

Life's Engineering Tales: featuring Grandma's Hip Replacement

Facilitator's Guide

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This guide supports the integration of an Infographic and set of Activity Cards, titled “Life’s Engineering Tales: featuring Grandma’s Hip Replacement”, into the classroom.

The poster/infographic tells a story about engineering that a lot of people can relate to. In simple terms and through visualization, the infographic walks through the steps and considerations of making a new hip implant (3D model on the computer; making sure it facilitates movement inside the body; considering which materials can be used; etc.)

Five activity cards bring an interactive element to this resource. The cards include a question on the front and possible answers on the back. The back also includes a “master mind question” for those motivated to dig deeper.

Zip File Contents:

- Read Me Facilitator’s Guide
- Poster/Infographic PDF
- Activity Cards PDF

Age Range:

This resource was designed to tell a story, give food for thought, and inspire. It is therefore suitable for all ages.

It is, however, worth noting, that we intentionally use simplified language avoiding specific jargon, to make the story understandable and relatable for children (**age 12+**) and anyone trained outside of this subject area.

The focus of this resource is to encourage discussion around a STEM topic, regardless of age.

Learning Objectives:

After going through this activity, learners will be able to:

- Understand steps that need to be undertaken to design an artificial hip
- Understand deciding factors for shape, design, and optimization
- Understand characteristics of “bio-medical” materials

Estimated Time for Completion:

We expect it to take approximately **45 minutes** to go through this exercise. Below is a breakdown of an example of how this resource could be implemented:

1. Facilitator presents the poster, walking participants through steps 1 to 3 (**5 min**)
2. Divide participants into up to **5 groups**
3. Each group gets one card and is asked to have a discussion around the question on their card (**10 min**)
4. Group is allowed to look at answer on the back and can discuss and compare the answers on the card with their previous discussion (**5 min**) (Give option to tackle the mastermind question on the back.)
5. Each group presents a summary of their discussion, including challenges and take-home message (**i.e. 3 min per group**)
6. Time for Q&A and open discussion (**10 min**)

Prior/Supplemental Knowledge Required:

No prior knowledge is required for this exercise.

Fundamental concepts covered:

This resource covers the concepts of the interplay of

- 3D modeling
- Design
- Design optimization
- Healthcare
- Materials science



Additional Ansys Resources:

Below are links to Ansys Educational Resources to support teaching this topic. Some are geared more towards pre-university classrooms, while others are more advanced.

Pre-University Content

1. [Materials Intelligence: the Card Game](#)
2. [Why this shape? Exploring the historical and structural significance of the Arch part 1](#)
3. [Selecting Materials for Musical Instruments: a Case Example with a Xylophone](#)

Advanced Content

1. [Level 3 Industrial Case Study: Biomaterials Selection for a Joint Replacement](#)
2. [Case Study: Simulation-driven design for a Joint Replacement in Ansys Discovery](#)

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Document Information

This instructor's guide is part of a set of teaching resources to help introduce students to science, technology, engineering, and math.

Ansys Education Resources

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