Practicing Scientific Inquiry through Jigsaw Puzzles

Tara Mohanan

Puzzles as Games

- Math puzzles
- Logic puzzles
- Number puzzles
- Word puzzles
- Object puzzles
- Shape puzzles

Jigsaw puzzles

Puzzles as Part of Inquiry

***Jigsaw Puzzle* (JP): the task**

putting together the pieces of the puzzle

such that

the finished picture is a **projection** of the picture on the cover of the puzzle box.

Jigsaw Puzzles

Questions to ask yourself:

1. What can you tell about the pieces and the picture even before opening the box?

2. When you open the box and start the puzzle, what strategies do you use to put the pieces together?

What is Science?

- *a school subject*
- *information about things around us, living and non-living*
- *something we do in a lab*
- *a way of looking at the world: an attempt to understand the world and how it works*

What is scientific inquiry?

1. making **systematic *observations*** of phenomena in the world
2. arriving at ***observational generalizations*** based on 1
3. creating ***concepts, definitions***, and ***laws*** (theories) to *explain* 2

and as part of this,

- ***categorizing***; and
- ***Inferring***, ***reasoning***.

Jigsaw Puzzles: Strategies

Strategies I use: (you have to figure out your own)

Separate the **edge** pieces, especially the 4 corner pieces: they are easily identifiable without looking at match with other pieces, and easier to put together.

Work the edge of the puzzle to the extent possible. This gives the working space a frame, and gives me an idea of the overall size of the puzzle.

Jigsaw Puzzles: Strategies

Parameters/Traits to pay attention to:

a. Colours, Textures, Depths ... of the image

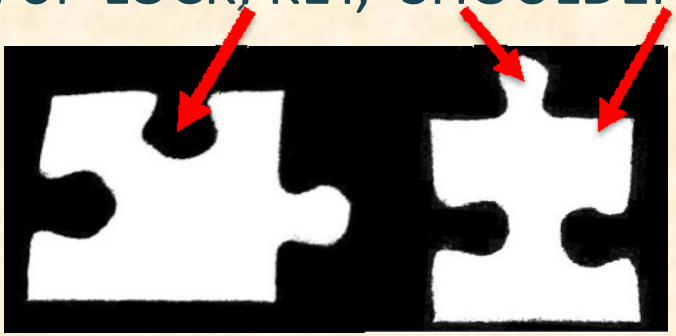
b. Edges and Boundaries in the image
(line; shape; colour...)

c. Objects / Designs
(animals/buildings/people...)

Jigsaw Puzzles: Strategies

Parameters/Traits to pay attention to:

d. SHAPE/SIZE: of LOCK, KEY, SHOULDER



e. Very minute DETAILS OF DESIGN and TEXTURE (details that you see only of you stare at the picture long enough)

Jigsaw Puzzles: Strategies

Relevance of JPs for scientific inquiry:

As in solving a jigsaw puzzle,

scientific inquiry requires careful observation,

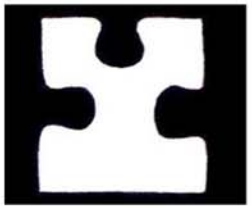
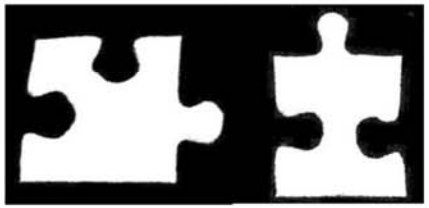
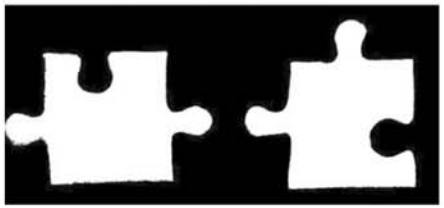
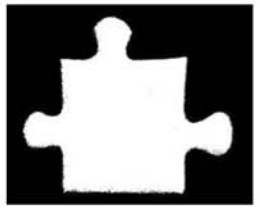
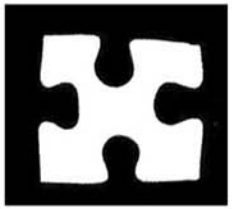
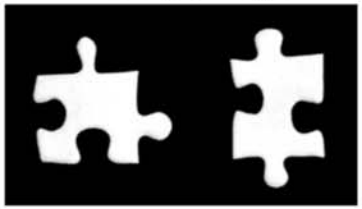
paying attention to details;

categorizing; finding relevant traits;

seeing the fit between pieces;

seeing the relation between the part and the whole.

Categories of Puzzle Pieces

Corner	2 locks 	1 lock, 1 key 	2 keys 
Edge	3 locks 	2 locks, 1 key 	1 lock, 2 keys 	3 keys 
Body	4 locks 	3 locks, 1 key 	2 locks, 2 keys 	1 lock, 3 keys 	4 keys 

Metaphors to Understand Reality

Einstein: "In our endeavor to understand reality, we are somewhat like a man trying to understand the mechanism of a **closed watch."**

Richard Feynman: Doing science is like watching **gods playing chess**, and trying to figure out the rules.

Einstein uses another metaphor: A scientist is like a detective trying to "**solve the mystery of the universe."**

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- JP at the broader level: using it as a metaphor for scientific inquiry (SI),

  (i) to figure out the parallels between JP and SI, in their abilities and mental qualities, and

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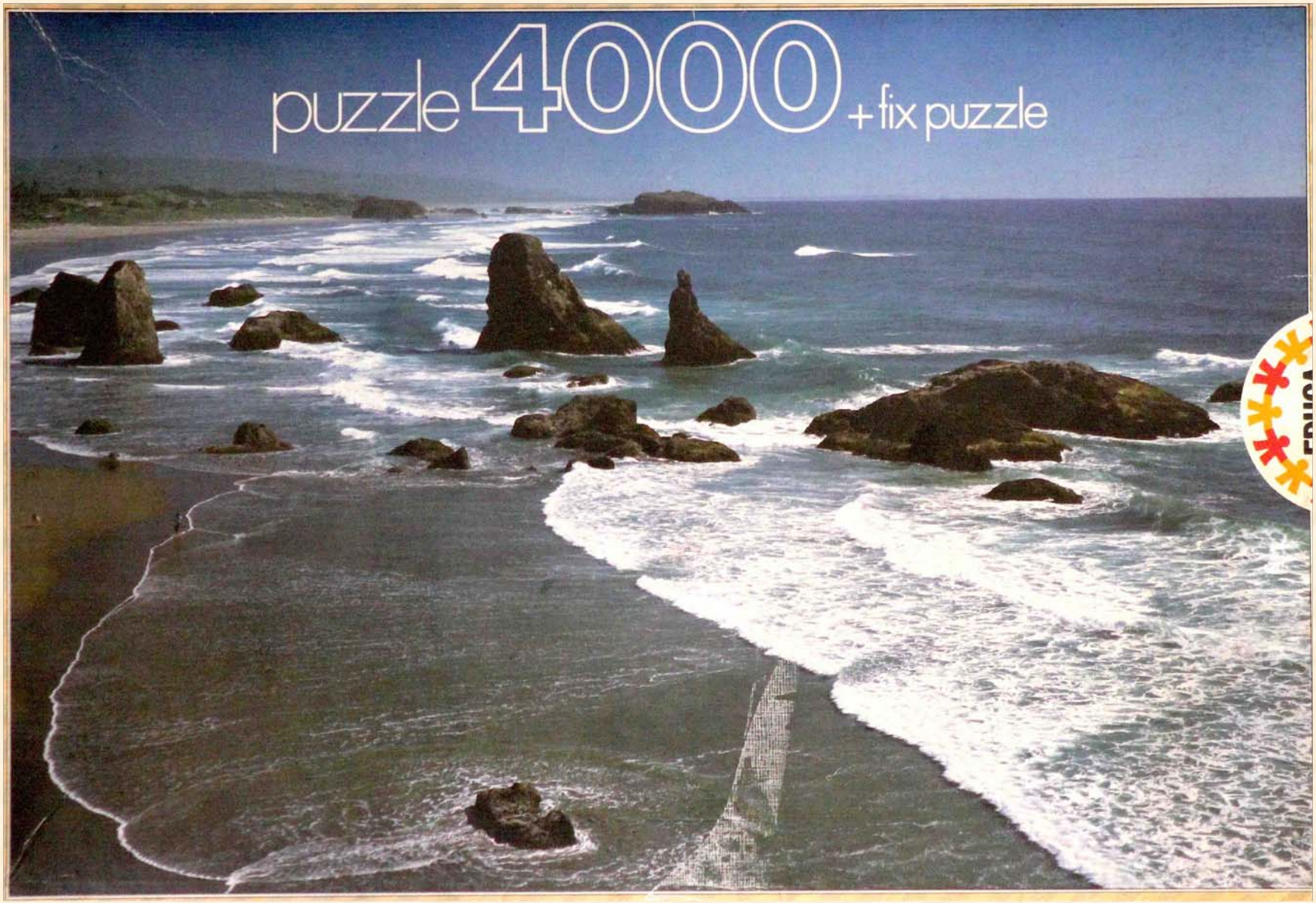
Jigsaw Puzzles

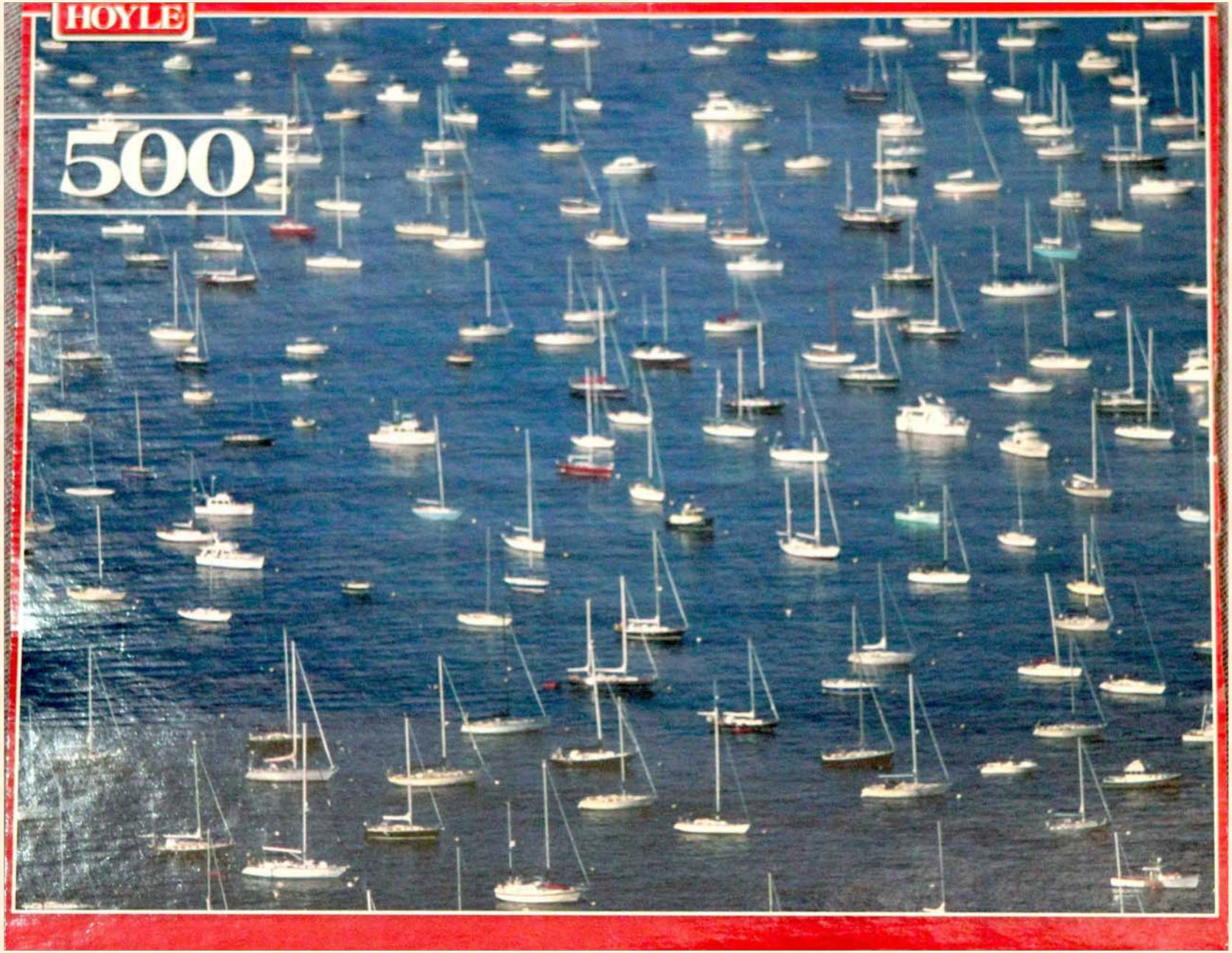
Sometimes science happens by accident.

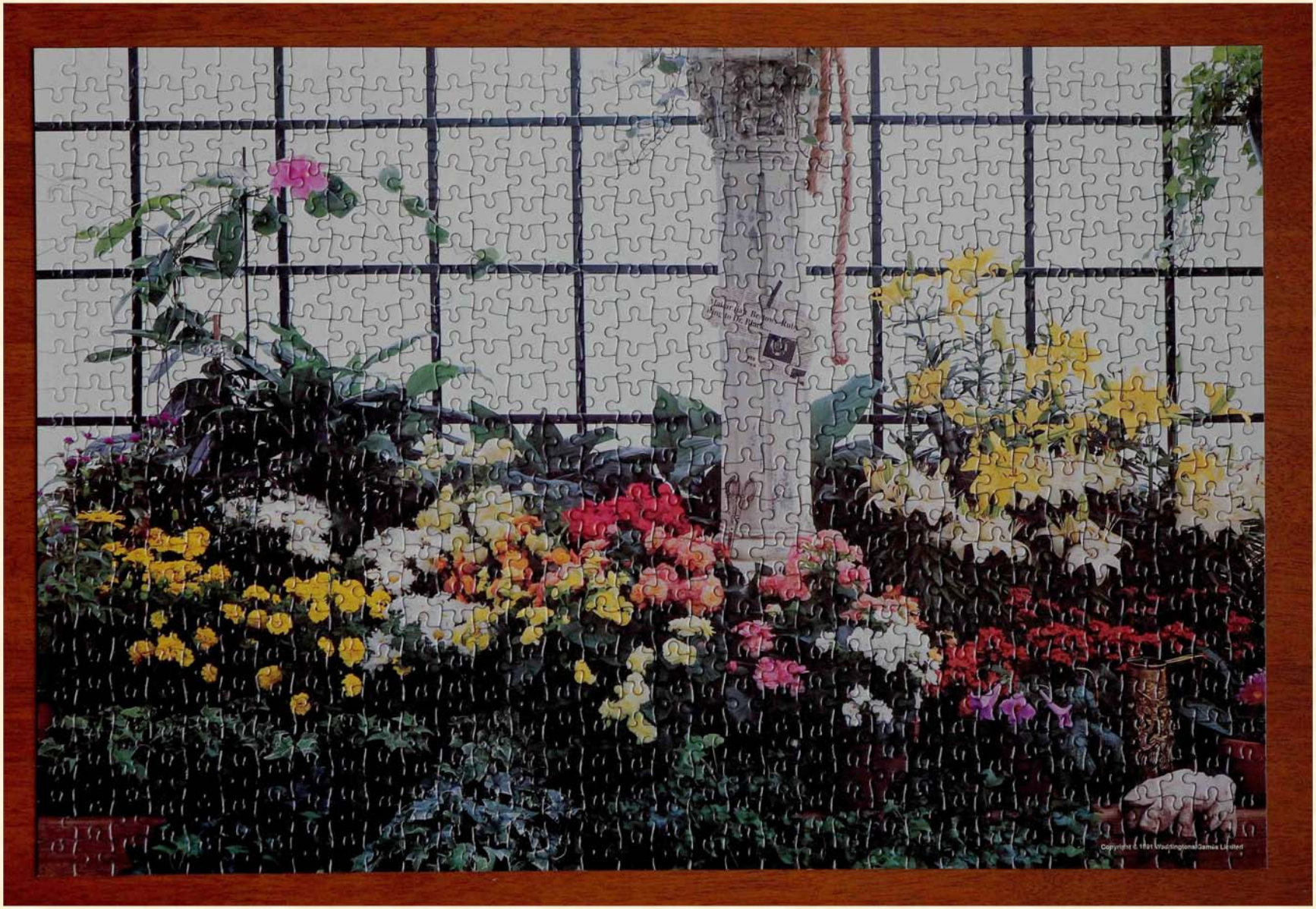
Similarly, sometimes you find a fit in a jigsaw puzzle by accident.

But in both cases, you have to prepare the ground for it to happen, and let it happen.


MB
PUZZLE
2000
Super
BIG BEN


puzzle 4000 + fix puzzle


HOYLE
500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Thank you!!!

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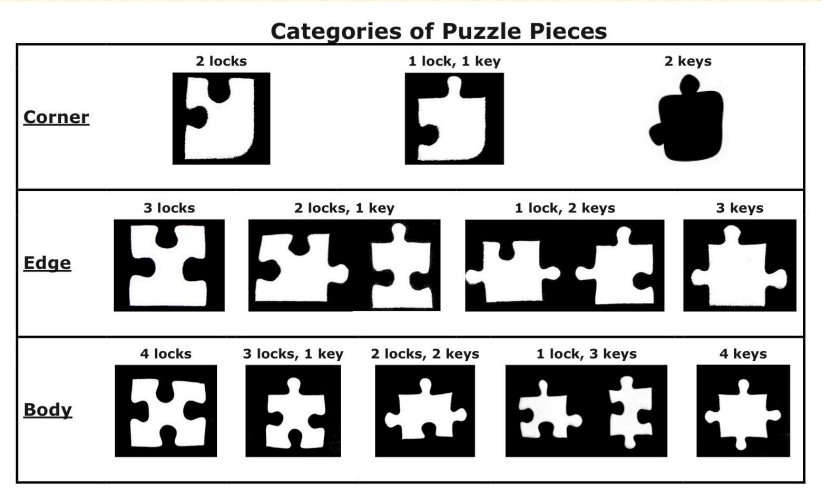

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