



# **Analogies in Education in Training**

## Learning, Problem Solving and Creative Thinking

*Kenneth Yates, Ed.D.*

# Topics



- What is an analogy and why should we care?
- Examples of analogies
- Explanation of why analogies work
- How to build analogies into education and training
- How analogies help to solve complex problems



# What is an Analogy?

- A similarity between new knowledge that must be learned and familiar knowledge in a very different domain of experience where elements are different on the surface but similar at a deeper level.
- The familiar part is called the *source* and the unfamiliar part of the analogy (to the learner) is called the *target*.
  - Example: Applying the supervisor’s sales plan (*target*) is like implementing a coach’s intent when planning with a basketball team to win the NBA finals (the *source*).
- Analogies help connect something new to be learned with prior experience in a way that generates new knowledge.
- Analogies have to be distinguished from metaphors and examples – also used to draw on prior experience.

# Metaphors and Examples are not Analogies



- A metaphor is a poetic way to compare two things:
  - “The staff got off on the wrong foot”
  - “We may have fostered a ‘bunker mentality’ in Haiti and Bosnia”
  - “Maneuvers were ordered on a coal black night”.
- An example is a specific instance of a past event or object.
  - “The supervisor made the same kind of mistakes implementing the sales plan that the former supervisor made.”
  - “Haiti and Bosnia were assumed to be two more examples of a country like Somalia.”

# Why are analogies important?



- Analogies can help people learn new and complex ideas and solve novel problems
  - In 11 training studies, analogies increased learning an average of 35 % (Mayer, 2009)
  - Historical analysis of scientific and medical breakthroughs indicate that analogies are often critical
- Many psychologists believe that our ability to use analogies is a key component of human intelligence and complex problem solving

# An example we all share - Fractions

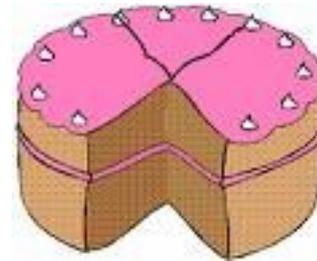


- Kids learn to count whole numbers first
- Then we tell them that there are “numbers less than one” or **Fractions**
- Teachers use an analogy to connect a new target concept (fractions) with a familiar source concept
  - “Fractions are like ....”

# Fractions are like ....



- Slicing pies and cakes



# And then teachers use the analogy ....



- Kids are taught to use a “sliced pie” to solve addition and subtraction of fractions

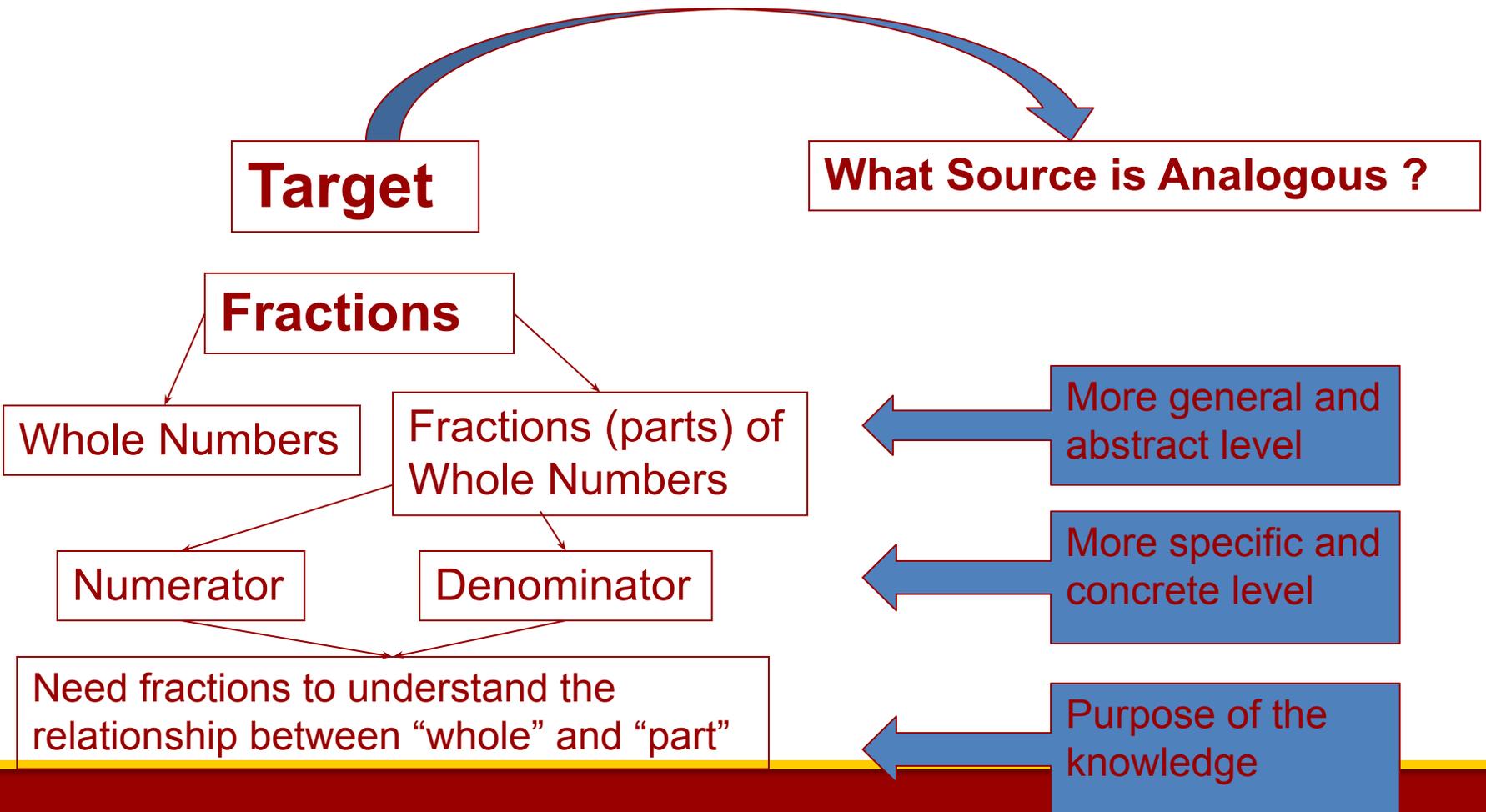


# Caution: Two problems with Analogies



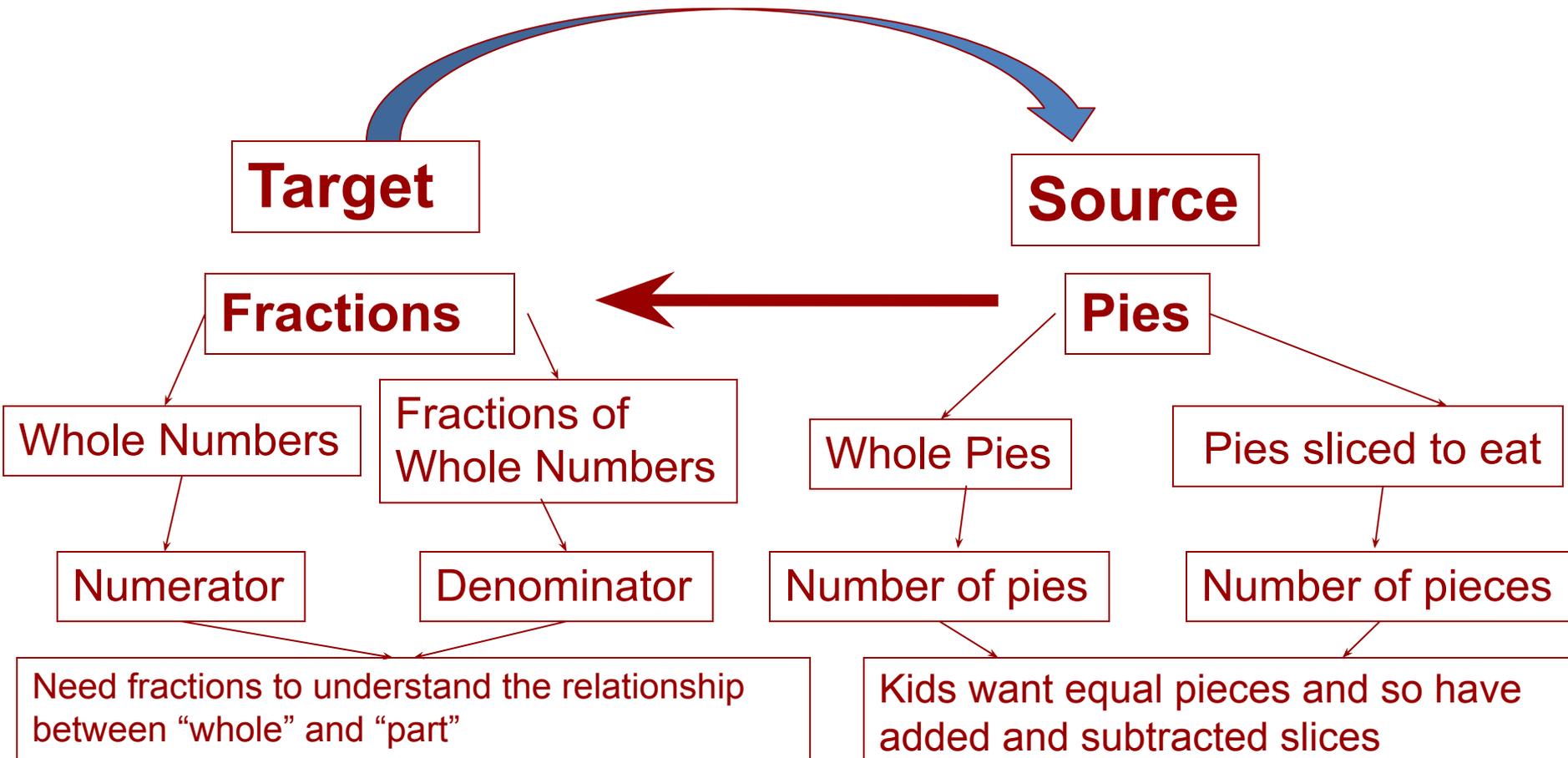
1. People often focus on unimportant features of the familiar part of the analogy and do not always see the important and deeper connections so you have to point them out.
  - Some kids worry that you can't add slices of different kinds of pie together (a surface feature of pies is the type of filling)
2. Analogies are never perfect – so you must point out where two things are not similar at a deeper level
  - Pies can't be divided or multiplied

# Why does the Fraction analogy work?





# Selecting Analogies



# Personal Experiences



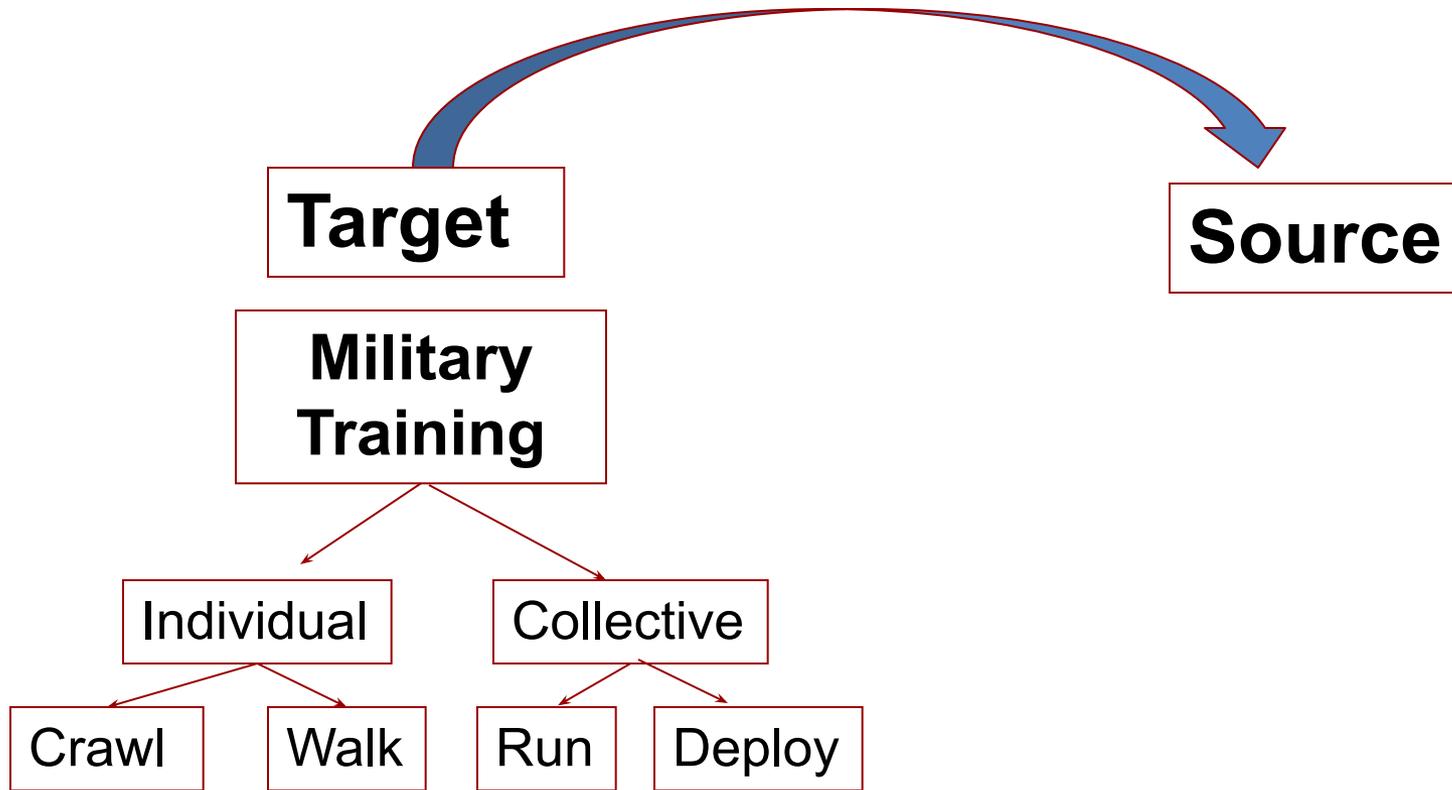
- Can you think of a time when an analogy helped you learn something important?
- Have you seen analogies used effectively in training?

# Military Analogies



Assume you want to help new recruits understand what they will experience in military training

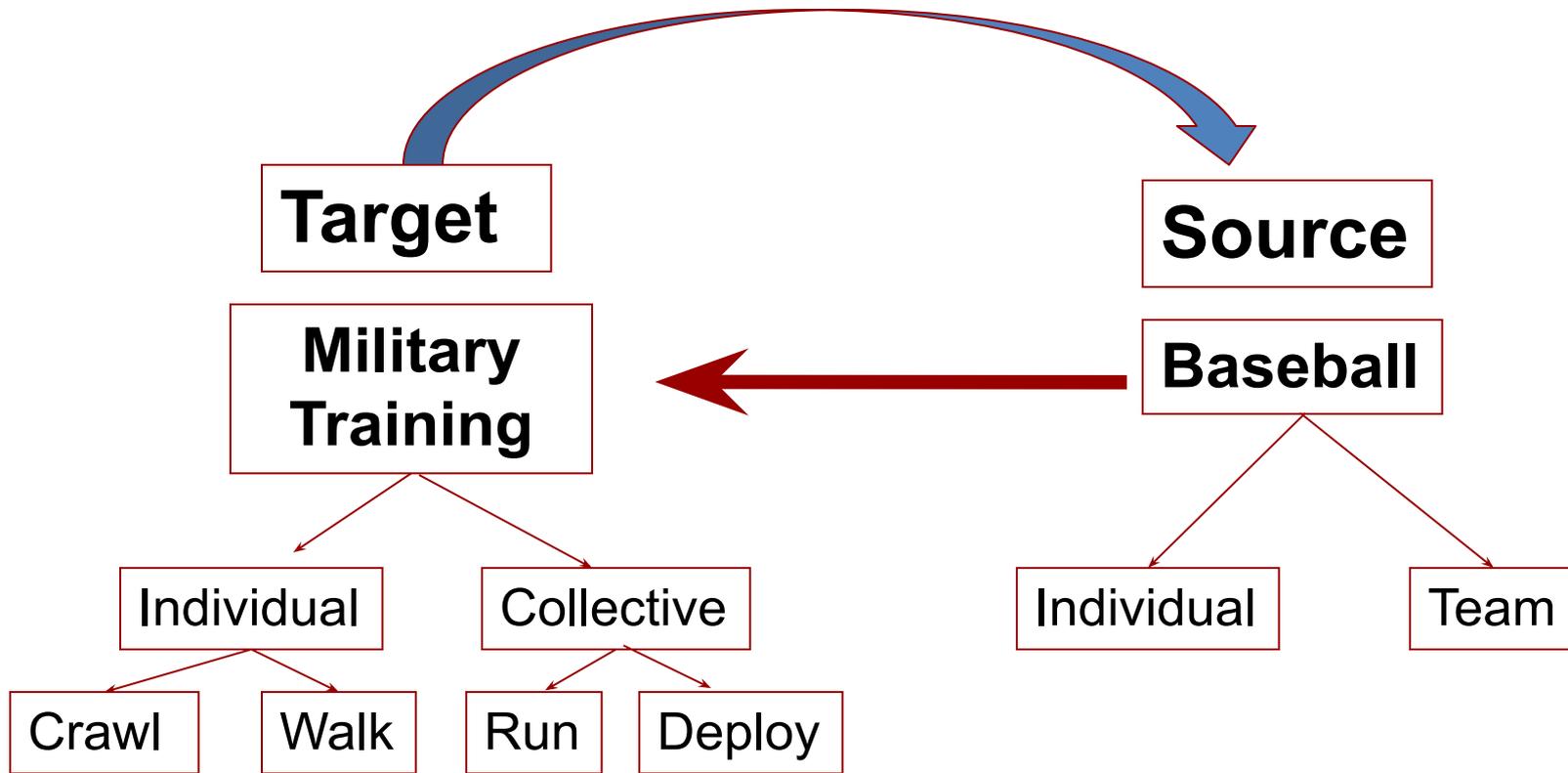
# How do Analogies help learning?



A progression of individual and collective task training for missions.

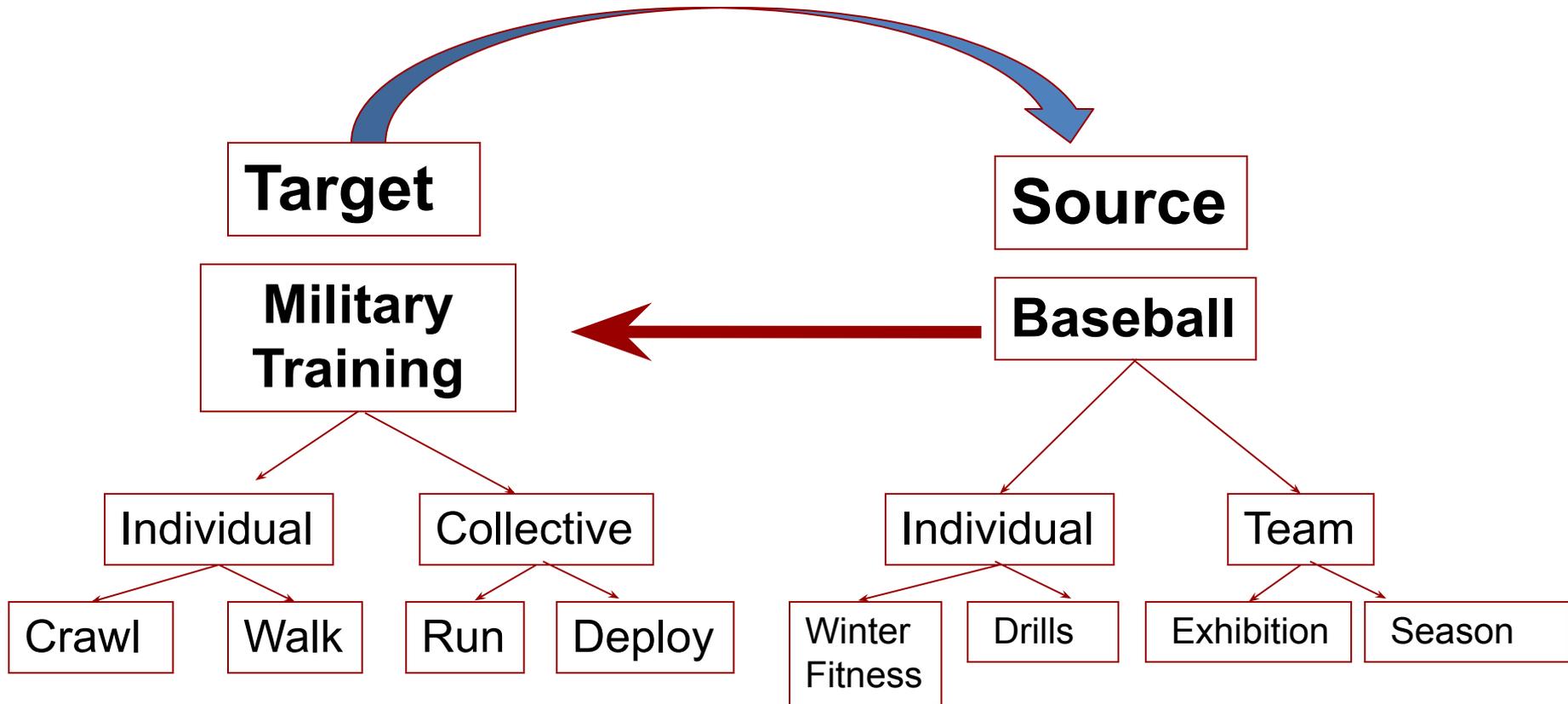


# How do Analogies help learning?



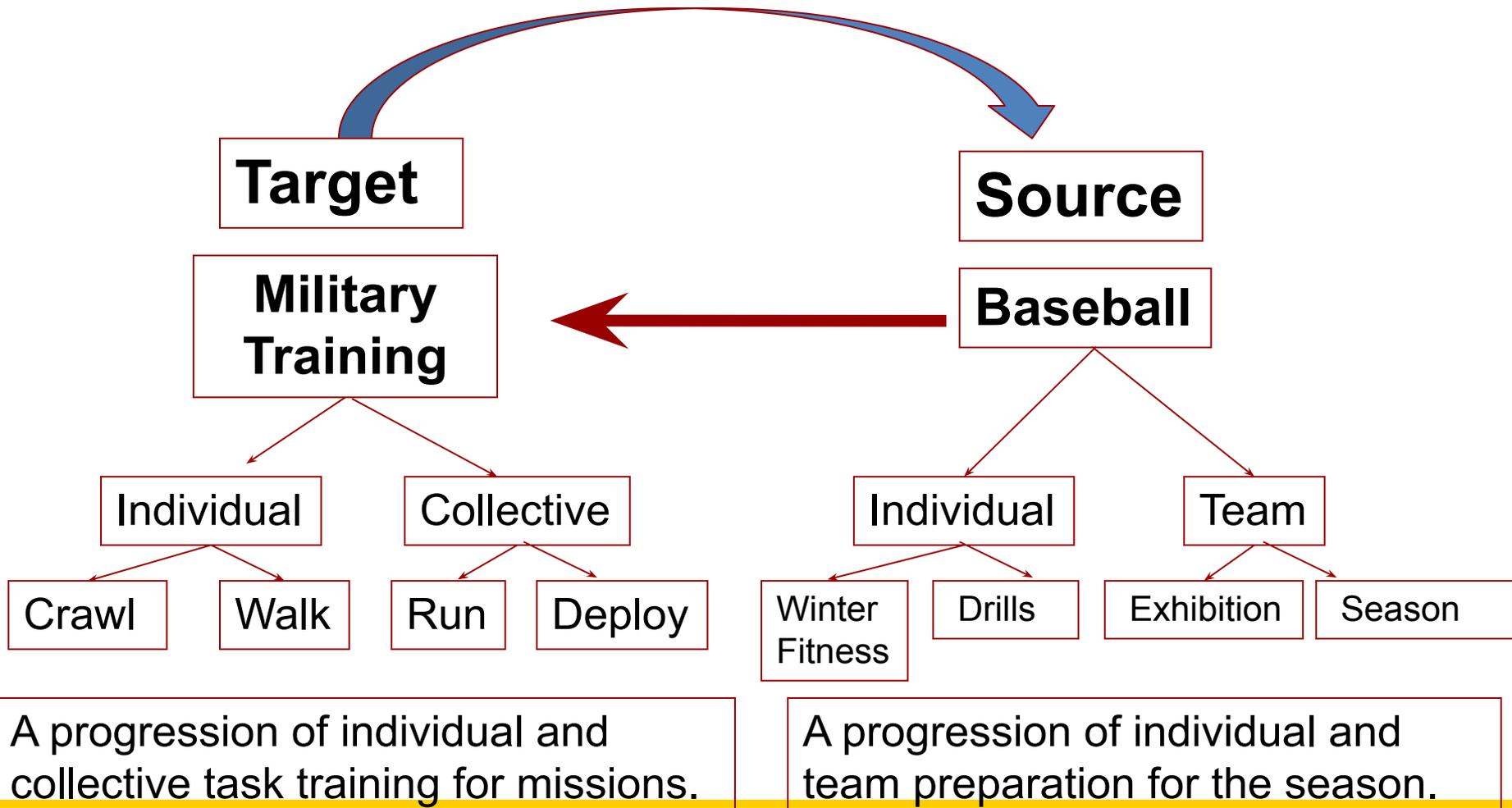
A progression of individual and collective task training for missions.

# How do Analogies help learning?



A progression of individual and collective task training for missions.

# How do Analogies help learning?





# Using analogies...

1. Introduce target concept
2. Ask people to think about the source analog concept
3. Identify relevant features of target and source analog
4. Map similarities
5. Indicate where analogy breaks down

# Summary



- Analogies connect new ideas with familiar experiences that are only similar at deeper levels
- Analogies increase learning about 35% and help solve very complex problems
- When the source and target are connected mentally the association allows us to use familiar knowledge to understand complex, novel problems and tasks
- Use analogies when possible in training but always when we teach novel and complex processes
- Always make clear the “exceptions” – the ways that source and target are different