Society for Space Education Research & Development

Space Medicine and Law

Introduction

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Space Medicine and Law - Main objective

Aerospace engineering is complimentary to other areas of science such as medicine arts and laws. So doctors, lawyers and several other engineers in other areas can participate in this industry.

Outcomes

- A general vision of the advances in medicine applied to aerospace engineering
- The main role of the United Nations for establishing cooperation agreements between different countries•
- Understanding of the main principles on outer space regarding good practices.

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1. Introduction to Space Medicine

Definition of Space Medicine

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Space medicine is the practice of medicine on astronauts in outer space whereas **astronautical hygiene** is the application of science and technology to the prevention or control of exposure to the hazards that may cause astronaut ill health.

Credits to NASA

Dan Burbank and Anton Shkaplerov participate in a medical contingency drill in the Destiny laboratory of the International Space Station.

Why Space Medicine is so Important?

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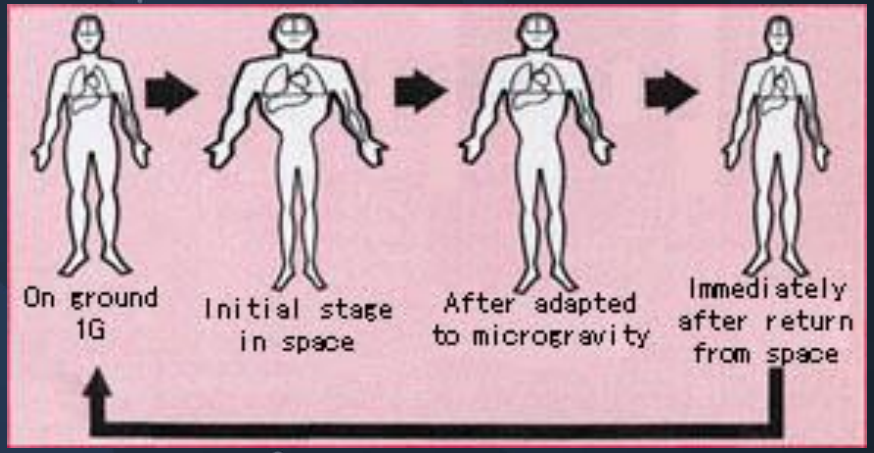
To discover how well and for **how long people can survive** the extreme conditions in space, and how fast they can adapt to the Earth' s environment after returning from their voyage. **Medical consequences** such as possible blindness and bone loss have been associated with human spaceflight.



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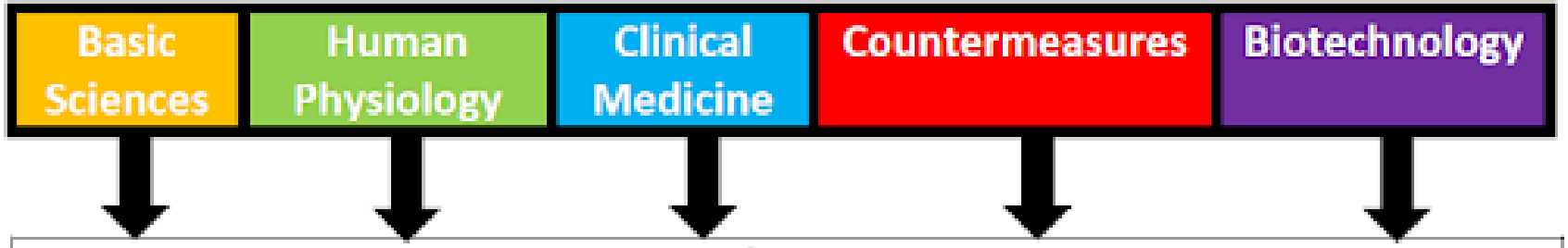

Sub-areas				
Genetics	Space deconditioning	Medical emergencies	Microgravity	Hardware
Cell culture	Space adaptation	Remote assistance	Hypogravity	Software
Molecular biology	Circadian rhythm	Pharmacology	Radiation	Medical devices

Effects in Human Body

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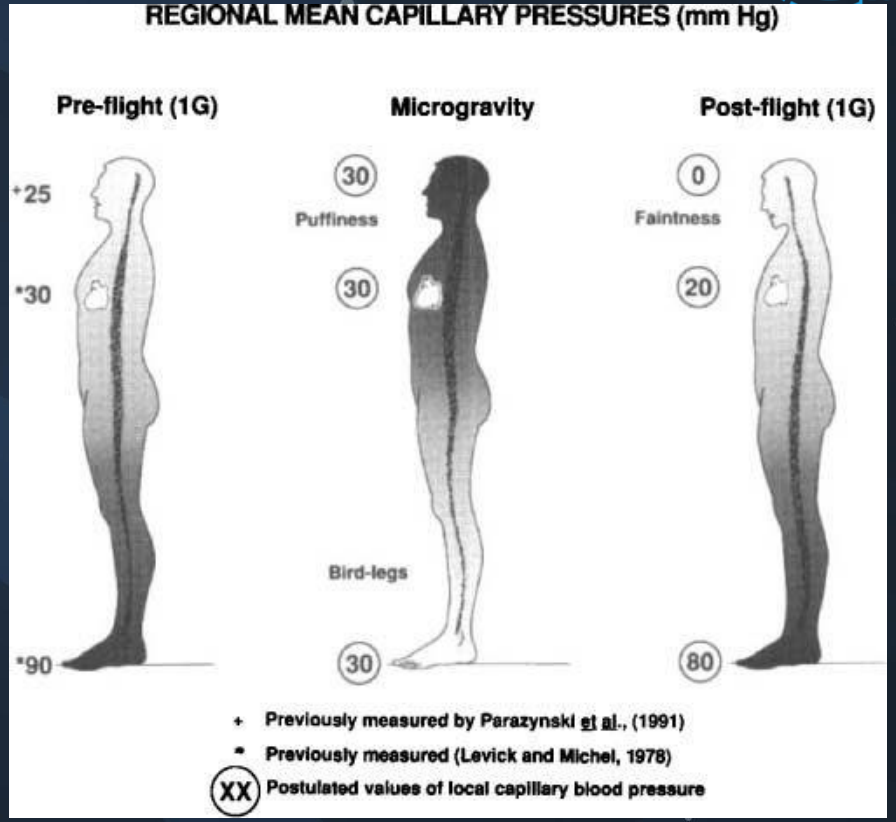
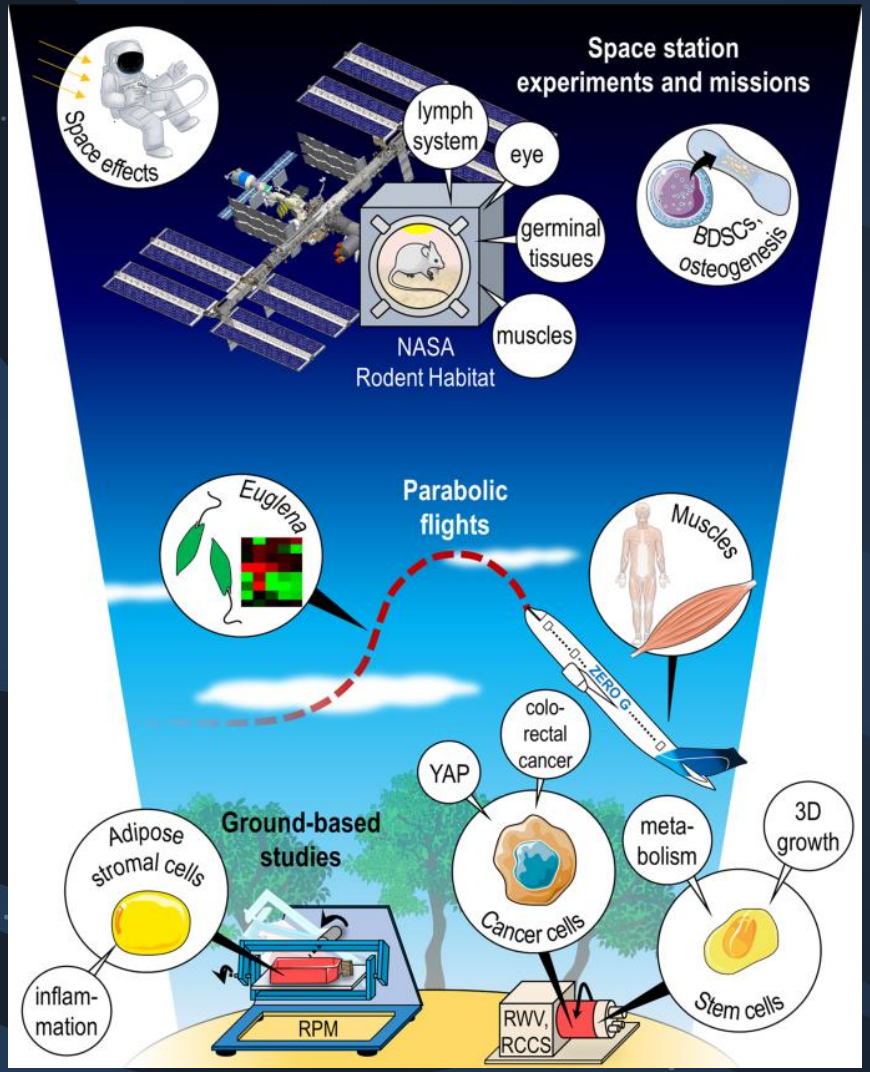
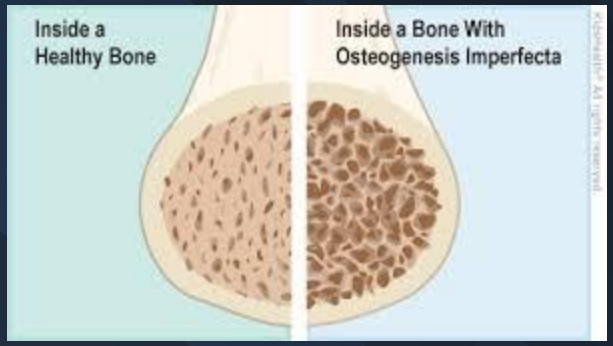
Microgravity

How microgravity affects the human body?

While in microgravity, the human body suffers a 1 - 1.5% of bone loss per month in space. This increase the risk of **kidney stones**, osteoporosis and weakens the abillity to heal bones. Microgravity can also affect **muscles**, making you endurance and strength.







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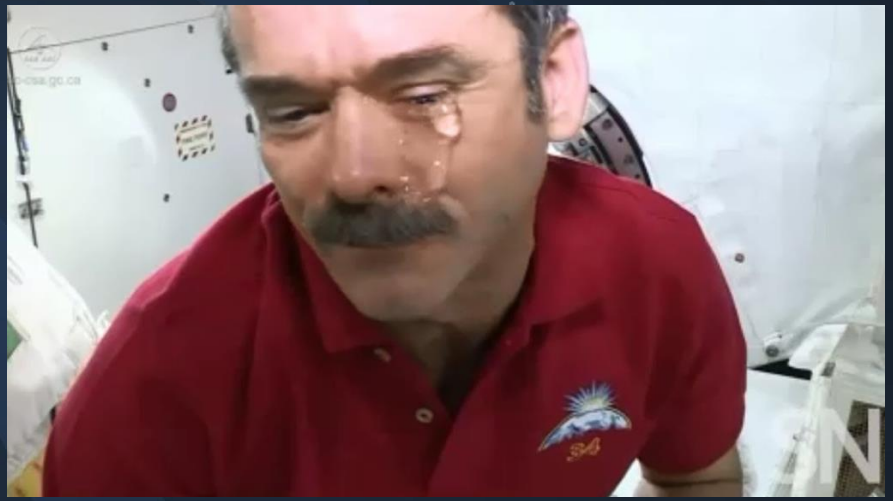

An unidentified syndrome has been causing the deterioration of astronauts vision aboard the ISS

https://edgeofspace.in/telescope-buying-guide/

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Telescope Buying Guide

You can also read

2. History

The Father of Space Medicine

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Hubertus Strughold **(June 15, 1898 – September 25, 1986)** was a German-born physiologist and prominent medical researcher.

In 1947 he was brought to the United States as part of **Operation Paperclip** and held a series of high-ranking medical positions with both the US Air Force and NASA.

It was while at Randolph Field that Strughold began conducting some of the **first research into the potential medical challenges posed by space travel**, in conjunction with fellow "Paperclip Scientist" Dr. Heinz Haber.

The Pressure Suit

A **pressure suit** is a protective suit worn by high-altitude pilots who may fly at altitudes where the **air pressure** is **too low** for an unprotected person to survive, even breathing pure oxygen at positive pressure. Such suits may be either full-pressure (i.e. a space suit) or partial-pressure (as used by aircrew). Partial-pressure suits work by providing mechanical counter-pressure to assist breathing at altitude.

A U-2 pilot suit

The European Space Sgency Experience

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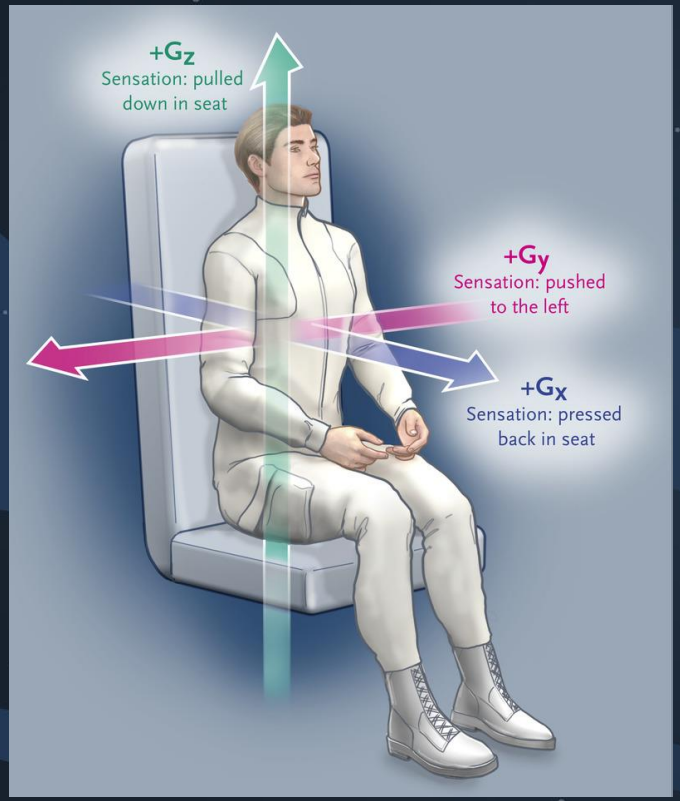

Astronauts work out for around 90 minutes a day onboard the International Space Station to combat the muscle and bone weakening effects of microgravity. But exercise is just as important for mental and physical health on Earth.

Research Advancements in Universities

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Recent graduate students at University of North Carolina applying studies on Intracranial Pressure.

In outer space, body fluid doesn't circulate the way it does on Earth. One big issue, includes **impairing astronauts' vision** during and after their missions.

"The big health issue which is being studies is a symptom that many of NASA astronauts have come back reporting that has been called **'visual impairment and intracranial pressure'**.

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Space Law

What is Law ?

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Traffic Laws

International Law

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United Nations

The United Nations is an international organization founded in 1945. It is currently made up of 193 Member States. The United Nations is an international organization founded in 1945. It is currently made up of 193 Member States.

Space Law

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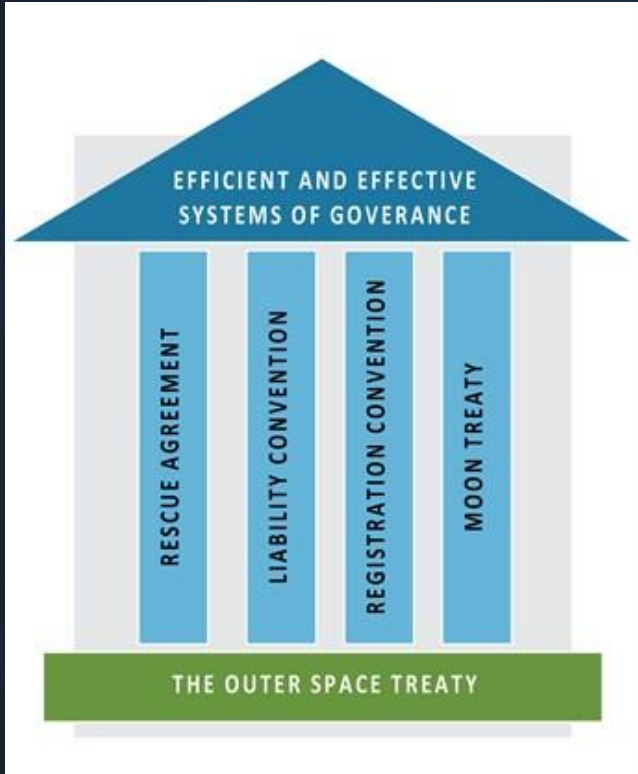
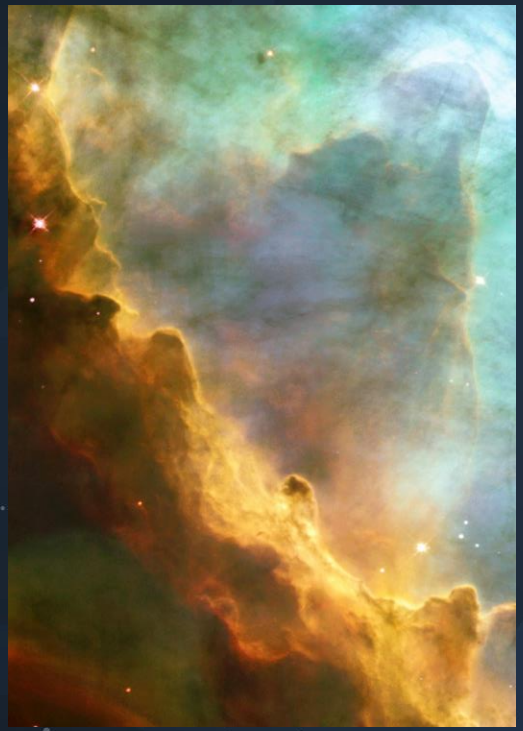
The term "space law" is most often associated with the rules, principles and standards of international law appearing in the five international treaties and five sets of principles governing outer space which have been developed under the auspices of the United Nations.

Treaties



The treaties commonly referred to as the "five United Nations treaties on outer space" are:

1. THE "OuTErSPAcETrEATY"



Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies

2. Rescue Agreement

In the movie – ‘The Martian’ the china’s space agency helped NASA

2. The "Rescue Agreement"

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Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space

3 . THE "LIABILITY CONVENTION"

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Convention on International Liability for Damage Caused by Space Objects

Liability Convention

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Clip from the movie- ‘The Core’

4. The "Registration Convention"

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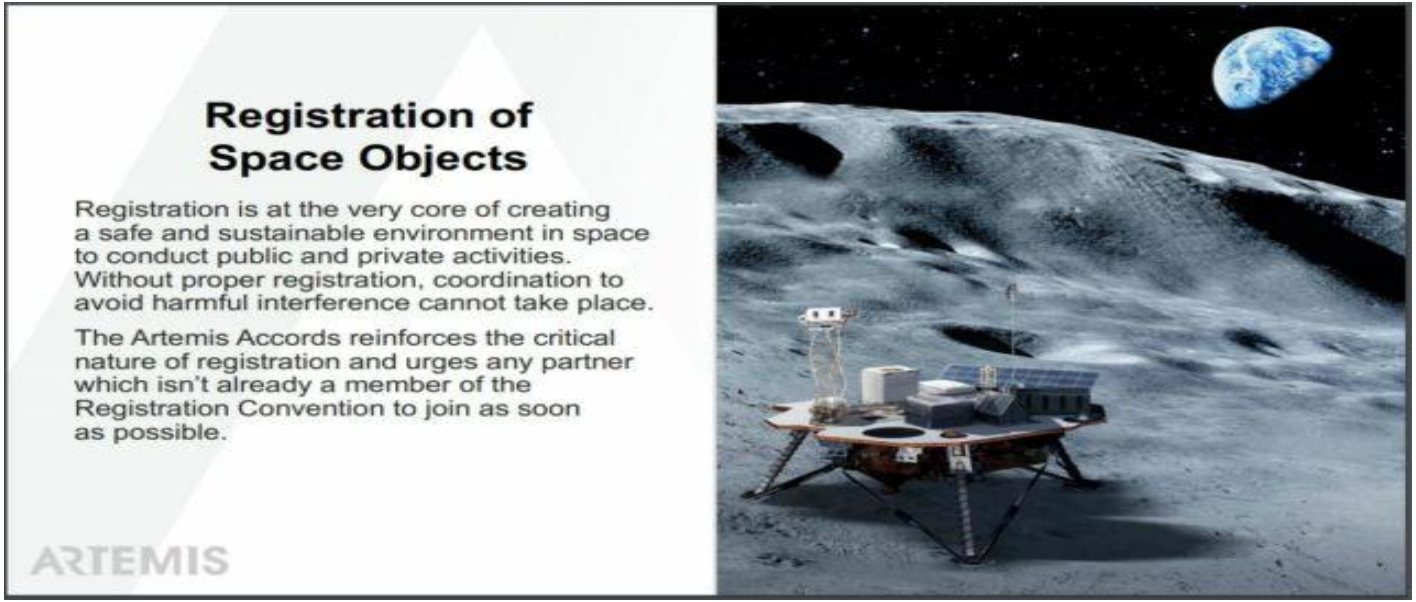
Convention on Registration of Objects Launched into Outer Space



5. The "Moon Agreement"

Agreement Governing the Activities of States on the Moon and Other Celestial Bodies

. THE GLOBAL DEVELOPMENT AGENDAS

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- 2030 Agenda for Sustainable Development
- 17 Sustainable Development Goals SDGs
- Actions contained in the Sendai Framework for Disaster Risk Reduction
- Paris Agreement on Climate Change

Sustainable Development Goals

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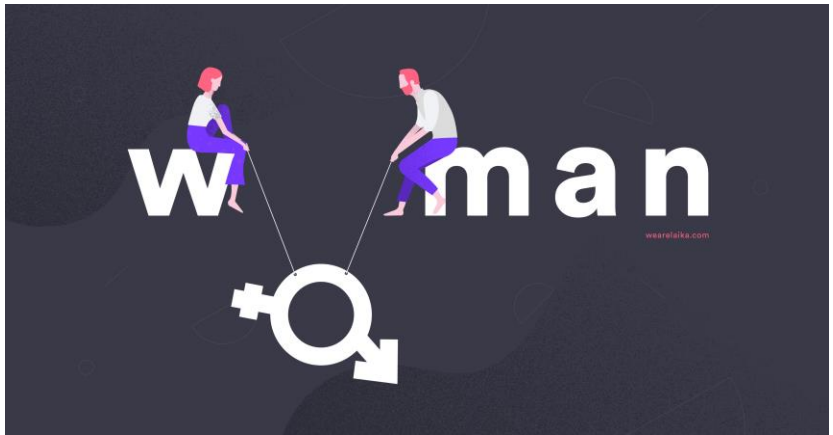
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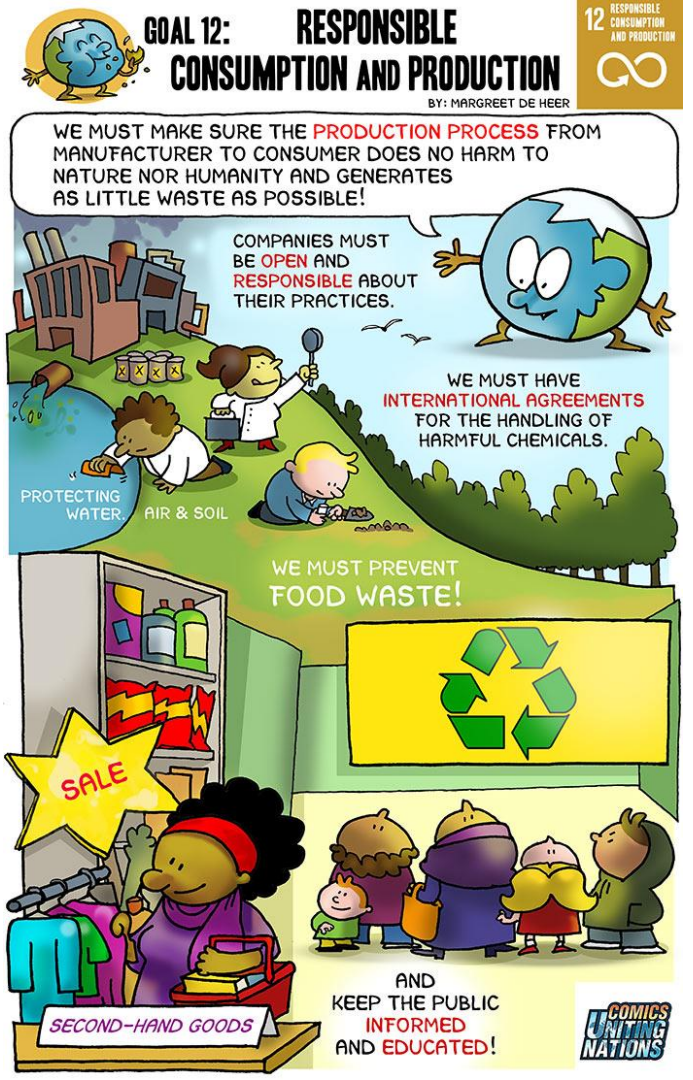
wearelaika.com


GOAL 12: RESPONSIBLE CONSUMPTION AND PRODUCTION
BY: MARGREET DE HEER
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
WE MUST MAKE SURE THE PRODUCTION PROCESS FROM MANUFACTURER TO CONSUMER DOES NO HARM TO NATURE NOR HUMANITY AND GENERATES AS LITTLE WASTE AS POSSIBLE!
COMPANIES MUST BE OPEN AND RESPONSIBLE ABOUT THEIR PRACTICES.
WE MUST HAVE INTERNATIONAL AGREEMENTS FOR THE HANDLING OF HARMFUL CHEMICALS.
PROTECTING WATER
AIR & SOIL
WE MUST PREVENT FOOD WASTE!
SALE
SECOND-HAND GOODS
AND KEEP THE PUBLIC INFORMED AND EDUCATED!
COMICS UNITING NATIONS

4 . THE GLOBAL DEVELOPMENT AGENDAS

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The Sendai Framework for Disaster Risk Reduction 2015-2030 outlines seven clear targets and four priorities for action to prevent new and reduce existing disaster risks:

(i) Understanding disaster risk;
(ii) Strengthening disaster risk governance to manage disaster risk;
(iii) Investing in disaster reduction for resilience and;
(iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

Seven Targets of the Sendai Framework

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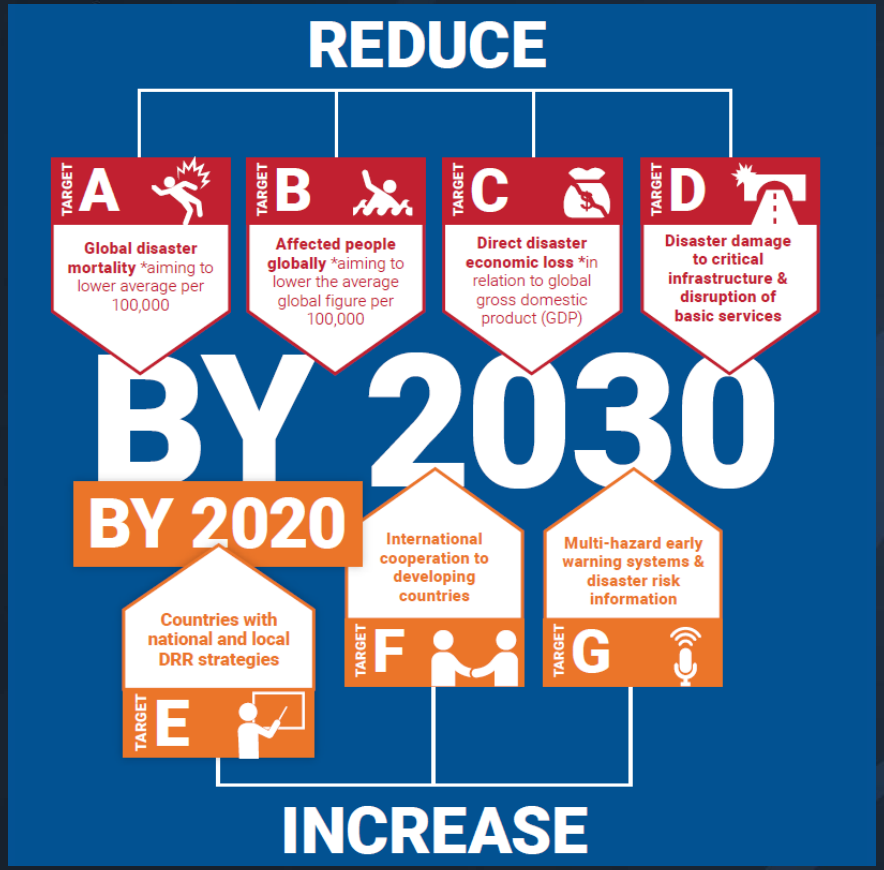

- The **strategy is to reduce** de global disaster mortality, the affected people globally & disaster damage to critical infrastructure.
- To **increase multi-hazard early warning systems**.

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QUESTIONS?

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THANKS!

Do you have any questions?

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