

The Technology method

Unit 1

Criterios de Evaluación

Bloque I: PROCESO DE RESOLUCIÓN DE PROBLEMAS TECNOLÓGICOS

1. Identificar las etapas necesarias para la creación de un producto tecnológico desde su origen hasta su comercialización, describiendo cada una de ellas, investigando su influencia en la sociedad y proponiendo mejoras tanto desde el punto de vista de su utilidad como de su posible impacto social. CAA, CSC, CCL, CMCT.
5. Valorar el desarrollo tecnológico en todas sus dimensiones. CAA, CSC, CEC.

Bloque II: EXPRESIÓN Y COMUNICACIÓN TÉCNICA

3. Explicar y elaborar la documentación técnica necesaria para el desarrollo de un proyecto técnico, desde su diseño hasta su comercialización. CMCT, CAA, SIEP, CCL, CEC.

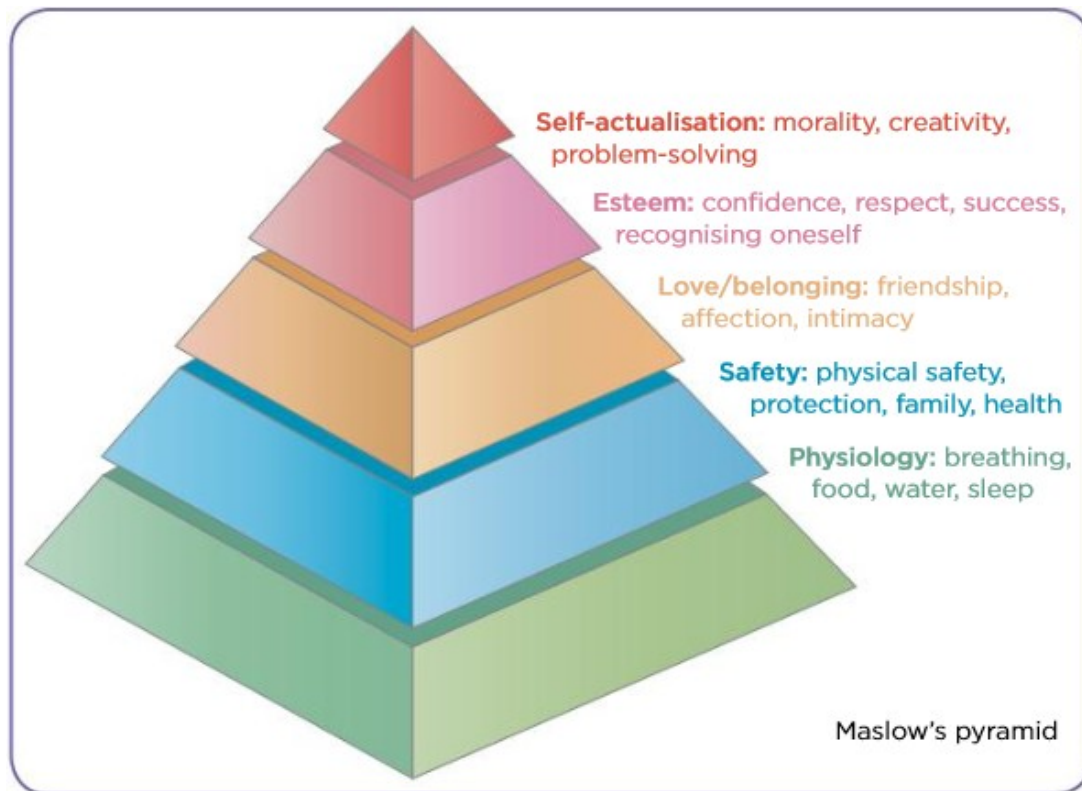
¿qué vamos a ver en esta unidad?

- ¿por qué se desarrolla la tecnología?
- ¿cómo se desarrolla un producto o proceso tecnológico?
- Las etapas de un proyecto técnico.
- La importancia de la innovación.

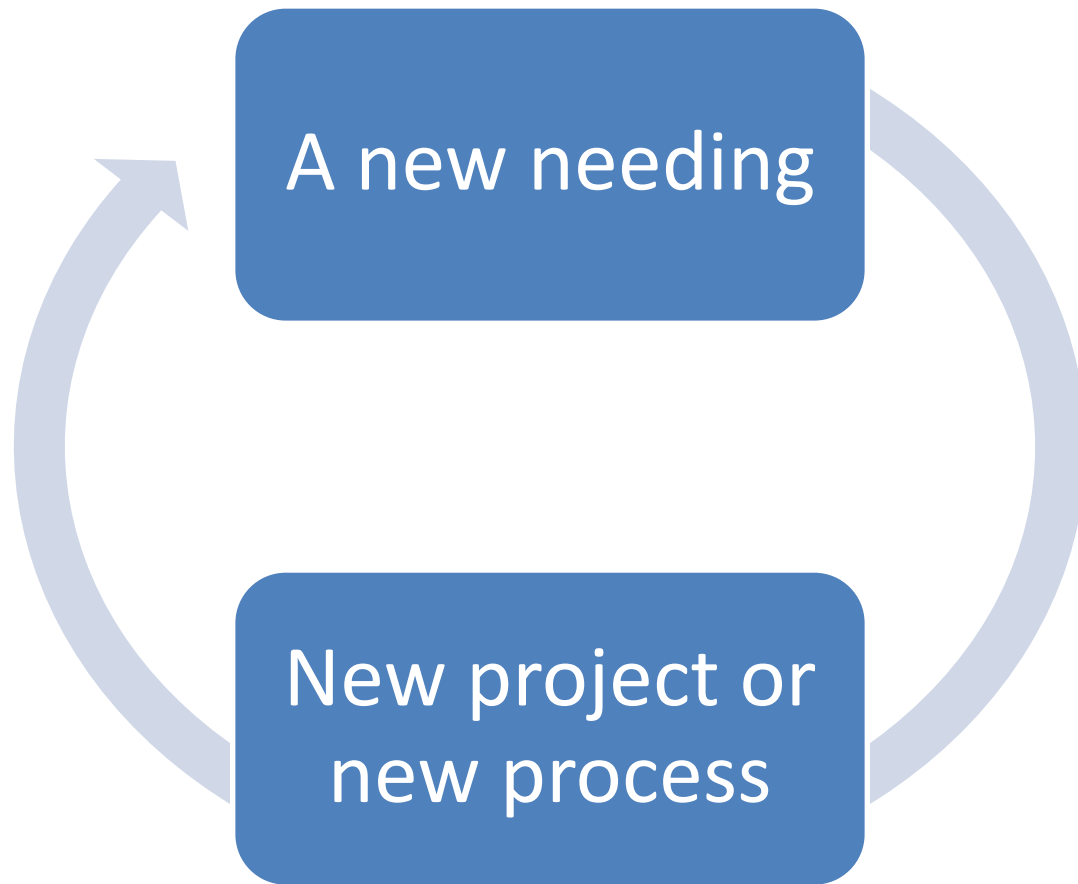
Why do we make objects?

Quick answer: **To Survive**

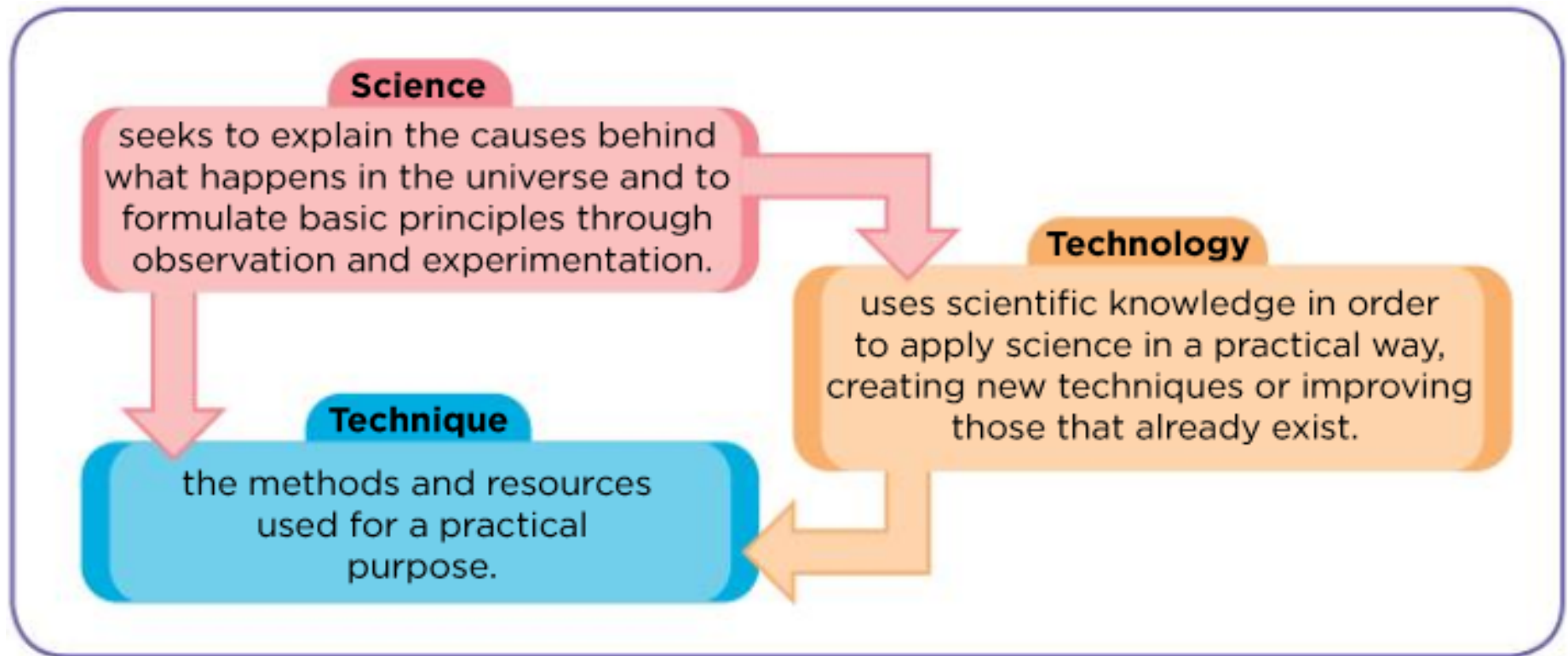
But the right answer is much deeper



The virtuous circle of managing objects and processes



How do we get them?



How do we get them?

- Scientific method:

Science is based on observation and experimentation and aims to understand aspects of our environment and how it works.

- Technological method:

Technology applies scientific knowledge in a practical way, resulting in the creation and improvement of the technique.

¿Cómo lo conseguimos?

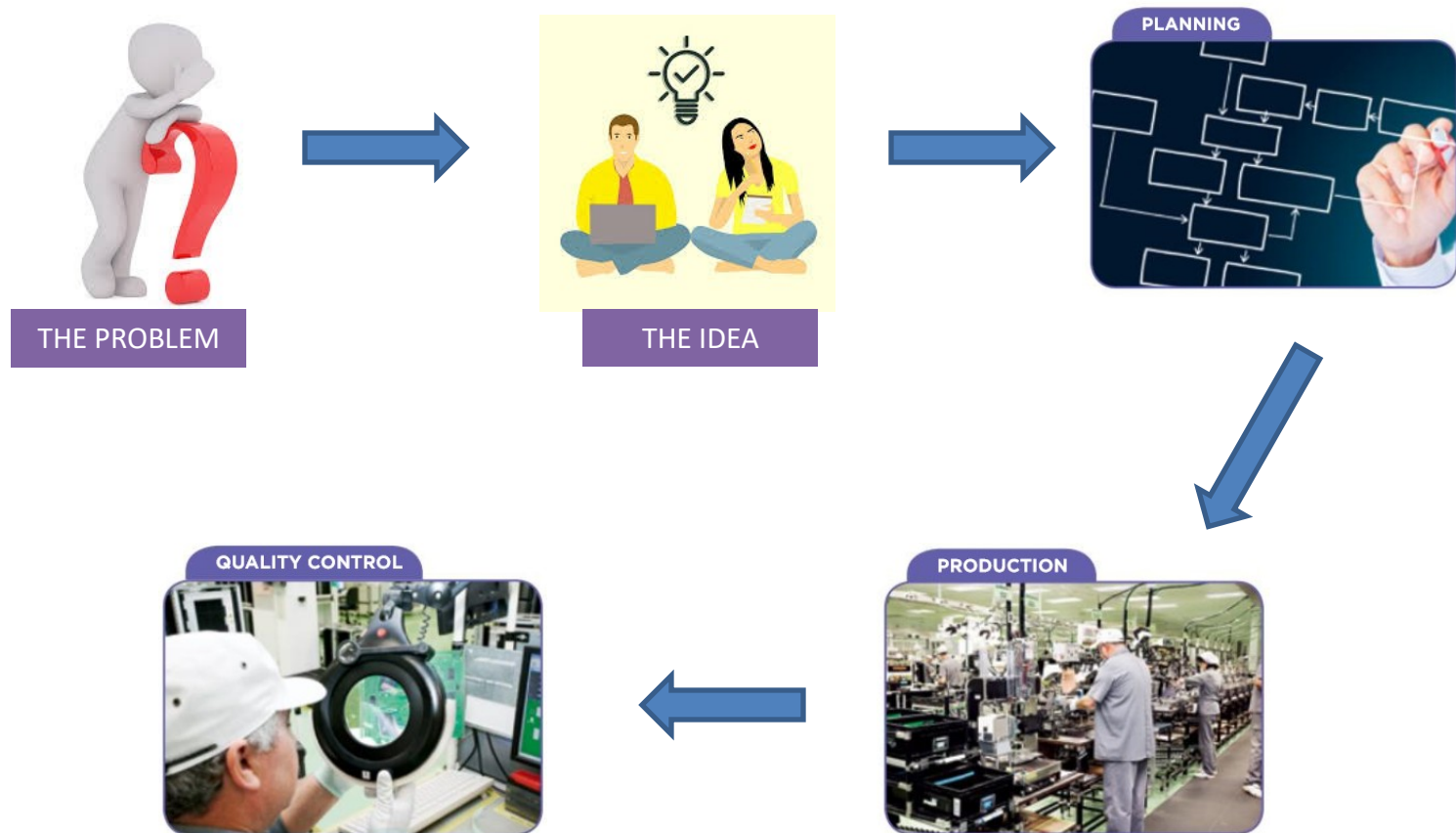
- El método científico:

La ciencia se basa en la observación y la experimentación y tiene como objetivo comprender aspectos de nuestro entorno y cómo funciona.

- El método tecnológico:

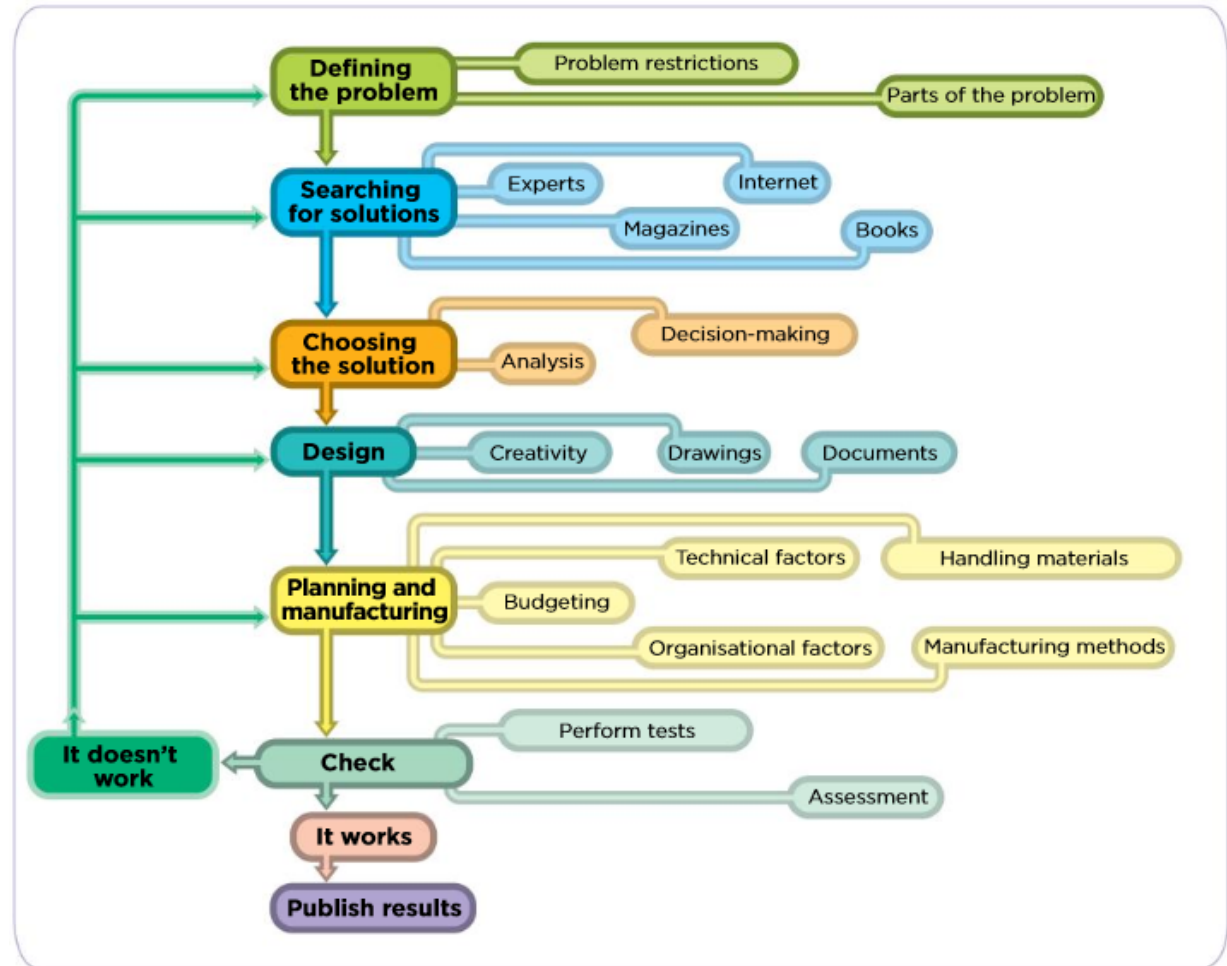
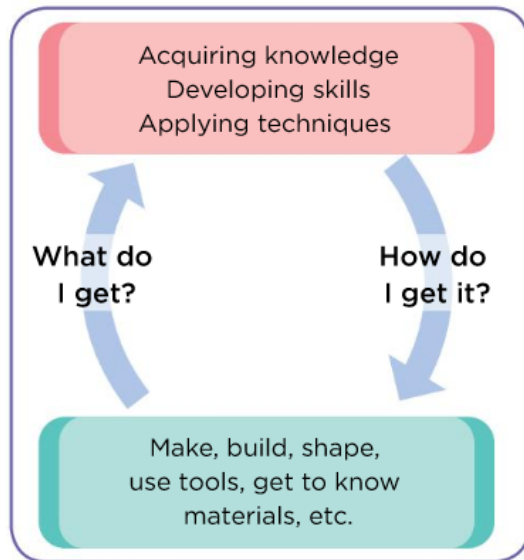
La tecnología aplica el conocimiento científico de una forma práctica, dando como resultado la creación y el perfeccionamiento de la técnica.

What does a “techie” do?

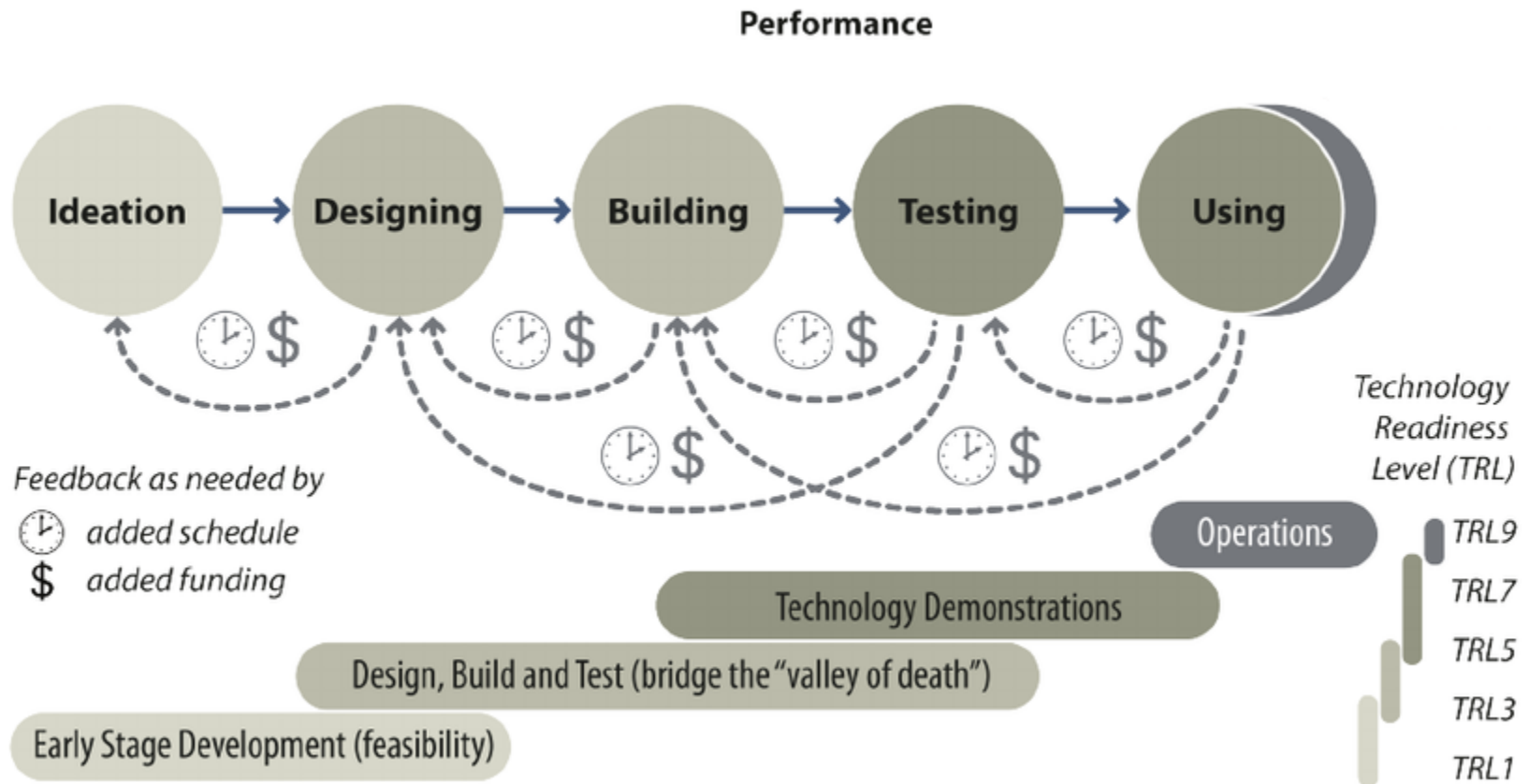


Techie: Technologist

THE TECHNOLOGICAL METHOD



THE TECHNOLOGICAL METHOD



The stages of a technical project

1. Developing ideas and finding solutions.
2. Analysing objects.
 - Morphological analysis.
 - Functional analysis.
 - Technical analysis.
 - Economic analysis.
3. Designing an object / process.
4. Planning and manufacturing.
5. Project report.

Las etapas de un proyecto técnico

1. Desarrollo de ideas y planteamiento de soluciones.
2. Análisis de objetos.
 - Análisis morfológico (de forma).
 - Análisis Funcional.
 - Análisis técnico.
 - Análisis económico.
3. Diseñando un objeto/proceso.
4. Planificación y fabricación.
5. Documento Proyecto.

Developing ideas and finding solutions

- Stating the problem correctly.
Definir correctamente el problema
- Brainstorming .
Lluvia/tormenta de ideas

Understand, think and apply

- 1  Propose five different solutions to the problem of 'crossing a river', without thinking about any restrictions. Next to each one, write why you think it is a good solution.
- 2 Now we are going to make the problem above even more specific: 'crossing a river with a suspension bridge, with separate areas for vehicles and pedestrians'.
Search for information about suspension bridges. Pay attention to what they look like. In your notebook, draw a picture of a possible solution.
- 3 Now, think about the problem of carrying several books and notebooks in your backpack every day. Propose three possible solutions to the problem. Next to each one, write the pros and cons. Which solution do you think is the best?



Analysing objects

Morphological analysis

Functional analysis

Technical analysis

Economic analysis

Understand, think and apply

4  Have a look at the two doorknobs in the picture. In order to carry out a full analysis of each of them, complete the following activities:

- a) Describe each of them physically.
- b) Explain how each of them works.
- c) On a manufacturer or [ironmonger's](#) website, look for the cost of a spherical knob and a lever-type knob. Compare their prices.

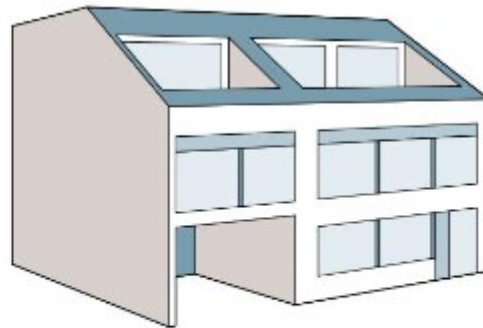
d) Imagine you are a building contractor. Which of the two knobs would you choose for the doors of a block of flats? Present the pros and cons of each of them in order to help you choose just one.



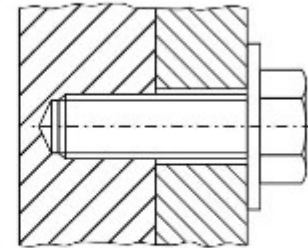
Designing an object

“See for oneself is a hundred times better than hearing from others”.

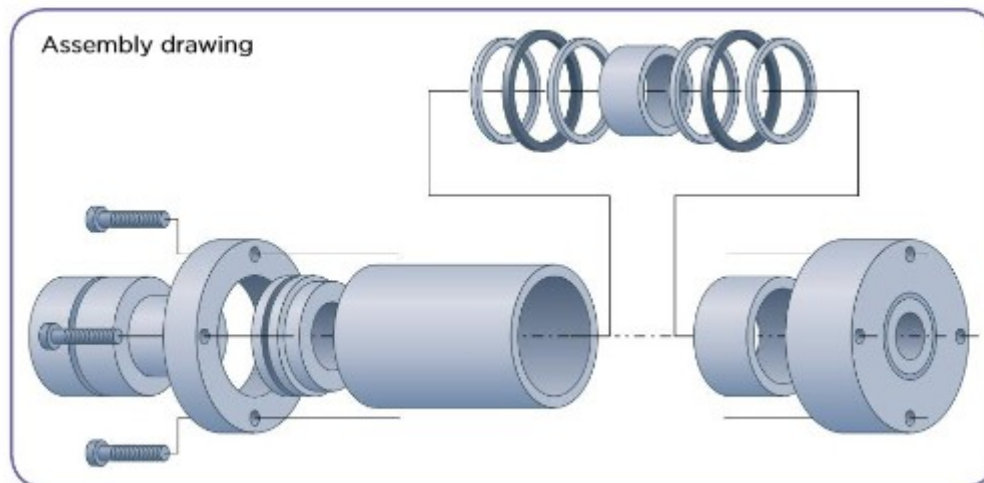
“Una imagen vale más que mil palabras”.



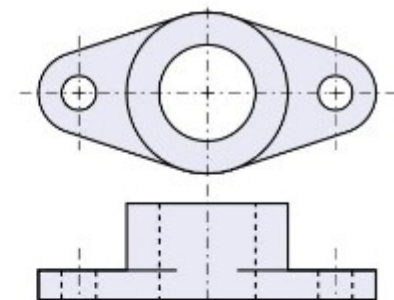
Perspective drawing



Cross-section



Assembly drawing



Overhead and side views

Requirements of a good design

- As simple as feasible.
 - Easy to build and few materials involved.
- Appropriate.
 - According to the purpose for which is made.
- Easy to handle and safe.
 - It's use has to be simple and safe.
- Cheap.
 - The easier to be built, the cheaper it results.

Requisitos de un buen diseño

- Tan simple como sea posible.
 - Fácil de construir y pocos materiales implicados.
- Apropiado.
 - Acorde al propósito para el cual se fabrica.
- Fácil de manejar y seguro.
 - Su uso ha de ser simple y seguro.
- Asequible.
 - Cuanto más fácil de construir, más barato resulta.

Planning and manufacturing

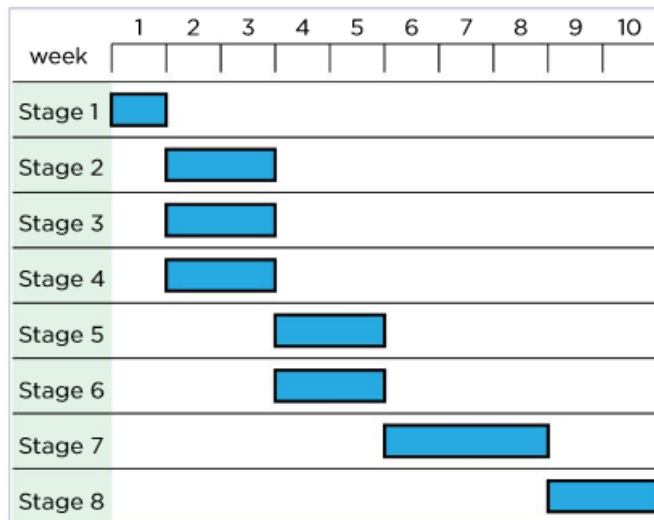
Gantt chart

Let's look at an example of creating a Gantt chart for making a chair. The manufacturing stages will include:

- Stage 1: Preparing materials
- Stage 2: Cutting the legs
- Stage 3: Cutting the horizontal board
- Stage 4: Cutting the parts that make up the backrest
- Stage 5: Putting the legs and the board together
- Stage 6: Putting the backrest parts together
- Stage 7: Incorporating the backrest into the assembly
- Stage 8: Finally painting the assembly.

The Gantt chart reflects each of these stages over time. If the time frame for a technology

project is 2 months, the timeline must be set by weeks. Look at how some stages are carried out at the same time, given that the team has people for each stage. If, for example, the team has 3 groups of 2 people, each group can be responsible for a different stage.



Understand, think and apply

- 5  Think of a technological object, such as a chair. Think about how many different parts the chair is made up of, for example the legs, board, backrest and screws. Remember that all of these parts must be made of wood or pieces of metal. In teams, plan the tasks of gathering material supplies, making each component and putting the chair together step by step, just as it would be done in a chair manufacturing workshop. When the list of manufacturing steps is ready, put these steps in the right order and decide how long each one will take. Remember that some tasks may be carried out at the same time.

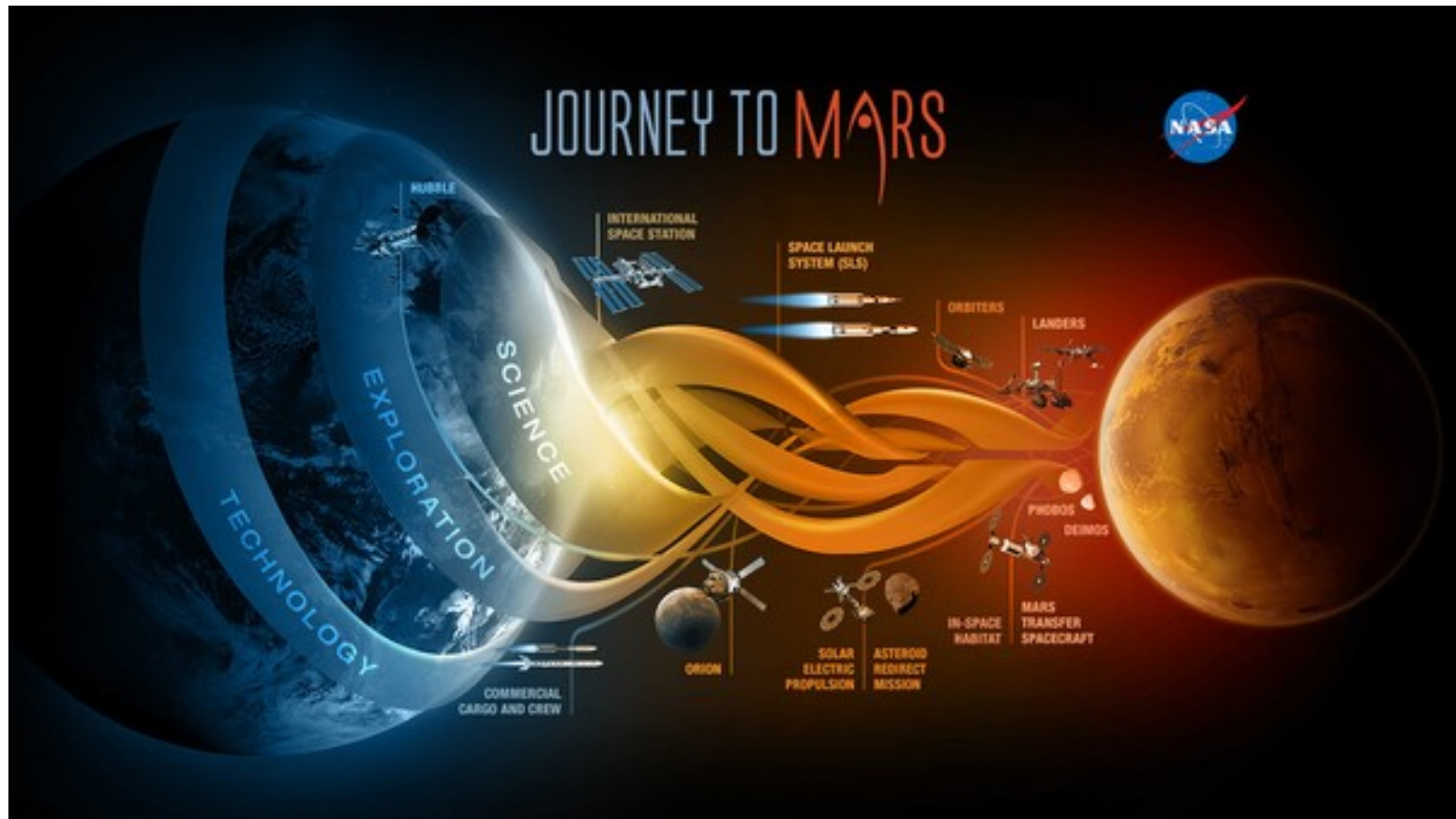
Project report

- Cover.
 - Index.
 - Definition of the problem.
 - Schedule of each proposed solution.
 - Chosen solution 
 - Conclusions.
 - Bibliography.
- Views of the object.
 - Drawing of the parts.
 - Assembly instructions.
 - Budget
 - Table of materials used.
 - Table of tools used.

Documento Proyecto

- Portada.
 - Índice.
 - Definición del problema.
 - Esquema de cada solución propuesta.
 - Solución escogida. 
 - Conclusiones.
 - Bibliografía (y webgrafía).
- 
- Representaciones del objeto.
 - Planos de los componentes.
 - Instrucciones de ensamblaje.
 - Presupuesto.
 - Tabla de materiales usados.
 - Herramientas usadas.

An example to discuss



[Why is so hard to travel to Mars?](#)

A brief resume of changes in production models

Initial concepts of work (1750-1880)

Changes in model of job. Unemployment and migration grow.

The era of scientific manufacturing (1880-1910)

Scientific methods are applied to increase efficiency in manufacturing.

The mass production era (1910-1980)

The mass production got manufacturing cheaper.

The quality era (1980-1995)

Excess of production and higher energy costs made manufacturers compete in base of quality.

Personalised mass production (1995-present)

A more and more specialised production allows guests to satisfy their demands, and manufacturers deal to make their products according to guests' preferences.

Technological Innovation

Any **change** based on **knowledge** generates **value**

- **Change:** Modification respect the traditional way of making or proceeding.
- **Knowledge:** all data or ideas generated through science, technique or technology.
- **Value:** Practical use and service to society.

Innovation allows to take advantage respect to the competition.

Innovacion tecnológica

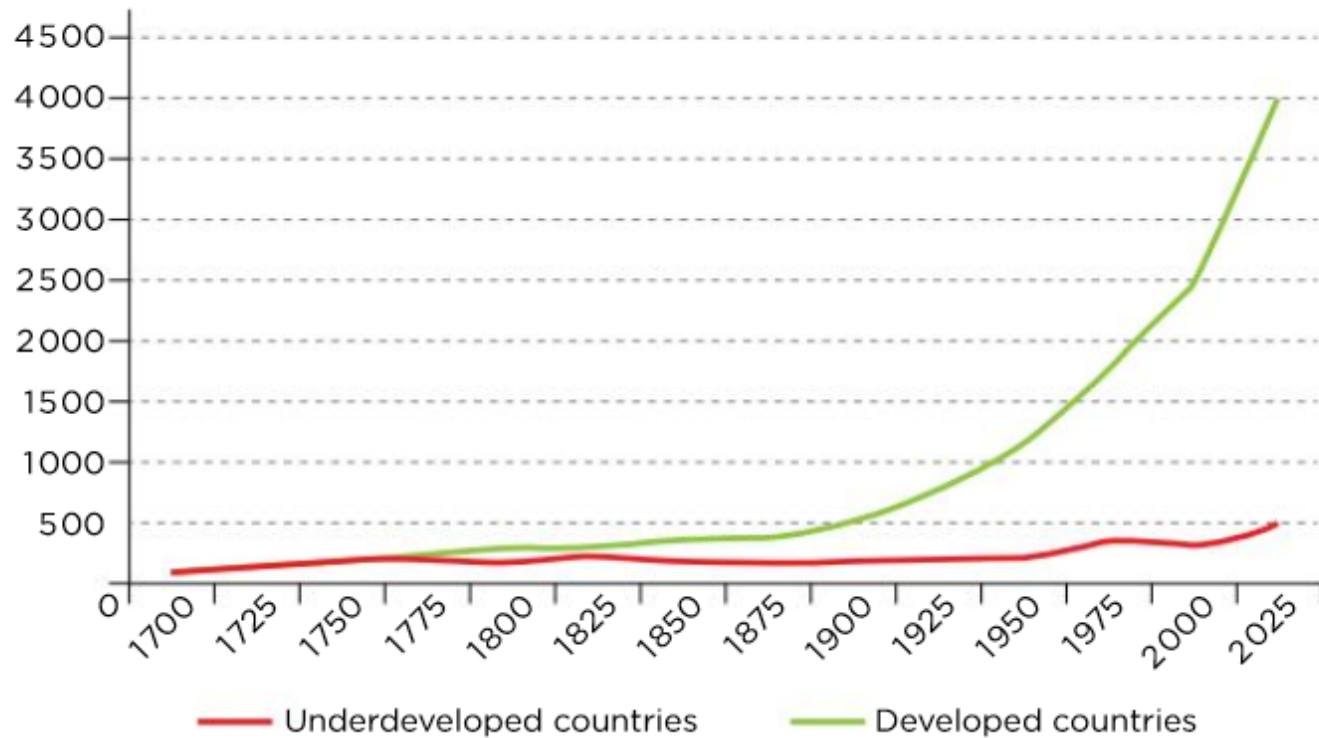
Cualquier **cambio** basado en el **conocimiento** genera **valor**.

- **Cambio:** Modificación respecto a la manera tradicional de hacer o proceder.
- **Conocimiento:** el conjunto de datos e ideas generado a través de la ciencia, la técnica y/o la tecnología.
- **Valor:** Uso y servicio Práctico para la sociedad.

La Innovación permite sacar ventaja respecto a la competencia.

The result

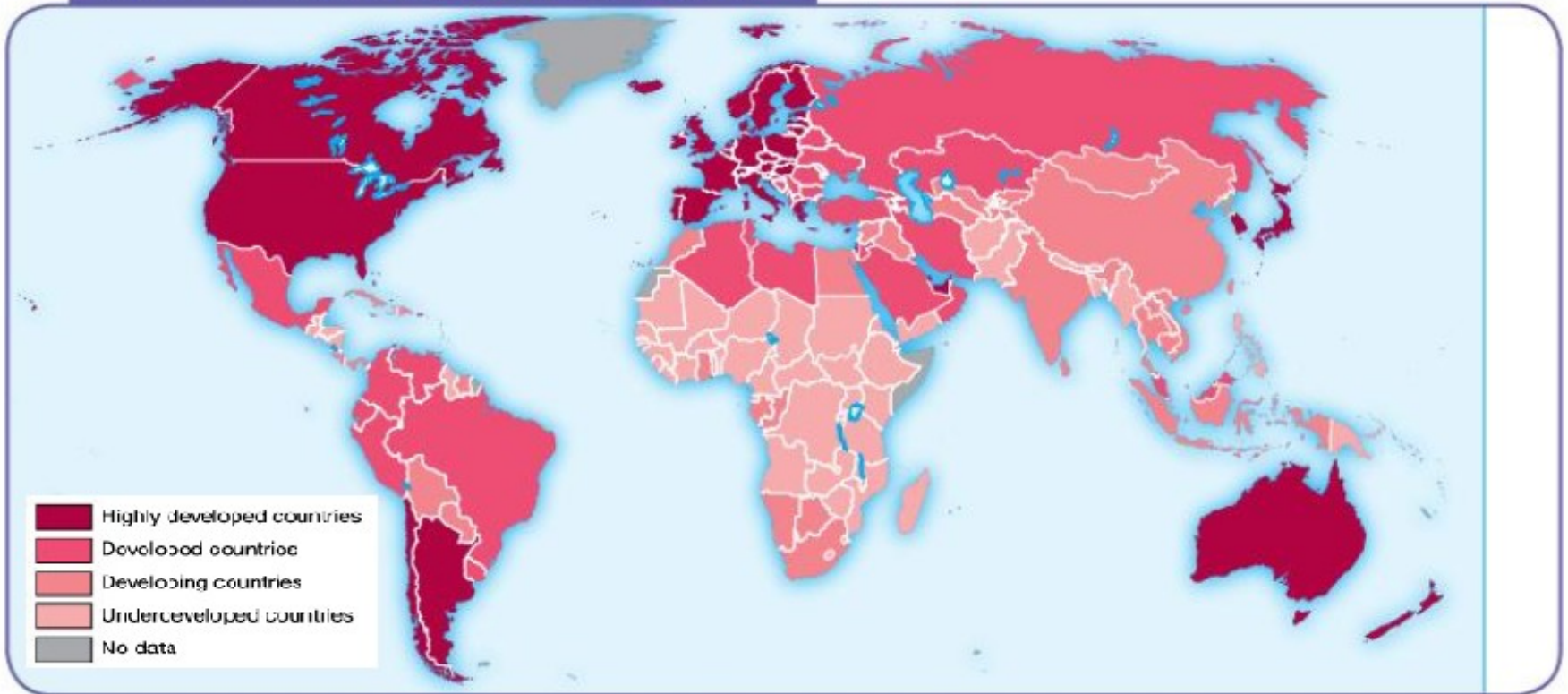
Innovation as the driving force behind a country's development



Growth of average income per capita for both underdeveloped and developed countries.

The result

THE GLOBAL DISTRIBUTION OF WEALTH



Can technology help to bridge the poverty gap?

The trend indicates negative perspectives but...

It's possible to contribute with developing countries in an effective way by:

- Paying raw materials with technology instead of currency (funds) to prevent corruption.
- Establishing technical training programs.
- Developing infrastructures.
- Creating stable transport networks.
- Developing a culture of innovation.

¿Puede la tecnología ayudar a salvar la brecha de pobreza?

La tendencia indica que no, pero...

Es posible contribuir con países en desarrollo de una manera efectiva mediante:

- Pagando materias primas con tecnología en vez de con fondos monetarios para prevenir la corrupción.
- Estableciendo programas de formación técnica.
- Desarrollando infraestructura.
- Creando redes de transporte estables.
- Desarrollando una cultura de innovación.

Exercises

Understand, think, search

- 1 The African country Cape Verde is often considered to be one of the most significant examples of progress. In 2007, the United Nations removed Cape Verde from the list of the poorest countries in the world and placed it on the list of developing countries.

Do some research online to find out how Cape Verde made progress, then write a report to analyse the factors and work sectors that led to such a small country being able to slowly grow out of poverty.



Or

Do the same with the [Costa Rica](#) case.