

*"Sixty years ago I looked up at that star," my great-grandfather gestured toward a single point of light among thousands through the station window, "and they laughed at me when I said I'd send a probe there. But look at what our efforts have wrought, William! Some sixty years from now, the probe we launched today will send back the first images of Alpha Centauri, another star system..."* He trailed off wistfully, the regret in his voice both palpable and understandable.

While CEO of our family business, Oberon Corporation, my great-grandfather funded the development of the Herschel 1 probe. Launched today from Earth's moon bound for the Alpha Centauri System four light years away, the probe contains a transmitter, a state-of-the-art imaging device, and two fusion generators to power its ion glide drive. Even traveling at speeds just under 10% the speed of light, it will still take sixty years to get there with an additional four years before final confirmation of its arrival is possible.

At 100, he's seen more scientific and social progress in his life than practically any human ever - excepting fellow centenarians, of course. When he was born in 1963, a national tragedy gave way to fears that a new president wouldn't continue to support the U.S. space program - but those fears weren't realized. The notable achievements of that decade are often referred to as the golden age of space exploration with "great leaps for mankind" and routine trips into orbit considered "slipping the bonds of Earth." By the dawn of the 21<sup>st</sup> century, entrepreneurs like my great-grandfather were taking the reins away from governments and launching the corporate space age.

The space elevator that brought my great-grandfather and me 62,000 miles up to Port Earth Station this past week so that we could watch the launch is but one of the achievements of entrepreneurs like my great-grandfather. Port Earth Station is effectively an orbiting city - "a new star," as my great-grandfather likes to say. Some 3,500 scientists, engineers, and marketing-specialists live semi-permanently on the station - and most of them are employees of Oberon Corporation. Even with rival mineral mining concerns on the moon and Mars, Oberon Corporation remains by far the solar system's largest supplier of "extra-Earth" minerals and Helium-3, the primary fuel in fusion power generators - and we intend to keep it that way.

"Our next venture will be the crown jewel of Oberon Corporation - a new settlement we'll call Midsummer Station. We plan to build this on the Uranian moon of Titania, 1.7 billion miles away. It will be the most distant human settlement from Earth, with a planned population of roughly 600 people. Water supplies will be obtained by drilling down to Titania's water ice mantle. Three Helium-3 collectors deployed in the atmosphere of Uranus will supply Midsummer Station with all the fuel needed to run its fusion reactors and power its mining facilities. The twice-per-decade arrival of unmanned shipments of Helium-3 from the station to Earth will provide a nearly inexhaustible supply of fuel for Earth's own budding fusion reactors. A practically unlimited supply of clean energy will course through the power relays of Earth and the human footprint will continue expanding toward the fringes of our solar system and beyond. All of this, the very future of space exploration, has been made possible by my great-grandfather and the entrepreneurial skill he showed decades ago.

And what price for all this plenty - the inexhaustible supply of clean energy? As the first to mine the abundance of Helium-3 on Titania, the price will be what we say it is. And what of governments trying to tax our profits or trying to regulate Oberon Corporation? Well, mining Helium-3 is expensive and regulation tends to make it more expensive - so expensive that those governments might not get to enjoy the benefits of fusion energy as long as their taxes and regulations remain in place.

FPSers, use the six-step problem-solving process to address the implications of Oberon Corporation's space expansion in the late 21st century and beyond.

## STEP 1. Identify Challenges

Read the Future Scene carefully and generate ideas for challenges, concerns, and possible related problems. Choose the 8 most important challenges and write them in the space provided. Writing in the margins will not be scored. One additional page for both challenges and solutions is provided (page 4).

1. The Oberon corporation's advanced probe may be taken over by some people looking to use it for military purposes. Consequently the Oberon corporation might lose money but also <sup>may</sup> have lost advanced technology.

2. The Oberon corporation's position as a monopoly of minerals and helium-3 may cause them to destroy rivaling companies, hindering innovation by other companies, <sup>which could</sup>

3. Earth's dependence on the clean energy brought by helium-3 powered fusion reactors which are supplied mostly by the Oberon corporation may cause Earth to have chaos if the Oberon corporation stopped supplying ~~the~~ helium-3.

4. The privatization of space travel, which the Oberon corporation has done, may cause international or interplanetary dispute over who controls celestial objects or ~~the~~ outposts and stations.

## STEP 1. Identify Challenges (continued)

5. The Oberon corporation's lack of association with a formal government may cause disputes over who is to blame in cases of damage by space debris to vehicles or crew because it may not be clear who is at fault.

6. As humans expand throughout the solar system and possibly to other ~~galaxies~~ <sup>solar systems</sup>, there may be a fragmentation of human unity because no interselective binding covenant exists.

7. As humans expand to new ~~to~~ solar systems, there may be a point at which they can expand no further because of limits to the adaptation to new atmospheres, with technology and the human body.

8. The Oberon corporation's space expansion ~~and power~~ gives them the power to pick and choose who gets to go new outposts or stations. This power ~~may~~ may be abused or mishandled, which could result in unequal education opportunities.

**STEP 2. Select an Underlying Problem**

Using the challenges listed in Step 1, identify a problem of major importance to the Future Scene situation. Write your Underlying Problem making sure your question clearly explains the action that will be taken and the desired results/goal of that action.

Writing in margins will not be scored.

Challenge # 2, 3, 4, 5, 8

Because the Oberon Corporation has a large presence in space in regards to space exploration, colonization, and use for natural resources, how might we increase the competition in space so that Oberon Corporation will be less powerful in space in the late 21<sup>st</sup> century in regards to the topic of space privatization?

**STEP 1 Challenges and/or STEP 3 Solution Ideas extension page, if needed**

**Clearly label the Step and # of the idea being completed. Unreadable text will not be scored.**

**STEP 3. Produce Solution Ideas**

Generate solution ideas to the Underlying Problem in Step 2. Choose the 8 most effective solutions and write the elaborated ideas in the space provided. Writing in margins will not be scored. One additional page for both challenges and solutions is provided (page 4).

1. The Enrico Fermi foundation will create the Fermi Space Fellowship which will offer a chance for an education in engineering and business, as well as a grant for starting new space enterprises to allow more competition for Oberon Corp. This will cause a flooding of entrepreneurs into space.

2. The US and China will jointly manage the mining of natural resources by forming the IPNRO (Inter-planetary natural resources organization) which will sell off plots of land for mining such that the Oberon corporation will not get all land. This will allow more corporations to get natural resources from space.

3. The UN will create the Space Colonization Board, an independent review board that will decide who gets to go to off-Earth places. This will improve the competition of space by allowing all people an equal chance at going to space.

4. The ICU (International Courts United) will dissolve Oberon corporation into a series of smaller entities such that they will be forced to compete with each other.

### STEP 3. Produce Solution Ideas (continued)

5. The UN will enact Act 117-623, known as IGT (Interstellar Governance Treaty) which will hold all entities responsible for objects that they put into orbit. The treaty will also prevent any ~~any~~ entity from claiming any celestial object as their own. This will be an extension of the original Outer Space Treaty and will prevent the Oberon corporation from controlling outer space, as well as ensuring the Oberon ~~corp~~ corporation is responsible for their actions.

6. The WTO (World Trade Organization) will ~~enact~~ name helium-3 as a commodity, thus giving it a world price ~~set~~. This will stop the Oberon corporation from exploiting their dominant position in order to have a large helium-3 price. Therefore, this act will limit Oberon Corp's monopoly.

7. NASA will create the ARI (Advanced Research Institute) which will ~~do~~ research into methods of transport and then publish these with the aim of allowing people to use advanced designs to launch projects more easily. This will simplify the process of space start-ups.

8. The League of Nations will create the ETG (Extraterrestrial Governance) Resolution, which will classify outposts such as those on Titan as states of the League of Nations, thus allowing for open passage and subjecting the outposts to international law. This will cause greater migration by all people to these new settlements.

**STEP 4. Select Criteria**

Generate criteria to determine which solution idea does the best job of solving the Underlying Problem and/or addressing the Future Scene situation. Select the 5 most important criteria for measuring solution ideas and write them in the spaces provided. Writing in margins will not be scored.

1.	Because Oberon Corporation controls the natural resources of space, which solution best limits Oberon Corporation's power over the governments and people of Earth?
2.	Because Oberon Corporation is one of the only space facing companies, which solution best increases competition in space so that more companies join the space race?
3.	Because Oberon Corporation <del>has</del> controls a settlement on Titeria, and can set helium-3 prices, which solution <del>best</del> makes <del>the</del> space <del>fair</del> ? the most,
4.	Because Oberon Corporation is not controlled by a government, which solution regulates Oberon Corp's actions the best?
5.	Because humans are scattered over a large area due to space exploration, which solution <del>best</del> ties humanity together the best?

**STEP 5. Apply Criteria**

From the solution ideas written in Step 3, select the 5 ideas with the most potential to solve the Underlying Problem and list them on the grid. Use each criterion to rank the solutions on a scale from 1 (poorest) to 5 (best). The numerical ranking for one important criterion may be doubled.

Step 3 Sol'n #	Solution Ideas	Criteria					Total
		1	2	3	4	5	
# 1	Fellowship with sent	3	5	5	3	5	21
# 3	Review board for colonizers	4	1	4	1	4	14
# 4	Dissolve Oberon Corporation	5	4	3	4	2	18
# 5	Make Oberon irresponsible	1	3	2	5	1	12
# 6	Make helium-3 commodity	2	2	1	2	3	10

## STEP 6. Develop an Action Plan

Develop your top-scoring solution idea into an Action Plan. Thoroughly explain how the Underlying Problem is solved, how the plan will be implemented, and how the Future Scene will be affected. Writing in margins will not be scored.

Solution # 1

The Enrico Fermi Foundation will create the Fermi Space Fellowship which will offer a chance for an advanced education in business and engineering in addition to a grant for a enterprise in corporate space.

The Fermi Space Fellowship Review Board will search for talented and gifted people passionate about fields of space. Once 60 people are found, they will all be given a chance to have a free, highly advanced education in the fields of engineering and business. Once the students finish this yearlong course, they will go on to do an independent project. These projects will range from warp drives to research into fusion reactors. At the end of the project, the students are given grants to work together, forming companies that will use their collective knowledge to extend the limits of space exploration as well as put many new enterprises into corporate space. At this stage, these enterprises will be assisted by Fermi Foundation paid astrophysicists and mentors. However, gradually the Fermi Foundation will cease their contact with these enterprises.

The Fermi Space Fellowship will run every year, starting a new batch of 60 students. The students will have an education for a year, work on a project for a year, and finally will continue in their enterprises in a year assisted by the foundation. However, after a year the companies will be let loose.

A possible problem is that the students may ~~leave~~ leave to go work at the Oberon Corporation. This will be prohibited in the contract such that Fermi fellows must work independently of the Oberon Corporation for 7 years unless they have explicit permission from the Fermi Foundation Director.

The Fermi Space Fellowship will allow students to have a greater chance in space enterprise. The Fellowship will prevent the Oberon Corporation from abusing their power by training other gifted students. The competition

STEP 6 extension page Step 6, if needed

of space will be improved as every year several new enterprises  
all great

**STEP 6** extension page for GRAPHICS, CHARTS, PICTURES, OR DIAGRAMS, if needed

**Text should be limited to labeling.**