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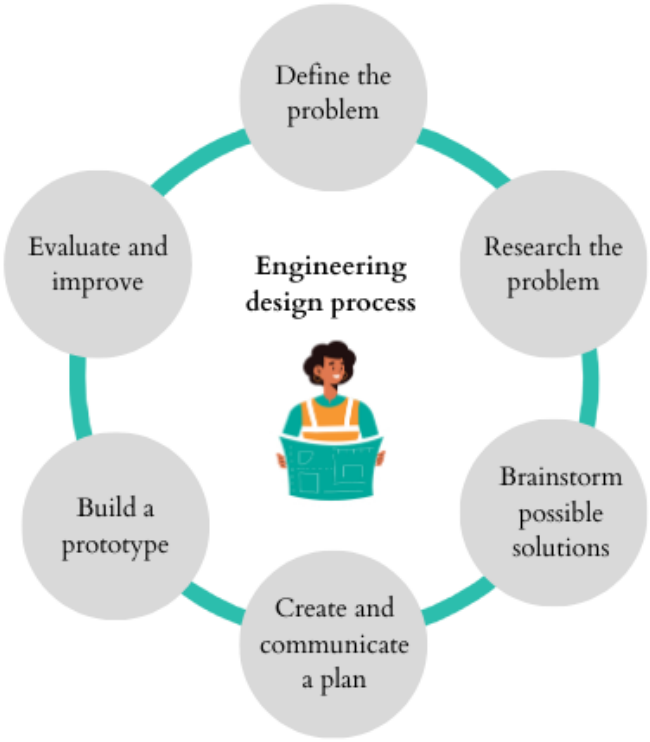
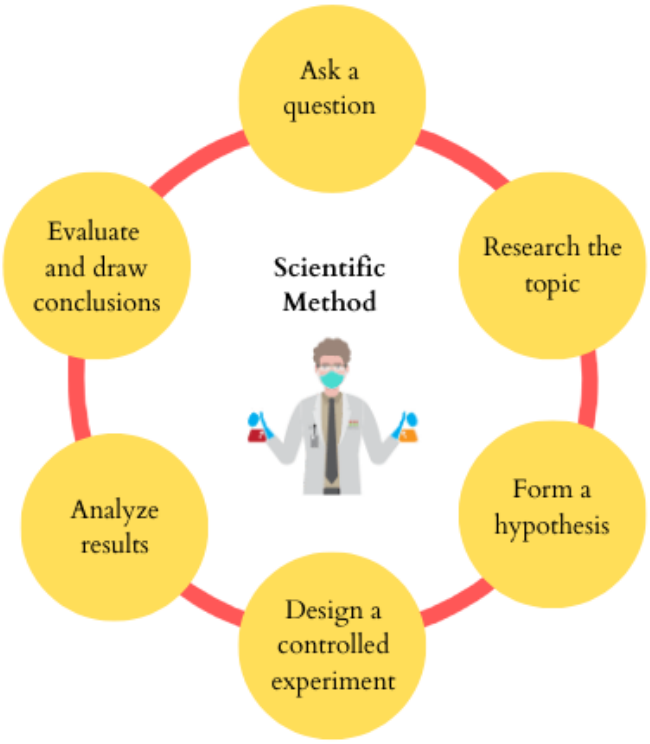
Lesson 2: Mycelium Design Challenge

Objectives:

1. Outline the steps of the engineering design process
2. Distinguish the engineering design process from the scientific method
3. Analyze the project brief for the mycelium design challenge





Introduction:

Engineers can become specialized in a huge variety of fields. The one common goal is to provide a solution to a problem. For scientists however, the goal is to further the advancement of knowledge in a particular field and not necessarily to apply a solution to a problem. Engineers may tackle problems related to health, cybersecurity, access to clean water, providing sustainable energy, building city roads, and a variety of others. Some engineering fields include electrical, software, mechanical, chemical, civil and aerospace. Tissue engineering, for example, is a type of biomedical engineering that involves improving damaged organs or even artificial producing them. A software engineer may work to help develop the futuristic Metaverse, a virtual reality universe pioneered by the company Meta. An electrical engineer may be working with a team to create solar power that is more cost-effective and accessible. The engineering design process is one that is iterative, where failing only brings more data to work towards a better solution. Engineers must be perseverant, creative and team players in order to develop the best possible ideas for a company.

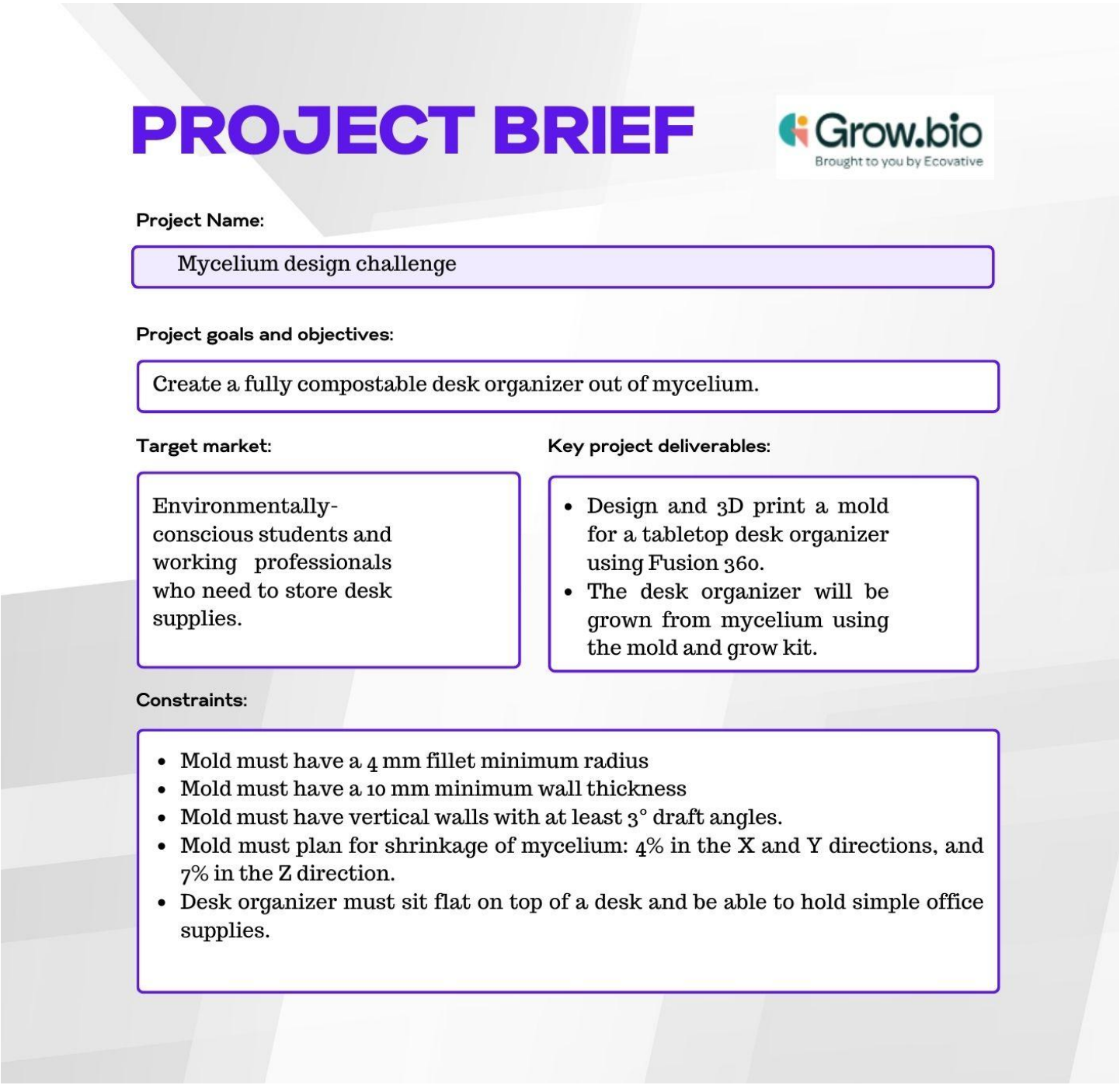
Activity: Analyze the engineering design process

1. Read about Industrial engineer Remy Labesque who wanted to reinvent the classic chocolate chip.
    a. What was the problem, according to Labesque?
    b. What was his proposed solution?

A. Read about the robotic sleeve being designed for children with cerebral palsy by the University of California, Riverside.
    a. What are the mobility issues related to having cerebral palsy?

b. What is the proposed solution?

Through this project you will take on the role of engineer. You will be following the engineering design process in the context of the challenge below:



PROJECT BRIEF

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Project Name:

Mycelium design challenge

Project goals and objectives:

Create a fully compostable desk organizer out of mycelium.

Target market:

Environmentally-conscious students and working professionals who need to store desk supplies.

Key project deliverables:

- Design and 3D print a mold for a tabletop desk organizer using Fusion 360.
- The desk organizer will be grown from mycelium using the mold and grow kit.

Constraints:

- Mold must have a 4 mm fillet minimum radius
- Mold must have a 10 mm minimum wall thickness
- Mold must have vertical walls with at least 3° draft angles.
- Mold must plan for shrinkage of mycelium: 4% in the X and Y directions, and 7% in the Z direction.
- Desk organizer must sit flat on top of a desk and be able to hold simple office supplies.

3. Read the project brief above. Who may need to have the project brief before a project begins? Why?

4. Creating a mental map of an upcoming task can help easy uncertainty and build motivation to begin.

a. In order to make your own mental map, anticipate what actions you may have to take in order to achieve your goal.
b. Which aspects of the challenges confuse you? What is still muddy and difficult to picture?
c. Share with a peer.