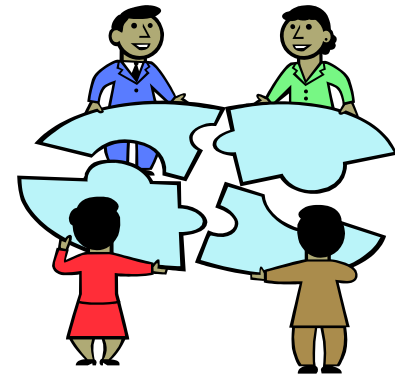


Chapter 8 Thinking

Problem Solving



Problem Solving

- 2 *General* approaches

Algorithms which are lengthy in process but effective at finding solutions

Heuristics which are short-cuts and efficient time-wise but may not always be effective at finding a solution



Problem Solving Specific Approaches

- Trial & Error
- Difference Reduction
- Means-End Analysis
- Working Backwards
- Analogies
- Insight
- Incubation



Obstacles to Problem Solving

- Mental Set (state or frame of mind)
- Functional Fixedness (stuck thinking inside the box)...limiting possibilities-antithesis of creativity



Solutions to Problem Solving

- Creativity and Divergent thinking

Divergent Thinking

- Free association of ideas...open minded
- Follows leads that may end at solution unexpectedly
- Produces many possible solutions



Versus Convergent Thinking

- Thoughts limited to available facts



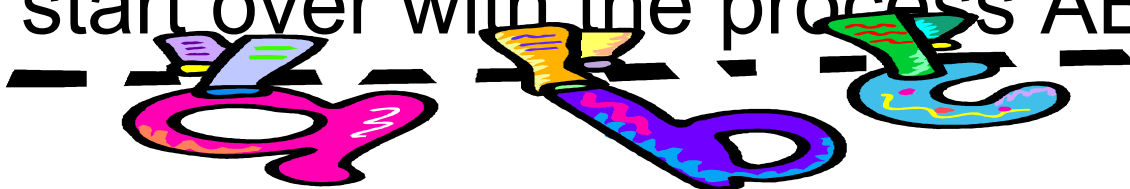
Divergent & Convergent Thinking

At times **divergent thinking** may be helpful to create ideas for *multiple* solution options but **convergent thinking** may help to limit or select *one* probable solution.



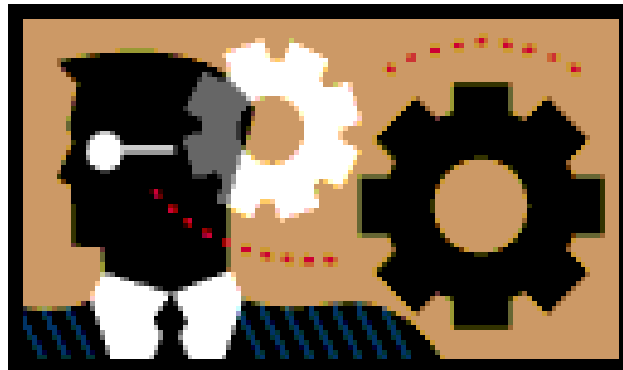
Psychologist's say the best way to solve a problem is use your ABCDE'S

- **Assess** the problem, define problem...check for understanding)
- **Brainstorm** alternative solutions (out loud, in a group, individually on paper)
- **Choose** a resolution -what will work best?
- **Do It** Implement the chosen resolution
- **Evaluate** Did you achieve the goal or do you need to start over with the process ABCDE?



Reasoning

- Using information to reach conclusions
- Two main types of reasoning are:
Deductive Reasoning and **Inductive Reasoning**



Deductive Reasoning

- The conclusions are true if premises are true

A **premise** is an idea or statement that is basic information that allows us to draw conclusions



Example of Deductive Reasoning

Premise 1:

South Korea is in Asia

True or false?

Premise 1 is True



Example of Deductive Reasoning continued

Premise 2:

The city of Seoul is in South Korea

True or false?

Premise 2 is True



Example of Deductive Reasoning continued

Conclusion:

Seoul is in Asia

Both **premises**
were true
therefore *the*
conclusion is
true



Deductive Reasoning review

- Conclusions are inferred from premises
- If the premise/s are true, the conclusion is true
- If the premises are incorrect the conclusion may be incorrect
- Start out with general statements and
DEDUCE down to a specific conclusion



Deductive Reasoning example 2

- Premise 1:

Countries that are near each other have similar languages

True or False?

False



- Premise 2:
Japan & Korea are
near each other.

True or false?

True



- Conclusion:
Japan & Korea have
similar languages.

True or False?

False



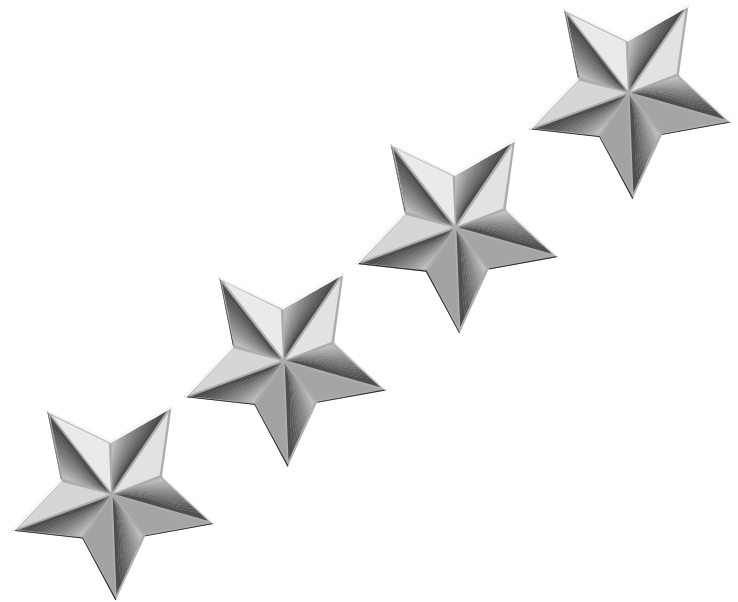
Deductive Reasoning

Premise 1 is not
completely true therefore
deductive conclusions
based on false
premises may be FALSE



Inductive Reasoning

- Reasoning begins with an individual case or particular facts as opposed to deductive reasoning's **general** statements or premises.
- Inductive reasoning ends with a general conclusion
- From *specifics to generalities*



Example of Inductive Reasoning

- Premise 1:
- Spain & Portugal are near each other and have similar languages

True or false?

Premise 1 is True



Example of Inductive Reasoning continued

- Premise 2:
- Sweden, Denmark, & Norway are near each other and have similar languages

True or False?

Premise 2 is True



Example of Inductive Reasoning continued

Conclusion:
Countries that
are near each
other have
similar
languages
(note a general
statement @ the end)

False Conclusion



Inductive Reasoning review

The conclusion is sometimes wrong even when premises are correct

Inductive conclusions are sometimes more of a hypothesis than a reasoning

Can easily be proven false, difficult to prove it true-this leads to ***confirmation bias*** tendency to seek, prove, or confirm a hypothesis rather than disprove it

