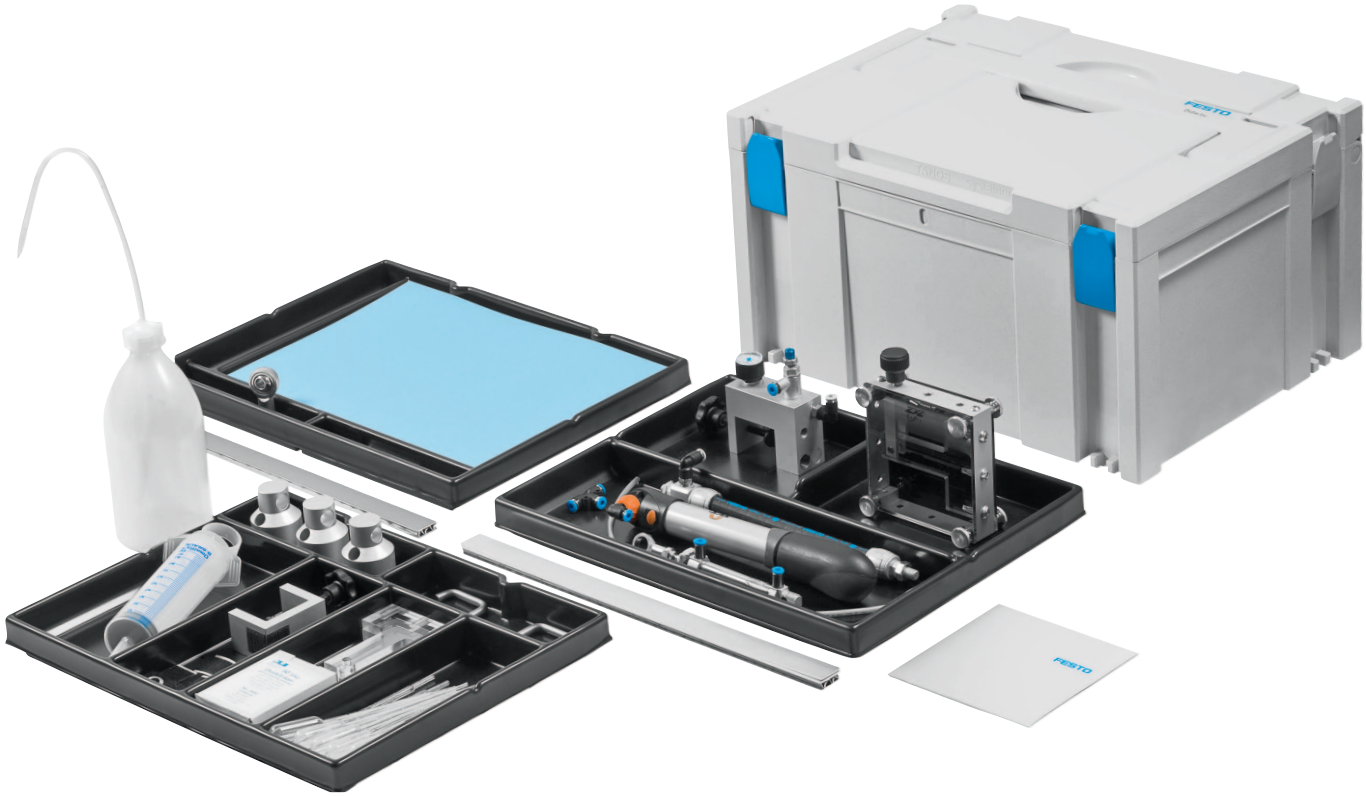
BionicsLab

Learning from and with nature

New



Bionics = biology and technology

Life on Earth has an evolutionary history spanning more than three billion years. During this long evolution process, “ingenious” design principles, optimisation strategies and numerous, sometimes surprising, solutions to problems have developed in nature.

Nowadays bionics is applied in nearly all areas of technology:
– Lightweight construction and materials
– Surfaces and boundary surfaces
– Swimming, driving and flying
– Biomechatronics and robotics
– Sensor technology and communication
– Optimisation
– Architecture and design

BionicsLab

The bionics case was specially developed for introducing bionics in schools.

It allows pupils to experiment by themselves and to experience the basic principles of bionics and scientific work thanks to 6 exciting experiments. The examples were specifically chosen on the basis of their industrial application. All experiments are easy to carry out and well-documented using prepared worksheets.

All the materials are packed in a Systainer and are therefore easy to transport. The Systainer contains all the components and consumables necessary to carry out the experiments.

Detailed descriptions, worksheets and teaching information are also provided on CD-ROM.

The experiments:

Velcro fastener
– Sticking like cockleburs
– Maximum bearing load of a Velcro fastener

Lotus Effect®
– Self-cleaning and Lotus Effect®
– Manufacturing surfaces that repel water
– Water on various surfaces

Fluidic Muscle
Mirroring nature – the Fluidic Muscle. Mechanical lifting using muscle power.

Fin Ray Effect®
– Constructing a Fin Ray
– Fin Ray Effect® – flexible like a fish fin

Folding structures
– Bending resistance of optimised aluminium plates
– Mechanical tests
– Folding structures in nature and technology
– Paper bridge competition

Structural component optimisation
– Stress distribution in mechanically loaded tree forks
– Designing a clamping collet using the tension triangle method
– Photoelasticity: structural component optimisation according to the principles of nature

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