Analogies

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Slides based on the “Problem Solving and Comprehension” book
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Analogy in communication promotes understanding.
   Bad analogies can promote misunderstanding.

Use of analogy in nature supports creative problem solving (mechanical inventions from biological analogy)
   I can solve this problem in a way similar to how that problem was solved.

Tunnelling underwater solved through analogy of how worms eat through wood.

Alexander Graham Bell developed the telephone by observing how a light membrane in the human ear caused movement in heavy inner ear bones.

Louis Pasteur discovered that infection in human wounds was caused in a way analogous to fermentation of wine.
Working analogy problems requires
- Spelling out ideas fully
- Formulating precise relationships of facts
- Developing correspondences between ideas
- Comparing relationships for similarities and differences

These skills are central to all problem solving.
Simple Analogy Example

Gills are related to fish as lungs are related to humans.

Restate:
- Gills are used for breathing by fish.
- Lungs are used for breathing by humans.

(Where did “used for breathing” come from?)

Define a “relationship sentence”:
_____ are used for breathing by _______. 

(Where did “used for breathing” come from?)
The key issue in analogy problems is picking the proper relationship sentence.

*Carpenter* is to *saw* as *plumber* is to *wrench*.

- A _____ is a _____.
- A _____ cuts wood with a _____.
- A _____ connects pipes with a _____.
- A _____ uses a tool called a _____.

**Analogy 1**
Analogy 2

Stewardess is to airplane as waitress is to restaurant.

- A _____ is a(n) _____.
- A _____ works in a(n) _____.
- A _____ gives safety instructions in a(n) _____.
- A ___________ takes care of the needs of customers in a(n) ___________.

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Analogy 3

Guitar is to *pick* as *fiddle* is to *bow*.

- A ____ is played with a ____.
- A ____ is plucked with a ____.
- A ____ is a ____.
- A ____ is a musical instrument that may be played with a ____.
Fence is to garden as bumper is to car.

- A_____ helps protect a_____.
- A_____ keeps trespassers out of a_____.
- A_____ surrounds a_____.

Which is the best relationship?
Analogy 5

20 is related to 10 as 50 is related to 40.

- _____ is larger than _____.
- _____ is ten more than _____.
- _____ is twice _____.
- _____ is one-half of _____.

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50 is related to 48 as 67 is related to 64.

- _____ is two more than _____.
- _____ is larger than _____.
- _____ is smaller than _____.

Analogy 6
Define the Relationships

*Mouth* is to *talk* as *hand* is to *grasp*.

6 is related to 2 as 21 is related to 7.

70 is related to 30 as 35 is related to 15.

*Arrive* is to *depart* as *find* is to *lose*.

*Roots* are to *plant* as *mouth* is to *animal*.

*Peacock* is to *bird* as *tuxedo* is to *suit*.

50 is related to 20 as 90 is related to 60.
Standard Test Analogy Problems

Now we look at the standard form of analogy problems on tests.

- One pair is given, you pick another pair that has the same relationship.
- It helps if you can define a relationship sentence.
Analogy Problem 1

*Thermometer* is to *temperature* as ____ is to ____.

a) telescope : astronomy
b) clock : minutes
c) scale : weight
d) microscope: biologist
Analogy Problem 2

Horse is to animal as _____ is to _____.

a) cow : milk
b) farm : pig
c) oak : wood
d) saddle : stallion
Analogy Problem 3

2 is to 6 as _____ is to ____.

a) 6 : 2
b) 12 : 36
c) 3 : 1
d) 12 : 60
Pack is to wolves as ____ is to ____.

a) alphabet : letters
b) wheel : spokes
c) garage : cars
d) aquarium : fish
e) murder : crows
Analogy Problem 5

Same idea, just a different format.

_____ is to dollar as year is to _____.

a) money, calendar
b) penny, century
c) dime, month
d) savings, century
Try each choice. If the relationships are different, the answer is wrong. If the relationships are unclear, then hold the answer to reconsider.

_____ is to cave as car is to _____.

a) Modern, primitive  
b) Stone, steel  
c) Primitive, modern  
d) Apartment house, horse
Some Common Types of Analogies

Contrasts

negligence is to careful as bravery is to cowardice

Part to whole

keyboard is to computer as trunk is to car

Part to part

keyboard is to mouse as trunk is to hood

Activity to result

heat is to warmth as rain is to flooding
Some Common Types of Analogies

Individual to object

doctor is to stethoscope as painter is to brush

Measure

clock is to time as decibel is to sound

Degree of difference/similarity

cool is to frozen as breeze is to gale

Use

pencil is to write as scissors are to cut
problem solving