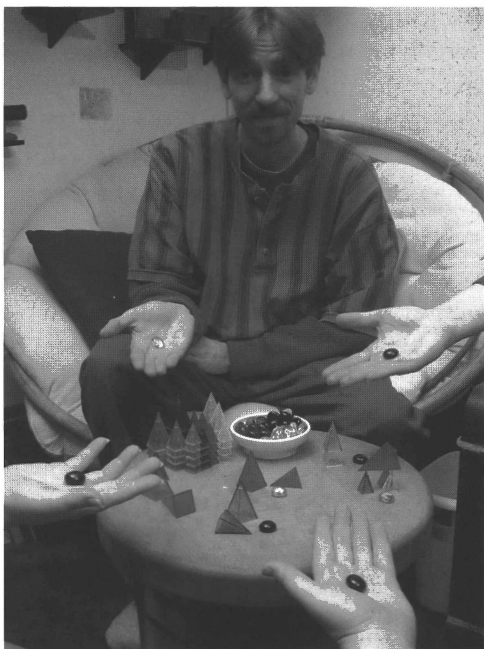
3. Guess the Rule (optional)

At the end of your turn, if you have any guessing stones, you may choose to spend one or more of them to try to guess the Master's rule. Give a single guessing stone to the Master and then state your guess as clearly as you can. It may help to preface your guess with the phrase "a koan has the Buddha-nature if..."

If the Master does not fully understand your guess, or if it is ambiguous in some way, the Master will ask clarifying questions until the uncertainty has been resolved. Your guess is not considered to be official until both you and the Master agree that it is official. At any time before that, you may retract your guess and take back your stone, or you may change your guess. If any koan on the table contradicts your guess, the Master must point this out, and you may take back your stone or change your guess. It is the Master's responsibility to make certain that a guess is unambiguous and is not contradicted by an existing koan; all students are encouraged to participate in this process.

After you and the Master agree upon an official guess, the Master will disprove it, if possible, either by building a koan which has the Buddha-nature but which your guess says does not, or by

building a koan which does not have the Buddha-nature but which your guess says does. Once the Master has built a counter-example and marked it appropriately, you may spend another guessing stone, if you have one, to take another guess. You may spend as many of your guessing stones as you would like during this portion of your turn. When you are finished, play passes to the student on your left.

If the Master is unable to disprove your official guess, you have achieved "satori" (enlightenment) – you have discovered the Master's secret rule and have won the game!

You are now ready to play. What follows are rule clarifications and examples. The Master should at least skim the sections below before starting the game, and should provide information to the players as needed.

Selecting a Master

There are no official rules about selecting a Master. If one person has many new rules to try out, that person may be selected as the Master for the entire evening. If everyone has rules to try out, you may simply take turns being the Master, or you may specify that the winner of each game gets to become the next Master. If possible, select a Master who's played as a student a few times. If you have one experienced player in a group of new players, that player ought to be the Master, at least for the first few games.

Illegal Master's Rules

When you are the Master, you may use any rule that you can imagine, though you should always try to select a rule that is not too difficult for the current group of players. When in doubt, use an easier rule. However, there are some official restrictions, which are all consequences of a basic relational property of koans: a koan is not allowed to refer to anything outside of itself, in space or in time.

What does this statement imply? First, you may not make a rule that has anything to do with whether or not a piece is pointing

at one of the players, because players are things that exist outside of koans. Similarly, you may not make a rule that has something to do with whether or not a piece is pointing in an absolute direction (say, toward one side of the room), because absolute directions are also things that exist outside of koans. Here is a good rule-of-thumb: you should be able to rotate a table full of koans, or move it into another room, without changing the status of any of those koans.

Furthermore, you may not make a rule in which the status of a koan is affected by the contents of other koans on the table. For instance, the rule "a koan has the Buddha-nature if it contains the same number of pieces as any other koan on the table" is illegal, because koans cannot refer to each other in this fashion. Think of each koan as a tiny microcosm — a small, isolated universe that cannot refer to anything but itself.

Koans are isolated in time as well as space. You may not make a rule that has something to do with which pieces used to be in a koan, because a koan's past state is something that exists outside of that koan in time. You may not make a rule that has something to do with the order in which pieces were added to a koan, or what hand a player used to add the pieces. Here is another good rule-of-thumb: as the Master, you should be able to leave the room while a student is setting up a koan, and still be able to mark it properly when you return. If you ever mark two identical koans differently, you have done something wrong. Note that all pieces of a given size and color are considered to be identical and interchangeable.

The playing surface itself is considered to be part of a koan — it is legal, for instance, to make a rule that has something to do with whether or not certain pieces are touching the table. However, you may not make a rule that refers to some pattern or design on the playing surface, nor may you make a rule that refers to the edges of the surface. Consider the playing surface to be a flat, featureless plane that extends outward in all directions, "whose center is everywhere and whose circumference is nowhere," as the philosophers might say.

Finally, note that the black and white marking stones are not actually contained within koans, so you may not make a rule that refers to them.

Terminology

There are several properties of koans and pieces that are frequently used as a basis for rules. It often helps to have naming conventions that everyone understands, so we have provided definitions for these terms. Be aware that these definitions are merely conventions, and are not mandatory. When you are the Master, feel free to use whatever concepts you would like in your rule. When a student takes a guess, ask that student to define his or her terms, and make sure you interpret the guess based on that student's terminology, not your own.

Size and Pips: Smalls are worth 1, mediums 2, and larges 3.

Orientation: A piece is "upright" when it is pointing straight upward, with its base parallel to the table, either on it or above it. A piece is "flat" when its lowest triangular side is parallel to the table, either on it or above it. A piece is "weird" when it is neither upright nor flat.

Pointing: Every piece has an imaginary "pointing ray" that shoots directly out of its tip and extends outward into space. The pointing ray passes unhindered through any other piece. However, if the ray hits the table, it bends to skim along the table's surface. A piece is pointing at all of the other pieces that its pointing ray touches.

Grounded: A piece is "grounded" if it's touching the table in any way, and "ungrounded" if not.

Zendo Stones

Ideal markers are glass or stone pebbles of three different colors: black, white, and some other color. Pennies, dimes, and quarters will do in a pinch, but glass stones are more aesthetically pleasing and can be obtained cheaply at any craft or pet store. Twenty of each type is plenty. Another nice option is a set of Go stones along with some pennies or other small coins.

Number of Players

It is possible to play Zendo with more than four students, but with that many people we recommend splitting the group into multiple games. Three students of roughly equal skill is best.

Sample Rules

If your group has never played Zendo before, Masters should be instructed to start with the easiest rules they can come up with. Beginning Masters vastly underestimate the difficulty of most rules, and players do not enjoy games where the rule is too difficult. To give you an idea of where to begin, we have provided some sample rules that would be suitable for your first games of Zendo. These are listed easiest to hardest.

A koan has the Buddha-nature if and only if...

- it contains at least one red piece.
- it contains four colors.
- it contains at least one flat piece.
- it contains at least two upright pieces.
- it contains at least one weird piece.
- it contains at least one medium piece.
- it contains an odd number of pieces.
- it contains all three sizes.
- it contains at least one ungrounded piece.
- it contains less than four points worth of pieces.
- at least two of its pieces are touching each other.
- it contains a piece that is pointing at another piece.
- it contains two identical pieces.
- it contains exactly two sizes.
- it contains exactly three colors.
- it contains more yellow pieces than blue pieces.
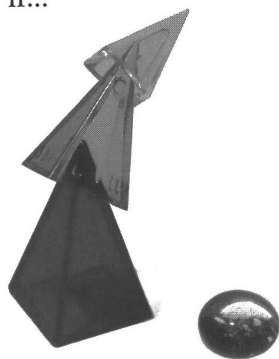
Rule Clarifications

Building Koans: When you build a koan, you may arrange the pieces in any fashion, as long as they don't touch another koan's pieces or any other foreign objects, including marking stones. It is legal to lean a koan's pieces against each other or to balance them precariously on top of each other. The Master may move any existing koan in order to help distinguish it from another one or to clear space for more of them; the Master should make the moved koan as similar as possible to the way it was before. The Master may disallow a koan from being built if there is not enough space for it.

Marking Difficult Koans: The Master's rule must provide an answer for any koan that a student could possibly build, and should always provide the same answer for two identical koans.

Sometimes the Master has difficulty deciding how a certain koan ought to be marked, because of some physical ambiguity, such as "is that red piece just barely pointing at that blue piece, or is it just missing it?" In such cases, the Master must make a silent judgment call, and then mark the koan appropriately. The Master must not indicate that a judgment call has been made.

Asking About Koans: Players are always free to ask the Master clarifying questions about the physical features of existing koans, such as "Master, is that small green piece pointing at the medium red piece?" or "Master, which pieces are touching that yellow piece?" These questions are free, may be asked out of turn, and the Master must always answer them, even if they have no bearing on the actual rule. In all matters of uncertainty, the Master's judgments are final.

Breaking Down Old Koans: If, when building a new koan, the pieces you'd like to use are not available, tell everyone which pieces you're looking for. The Master must decide which koan or koans to break down, if any, taking into account the input of all of the students as much as possible. If all of the students agree to allow a certain koan to be broken down, the Master should always do so. To break down a koan, the Master must simply remove the koan's marking stone; its pieces are now considered to be part of the global stash, and you may use them in any way that you'd like. If, when building a counter-example koan, the Master wants to use pieces that are not available, the Master will tell everyone which pieces are needed, and will decide which koan or koans to break down, taking into account the input of all of the students as much as possible.

Katsu: As a student, you are never allowed to touch a marking stone, or a koan that has a marking stone next to it. If you ever accidentally knock over or disturb a koan's pieces, someone should say "katsu!" in order to indicate that the board has been disturbed. The Master must then restore the table to its previous state. There is no penalty for katsu.

Previously-Existing Koans: If none of the koans on the table can disprove a particular guess, but a previously-existing koan

that has since been broken down *would* disprove the guess, the guess still stands and the guessing stone is not returned. Only koans actually in play are used to determine whether a guess is valid. The Master can build the previous koan again as the counter-example, or may build something entirely new.

Master's Mistakes: Sometimes the Master will mark a koan incorrectly and will fail to fix it before the next player has taken a turn. When this unfortunate event occurs, the Master should fix the mistake as soon as it's noticed. At that point, any player may demand that the game be scrapped. As Master, be careful when you mark koans.

Strategies for Students

Positive and Negative Rules: Any rule can be stated positively or negatively. "A koan has the Buddha-nature if it contains at least 3 medium pieces" can also be stated as "A koan *does not* have the Buddha-nature if it contains fewer than 3 medium pieces." Some rules are easier to think about in positive terms, and some in negative terms; learn to think fluidly in both styles.

Figure Out What Matters: In the early stages of a game, try to determine which of the basic types of features the rule seems to be about. Is this a color rule, or a pip-count rule? Does it have something to do with pointing, or touching? You can answer these questions by making copies of existing koans and only changing one type of feature. For instance, make a copy of a koan which is identical to an existing one, and then change some of its colors. Or, turn one piece slightly so that it's pointing at something else.

Pay Attention to Single-Piece Koans: Single-piece koans are extremely useful, because they're so simple. In a four color game, there are only 24 possible single-piece koans – they're made up of the twelve unique Icehouse pieces, which, in isolation, can only be placed in one of two positions: upright or flat. If you find that some single-piece koans are marked white, and some black, you can easily determine that color, size, or orientation matters.
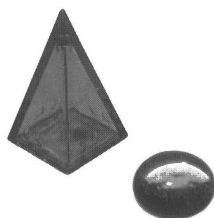
Whole-Patterns and Half Patterns: At all times throughout a game of Zendo, you should be scanning the koans on the table and asking yourself the following question: what is it that's true about all of the white koans on the table, and is not true about any of the black ones (or vice-versa)? If you can find an answer to this question, you've come up with a "whole-pattern" which may be worth spending a guessing stone on. If you can't find a whole-pattern, try concentrating on half of the question: ask yourself, "what is it that's true about all of the white (or black) koans on the table?" If you find an answer to this question, you've found a "half-pattern." It's a half-pattern because, even though all of the white (or black) koans contain a certain feature, some black (or white) koans contain this feature as well. Focus your attention on those koans that are keeping the pattern from being a whole-pattern. Try to look for similarities between these troublesome koans, with the aim of coming up with a deeper theory that incorporates them and explains them.

Answering Mondo: The strategy here is pretty simple — answer a mondo according to all of the information you've gathered so far during the game. If you've found a working whole-pattern, answer the mondo according to that. If you've found multiple whole-patterns, answer according to the one that you think is most likely to be true. If you haven't found any whole-patterns, answer according to any applicable half-patterns you've found. If you haven't even found an applicable half-pattern, you'll have to fall back on your intuition. Keep in mind What Matters, and try to answer based on similar koans you've seen already. As a last resort, go with the odds. Most rules do not generate an equal number of black and white koans; some rules tend to make more black koans than white ones, and some the reverse. Use this information to your advantage when answering a mondo. If there are six black koans on the table and only one white one, the answer to a mondo is more likely to be black than white.

When to Call Mondo: Don't call Mondo unless you have at least one whole-pattern that works for everything on the table. The best time to call Mondo is when you're about to spend a stone on a guess, because if the mondo supports your guess you will win a stone to pay for it. If you have no guessing stones and are desperate to take a guess, you should still perform an intelligent mondo that attempts to test your theory. If your theory

is correct, you will win the stone that you need. If you don't win the stone, that means that your theory was incorrect, so you no longer have a desperate need for the stone. If you choose to do an "easy" mondo which guarantees you a stone, you'll be providing free stones for everyone else as well, and you'll be forced to state your theory out loud (since you've made no attempt to test it with your play). If your theory is correct, this won't matter, but if it's not correct, this is the worst possible outcome of a Mondo.

When to Guess: In general, if you have a theory that works for everything on the table, it's probably worth spending a guessing stone on it. If you take a guess, and the Master falsifies it, don't just pass your turn on to the next player. Study the new koan, and see if you can come up with a new guess that incorporates it. You may be able to take a few guesses in a row and win — a process known as the "guess barrage." Your chances of success are greatly increased if you're willing to take "show-me" guesses: guesses that, while they work for everything on the table, are so inelegant and full of exceptions that they're unlikely to actually be correct. When you take a "show-me" guess, you aren't expecting to win with that guess. You're expecting the Master to "show you" another counter-example that may give you enough information to come up with a real guess. You may end up taking more than one "show-me" guess in a row, but it's all (hopefully) leading up to a theory that has a real chance of being the correct answer.

Be Inscrutable: If you suddenly come up with an extremely good theory during someone else's turn, conceal your excitement at all costs. It is a fascinating fact of human psychology that people are much more likely to solve a problem if they know that someone else has already solved it. By signaling that you've made a major discovery, you are greatly increasing the chances that someone else is going to steal the win away. Learn to cultivate your "Zendo face" — an inscrutable mask worthy of a Zen Master. Only gloat after you toss in your stone and win.
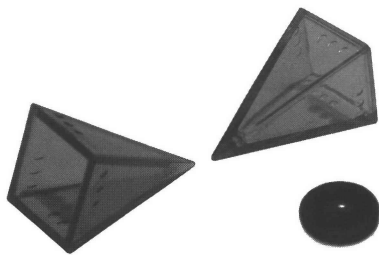
Sample Koans

Throughout this text you'll find pictures of sample koans, which should give you some idea of the variety of configurations that you can build. These pictures also highlight the fact that a single group of koans can suggest many possible rules. There are a number of simple rules that fit all of the koans pictured. You may want to stop reading for a moment to look for a few.

Here are six that work. A koan has the Buddha-nature if (and only if):

- it contains a medium piece.
- it contains no flat pieces.
- it contains an odd number of pieces.
- it contains only one grounded piece.
- it does not contain a large piece being pointed at.
- if it contains an even number of pieces being pointed at, and at least one piece not being pointed at.
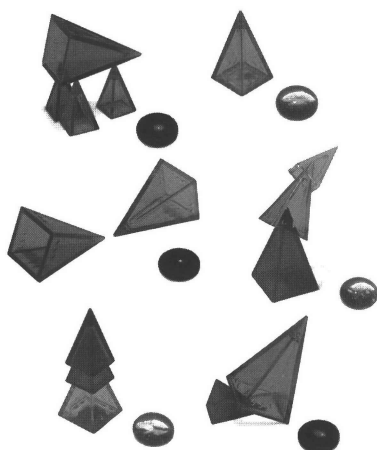
These rules are ordered from the simplest to the most convoluted. If you wanted to spend a guessing stone on one of these, it would be best to try the simplest one first. However, even a convoluted guess is worthwhile if other possibilities have been eliminated. Such a rule is not likely to be correct, but the Master will provide a counter-example that may give you insight.

Further Enlightenment

Although you now know all you need to know in order to play Zendo, much more has been written about the game, including information about additional terminology, variations on the rules-of-play, how to be a good Master, how to be a good student, history of the game's design, and more. You can also find the rules for the 2-player version of this game, called Dharma Duel, in which both people are simultaneously Master and Student.

Enlightenment awaits at:

http://www.wunderland.com/WTS/Kory/Games/Zendo/

Credits

Icehouse has changed and evolved enormously since the handmade test run of 100 game sets, packaged in stark black boxes, which we released in 1989. Once just an idea, then a game, then a whole bunch of games – the Icehouse system has grown far beyond what we ever imagined it could be, and it is continuing to expand and grow with no end in sight. But it never could have happened without all the help, support, feedback, and suggestions that we've gotten from our friends and fans during the past dozen years. Icehouse has been enriched by so many people during this time that a complete list of acknowledgments really isn't possible. We've listed the major contributors on this page; to these and all the other folks who've helped make the Icehouse experience what it is today, we say "Thanks!"

Playing with Pyramids

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and **countless others!**

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Martian Backgammon
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Volcano
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Rules written
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Strategies
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Martian Chess
Designed and written
by **Andrew Looney**

RAMbots
Designed and written
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Homeworlds
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Gnostica
Designed
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Rules written
by **Jacob Davenport**

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