

Solution for Preparation Quiz: Systems Thinking

“System” in SAFO can mean:

- System Architecture only = System of Interest (Sol)
- System function = Sol + boundary systems

Considering a petrol-powered private car with automatic transmission as a technological system, match each item to an aspect of the system.

- Structure: Acceleration Pedal; Brake Pedal; Internal Combustion Engine; Steering Wheel; Tire Wheels
- Behavior: Acceleration Pedal activates Internal Combustion Engine; Brake Pedal slows Tire Wheels; Internal Combustion Engine spins Tire Wheels; Steering Wheel rotates Tire Wheels
- Input: Human Driver rotates Steering Wheel, pushes on Acceleration Pedal, and pushes on Break Pedal
- Output: Tire wheels roll on Road Network
- Stakeholders: People who live far away from their workplace in a place without fast public transport
- Problem: Commuting to work using public transport can be time-consuming
- Benefit: Commuting to work quickly
- Detriment: Air pollution which harms the health of city residents

Select all the examples of a technological system.

- The London underground (subway) system [Yes]
- The Solar system [No]
- An artificial heart [Yes]
- A human with a brain-machine hardware interface to control a prosthetic arm installed in their brain [No - The interface is a technological system, the human is not since it is not mostly natural]

Select all the appropriate statements about system structure, behavior, and function.

- System function is made possible by system structure & behavior [incorrect]
- System architecture is made possible by system function [incorrect]
- The function of a system depends on other systems at its boundary [correct]

Select all the appropriate statements about system function and system outcome.

- It is sometimes possible for different system functions to achieve the same system intended outcome (benefits and/or detriments). [correct]
- It is sometimes possible to achieve multiple intended outcomes (benefits and/or detriments) with the same system function. [correct]
- It is sometimes possible to design a system that produces only benefit, without any detriment. [incorrect]

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