

System Explorer Tool

The Systems Explorer tool is a template for diagramming a system that can help you to illustrate the known and potential interconnections, resources, and sub- and super-systems of a particular design or organism. Doing so in the context of biomimetic design will help you come to a deeper understanding of the situation you are designing for, or the organism or natural model you are looking to for inspiration.

HOW TO USE THE TEMPLATE

Step One: The Systems Explorer consists of several boxes. The organism, system, or design situation of interest is placed in the center while the surrounding boxes are used to indicate systems or elements in relationship at higher, adjacent, or lower levels, as follows.

- Super-Systems

The super-system is at the top level of the diagram, and shown as physically larger than the system of interest. This area of the diagram can be used to explore the biological context by considering air, earth, energy and water as super-systems. For a design or organization, the super-system or context could include aspects of culture, economy and technology.

- Parallel Systems

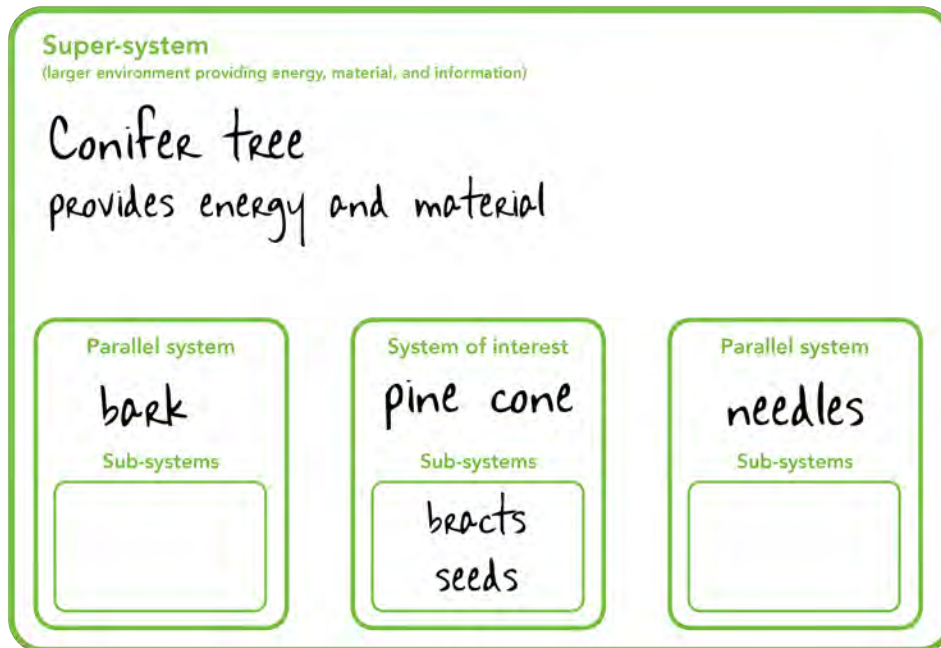
Parallel Systems represent systems or elements at the same level of scale as the system you are exploring. For example, a species of bird that lives in a meadow may have, as parallel systems, small mammals that exist within the same super-system. A toolbox may contain rulers, screwdrivers and saws.

- Sub-Systems

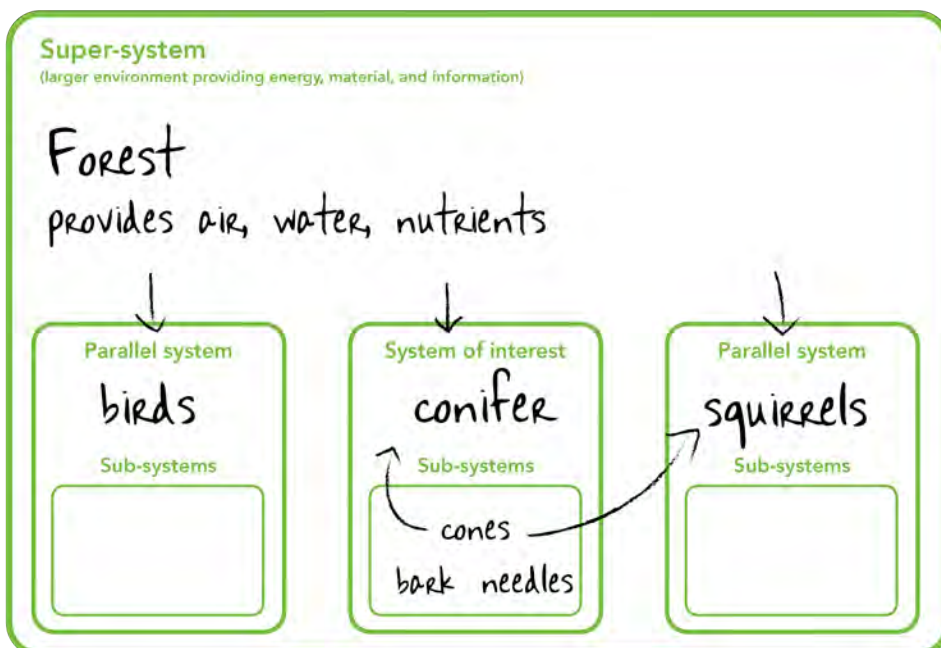
The boxes on the lower level of the template represent sub systems. All systems are composed of sub-systems or modules. For example, a living system has organs and cells as sub-systems. A design may have a support structure and energy processing.

Step Two: Once your diagram is roughed-in, step back from the diagram and think about the interconnections and flows that occur at the boundaries of the system. Every system exists in a super-system (environment) that provides energy, material, and information. Add these elements into your diagram as connections between the system levels. These connections (both actual and potential) are resources for the system and design team. For example, a flower might use wind or birds to enable dispersion of its seeds. A design might rely on human communications (word of mouth or recommendations) to become more widely dispersed.

Here is an example using the Systems Explorer to diagram the system relationships of a pinecone.



Here is another example, showing the pinecone as a subsystem of the conifer tree. Additional interconnections and flows are made clear with arrows showing how material, energy and information move in the system. For example, seeds are moving from pinecones to squirrels.



Super-system

(larger environment providing energy, material, and information)

Parallel system

Sub-systems

System of interest

Sub-systems

Parallel system

Sub-systems