

IDENTIFYING DESIGN LEVERAGE POINTS

Using the Systems Explorer

Diagramming a system reveals the interconnections and elements of the system and its environment. These show how the system works, and can be used to explore how it might be changed. The following investigations, using the System Explorer, can help you to identify potential leverage points and opportunities for design:

Look across scales: When approaching a design challenge, looking across all levels of scale is an especially important consideration. A resource at a higher/larger/slower level of system might solve the challenge. In other cases, sub-system elements can be used to support a new solution. Lower level sub-systems are smaller and generally operate faster, while higher-level systems are larger and usually operate on slower time scales. To investigate both higher and lower level systems, deliberately change scale in space and time.

- Move “up” a level: What systems encompass the design situation? These systems might be larger, slower, have a higher-level function, or include multiple systems like the design problem. What are the boundary issues, challenges, and opportunities between your system and these levels? The super-system of the design contains the forces that created and maintain the system. List what resources are available from the super-system (gradients, flows, cycles, energy, materials, structures, wind, air, water, sun, organization, society).
- Move down a level: “Zoom in” with your mental microscope to see lower levels of system. Explore the elements or modules within the design situation. The elements may be smaller, faster, or consist of sub-functions or lower level functions (bacteria, root structures, neural processing).

Look at the inside of the boundary: What forces and resources are present? Could new connections inside the system allow for a different solution? Each level of a system shows emergent properties that are not apparent in the level below. For example, the signals between ants and bees create the high level behaviors of the group, yet these high level behaviors are not obvious from the individual bee or ant.

Consider parallel systems for resources, connectivity, and insights: Look similar functions in a different context. Could new connections between adjacent elements be used to form a structure or network? Adjacent or parallel systems will have solved similar challenges to your design. Explore similar situations in other locations. Systems may appear unrelated while at the same time having similar requirements for resources, connectivity and/or operations.

Check for flows from your element to other systems: Flows and exchange occur at boundaries either up, down, or sideways. These are part of the cycles and feedback loops coupling higher-level, lower-level, and parallel systems.