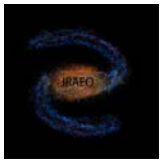

Cover Thoughts - A Prior Knowledge Matrix

Lawrence Krumenaker

On this first *JRAEO* Issue cover, and here, are five celestial objects that are the first in a list, in some physical parameter or in some historical context. Identify them, and then rank them in the matrix by distance and size. Draw a line dividing these into solar system and stellar system zones.

Identities:

1. _____ 2. _____ 3. _____

4. _____ 5. _____

	Smallest Size	→			**Largest Size**
Closest to Earth					
↓					
Farthest from Earth					

SOLUTIONS

Identities:

1. Halley's Comet and its Coma, 1986 – The first determined-to-be-periodic comet, formally 1P/Halley (Alternatively: its small nucleus). The distance to be used is where it is this year, 2014. (Note some will see the Milky Way here—a teachable moment in careful observation.)
2. Messier 1, a supernova remnant
3. Ceres – The first discovered asteroid, formally "1 Ceres"
4. NGC 1, a spiral galaxy (the galaxy at the top of the photo), first in the listings of the New General Catalog of objects
5. Sirius – The apparently brightest night time star (Alternatively: hidden in the glow, the first observed white dwarf star)

↓	**Smallest Size**	→			**Largest Size**
Closest to Earth	Ceres	(Ceres)			
	(Halley's Comet nucleus)	Halley's Comet coma			
			Sirius A (Sirius B)		
				Messier 1 (Messier 1)	
Farthest from Earth					NGC 1 (NGC 1)

We offer two alternative matrices. The one based one the obvious visible objects are listed in plain text. The alternative, using Halley's nucleus instead of its coma, and Sirius B, the white dwarf, instead of Sirius A, are shown in parentheses.

Using the first alternative, you can draw a dividing line between solar system and the rest of the universe by 'squaring off' the four upper left cells. With the other alternative you have three zones: the same upper four cells that are both in the solar system and solar system object sizes, the lower right four cells that are star size and distances or greater, and an overlap zone, Sirius B, which is beyond the solar system but Earth-sized.

The author has used matrices like these as a way to explore student prior knowledge, including whether the students understand what is in our solar system and what is not.

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