If we are satisfied that we have defined the real problem, we next need to determine if it is worth solving.

Does it seem worth solving?

Has it been solved before (or is a suitable solution apparent)?

Are the necessary resources available?

Is there sufficient time?

If any of these answers is "no", can the constraints be changed?

To succeed, ultimately you must:

- define the correct problem,

- select the best/acceptable solution for that problem.

You can't select an acceptable solution unless it gets on the list of potential solutions to be evaluated.

You need an effective process for generating potential solution alternatives.

1. Defining the problem too narrowly.

2. Attacking the symptoms and not the real problem.

3. Assuming there is only one right answer.

4. Getting "hooked" on an early solution alternative.

5. Getting "hooked" on a solution that almost works (but really doesn't).

6. Being distracted by irrelevant information (mental dazzle).

7. Getting frustrated by lack of success.

8. Being too anxious to finish.

9. Defining the problem ambiguously.

There is a direct correlation between the time people spend "playing" with a problem and the diversity of the solutions generated.

Sometimes problem solvers will not cross a perceived imaginary limit – some constraint formed in the mind of the solver---that does not exist in the problem statement.

Draw a continuous polygonal line that passes through each circle exactly once – and use the fewest number of line segments you can manage:
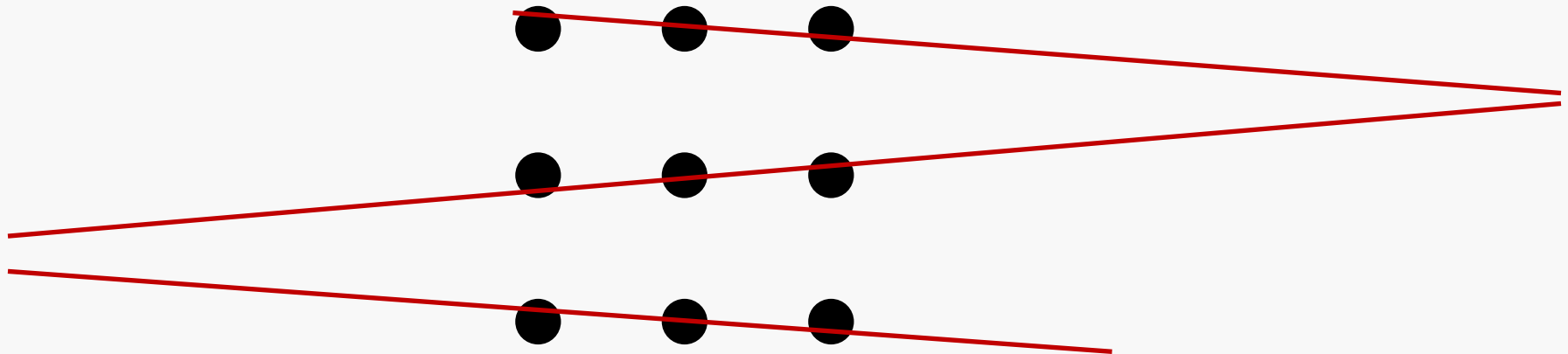
1. Stereotyping: functional fixedness (einstellung).

2. Limiting the problem unnecessarily.

3. Saturation or information overload.

4. Fear of risk taking.

5. Lack of appetite for chaos.

6. Judging rather than generating ideas.

7. Lack of challenge.

8. Inability to incubate.

Sources of blocks: culture, taboos, environment, inability to express, inflexible/inadequate problem solving skills.

1. Negative Attitude: Attitude Adjustment
   – List positives, focus on opportunity instead of risk.
2. Fear of Failure: Risk Taking
   – Define the risks and how to deal with them.
3. Following Rules: Breaking Rules
   – Try new things, new foods, new places.
4. Overreliance on Logic: Internal Creative Climate
   – Let imagination work, play with it.
5. Believing Not Creative: Creative Belief
   – Ask "what if," daydream, make analogies.

Keep track of ideas (write them down immediately).

Pose new questions to yourself every day.

Keep abreast of your field.

Learn about things outside your specialty.

Avoid rigid, set patterns of doing things.

Be open and receptive to new ideas.

Be alert in your observations.

Adopt a risk-taking attitude.

Keep your sense of humor.

Engage in creative hobbies.

Have courage and self confidence.

Learn to know and understand yourself.

Brainstorming

Futuring

Analogy and Cross-fertilization

Free Association Phase

Unstructured.

Generate lots of ideas.

Ideas flow freely for awhile, then taper off.

How to generate more ideas?

Vertical Thinking

Lateral Thinking

A more structured approach to generating new ideas as part of brainstorming.

- Adapt: How can we use this?
- Modify: What changes can we make?
- Magnify: Add something? Make stronger, longer, etc.?
- Contract: Split up? Lighten?
- Rearrange: Interchange, reorganize?
- Combine: Compromise? Blend?

- ***Substitute?*** ..... Who else, where else, or what else? Other ingredient, material, or approach?

- ***Combine?*** ...... Combine parts, units, ideas? Blend? Compromise? Combine from different categories?

- ***Adapt?*** .... How can this (product, idea, plan, etc.) be used as is? What are other uses it could be adapted to?

- ***Modify?*** .... Change the meaning, material, color, shape, odor, etc.?

- ***Magnify?*** ...... Add new ingredient? Make longer, stronger, thicker, higher, etc.?

- ***Minify?*** .... Split up? Take something out? Make lighter, lower, shorter, etc.?

Osborn's Checklist for Adding New Ideas   Kepner-Tregoe

■ ***Put to other uses?*** *.....* How can you put the thing to different or other uses? New ways to use as is? Other uses if it is modified?

■ ***Eliminate?*** *.....* What can you eliminate? Remove something? Eliminate waste? Reduce time? Reduce effort? Cut costs?

■ ***Rearrange?*** *.....* Interchange parts? Other patterns, layouts? Transpose cause and effect? Change positives to negatives? Reverse roles? Turn it backwards or upside down? Sort?

Vertical Thinking – (S.C.A.M.P.E.R)

- **S**ubstitute
- **C**ombine
- **A**dapt
- **M**odify (Magnify, Minify)
- **P**ut to other uses
- **E**liminate
- **R**earrange

■**S**ubstitute: Use the car seats in swings.

■**C**ombine: Use the side panels or roof to make a huge canopy or fort.

■**A**dapt: Take the hood off and use it as a toboggan in winter.

■**M**odify: Crush the cars into cubes and allow the kids to climb on the blocks.

■**P**ut to other uses: Remove the engines and side panels and make go-carts.

■**E**liminate: Throw away the rims and use the tires for a "romper room"/jumping pit.

■**R**earrange: Turn the car upside down and use it as a teeter-totter.

Random Stimulation

- Select a word from the dictionary or a list of "stimulating" words.

Other People's Views (OPV)

- Imagine yourself in other roles.

all, albatross, airplane, air, animals, bag, basketball, bean, bee, bear, bump, bed, car, cannon, cap, control, cape, custard pie, dawn, deer, defense, dig, dive, dump, dumpster, ear, eavesdrop, evolution, eve, fawn, fix, find, fungus, food, ghost, graph, gulp, gum, hot, halo, hope, hammer, humbug, head, high, ice, icon, ill, jealous, jump, jig, jive, jinx, key, knife, kitchen, lump, lie, loan, live, Latvia, man, mop, market, make, maim, mane, notice, needle, new, next, nice, open, Oscar, opera, office, pen, powder, pump, Plato, pigeons, pocket, quick, quack, quiet, rage, rash, run, rigid, radar, Scrooge, stop, stove, save, saloon, sandwich, ski, simple, safe, sauce, sand, sphere, tea, time, ticket, treadmill, up, uneven, upside-down, vice, victor, vindicate, volume, violin, voice, wreak, witch, wide, wedge, x-ray, yearn, year, yazzle, zone, zoo, zip, zap

Document

↓

Paper ⟶ **Art** ⟶ **Colors** ⟶ **Car Paint**

Allow kids to paint graffiti on cars ⟵

■ Think about walking around on your knees.

– How would this change your perspective--that is, imagine the playground from a child's height.

■ What was your favorite playground toy?

– How could this be mimicked with used auto parts?

Example: From a child's viewpoint, the intact car would be an exciting change to pretend to be a "grown-up." Just take off the doors and remove other equipment (electrical, etc.) and let the kids pretend to drive. Just leave the car as it is!

Ask leading/stimulating questions, ignore technical feasibility (aka wishful thinking).

- What are the characteristics of an ideal solution?

- What currently existing problem, if solved, would make our lives/jobs easier, or make a difference?

Cheese/yogurt factory generates acidic waste by products. Traditional approach is to "treat" the waste so that it can be discharged.

Futuring: Imagine a successful plant with no waste. All such "waste" has a useful purpose.

- Protein: Food additives/supplements.
- Sugar: Ferment for Ethanol.
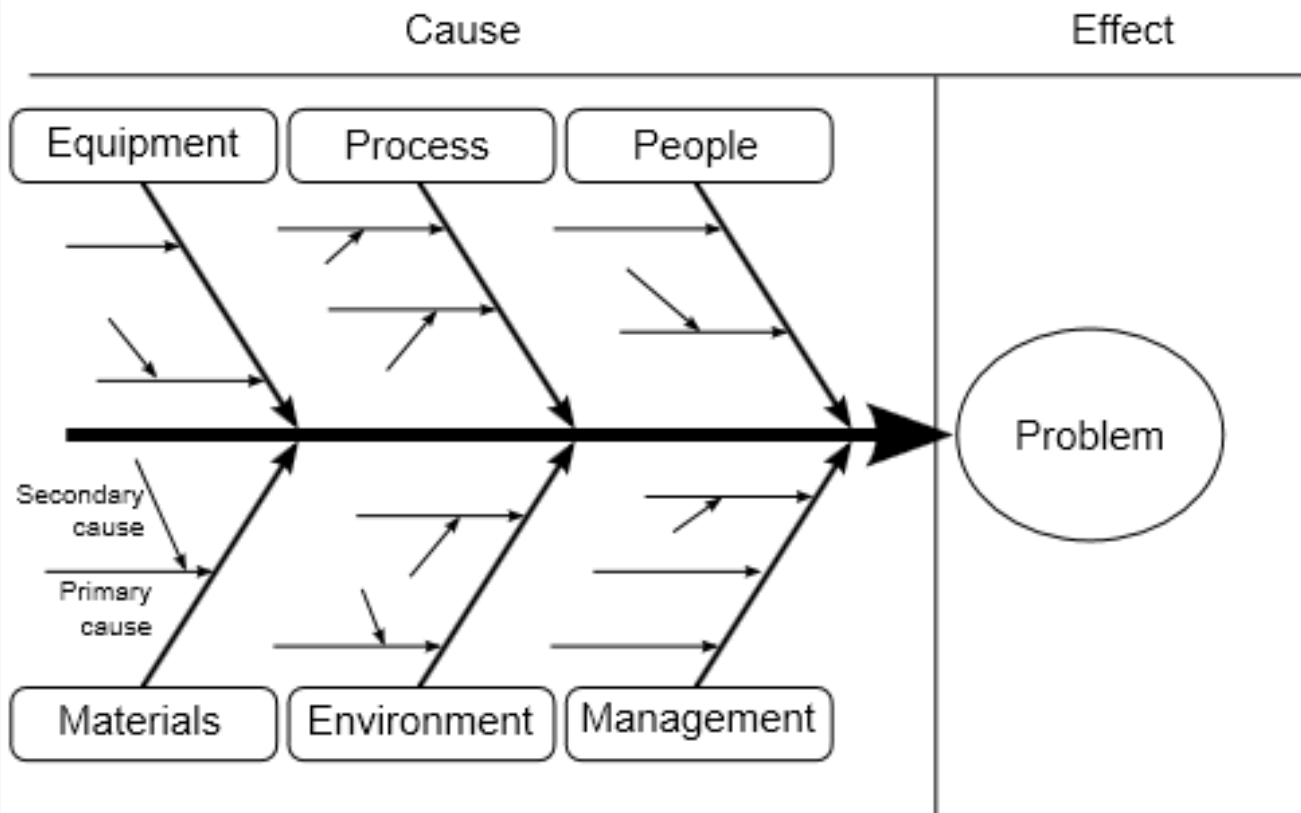- Solid waste: De-icing compound, construction material.
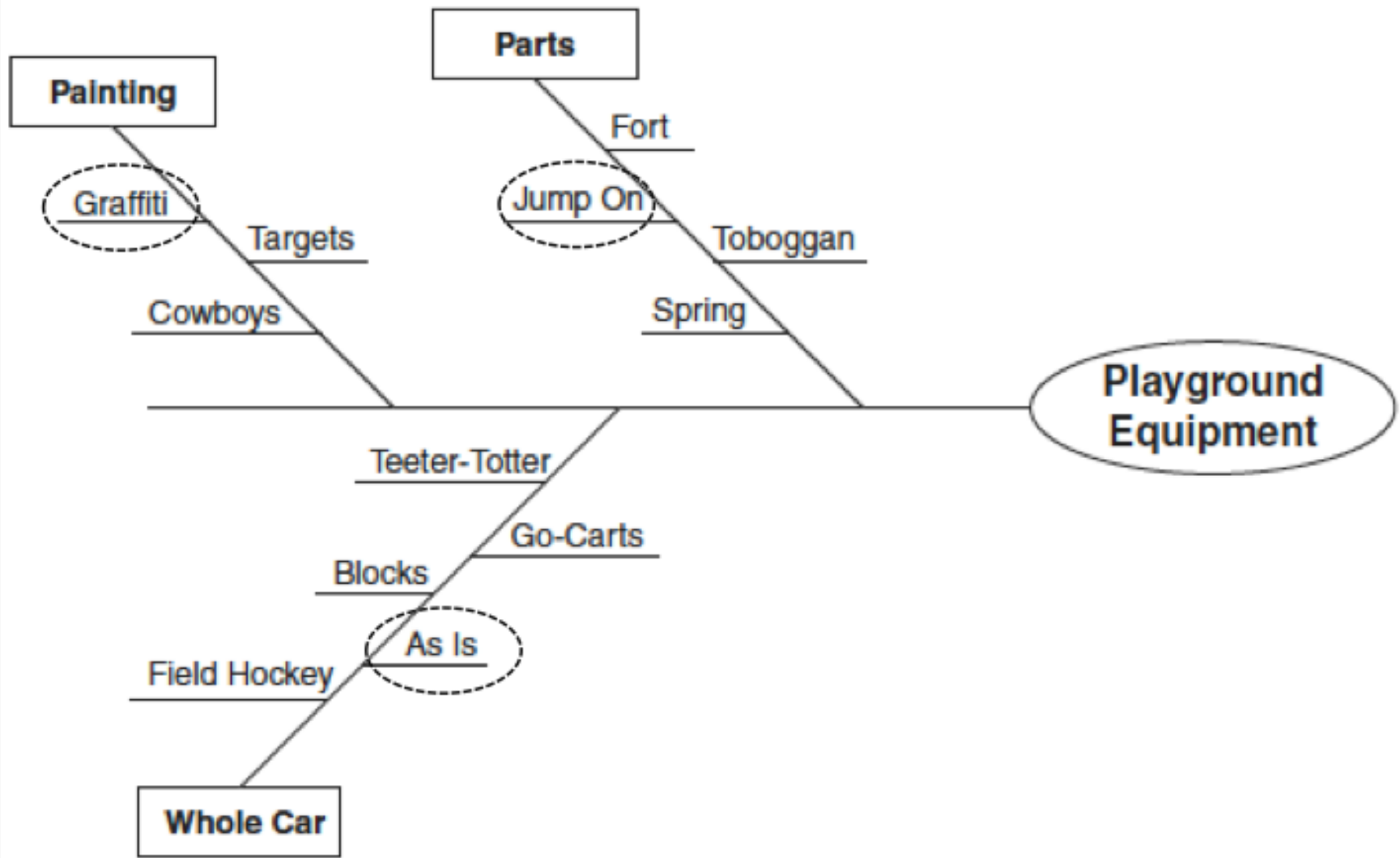
Real problem: What to do with waste?

Used to organize and record brainstorming session.

Backbone is the problem to solve.

Categorize solutions. Each is a diagonal spur.

List the solutions on each spur, perhaps generate subspurs.

Fishbone Diagram

Painting

- Let kids paint graffiti on cars.

- Paint targets and throw balls at them.

- Paint as something (wagon) for play.

Whole Car

- Make teeter-totter (upside down).

- Turn into a go-cart.

- Let kids drive it.

Parts

- Use seats as swings.

1. State the problem.
2. Generate analogies (the problem is like...).
3. Solve the analogy.
4. Transfer solution to problem.

Much of science is done by combining ideas from different fields.

Imagine a meeting between pairs such as:

- beautician and college professor,
- police officer and software programmer,
- automobile mechanic and insurance salesman,
- banker and gardener,
- choreographer and air traffic controller.