The 40 Principles of TRIZ

Principles for resolving design contradiction

If the concept of contradiction in problem solving is accepted, then every problem can be described as a conflict between a pair of parameters. Altshuller and his collaborators observed that many patents had, in the past, resolved these individual conflicts in several different fields. He also found that the principles used to resolve these contradictions fully, not as a trade-off or compromise solution, could be described in a list of just 40 principles.

These 40 principles are listed in the table below. TRIZ has developed over several decades and the specific names and numbering for the principles vary according to author and translation.

Along with the names for the principles used in this text, a list of other commonly used names are given in the table below.

No	PRINCIPLE	ALTERNATIVE NAMES
1	Segmentation	Fragmentation; Segmentation
2	Extraction	Separation; Take out
3	Local quality	Local property
4	Asymmetry	Symmetry change
5	Combining	Merging; Combination; Consolidation; Unite
6	Universality	Multi-functionality
7	Nesting	Nested doll; Matryoshka
8	Counter-weight	Anti-weight; Weight compensation
9	Prior counter-action	Preliminary anti-action; Preliminary counter-action
10	Prior action	Preliminary action; Do it in advance
11	Cushion in advance	Beforehand cushioning; Beforehand compensation; Previously installed cushions
12	Equi-potentiality	
13	Inversion	The other way round; Inverse action
14	Spheroidality	Curvature
15	Dynamics	Dynamicity; Dynamism
16	Partial or excessive action	

17	Transition into another dimension	Dimensionality; Another dimension
18	Mechanical vibration	Use of mechanical oscillations
19	Periodic action	
20	Continuity of useful action	Uninterrupted useful function
21	Rushing through	Skipping; Quick jump
22	Convert harm into benefit	Blessing in disguise; Transform damage into use; Lemons to lemonade
23	Feedback	
24	Mediator	Intermediary
25	Self-service	
26	Copying	
27	Inexpensive short life	Cheap disposables; Cheap short-living
28	Mechanical substitution	Another sense; Replacement of a mechanical system; Use of fields; Replacement of mechanical matter
29	Pneumatics and hydraulic construction	Pneumatics and hydraulics
30	Flexible membranes and thin films	Flexible shells and thin films
31	Porous materials	
32	Colour change	Optical property changes
33	Homogeneity	
34	Discard and renewal	Rejecting and regenerating parts; Discarding and recovering
35	Transforming the physical or chemical state of an object	Parameter change; Transforming physical or chemical states; Transformation of properties; Change in the aggregate state of an object
36	Phase change	Phase transition
37	Thermal expansion	
38	Strong oxidants	Accelerated oxidisation
39	Inert environment	Inert atmosphere
40	Composite materials	