



What is a Puzzle?

By Scott Kim

This article originally appeared in The Games Cafe, a now defunct web site devoted to lovers of board games and puzzles. In the article I occasionally refer to other Games Cafe article. I decided to leave these references as is, even though they no longer link to anything.



My favorite definition of "puzzle" came out of a conversation with puzzle collector and longtime friend Stan Isaacs:

1. A puzzle is fun,
2. and it has a right answer.

Part 1 of the definition says that puzzles are a form of play. Part 2 distinguishes puzzles from other forms of plays, such as games and toys.

This deceptively simple definition has some interesting consequences. For instance, here's the first puzzle I invented. (Martin Gardner first wrote about it in Games Magazine.)

The figure below is a letter of the alphabet that has been cut of paper and folded just once. It is not the letter L. What letter is it?

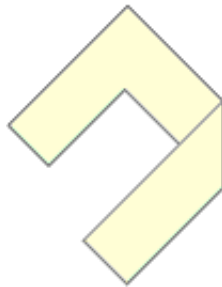


Figure 1. What letter has been folded once to make this shape?

Take a moment to solve this puzzle if you like. The answer is given at the end of this article.

Now let's see how well our definition applies.

Is it fun?

There are several things that help make this puzzle fun.

- **Novel.** Puzzles are a form of play. And play starts by suspending the rules of everyday life, giving us permission to do things that are not practical. Folded letters certainly don't have any practical value. They take something familiar and give it a novel twist – a good way of inviting you to be playful.
- **Not too easy, not too hard.** Puzzles that are too easy are disappointing; puzzles that are too hard are discouraging.

You know there are only 26 letters in the alphabet, so it seems that this puzzle can't be too difficult. In fact this puzzle is hard enough that many people never get the answer. Nonetheless, the perceived lack of difficulty helps keeps you interested.

- **Tricky.** To solve this puzzle you must change how you interpret the picture. Personally, I enjoy puzzles that involve such perceptual shifts.

But, like beauty, fun is in the eye of the beholder. What may be fun for one person may be torture for another. For instance, some people prefer word puzzles and won't touch visual or logical puzzles. Puzzles that are too easy for one person may be too hard for another. Bridge puzzles are fun only if you know how to play bridge.

Consequently, my first job as a puzzle designer is to tailor my puzzles to the tastes of my audience. For instance, my monthly puzzles for [Discover](#) magazine all revolve around science themes, and emphasize mathematical reasoning. I try to appeal broadly by breaking each puzzle into several questions, ranging from very easy to very hard. Finally, the editors at Discover recently decided to increase the number of puzzles per issue from one to three. This lets me include a variety of puzzle types every issue, such as word, number, visual and logic puzzles.



Another consequence of the subjective nature of fun is that what may seem like an everyday problem to you may seem like a delightful puzzle to someone else. Is washing the dishes a chore or a game? That depends on whom you ask. It tickles me to think that for every problem in the world, no matter how tedious, there is someone who would leap at the chance to figure it out.

If fun is a state of mind, then you can make your life more enjoyable by finding ways to turn work into play. When I was in school I used to hate to take notes. Then I learned about [mind-mapping](#), a technique of capturing ideas in diagrams and cartoons, instead of transcribing every word the teacher says. Not only were my notes more useful, taking notes became an enjoyable game of translating words into pictures.



On the flip side, even the best game can be ruined if the players do not play it with a spirit of fun. In his GamesCafe article "The Spirit of Gaming," Greg Schloesser describes how mean-spirited competition can kill a game. Game designer and philosopher [Bernard Dekoven](#) wrote a wonderful book about this subject called "The Well Played Game" (now out of print). Key idea: in a well-played game, players are willing to alter the rules to keep the game fun for everyone.



Does it have a right answer?

So does my letter puzzle have a right answer? It does in the sense that when shown the answer, most people will agree that this is the best answer. But what constitutes a letter is a subjective matter. For instance, in a squarish typeface, the following shapes could be interpreted as a lowercase R or a capital J:



Figure 2. These shapes could be the letters R and J.

I could plug this leak in my puzzle by showing the particular alphabet of letters I have in mind:

ABCDEFGHIJKLM
NOPQRSTUVWXYZ

Figure 3. The answer comes from this typeface..

Notice that my definition doesn't insist that there be only one right answer. If you interpret the diagram differently, there are many other possible answers. For instance, the following shapes, which could be interpreted as the letters J and G, can all be unfolded from figure 1, if we interpret the edges a bit differently:

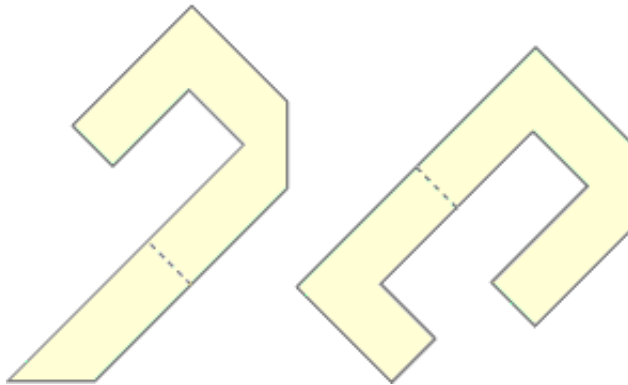


Figure 4. Other ways to unfold figure 1.

"Has a right answer" distinguishes puzzles from games and other play activities. Another game designer Kevin Maroney includes puzzles as a subspecies of games. I prefer a finer-grained definition that I first heard from Chris Crawford, veteran game designer and founder of the [Game Developers Conference](#).

In his 1984 book [The Art of Computer Game Design](#), (still the most articulate book on the subject, and now available online) Chris distinguishes four types of play activities, ranging from most interactive to least:



- **Games** are rule-based systems in which the goal is for one player to win. They involve "opposing players who acknowledge and respond to one another's actions. The difference between games and puzzles has little to do with mechanics; we can easily turn many puzzles and athletic challenges into games and vice versa."
- **Puzzles** are rule-based systems, like games, but the goal is to find a solution, not to beat an opponent. Unlike games,

- puzzles have little replay value.
- **Toys** are manipulable, like puzzles, but there is no fixed goal.
 - **Stories** involve fantasy play, like toys, but cannot be changed or manipulated by the player.



Figure 5. Four types of play, each built on the previous

For instance, in the realm of computer entertainment software,

- **Quake** is a game, which includes some puzzles.
- **The Incredible Machine** is a series of puzzles, which includes a toy-like construction set for building puzzles.
- **SimCity** is a toy, which players make more puzzle-like by setting their own goals.
- **Myst** is a story, which happens to be told partly through puzzles.

This hierarchy leads me to a useful rule of thumb for puzzle designers: to design a good puzzle, first build a good toy. The player should have fun just manipulating the puzzle, even before reaching a solution. For instance, players can enjoy rotating and manipulating blocks in the action puzzle game Tetris even if they don't understand the goal.

Puzzles are solitary affairs, unlike games. Herb Levy, in his GamesCafe column "Nature of the Beast," sings the praises games as social activities. One of the main challenges for me as a game designer is to find ways to introduce some of the thrill of competition back into puzzle games.

As Maroney points out, the card game Solitaire is an interesting borderline case between game and puzzle. We normally call Solitaire a single-player game, but in fact it is a kind of puzzle, since any given deck has a definite solution (or sometimes no solution). Shuffling the cards is a way to randomly generate a new puzzle.

Other types of puzzles that walk the line on the issue of right answers include trivia questions (which require knowledge of the world), dexterity puzzles (which could be classified with sports), puzzles involving chance (in which the player does not completely control their own fate), and poll-based questions (in which the rightness of answer depends on what everyone else answers).

Other definitions

Here are a few more definitions of "puzzle," and what I learn from them.

The Random House dictionary defines a puzzle as "a toy or other contrivance designed to amuse by presenting difficulties to be solved by ingenuity or patient effort." Lesson: the two main skills for solving puzzles are ingenuity and patience. Any given puzzle may require more of one or the other. For instance, my letter puzzle emphasizes ingenuity, while mazes emphasize patience.

"A simple task made difficult." For instance, twisting Rubik's Cube is a tortuous way to achieve the simple goal of making each face of a cube monochromatic. Although the goal is difficult to achieve, however, twisting the cube by hand feels good. On computer, Rubik's Cube feels terrible because it is awkward to manipulate a three-dimensional object with two dimensional controls. Lesson: be sure the player is challenged by the puzzle itself, not the controls for the puzzle.

"The longest distance between two points." Lesson: if you're going to ask players to take a long trip, be sure they enjoy the journey.

Answer to the letter puzzle

Just to make things more exciting, the answer to the quiz above is the only letter that does not appear in this sentence.