makedo® STEAM DESIGN CHALLENGE

'BIONICS'

THE PROBLEM

Humans are pretty clever and they can do amazing things. Sometimes would it be useful to have an extra hand or finger? What about a tail to keep you balanced as you climb and jump? A pouch to carry all your things? Can we make the human body better in any way?
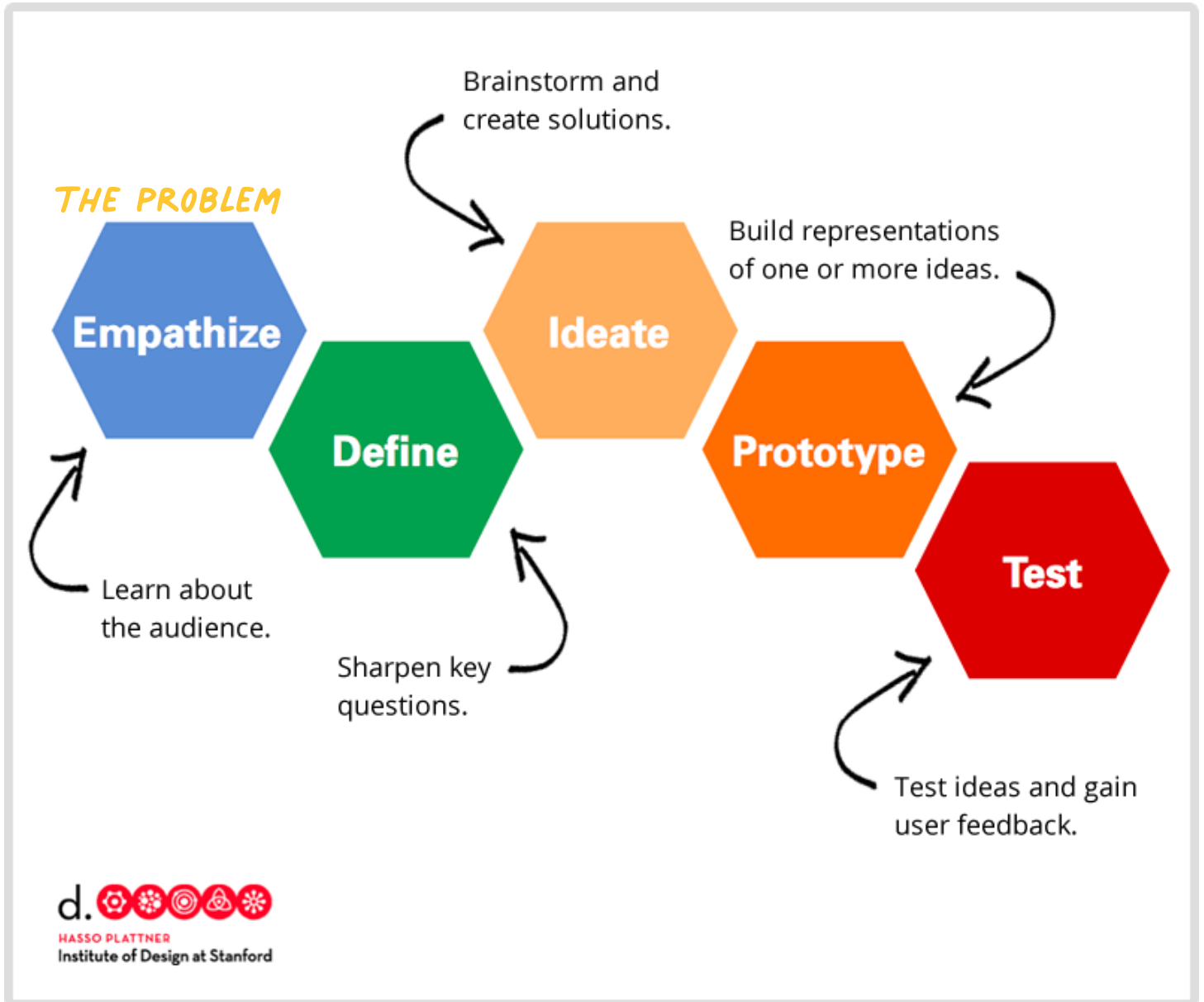
Using nature as your inspiration you can design and create something to make an everyday task easier or enable you to do extraordinary things.

YOUR GOAL	Use Makedo resources and recycled materials to create a bionic enhancement.
YOUR ROLE	You are an engineer looking to help improve the design of humans.
YOUR AUDIENCE	People who want to make life easier or push the boundaries of what their body can do.
THE SCENARIO	Humans and animals are evolving all the time, what will be the next step?
THE PRODUCT	The product will be a functioning enhancement of a body part or addition to the body.

HOW TO USE THIS PROJECT SHEET

- As a class, inquire into the design problem. Use this sheet to guide students through the Makedo design thinking process to create your designs.

- Work with students to inquire, generate ideas, create prototypes and test their designs.

- Depending on your group's age and ability use the "Go Further" section to extend the challenge.

THE DESIGN THINKING PROCESS

THE PROBLEM

Brainstorm and create solutions.

Build representations of one or more ideas.

Empathize

Ideate

Define

Prototype

Test

Learn about the audience.

Sharpen key questions.

Test ideas and gain user feedback.

d. HASSO PLATTNER
Institute of Design at Stanford

USING THE DESIGN THINKING PROCESS

When starting out you can work through each section step by step.
As you get more experienced, you can rearrange the sections or jump
back and forth between stages to get a more authentic design experience.
For example you could test an idea before making the final prototype!

EMPATHISE

OBSERVE:
What are the different parts of the problem?
Where is the problem happening?
What can we observe that will help us to design our own solution to the problem?
Who is involved; the users, clients and designers. These people are our stakeholders.

ENGAGE:
Ask questions and learn everything you can about the design problem.
Why are we solving this problem?

CONNECT:
What connections did you make between what you have found out and what you observed?
Talk to other designers about the problem.

DEFINE

FOCUS:
What exactly is the problem we will solve?
How could you begin to solve the problem?
What things do we need to be aware of as we move forward?

PATTERNS:
What connections and patterns did you see while you investigated the problem?
What areas should you focus on when you start to create ideas?

NEEDS:
What do your stakeholders need from a solution?
What are the essential things our solution must have?
How will we know if we have succeeded in solving the problem?

IDEATE

CREATIVITY:
How can we represent different parts of the problem or initial ideas for solutions?
Are some ideas best represented with... Mind-maps? Sketches? Models?

FLEXIBILITY:
How many different ideas can we come up with to solve the problem?
Do our ideas need to solve all aspects of the problem or just some?
How can we get feedback on our ideas?

DEVELOPMENT:
How can we move from our first idea to the final design?
What rationale will we use to choose the best idea(s)?
How can we represent our final idea(s)?

PROTOTYPE

BUILD: Even if you are not sure of all of the details, begin to create your design using Makedo tools

OPTIONS: Make sure to create multiple options or different versions of your ideas.
Remember these are prototypes, not final products.

RESOURCES: Using Makedo tools allows you to work with any kind of recycled cardboard and paper.
What can you find to work with?

USERS: Remember who you are designing for.
What are the needs and preferences of the users we identified earlier?

TEST

SHOW, DON'T TELL: Will we learn more about our prototypes by describing them to others or by showing them off?
What different perspectives will users have of our prototypes?
What can you learn from observing and listening to users while they experience your prototypes?

EXPERIENCES: Does your prototype create an experience for the users that explains how the product would work?
Is it good if our prototype breaks or fails during testing?

COMPARE: Did you create multiple prototypes which can give users multiple options to compare and contrast?
Can we compare to other designers' prototypes to assess our own success?
Can we compare our prototype to existing real products?

KEYWORDS

Here are some keywords and terms you can explore to help you understand the design thinking process.

Design	User	Design problem
Empathise	Engineer	Observation
Define	Design solution	Programming
Ideate	Sketching	Perspective
Prototype	Modeling	Movement
Testing	Resources	Ergonomics

GO FURTHER!

LEVEL 1: Can your bionic enhancement work without you using your own hands to control it?

LEVEL 2: Could you use any robotics or technology to make your design better?

LEVEL 3: Can your design use programming to think for itself?

SHARE YOUR CREATIONS!

Share your Makedo Design Challenge adventures with our Makedo community!

Upload here to be considered for our HUB

Post on Instagram and tag us @makedo