



IMAGINE

Helping Hands, Making Hands



Primary Biomechanical
Engineering Lessons 1 & 2

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

LESSON 1



What are you made of?

> Skin

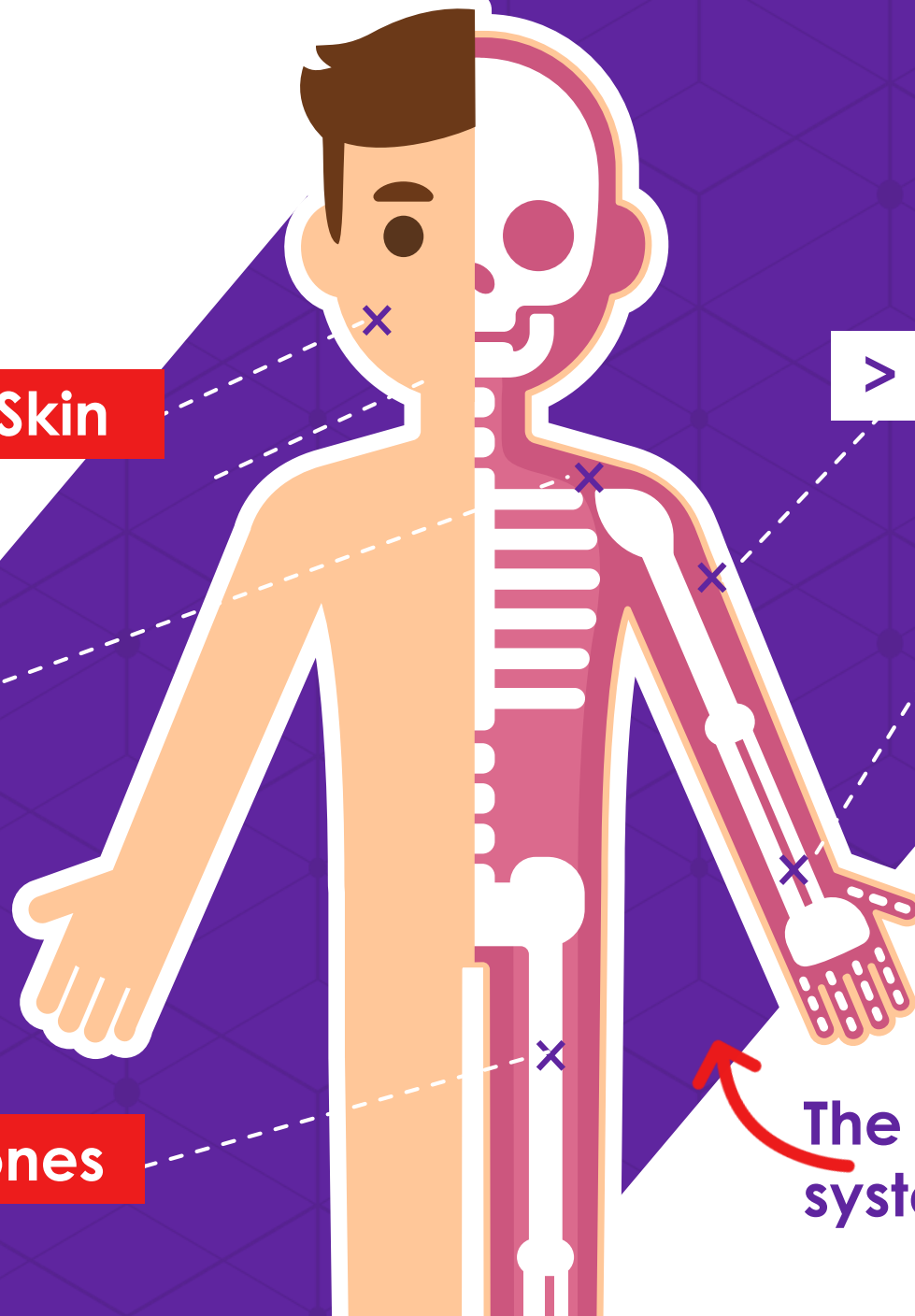
> Muscle

> Connective tissue

> Ligaments

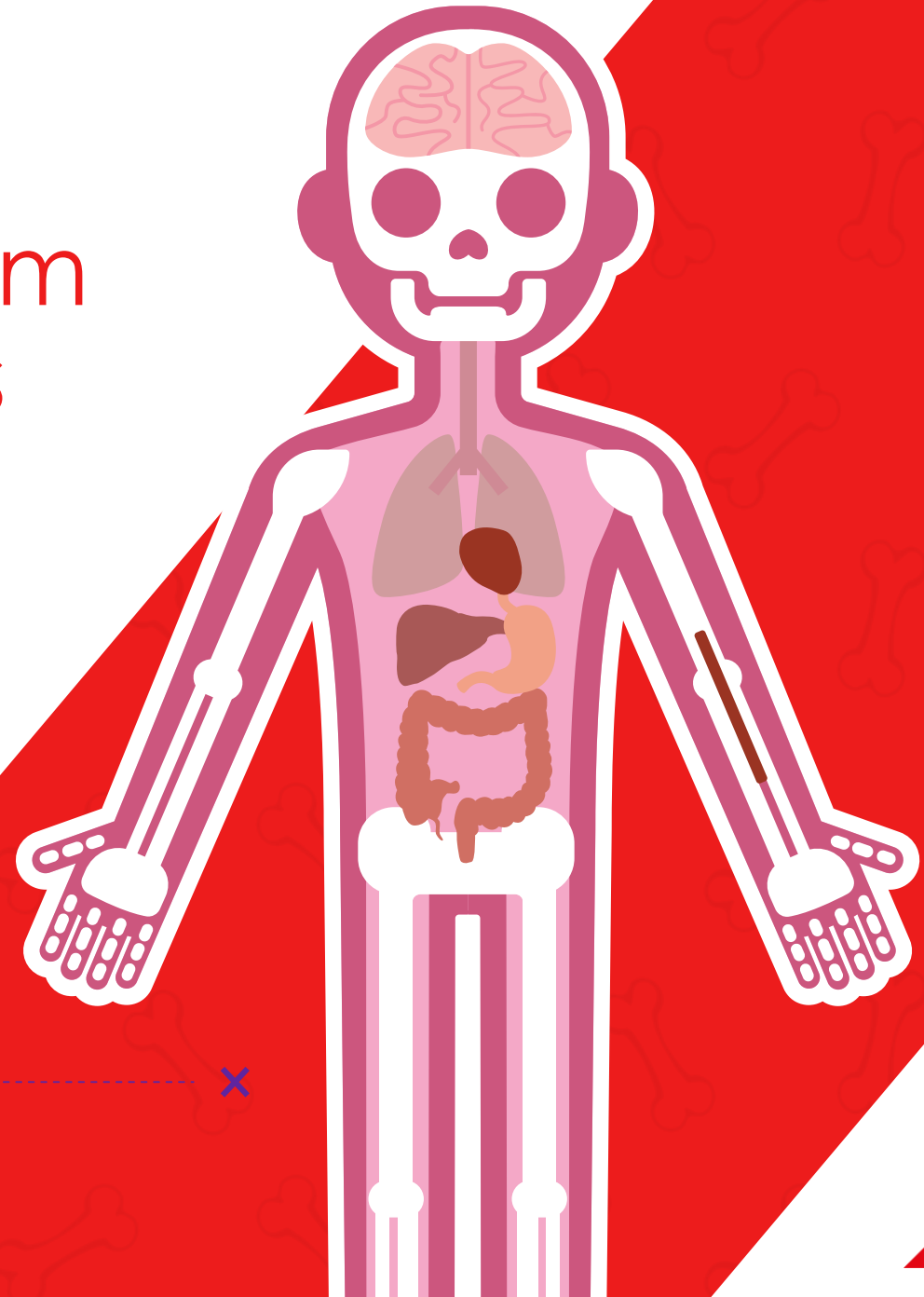
> Bones

The skeletal/muscular system



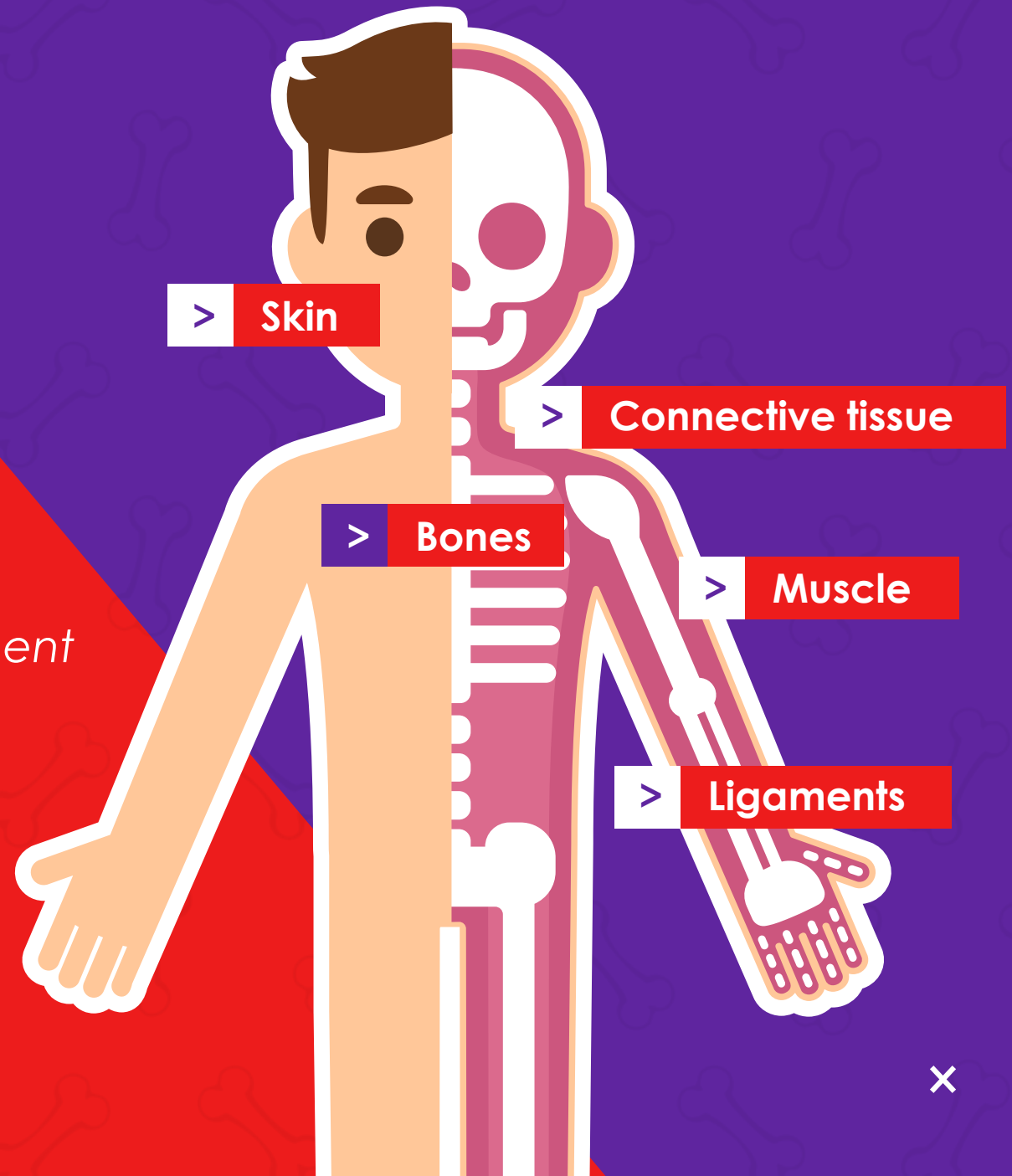
Each part of our **musculoskeletal** system does something for us

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



What does each thing do?

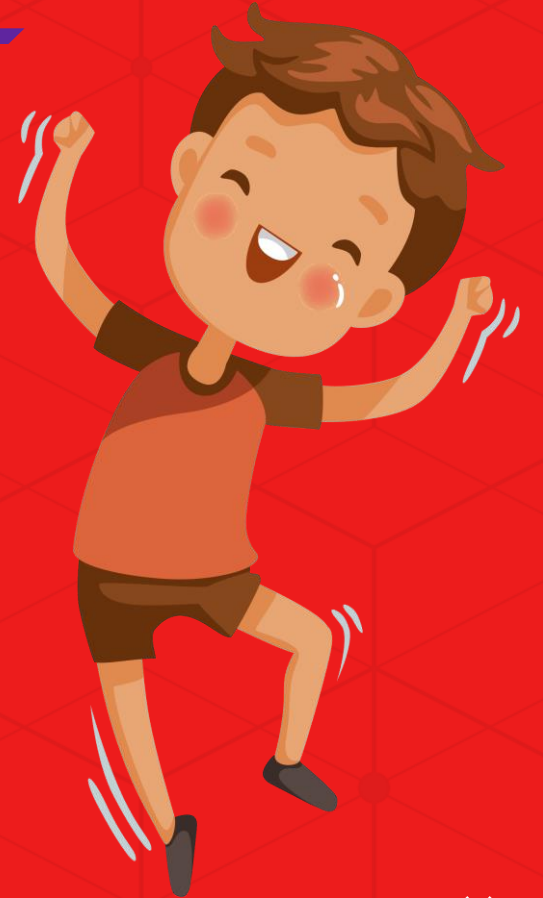
- **SKIN**
Protective, supportive
- **BONES**
Protective, supportive, movement
- **MUSCLE**
Movement
- **CONNECTIVE TISSUE**
Supportive
- **LIGAMENTS**
Movement



How our bodies MOVE



Today we're looking at...



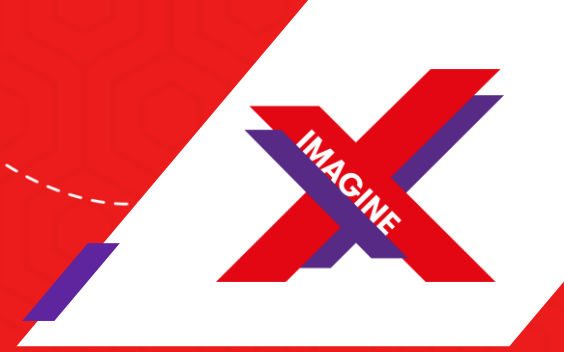


TIME TO IMAGINE



x





LET'S GET
MOVING



x

I NEED MY ARMS TO....

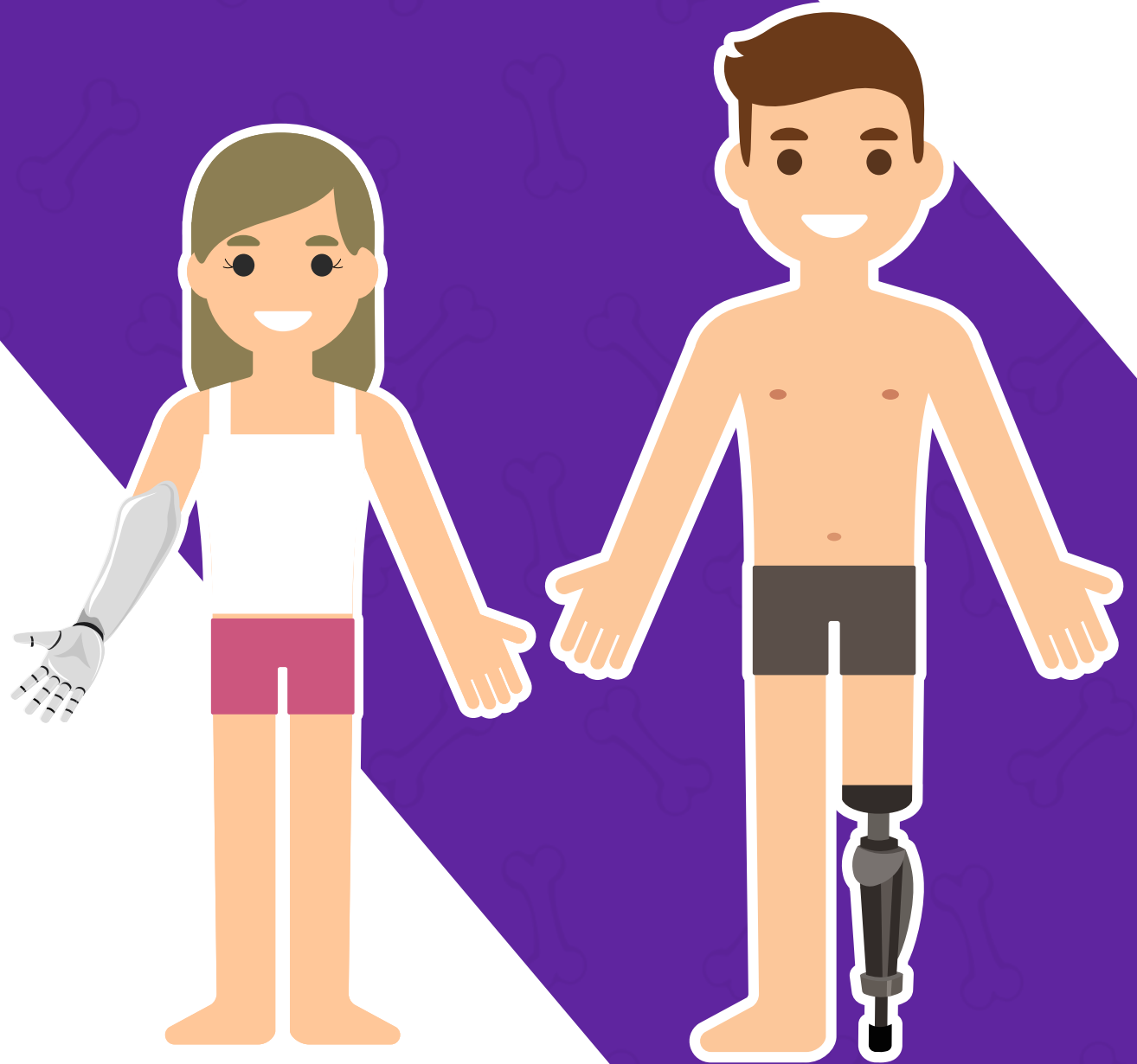


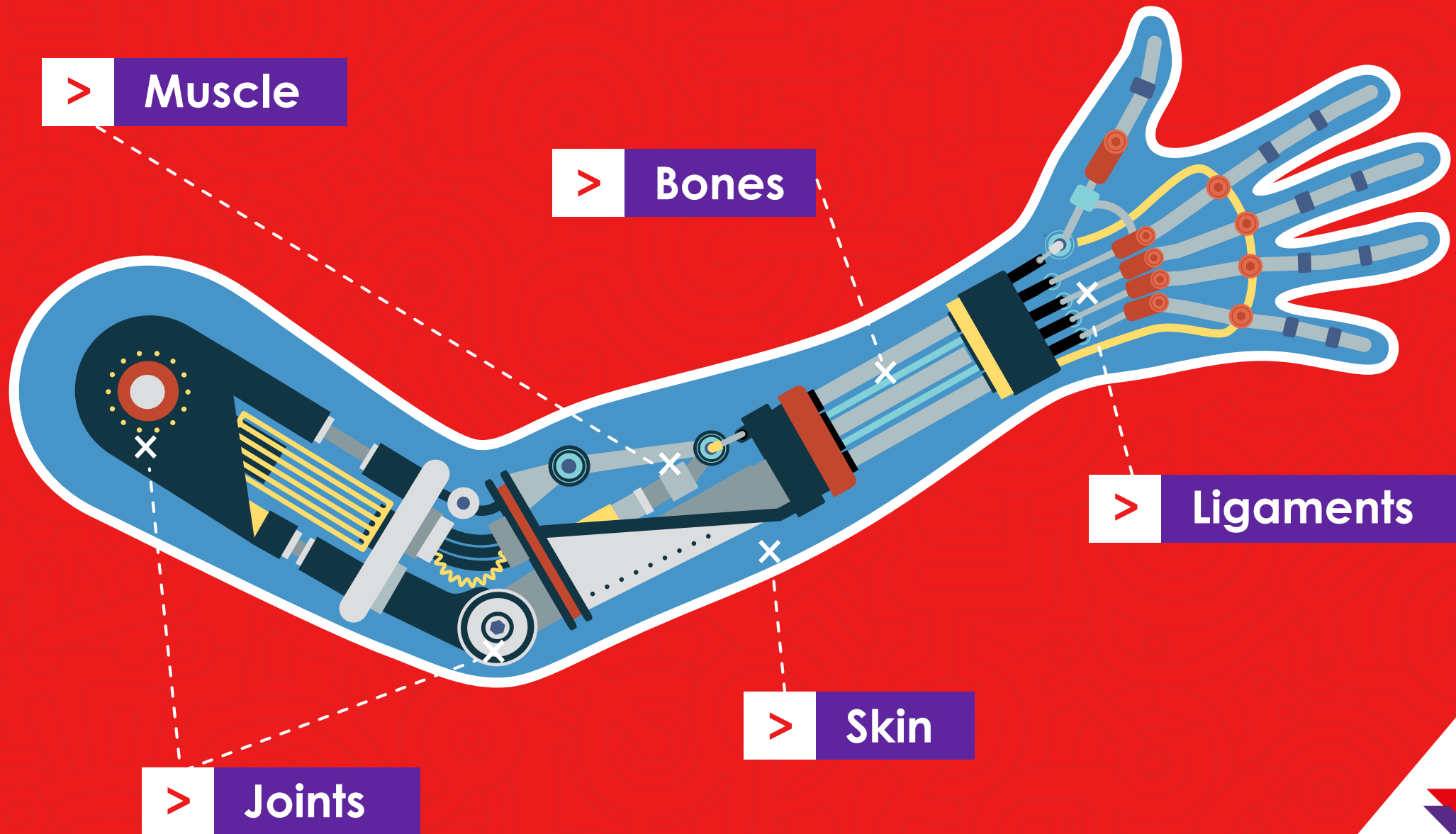
[Play intro video for biomechanical
engineering]



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





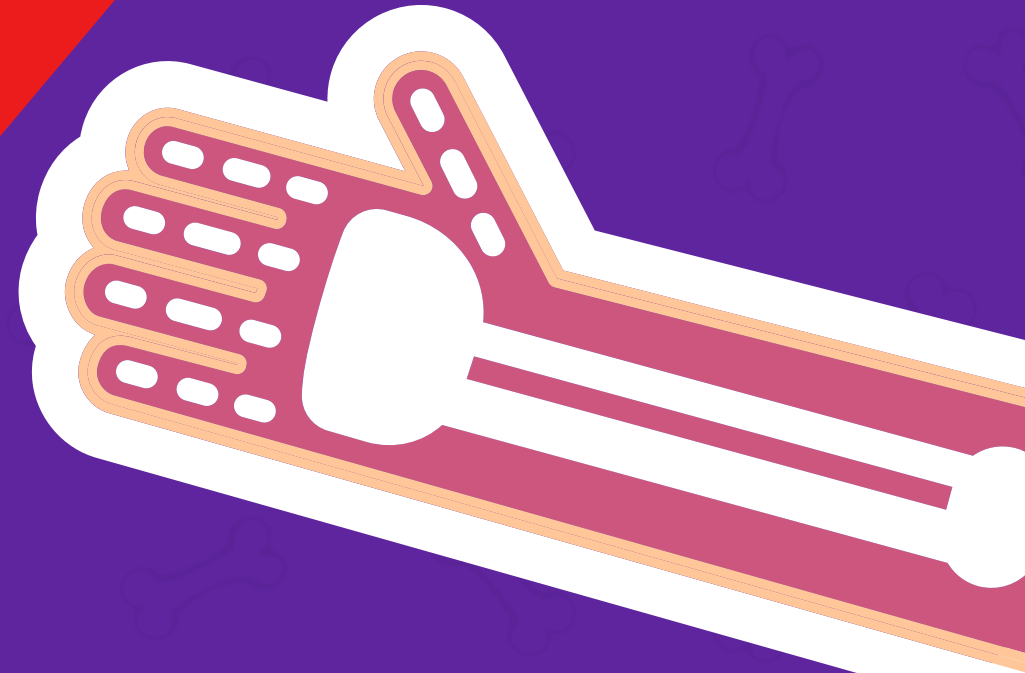
~~IMAGINE~~

Think about



HOW DOES MY
ARM MOVE?

× HOW DOES MY
HAND MOVE?



LESSON 2



What does each thing do?

> Skin

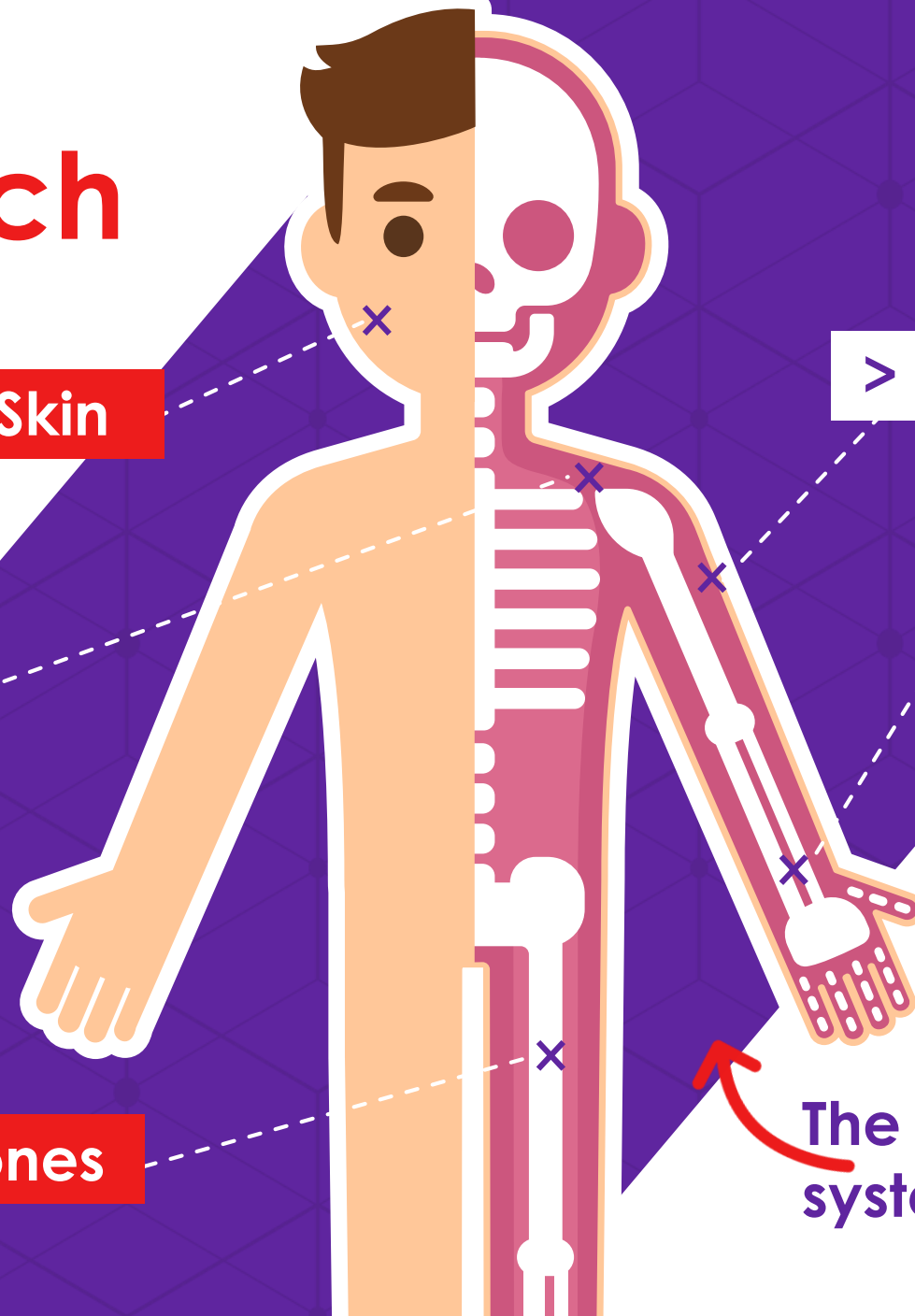
> Muscle

> Connective tissue

> Ligaments

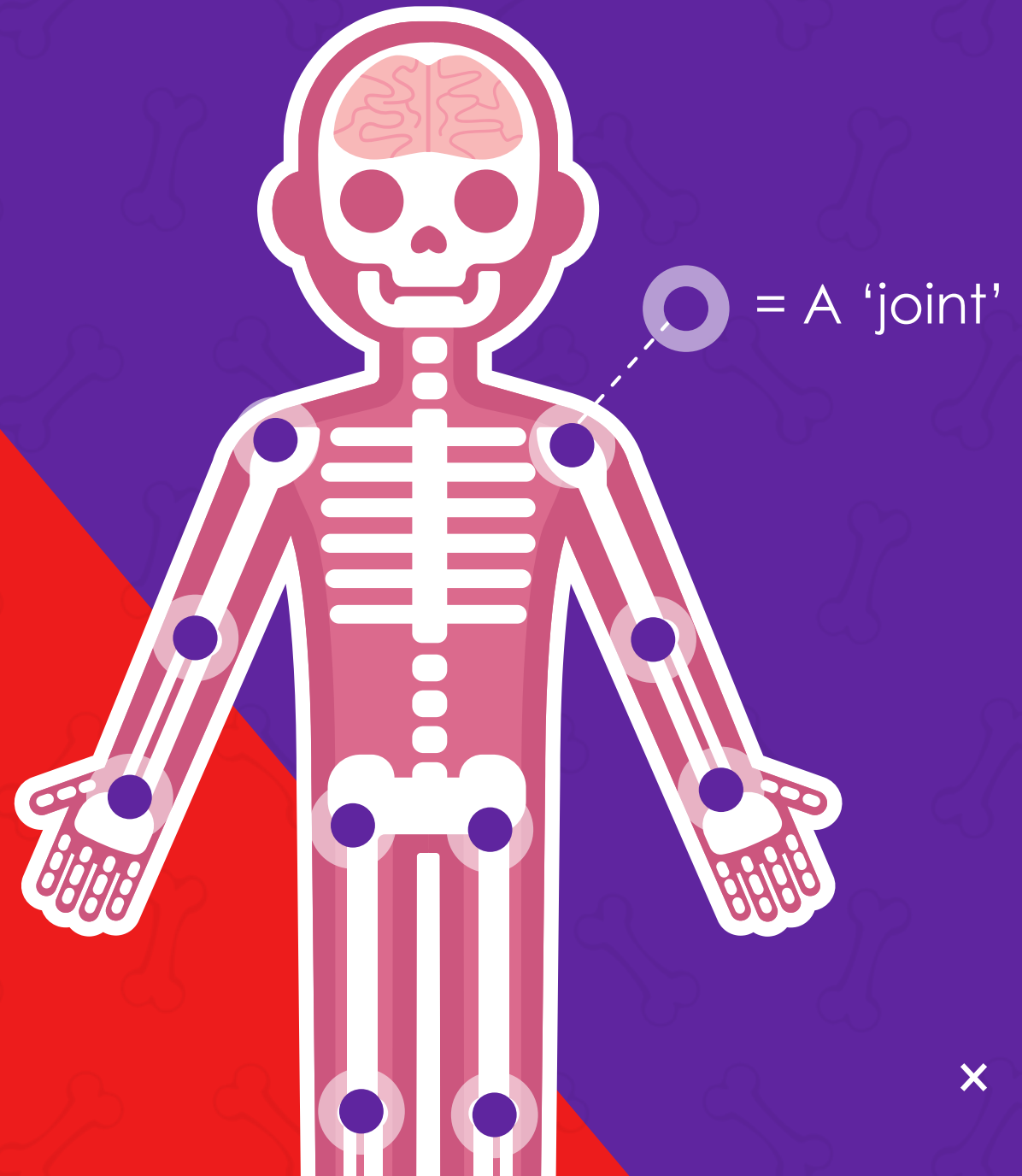
> Bones

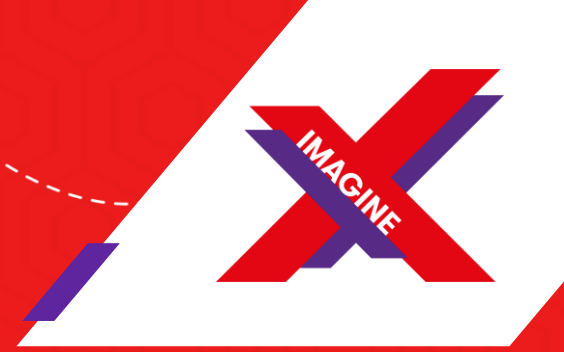
The skeletal/muscular system



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



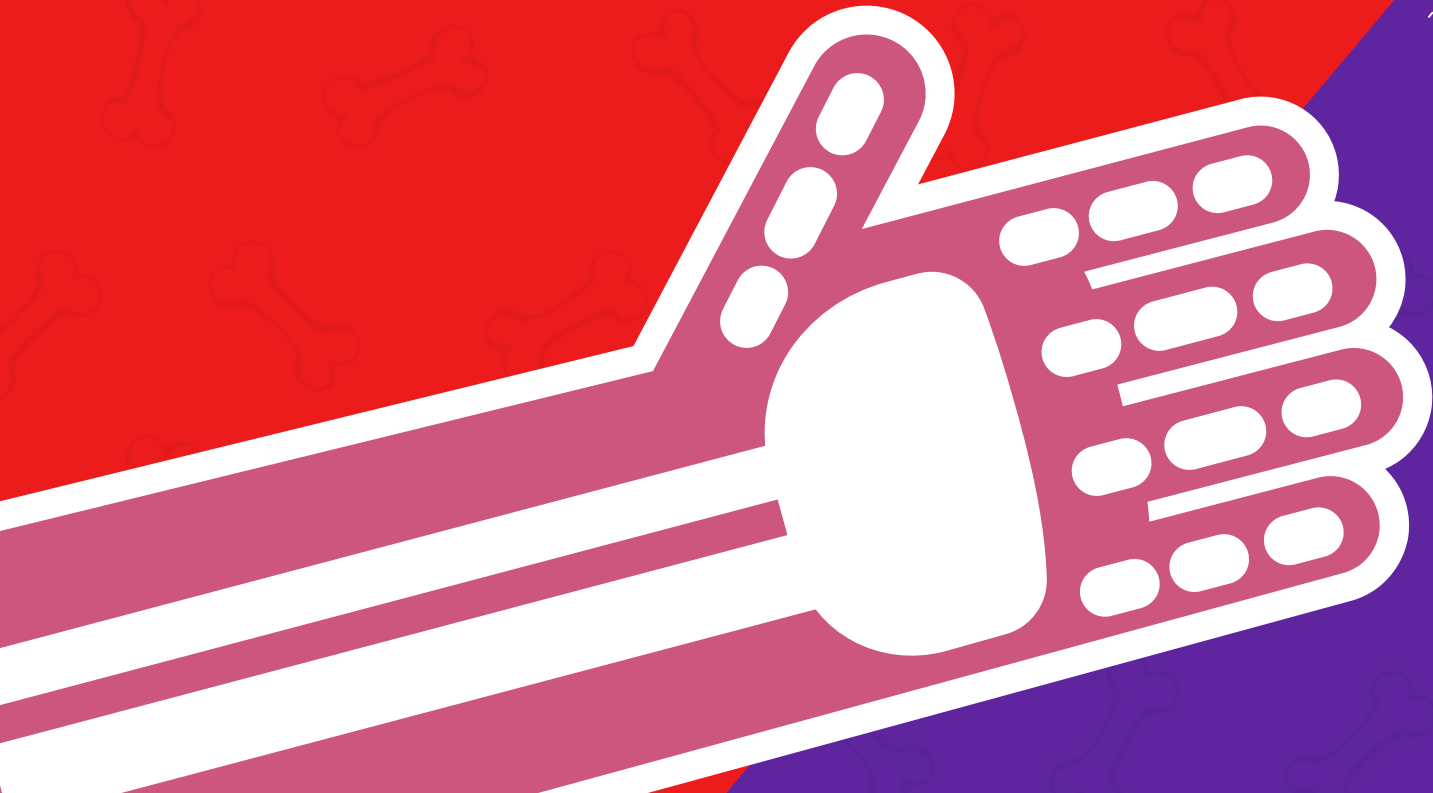
x

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



x



Instead of skin, muscles, and bones...

BONES

Lightweight metal such as titanium
or aluminium alloy

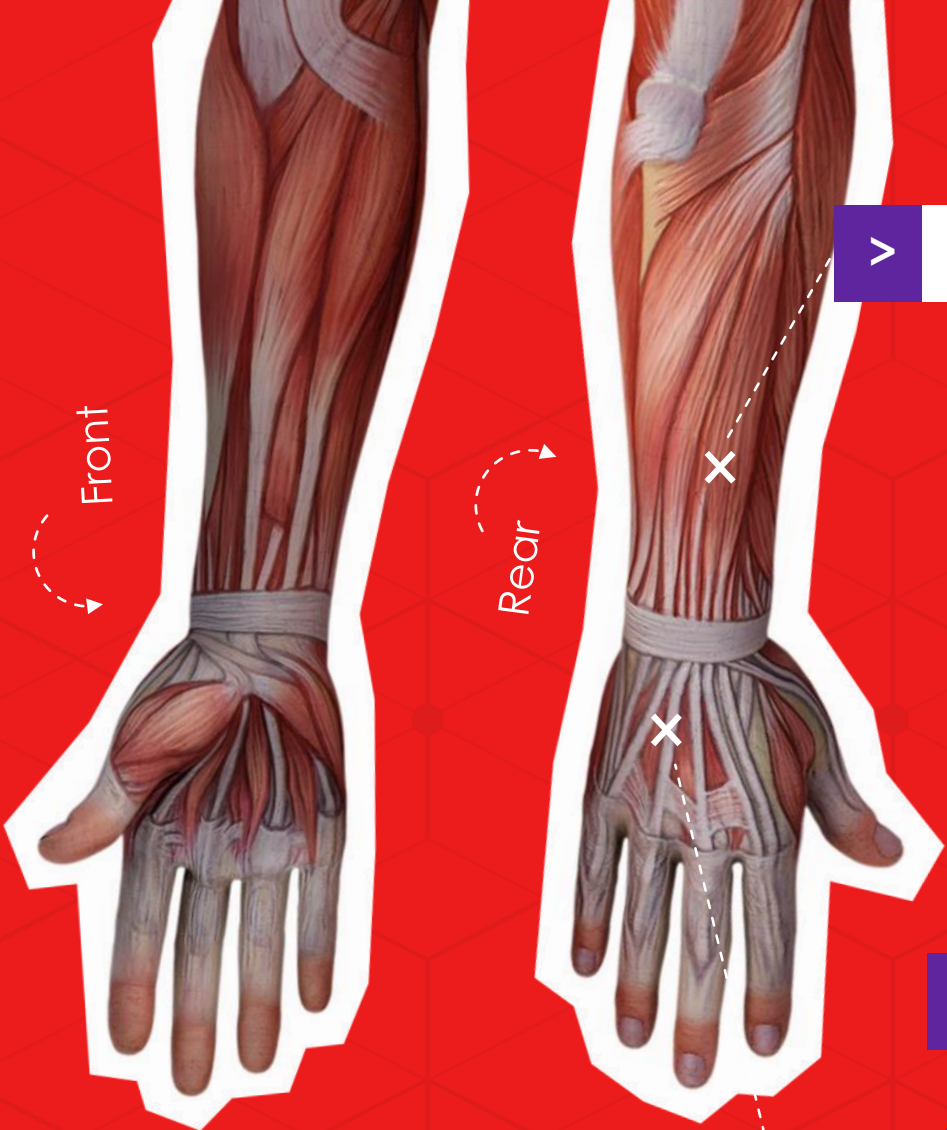
LIGAMENTS AND MUSCLES

Plastics such as polyurethane
and carbon fibre

SKIN

Foam or material





> Muscles

> Skin

> Joints

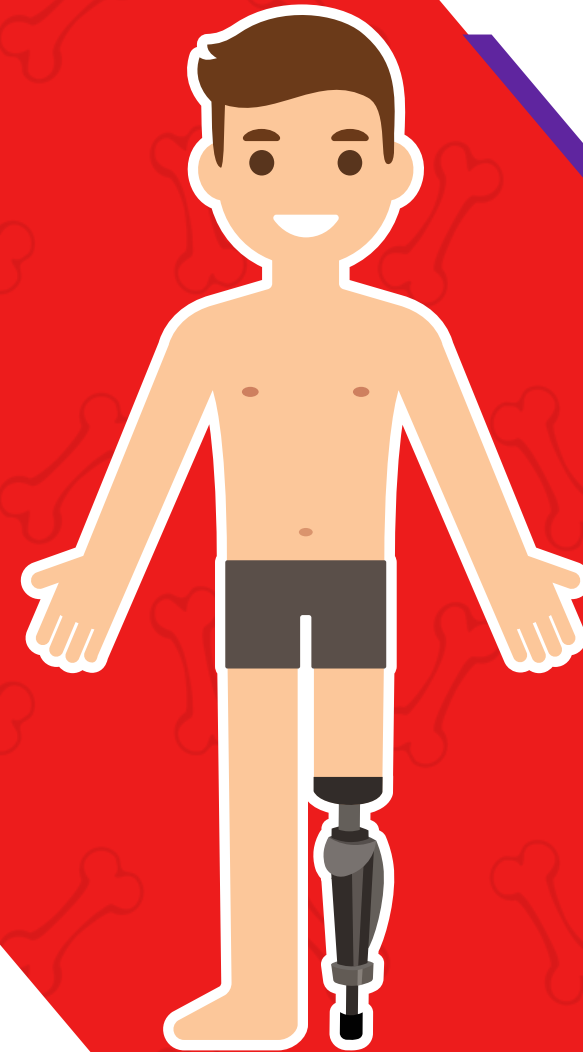
> Bones

> 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





TIME TO IMAGINE



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





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uk.rs-online.com/stem



an RS Components **Imagine-X** resource