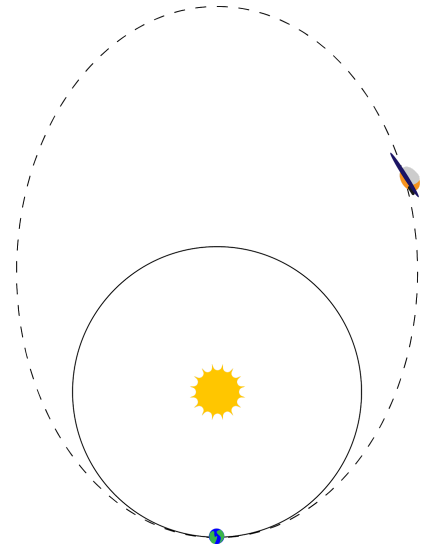


MWrite Prompt 3: A Cruise Through Space

You are the head engineer of a newly created space tourism company. Before you are able to develop and deploy your tourism crafts, you must convince investors that you know what you are doing and that you are planning to do it in a cost effective way. You are attending the primary investor meeting, which is being led by your CEO, Dr. Uhura. While explaining the path that your space crafts will take, she uses the image included on the right.



“Our plan for a cost effective, in-orbit, vacation is for the spacecraft to take an elliptical orbit around the Sun that extends past Earth’s circular orbit. For this to work, we will only need an initial thrust to get off of Earth that will put us into our new orbit. After this, the only time we will need fuel again is for emergencies and when we land back on Earth. We will not need to use any fuel during the trip.”

As the spacecraft reaches its farthest position from the Sun, it will be moving its slowest, which will allow for our customers to experience this far location for the longest time. Up until this point, the craft will be slowing down, and after this point it will be speeding up. Each trip will take two years and will offer a real outer space experience. Our customers will be travelling past the orbit of Mars, and will be able to look back at our little pale blue dot. It will be a once in a lifetime experience.”

When Dr. Uhura finishes her presentation, a few of the investors have questions about how you were making this trip work.

“You said that you wouldn’t need any fuel during your trip, but you are speeding up and slowing down, how is that happening? Is there something you’re not telling us?”

“I’ve heard of the ‘Conservation of Energy’ as a physics-y thing, does that have anything to do with this? How is energy conserved if you are moving faster and slower?”

“Speaking of conservation things, I seem to remember from my physics course that angular momentum was conserved when something moves around the Sun? Your diagram doesn’t look like anything would be conserved though, its an oval, not a circle! What’s going on with that?”

“Okay, well I have a different question, less physics crap, no ‘Conservation’ thing. Why do we need to make this trip 2 years, why not 1.5 years, 1 year, or half a year? Not many people can take a 2 year vacation. And why would anyone want to take this trip anyway, it’s just empty space.”

Dr. Uhura assures them that their amazing head engineer (you) will be able to answer all of these questions in a memo that will be sent around by the end of the week.

In your memo be sure to...

- Explain how the spaceship speeds up and slows down without needing to burn extra fuel.
- Explain how and why Angular Momentum can be conserved around a non-circular path while moving with varying speeds.
- Explain why the trip would have to take 2 years. Give reasons why the trip is not being done in 1.5, 1, or 0.5 years.

Keep in mind...

- Make sure to convey your physics understanding clearly and precisely
- Do not include your name (to preserve anonymity for peer reviews)
- Stay within 300-500 words
- Write your response to resemble the body of a memo
- Use an appropriate tone of voice for your role and audience
- Outside sources are not needed, but if used, please cite them in a citation style of your choice