



RED PLANET ROYALE

THE EXTRATERRESTRIAL TRAIL

Lesson Plan:
Fortnite Creative (UEFN)



Lesson introduction:

Attention, intrepid travelers of the Extra-Terrestrial Trail! Welcome to the Red Planet Royale, an extraordinary journey much like the famous Oregon Trail, but with a cosmic twist. Just like the brave pioneers who explored new lands in the past, you are now the space pioneers who have successfully made it to Mars. Congratulations!

Now, your mission is to go beyond exploration and start a whole new chapter in human history by establishing the very first Martian community. Think of yourselves as community builders, building a place to thrive on this distant red world, just as the explorers once established communities along the Oregon Trail many years ago.

In this thrilling Fortnite Creative challenge, you'll work individually or together as a team, utilizing your creative skills and problem-solving abilities to design and construct a flourishing community. You'll need to plan how to set up buildings and travel, manage resources wisely, and ensure the well-being of your future Martian residents.

Remember, just like the pioneers of old, you're forging a path into the unknown. Challenges will come your way, but fear not, for you have the spirit of adventure and discovery within you. Embrace the excitement and let your imaginations soar as you create the very first chapter of human life on Mars. The Extra-Terrestrial Trail awaits, brave explorers! Onward to your Martian future!



Rationale

Living on Mars and exploring other extraterrestrial destinations is crucial for scientific advancement and the future of humanity. As we venture beyond Earth, we unlock a wealth of scientific knowledge about the cosmos and our place in it. Understanding other planets and celestial bodies provides valuable insights into planetary formation, evolution, and the potential for life beyond Earth. Studying Mars can offer clues about the early history of our solar system and whether life could have emerged elsewhere (NASA, 2021).

From a practical standpoint, establishing human communities on other planets, like Mars, acts as a crucial step in ensuring the long-term survival of our species. Earth is the only known habitable planet, and as we face various challenges such as climate change, overpopulation, and potential catastrophic events, having a backup location becomes increasingly important. By becoming a multi-planetary species, we can significantly reduce the risk of human extinction and preserve our culture, knowledge, and achievements for generations to come (SpaceX, 2017).

Furthermore, venturing to other planets pushes the boundaries of technology and innovation. The challenges of space travel and colonization drive us to develop new solutions and technologies that have practical applications on Earth, from renewable energy sources to advanced life support systems. The expertise gained from space exploration can lead to ground-breaking discoveries and improve our daily lives, ultimately benefitting humanity as a whole (European Space Agency, 2021).

Establishing a presence on Mars and exploring other extraterrestrial destinations is essential for advancing scientific understanding, securing the future of humanity, and propelling technological progress. By expanding our presence beyond Earth, we embrace the spirit of exploration and discovery that has defined our species for millennia. Together, as spacefaring pioneers, we open the door to a promising future where the cosmos becomes a canvas for human ingenuity and aspirations.



The Mission

1. Use the provided planning document in this lesson plan (or document of your own) to map your Mars community on the Wasteland Island template. Review the list of suggested locations and community aspects to consider when designing your layout.
2. Enter Fortnite Creative, choose the Wasteland Template Island, and use the lighting, time of day, and fog settings to create a Mars atmosphere. See screenshot in this lesson plan or in the Educator and Student Video. (You can do this step last if you wish to build without visual distraction)
3. Remove the rare vegetation from the perimeter of the Wasteland Template Island.
4. Begin building your Mars community based on your plan. If you change your design, be able to speak to why you chose the changes.
5. Present your finished Mars Community and be able to speak to why you added, and why you didn't add certain aspects.
6. Optional: Share online with the Unreal Education Team and/or with LogicsAcademy using #LogicsAcademy and #EpicGames hashtags (Perhaps teachers can do this step)



Guiding Questions

1. How can we design a sustainable and self-sufficient community on Mars that can provide for our basic needs, like food, water, and shelter?
2. What innovative technologies and solutions can we use to overcome the challenges of living in a harsh Martian environment, such as extreme temperatures and thin atmosphere?
3. How can we ensure the safety and well-being of the Martian community members, considering the potential risks of space travel and the psychological impact of living far from Earth?
4. How can we create an inclusive and diverse community on Mars, where everyone's unique skills and perspectives are valued and celebrated?
5. How can we work as a team, communicating effectively and collaborating with one another, to successfully build and sustain our Martian community in the face of various obstacles?



General Learning Outcomes

- **Research and Inquiry Skills:** Students will demonstrate the ability to conduct thorough research about Mars, including its geology, atmosphere, and potential for community growth. They will engage in inquiry-based learning to explore various aspects of designing a Martian community, drawing from scientific sources and credible research.
- **Critical Thinking and Problem-Solving:** Throughout the project, students will apply critical thinking and problem-solving skills to address the challenges of Martian community building. They will design solutions and make informed decisions to create a sustainable and efficient community on the Red Planet.
- **Collaboration and Teamwork:** Students will work collaboratively as a team, pooling their skills and expertise to plan, design, and build their Martian outpost. They will communicate effectively, share ideas, and respect diverse perspectives to achieve common goals.
- **Creative Design and Innovation:** As architects and engineers of the Martian community, students will unleash their creativity and innovation, devising unique solutions for habitat design, resource management, and space exploration technologies.
- **Effective Communication and Presentation:** At the culmination of the project, students will present their community designs, sharing their research findings, problem-solving processes, and innovative ideas with the class. They will communicate their vision for the Martian habitat effectively, engaging their peers with compelling and well-structured presentations.

Resources

1. Title: NASA Mars Exploration Program

Description: The official website of NASA's Mars Exploration Program, providing a wealth of information about ongoing missions, discoveries, and plans for future exploration and colonization of Mars. Website: <https://mars.nasa.gov/>

2. Title: SpaceX - Mars

Description: Visit SpaceX's dedicated page on their plans for Mars colonization. Get insights into Elon Musk's vision and see the latest updates on SpaceX's efforts to make humans a multi-planetary species. Website: <https://www.spacex.com/mars>

3. Title: Canadian Space Agency - Mars Exploration

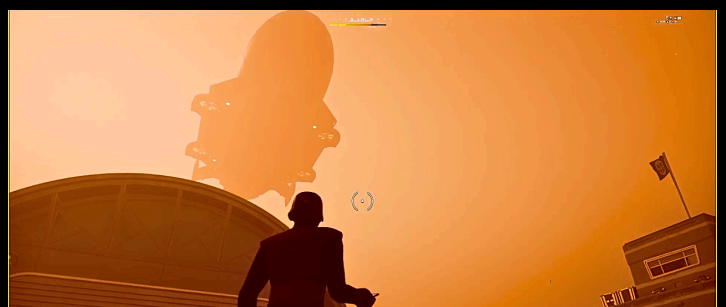
Description: Explore the Canadian Space Agency's contributions to Mars missions and research, learning about their role in international efforts to explore the Red Planet. Website: <https://www.asc-csa.gc.ca/eng/astronomy/mars/>

4. Title: European Space Agency (ESA) - Mars Exploration

Description: Discover ESA's involvement in Martian exploration and gain access to updates, scientific findings, and future plans for exploring Mars. Website: <https://exploration.esa.int/web/mars/>

5. Title: NASA Mars Science Laboratory - Curiosity Rover

Description: Dive into the detailed information about NASA's Curiosity Rover mission, a robotic explorer currently active on Mars, and learn about its scientific discoveries. Website: <https://mars.nasa.gov/msl/>



Next Generation Science Standard Connections

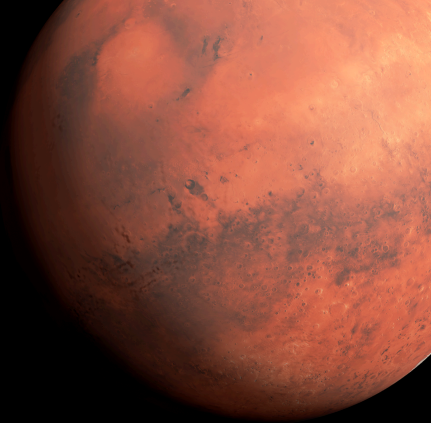
NGSS: MS-ESS1-1 Standard: Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. Relevance: Understanding the Earth-sun-moon system is essential for students as they explore similarities and differences between Earth and Mars, especially in terms of day-night cycles and seasonal variations on both planets.

NGSS: MS-ESS1-2 Standard: Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. Relevance: Gravity is a critical factor in space travel and Martian colonization. Students can explore how gravity affects objects on Mars, the importance of gravity in maintaining a habitable environment, and how it influences space travel to and from the Red Planet.

NGSS: MS-ETS1-1 Standard: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. Relevance: This standard connects directly to the task of designing a sustainable and self-sufficient Martian community. Students will need to consider scientific principles and environmental constraints while developing their community plans.

NGSS: MS-ETS1-2 Standard: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. Relevance: During the lesson, students will analyze and compare different community designs to determine the most effective and feasible solutions for creating a successful Martian outpost.

NGSS: MS-ETS1-3 Standard: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. Relevance: Students will assess data and feedback from their community prototypes, making informed decisions on how to optimize and improve their designs for the Martian habitat.



ISTE Student Standard Connections

ISTE Standard 1: Empowered Learner

- How it's satisfied: Students will use technology and virtual platforms like Fortnite Creative to design and prototype their Martian community, showcasing their creativity and critical thinking skills.

ISTE Standard 2: Digital Citizen

- How it's satisfied: Throughout the lesson, students will engage in collaborative discussions and virtual teamwork, practicing responsible and respectful digital communication.

ISTE Standard 4: Innovative Designer

- How it's satisfied: By addressing the challenges of creating a sustainable and inclusive Martian community, students will demonstrate their ability to think innovatively and develop creative solutions.

ISTE Standard 5: Computational Thinker

- How it's satisfied: As students plan and design their community, they'll apply computational thinking, breaking down complex problems into smaller manageable tasks and using logic to structure their solutions.

ISTE Standard 6: Creative Communicator

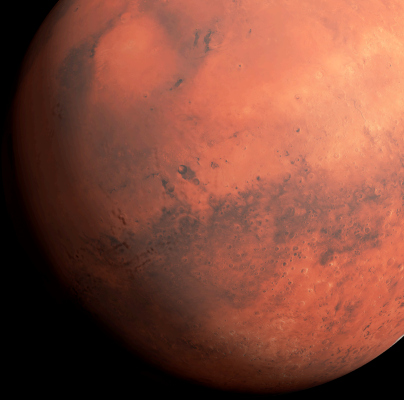
- How it's satisfied: Students will present their community designs and share their ideas with the class, utilizing digital tools and media to effectively communicate their vision for the Martian settlement.

ISTE Standard 7: Global Collaborator

- How it's satisfied: Through the virtual collaboration and teamwork required in Fortnite Creative, students will learn to work with peers from diverse backgrounds to achieve common goals.

20 Educator Prompts for Students

1. Have you considered additional features or technologies from the Fortnite asset and prefab galleries that could improve the sustainability and functionality of your Martian community?
2. How might you utilize STEM concepts to create more efficient energy sources, advanced transportation systems, or better waste management solutions for your community?
3. What other essential resources or materials might you need on Mars, and how will you ensure their availability and accessibility for the settlers?
4. How can you design your Martian habitat to ensure the safety and well-being of the settlers, addressing potential hazards and providing necessary medical facilities?
5. Have you thought about creating recreational areas or leisure activities for the settlers to promote mental well-being and foster a sense of community?
6. How will you address the psychological challenges of living in isolation on Mars and create strategies to maintain positive mental health for the settlers?
7. Have you explored the possibility of growing food on Mars? How will you ensure a sustainable and reliable food supply for your community?
8. How might you utilize renewable energy sources, like solar power or wind turbines, to power your Martian community and reduce dependence on limited resources?
9. What innovative methods can you implement to recycle and reuse materials on Mars, reducing waste and minimizing the reliance on shipments from Earth?
10. How can you create an inclusive and diverse community on Mars, considering the importance of culture, language, and social connection for the settlers?
11. Have you researched the potential effects of long-term space travel on the human body and how you can mitigate any health risks for the settlers?
12. How can you use robotics and automation to assist with tasks on Mars, and what role will humans play in the operation and maintenance of these systems?
13. What strategies can you develop to maintain communication with Earth and ensure a strong connection between the Martian community and humanity back home?
14. How will you address the challenge of limited space on Mars and design efficient and ergonomic living spaces for the settlers?
15. What plans do you have in place for emergencies or unforeseen events on Mars, and how will you ensure the safety and quick response of the settlers?
16. Have you considered the impact of your community's activities on the Martian environment and how you can minimize any potential harm?
17. How will you involve the settlers in decision-making and community governance on Mars, promoting democracy and equal participation?
18. How can you create a sense of purpose and motivation among the settlers, encouraging them to contribute their unique skills and passions to the community?
19. Have you researched the historical significance of pioneering and exploration, and how your Martian community contributes to the legacy of human achievements?
20. What message do you want to convey to future generations about the importance of human exploration and the potential for a thriving life beyond Earth through your community on Mars?



Valuable Build Considerations

Safety and Success

1. Emergency Response Center: A facility equipped to handle emergencies, ensuring the safety and quick response to any crises in the community.
2. Communication Hub: A central location for all communications, vital for staying in touch with Earth and coordinating within the Mars community.
3. Advanced Life Support Systems: Systems that provide essential life support like air, water, and temperature control, crucial for survival in the harsh Martian environment.
4. Medical Facilities: Clinics or hospitals where residents can receive medical care, essential for maintaining health and addressing injuries or illnesses.
5. Protective Shielding: Structures or materials that protect the community from harmful radiation and extreme weather conditions on Mars.

Enjoyability and Inclusion

1. Recreational Areas: Spaces designed for leisure activities and exercise, helping to maintain physical and mental health.
2. Cultural Centers: Places where residents can engage in cultural activities, fostering a sense of community and preserving traditions.
3. Community Gardens: Areas where residents can grow food and plants, providing fresh produce and a green space for relaxation.
4. Event Spaces: Venues for community gatherings, celebrations, and events, promoting social interaction and a sense of unity.

Accessibility and Inclusion

1. Universal Design Considerations: Designs that ensure all buildings and spaces are accessible to everyone, including people with disabilities.
2. Multi-level Transportation System: Efficient transportation networks, such as elevators and multi-level transit, to navigate different parts of the community easily.
3. Accessibility Ramps and Elevators: Features that make all areas accessible to individuals with mobility issues, ensuring inclusivity.

Future Growth

1. Expansion Plans: Blueprints and areas set aside for future growth and development of the community.
2. Research Labs: Facilities dedicated to scientific research and experiments, essential for innovation and solving Mars-specific challenges.
3. Sustainable Resource Management: Systems and practices for managing resources like water, energy, and waste sustainably to ensure long-term viability of the community.

Creating Mars in Fortnite - It's All In The Settings

In the students' Island Settings there are multiple factors that can create a Mars environment when using the Wasteland island Template.

Here are some recommendations:

1. Set the time of day to midnight or twilight.
2. Bring the light brightness down to 70%.
3. Set the light color to Red or Magenta.
4. Set the fog thickness (dust in this case) to 30-50%.
5. Set the fog color to magenta or red.

Once some limited vegetation is cleared from the perimeter of the Wasteland Island, students will have a viable Mars surface atmosphere for all of their Mars ambitions using settings similar to these.

Setting	Value
TIME OF DAY	7:00 AM
CAMERA FILTER	DEFAULT
LIGHT BRIGHTNESS	70%
LIGHT COLOR	WHITE
FOG THICKNESS	30%
FOG COLOR	MAGENTA
STARTING HEALTH	100% HEALTH
MAX HEALTH	100 HEALTH
STARTING SHIELDS	100% SHIELDS

Sets the time of day on the island. **DEFAULT** - uses the normal day/night cycle. **RANDOM** - selects a time of day at game start.

Red Planet Royale – The Extraterrestrial Trail Student Planning Handout

Use the following “Essential Aspects” of a Martian community along with the map of the Wasteland Island Template to plan your development before heading into Fortnite Creative. Be able to speak to why you added these or why you did not.

Safety and Success:

1. Emergency Response Center
2. Communication Hub
3. Advanced Life Support Systems
4. Medical Facilities
5. Protective Shielding

Enjoyability and Inclusion:

6. Recreational Areas
7. Cultural Centers
8. Community Gardens
9. Event Spaces

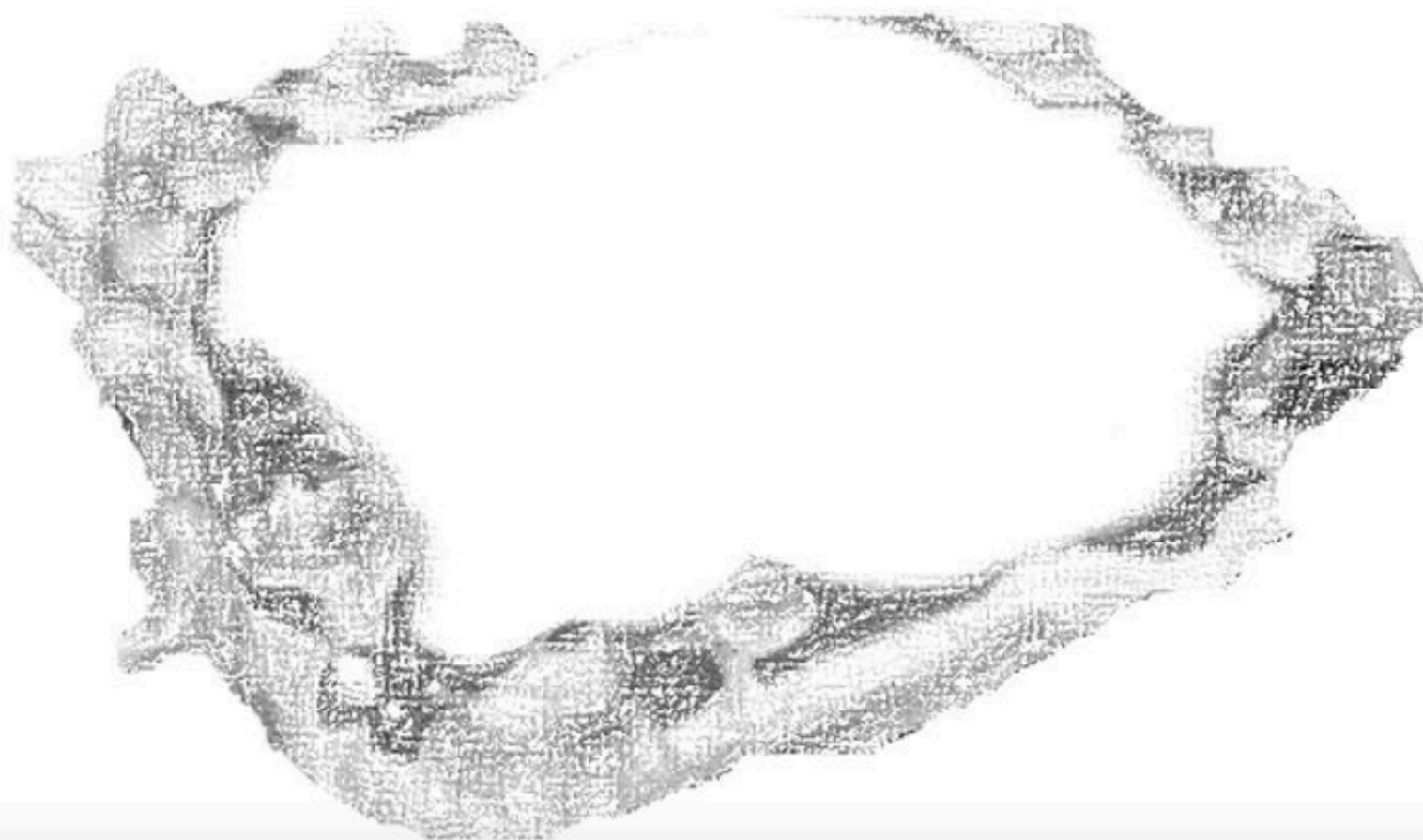
Accessibility and Inclusion:

10. Universal Design Considerations
11. Multi-level Transportation System
12. Accessibility Ramps and Elevators

Future Growth:

13. Expansion Plans
14. Research Labs
15. Sustainable Resource Management

Wasteland Island Map (Identify the intended location for the above essential aspects using their numbers)



Notes:

Red Planet Royale

THE EXTRATERRESTRIAL TRAIL



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