Trappist-1 Science Writing Contest

Victor Aguilar www.axiomaticeconomics.com/trappist-1.php

If p_I and p_O are the periods of an inner and an outer planet, then $\frac{t}{p_I} = \frac{t}{p_O} + 1$ with t the time it takes for I to lap O. Solving for time, $t = \frac{p_O p_I}{p_O - p_I}$, and solving for period, $p_O = \frac{t p_I}{t - p_I}$. At Trappist-1, the **month** is the time for B to lap C. This is 0.6667 **weeks**. These units were chosen for stories that takes place on the dark side of C, which is to be depicted as an archipelago whose life is centered at hydrothermal vents powered by volcanism due to the tidal forces from the other planets. The inhabitants (an octopod) measure their month by the B tides and their week by the passage of the outer planets. Also, stories are to depict humans living on the bright side of G, which has a cold salty ocean surrounded by mountains with fresh-water lakes. Near the terminal line, there are strong cold winds from the Antarctic-like dark side. The humans from G enjoy octopus-hunting safaris on C, but the octopi are intelligent and fight back!

Period, in months	Lap time, in weeks		Earth days	Earth masses	Surface G's
$p_B = 0.37614325$	B laps C	$^2/_3$	1.51087081	0.85	0.72
$p_C = 0.6029321$	C laps G	$^1/_2$	2.4218233	1.38	1.24
	C laps E	$^2/_3$			
	C laps D	1			
$p_D = 1.008182$	D laps G	1	4.049610	0.41	0.69
	D laps E	2			
$p_E = 1.518547$	E laps G	2	6.099615	0.62	0.74
	E laps F	3			
$p_F = 2.292078$	F laps I	3	9.206690	0.68	0.62
	F laps H	4			
	F laps G	6			
$p_G = 3.075362$	G laps I	6	12.35294	1.34	1.06
	G laps H	12			
$p_H = 3.709123$	H laps I	12	14.89859	(My prediction, March 2017)	
$p_I = 4.671885$			18.76576	(My prediction, March 2017)	

For now, we only know of a planet with period 20^{+15}_{-6} Earth days. Trappist One will record new discoveries.

I am sponsoring a contest for middle-school, high-school and adult writers. These categories are defined by age: 12-14 years old is middle school, 15 to 18 years old is high school, and 19+ years old is adult. The prizes, awarded twice a year on the Friday before Christmas and the first Friday of May, are $100 for middle school students, $200 for high school students and $500 for adults. The submission deadline is one month before the prizes are awarded. Depending on how many enter, there may be consolation prizes as well. The entry fee is $5 for middle-school students, $10 for high-school students and $15 for adults. This fee includes commentary on student papers. If adults want me to comment on their papers, they must pay an additional $15 for this service. For another $5, students can simultaneously submit as adults. The manuscripts must be Word documents with a 12-point Calibri font, 1.15 space between lines, left and right justification and no additional space before or after paragraphs – like this document.

Length: Middle-school papers are up to 1500 words, high-school papers are up to 3000 words and adult papers are up to 5000 words; papers that exceed these limits will be disqualified, but students will still get comments. Papers with less than 1000 words are discouraged.

Subject: All stories must include some math and science; pure adventure stories with no mention of math or science topics will be disqualified. Possible topics are, but are not limited to:

1. Describe the humans as being like Vikings, but with technology. Imagine that you are an explorer who sailed the ocean, took dog sleds to the terminal line where you found unending glaciers, and then built a rocket ship to explore the inner planets.

2. Two octopus laborers can dig a five-meter trench in three and four weeks, respectively. How long will it take if they start at each end? Imagine that you solve this problem and are then inspired to go on to invent the theory of orbital resonance.

3. Imagine that you are an octopus scientist. You measure the tides and try to predict them. C is tidally locked to A, so the tides rise and fall as B passes inside your orbit and D passes outside it. Consult Ocean Motion to learn how Earthlings predict tides.

4. Imagine that you are an octopus astronomer. You can see G, but your eyes – evolved for seeing underwater – are too dim to see H, I or any individual stars. How do you use orbital resonance to aim your telescope at where you expect to find H or I?

5. Imagine that you are an octopus naturalist. Describe the environment around the hydrothermal vents, ocean currents on a tidally locked planet and how the ocean and the ocean floor rise as planets pass by. Implore the octopi not to pollute or overfish.

6. Imagine that you are an octopus meteorologist. Describe the weather patterns on C.

7. Imagine that you are a rocket scientist. What are the escape velocities of C and G? If C's radius is 105.6% that of Earth, why is its surface gravity 123.8% that of Earth?