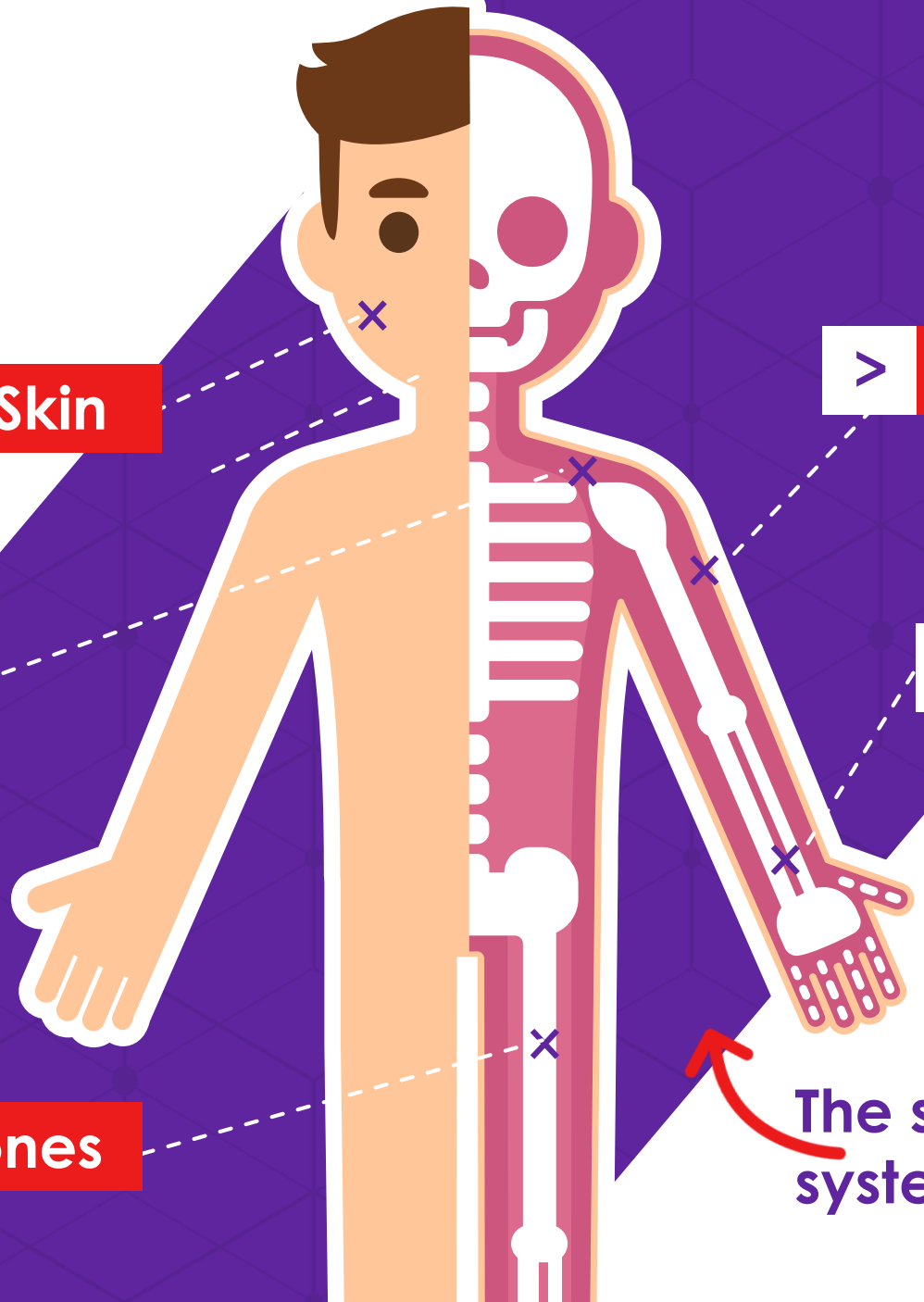
Helping Hands, Making Hands

Primary Biomechanical Engineering Lessons 1 & 2

> an RS Components **Imagine-X** resource

LESSON 1

What are you made of?

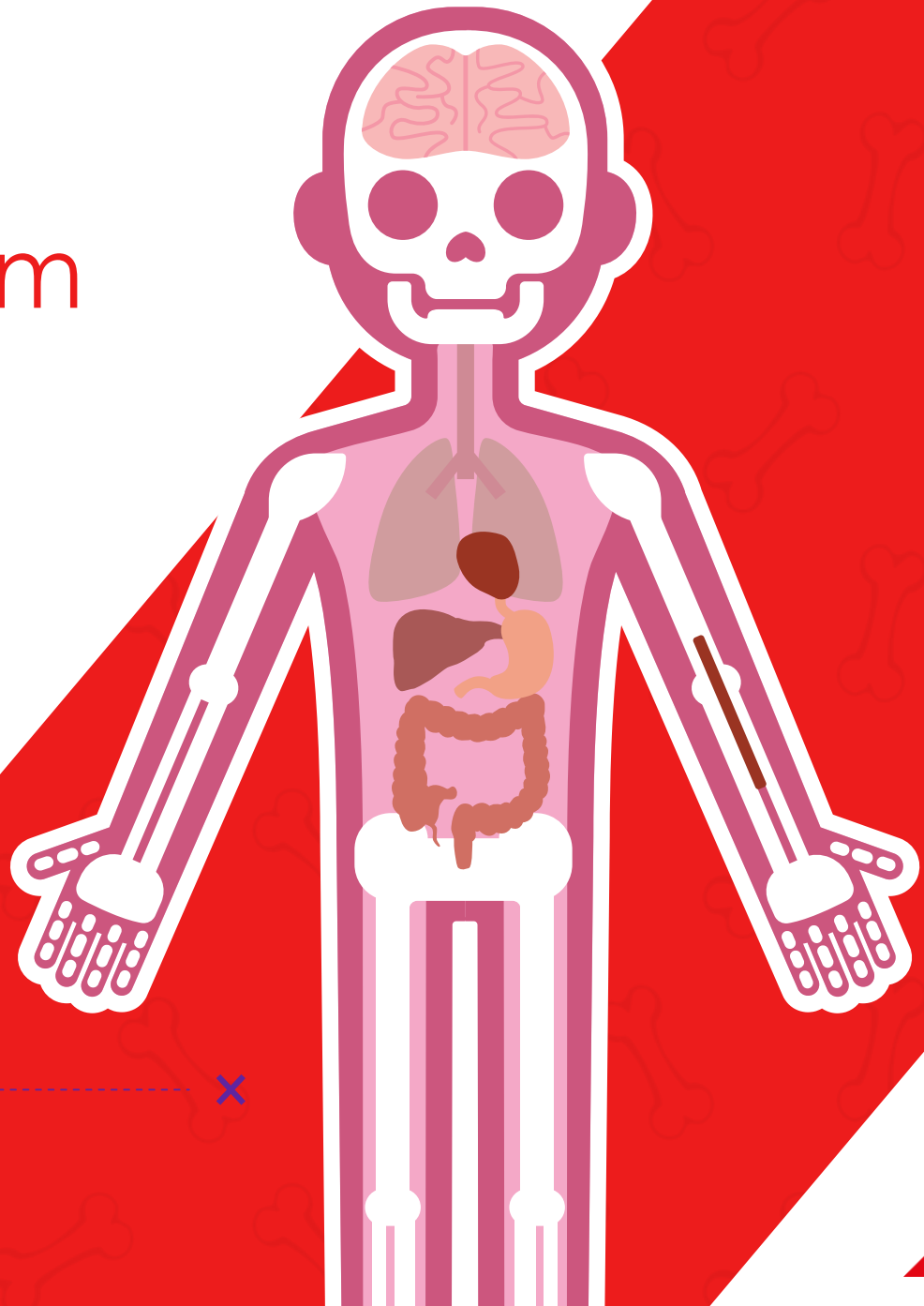


- Skin
- Muscle
- Connective tissue
- Ligaments
- Bones

The skeletal/muscular system

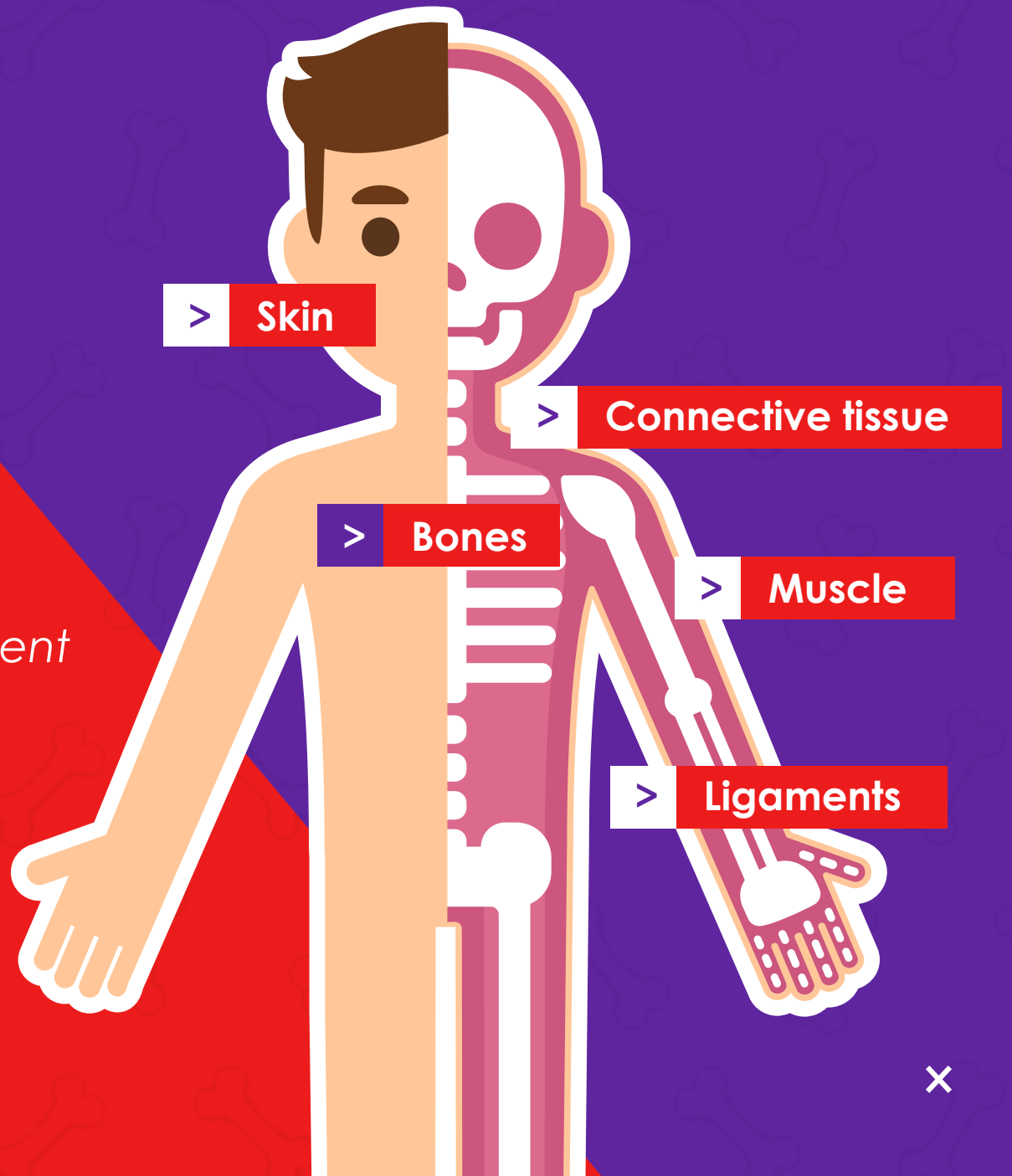
Each part of our **musculoskeletal** system does something for us

- For support
  (keeps our bodies together)
- For protection
  (keeps our organs safe)
- For movement
  (makes our bodies move)



What does each thing do?

- **SKIN**
  Protective, supportive
- **BONES**
  Protective, supportive, movement
- **MUSCLE**
  Movement
- **CONNECTIVE TISSUE**
  Supportive
- **LIGAMENTS**
  Movement



IMAGINE

How our bodies MOVE

Today we're looking at...

TIME TO IMAGINE

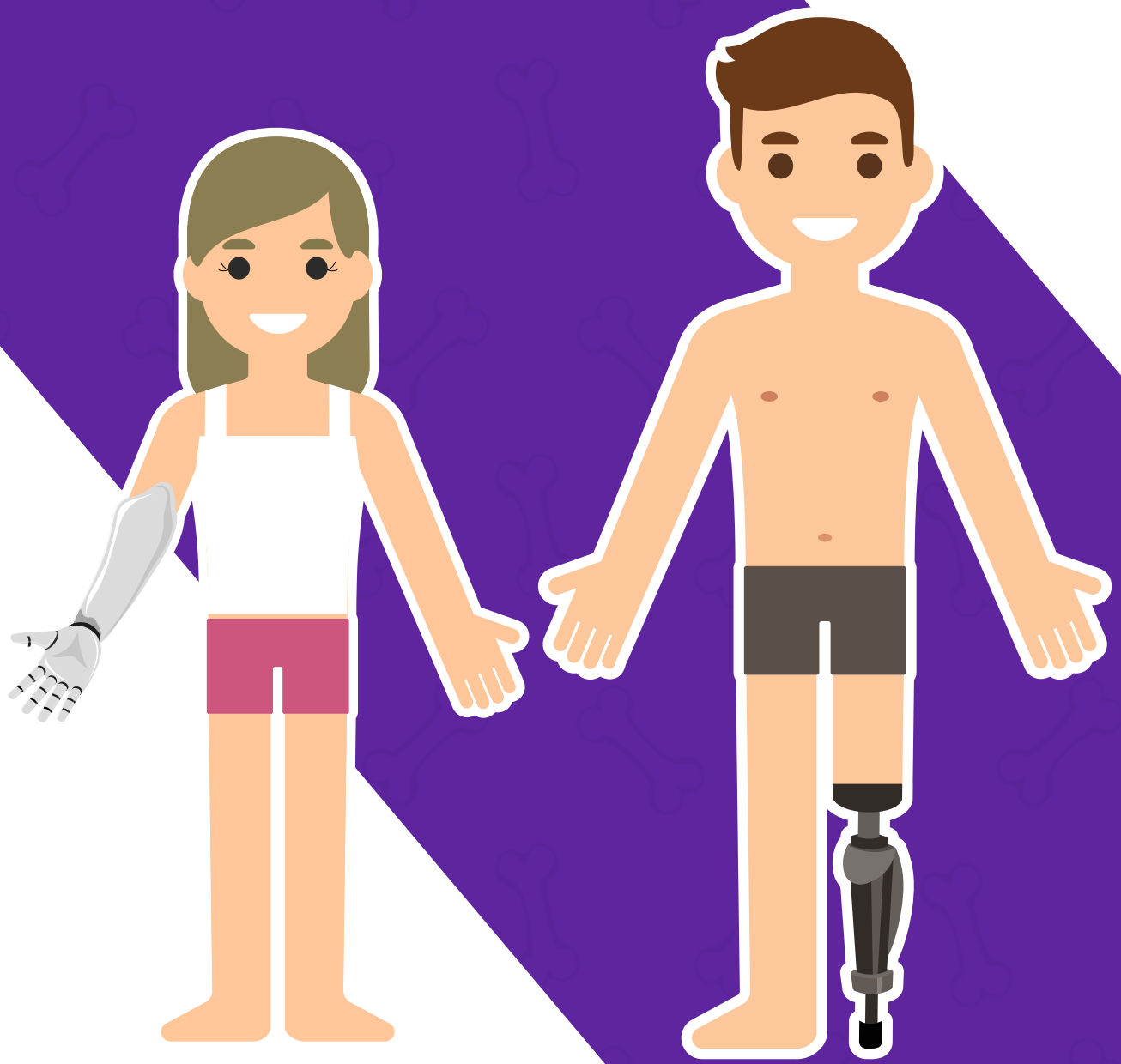
LET'S GET MOVING

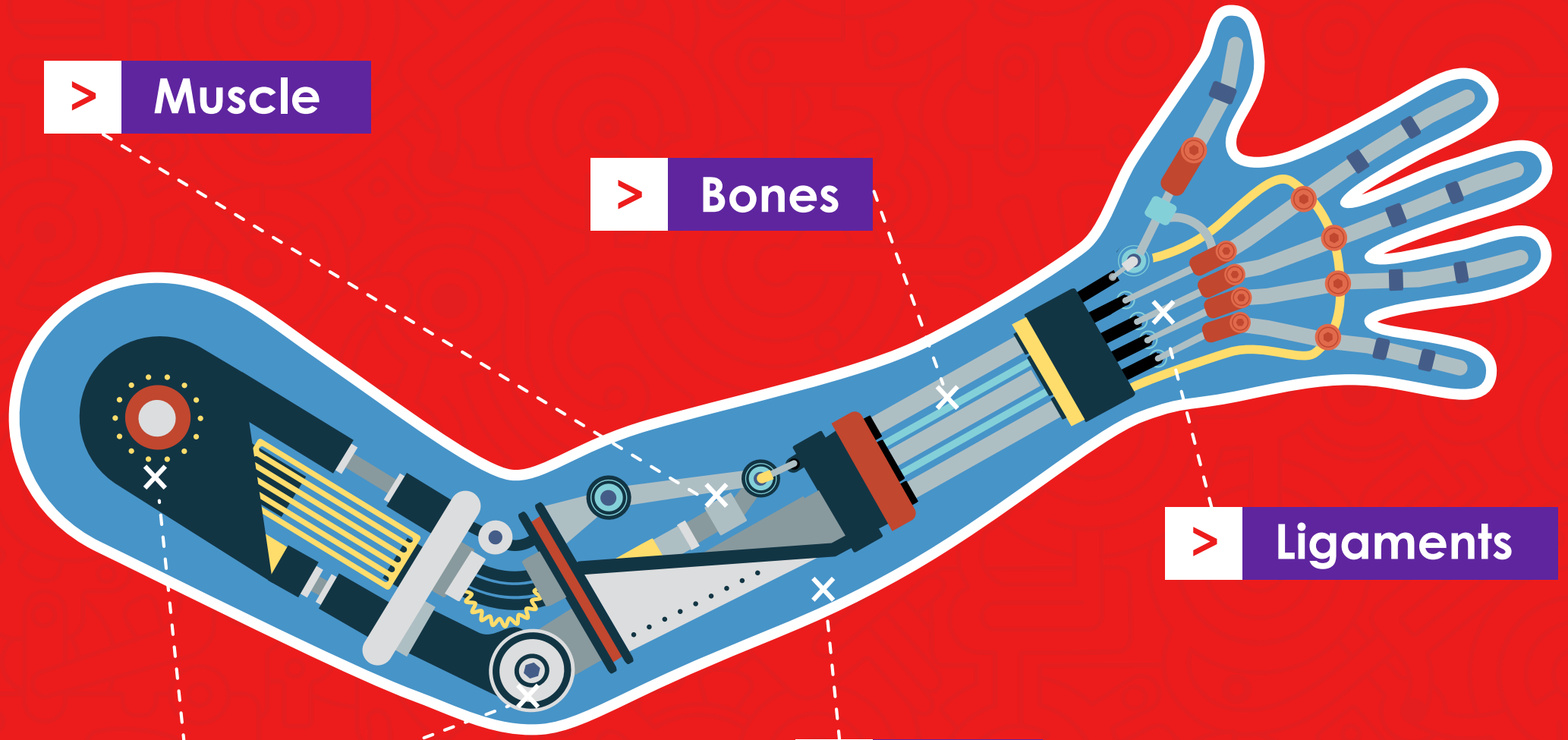
I NEED MY ARMS TO….

[Play intro video for biomechanical engineering]

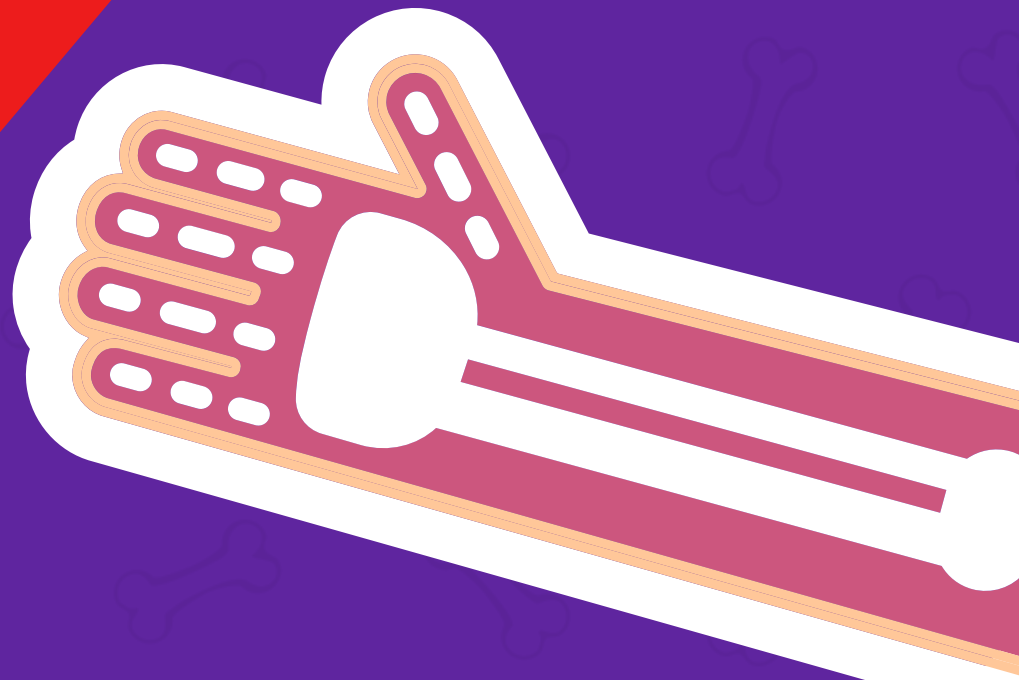
A prosthetic is…

- An artificial or ‘fake’ body part
- Used in place of a missing biological or ‘real’ body part
- Sometimes can be used to fill the function of a missing, or damaged body part




Muscle
Bones
Ligaments
Skin
Joints

Think about

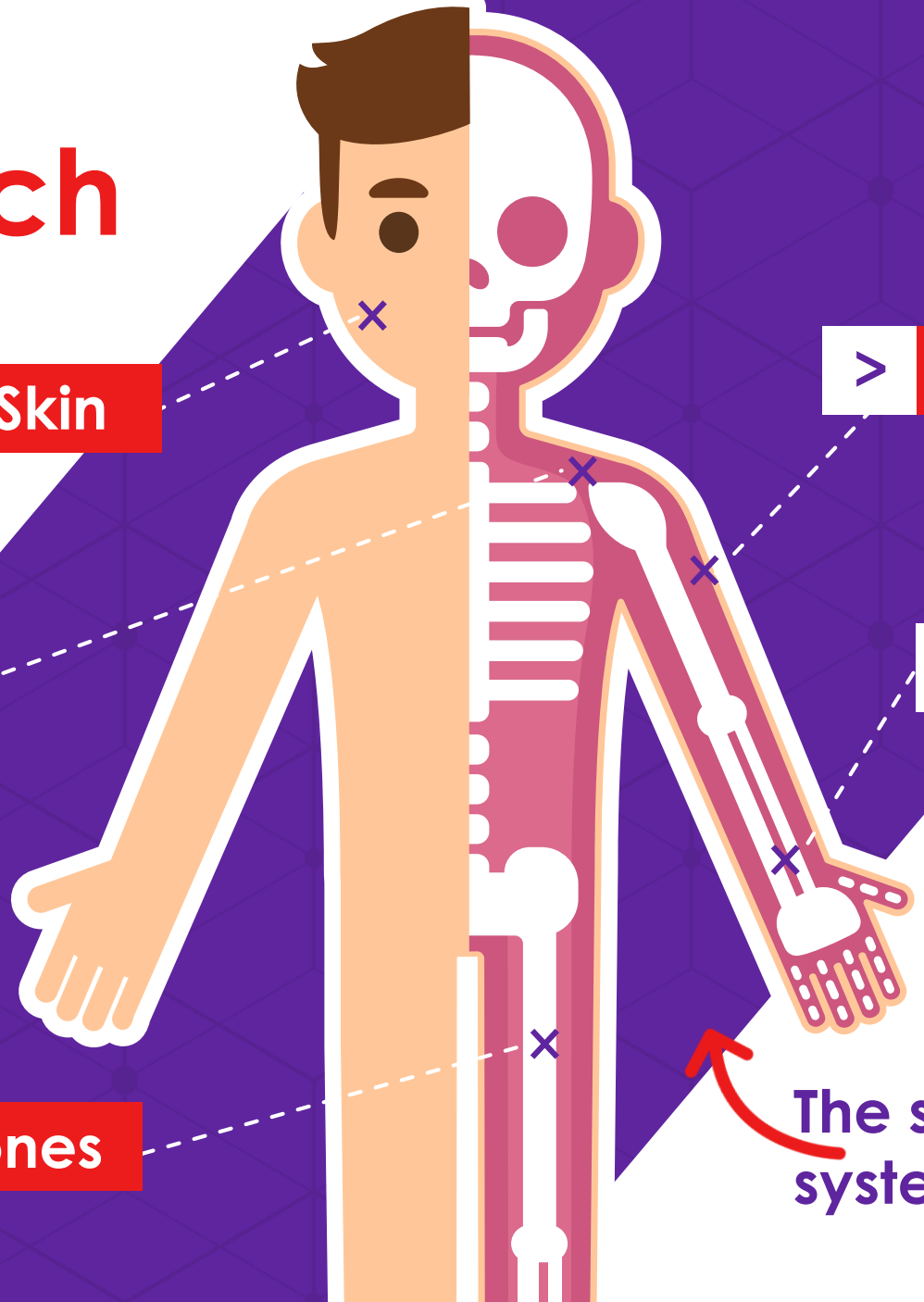


HOW DOES MY ARM MOVE?

HOW DOES MY HAND MOVE?

LESSON 2

What does each thing do?



> Skin

> Connective tissue

> Bones

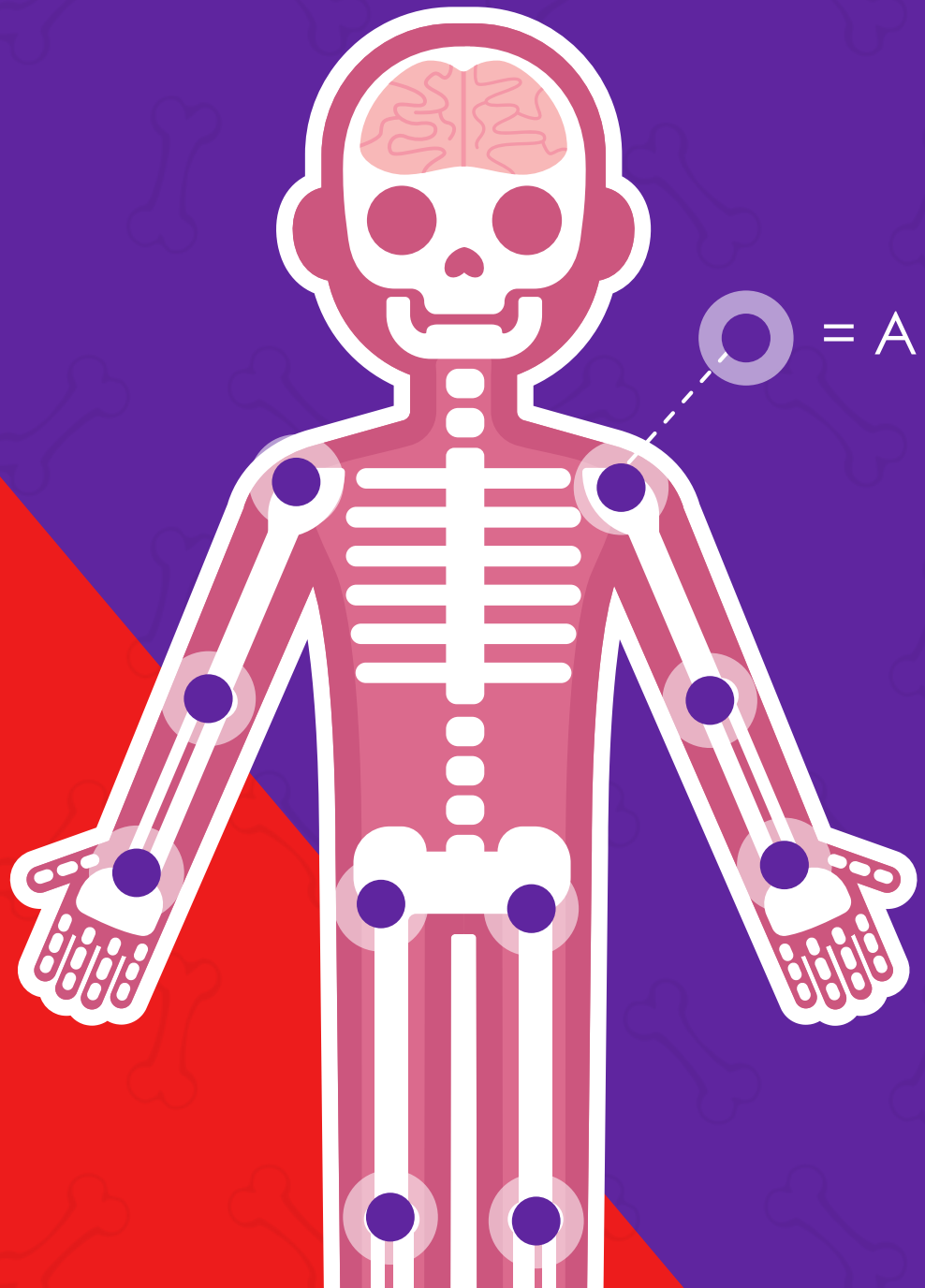
> Muscle

> Ligaments

The skeletal/muscular system

A ‘joint’ is…

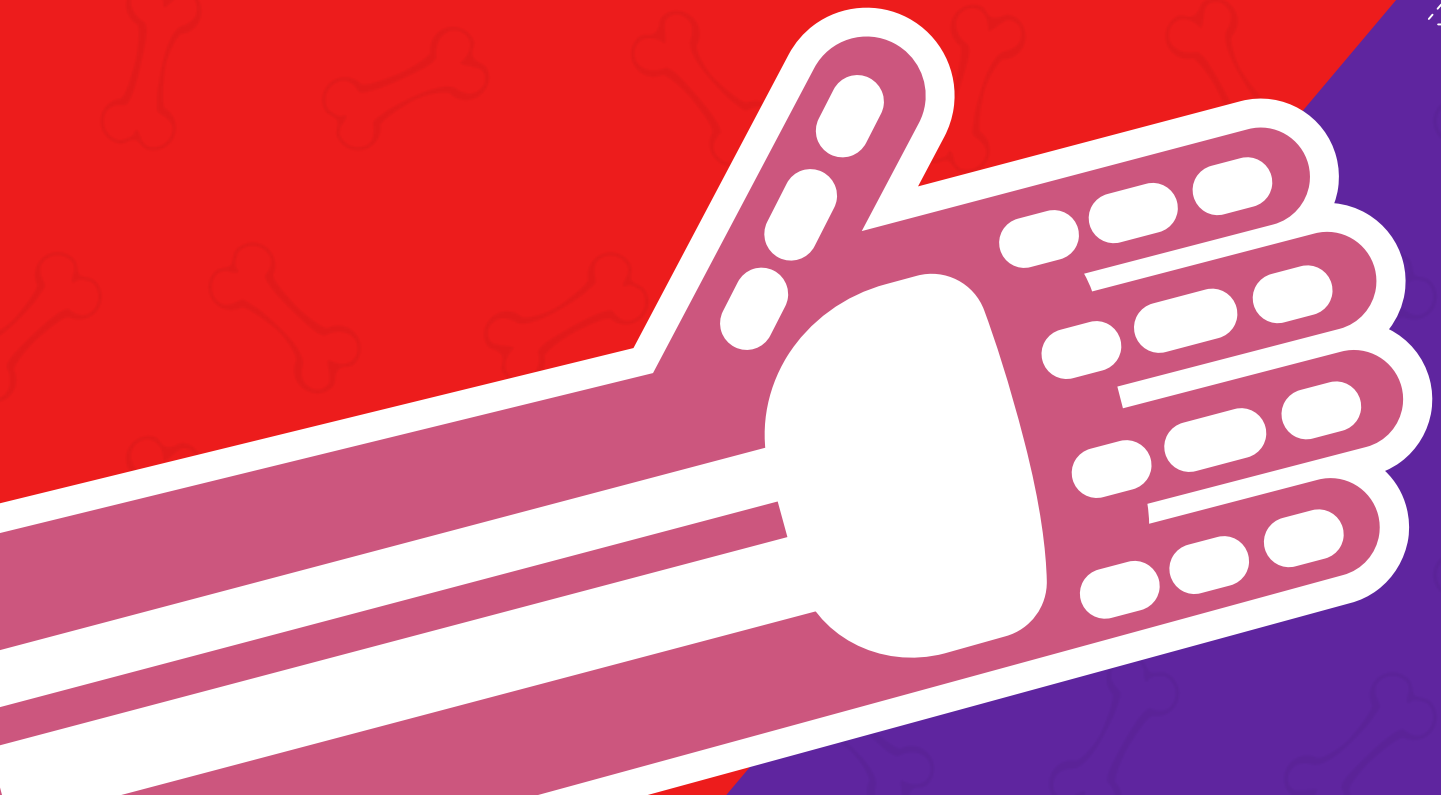
- A structure in the body
- They are where the pieces of your skeleton fit together
- 80% of them can move
- They support movement



LET'S GET MOVING

Find out...

How many joints are there in your arm and hand?



What type of joints are they?

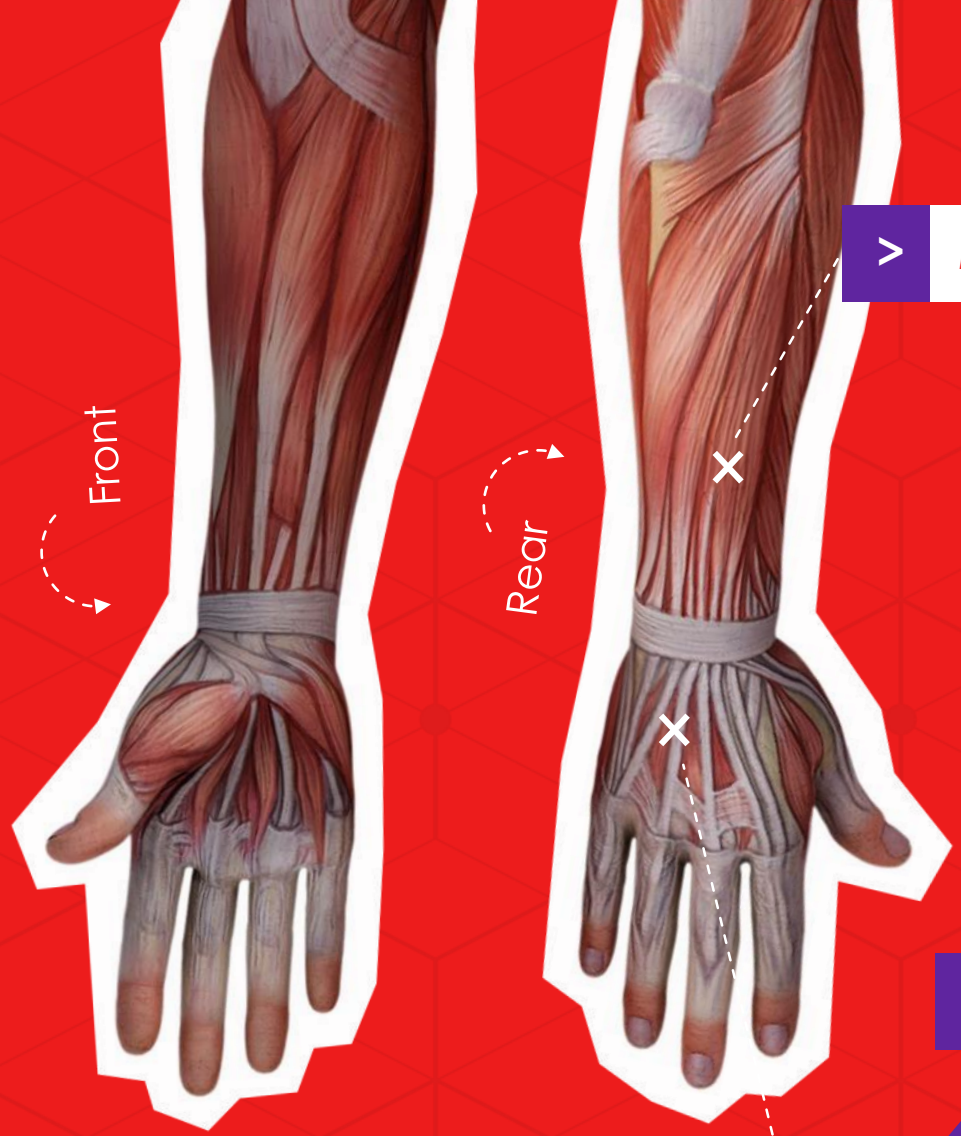
- Single direction
- Multi direction
- Ball joints
- Fixed

Instead of skin, muscles, and bones…

BONES
Lightweight metal such as titanium or aluminium alloy

LIGAMENTS AND MUSCLES
Plastics such as polyurethane and carbon fibre

SKIN
Foam or material



> Muscles

> Skin

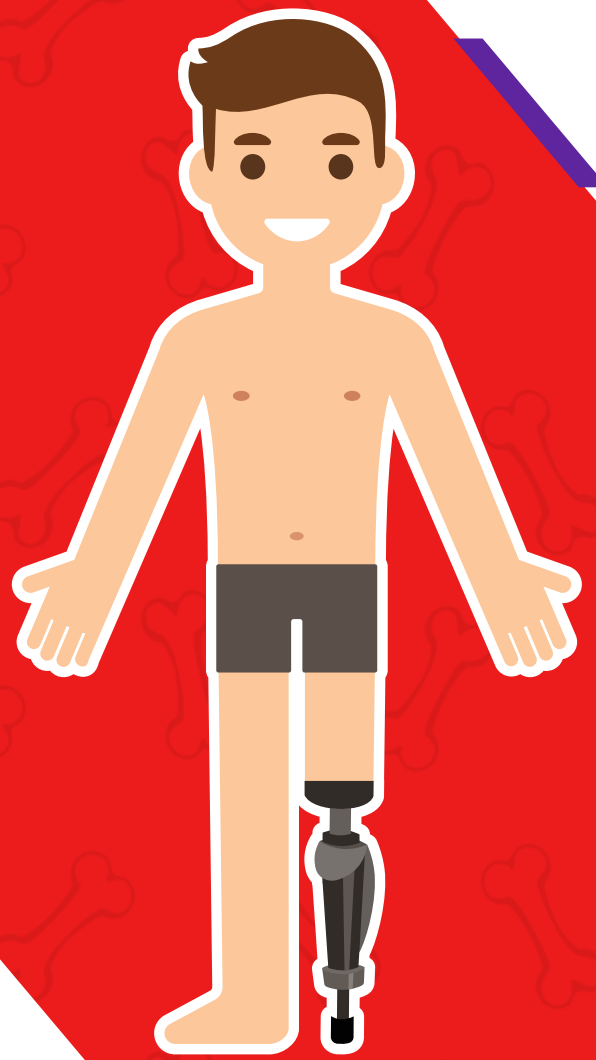
> Bones

> Joints

> Ligaments

Why are prosthetics important?

- Better conduct of day-to-day activities (eating, gaming, dressing, etc.)
- Help people lead ‘normal’ lives
- Good for self confidence and body image
- Increase mobility (moving around without help)



… what would happen if you needed a prosthetic, but didn’t have one?

Why are babies and children harder to make prosthetics for?

- Prosthetics need to be custom-made for each person
- Babies and children grow quickly
- Prosthetics are very expensive to make

IMAGINE

TIME TO IMAGINE

… can you think of ways to make it easier for babies and children to get access to prosthetics?

IMAGINE

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