Task Analysis

Objectives

- Break a math objective into a **list of component steps** using a formal task analysis process
- Use the task analysis to **assess** mastery of the respective math objective

Initiation

A prerequisite for these objectives is that the participants have a **clear understanding of what constitutes a valid, effective objective**.

Agenda

- Foundation for Task Analysis
- Process for creating a formal Task Analysis

Foundation for Task Analysis

This is Gabriel, a young boy with autism. We have an objective of him dressing himself - assume clothes are laid out for him and he is wearing only his pull ups.

List Steps for Gabriel to get dressed in the morning – list in order

- Identify underwear.
- Pick up underwear.
- Turn underwear, label closest to his belly
- …
- Match shoes to feet
- Put feet into shoes
- Strap or tie shoes

Now we use assess his ability to perform the steps

- Identify underwear.
- Pick up underwear.
- Turn underwear, label closest to his belly
- …
- Match shoes to feet
- Put feet into shoes
- Strap or tie shoes

} Assess all the steps

Assume that out of that list you find that he has trouble putting on his shoes. What do you do?

A. Come up with permanent accommodations
B. Rewrite goals and objectives
C. Address the gap with instruction

Provide instruction (support would be faded)

- Match shoes to feet
- Put feet into shoes

List Steps for Gabriel to get dressed in the morning – list in order

- Identify underwear.
- Pick up underwear.
- Turn underwear, label closest to his belly
- …
- **Match shoes to feet**
- **Put feet into shoes**
- **Strap or tie shoes**

Assess a subset of steps

List Steps for Gabriel to get dressed in the morning – list in order

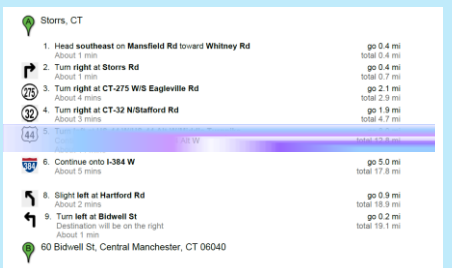
- Identify underwear.
- Pick up underwear.
- **Turn underwear, label closest to his belly**
- …
- Match shoes to feet
- Put feet into shoes
- Strap or tie shoes

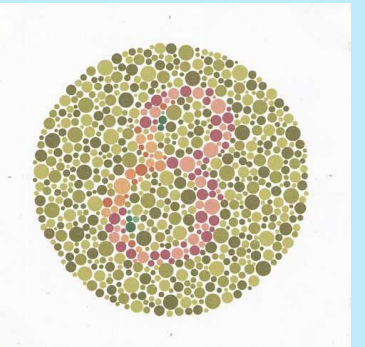
Assess a single step

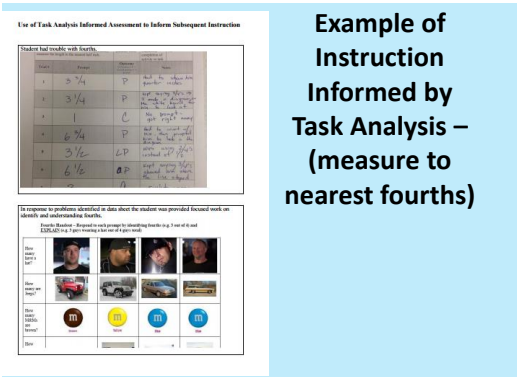
Task Analysis

- Task Analysis is a formal procedure for breaking the topic into manageable little parts for the students
- It can be used to guide assessment:
  - For all steps
  - For subset of steps

Concept of Intervention






Use of Task Analysis Informed Assessment to Inform Subsequent Instruction

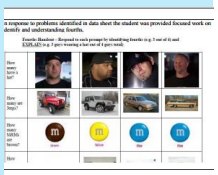
Student had trouble with fourths.

In response to problems identified in data sheet the student was provided focused work on identify and understanding fourths.

Example of Instruction Informed by Task Analysis – (measure to nearest fourths)

Which step is being addressed

A. Marking a ruler
B. Identifying fourths
C. Identifying prior knowledge
D. Engaging the student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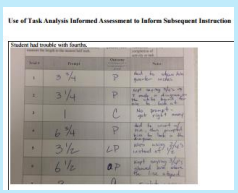
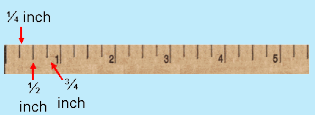
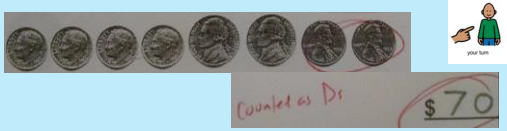

Use of Task Analysis Informed Assessment to Inform Subsequent Instruction

Student had trouble with fourths.

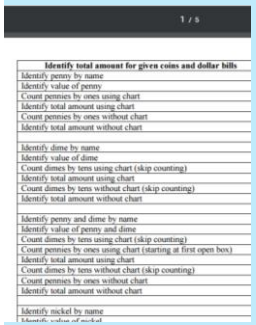
Identifying fourths on a ruler



Is the student totally confused by the values of these coins?



- Possibly misidentified pennies as dimes
- Steps to possibly address:
  - Identify dimes
  - Identify pennies
  - Identify value of dimes
  - Identify value of pennies
  - Distinguish dimes and pennies in a given set of coins
  - Count on with pennies from a cumulative total for other coins



Identify total amount for given coins and dollar bills
Identify penny by name
Identify value of penny
Count pennies by ones using chart
Identify total amount using chart
Count pennies by ones without chart
Identify total amount without chart
Identify dime by name
Identify value of dime
Count dimes by tens using chart (skip counting)
Identify total amount using chart
Count dimes by tens without chart (skip counting)
Identify total amount without chart
Identify penny and dime by name
Identify value of penny and dime
Count dimes by tens using chart (skip counting)
Count pennies by ones using chart (starting at first open box)
Identify total amount using chart
Count dimes by tens without chart (skip counting)
Count pennies by ones without chart
Identify total amount without chart
Identify nickel by name

5 Pages of steps to address for counting out total value for given set of coins

Count out **given money** to find total value

vs count out money
to pay a **given price**

Identify the first step for the following problem on algebraic expressions:

Simplify 7.5x + 1 – 3x – 5

A. 7.5x – 3x
B. 1 – 5
C. Understanding subtraction
D. Identifying like terms

All steps including mental ones

$7.5x + 1 - 3x - 5$

Like terms $7.5x + 1 - 3x - 5$

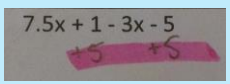
Minus = negative # $7.5x + 1 - 3x - 5$

Rearrange by like $7.5x - 3x \quad + 1 - 5$

simplify $4.5x \quad -4$

Answer is a single expression $4.5x - 4$

Identify the mistake using steps from previous slide



$7.5x + 1 - 3x - 5$

Like terms $7.5x + 1 - 3x - 5$

Minus = negative # $7.5x + 1 - 3x - 5$

Rearrange by like $7.5x - 3x \quad + 1 - 5$

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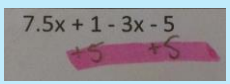


A. Didn't rearrange properly
B. Didn't combine like terms
C. Didn't understand minus is same as a negative 5

Rearrange by like $7.5x - 3x \quad + 1 - 5$

- Possibly confused expression with equation

$$x - 5 = 8$$
$$x - 5 + 5 = 8 + 5$$

- Steps to possibly address:
  - Distinguish between expressions and equations
  - Determine when to simplify and when to solve

What mistake did the student make?


.46


.46


.36

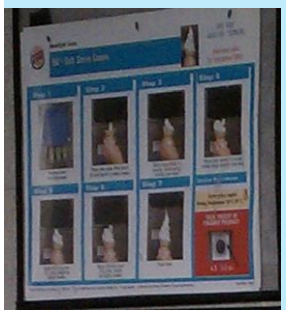
Counted the nickels as dimes except for the last nickel – actual situation!


.46


.46


.36

If BK can create an effective task analysis, we should!



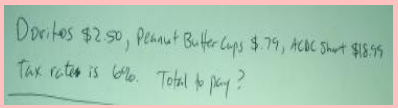
Steps for creating a formal Task Analysis

I will walk through the steps to create a task analysis for this objective.

Objective: Compute total to pay given tax rate and price of multiple items to be purchased. (solve multi-step real life problem)

Note: step 1 is to ensure the objective is measurable and observable

2. Identify or create an example problem for the objective. We will use the one below for the rest of the steps.

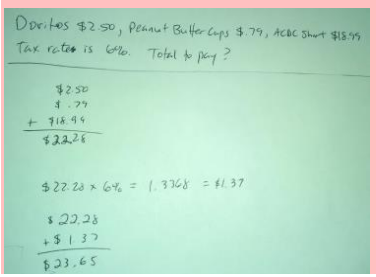


3. Work out the Example Problem – Show all steps

Why would we want to create and work out an example problem?

A. To use as the assessment
B. To help identify all the steps
C. To ensure we are competent with the math topic

The idea is for you to "see" and think through all the steps the student would have to perform.



4. Write all steps into task analysis table (use template provided – page 1)

	Steps	Outco C = Correct, L prompt, P =
1	identify $2.50, $.79, $18.99 as prices and 6% as percent (different)	
2	2.50+.79+18.99	
3	$22.28	
4	6% or .06 is not money	
5	.06x22.28=1.3368	
6	$1.34	
7	tax is extra to pay	
8	22.28+1.34	
9	$23.65	
10	I pay the cashier 23 dollars and 65 cents	

You handwrite or type this part.

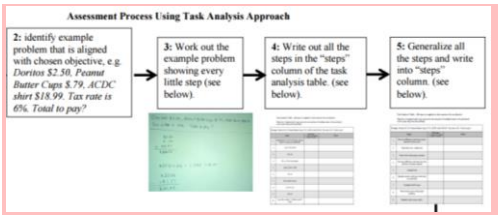
5. Rewrite all steps in the task analysis table as general steps – page 2 of template

Why would we want to generalize the steps?

A. To ensure we are competent with the math topic
B. To have steps for use with different given problems of this type
C. To generalize for other settings, e.g. at home

	Steps	Outc C = Correct, L prompt, P =
1	Discern difference between money amounts and tax rate	
2	Find total cost , before tax	
3	Write total with proper notation	
4	Discern difference between tax rate and tax as money amount	
5	compute tax	
6	Identify need to add (pay both total cost and tax)	
7	Compute total to pay	
8	Write total to pay with proper notation.	
9	Identify total to pay orally.	

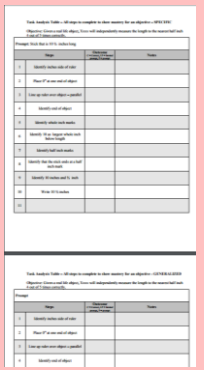
The purpose for generalizing is to use the template as an assessment for various problems



This is an excerpt from a flow chart handout showing all steps for math intervention

Create a Task Analysis for the following objective (use template):

Given a real life object, Xxxx will independently measure the length to the nearest half inch 4 out of 5 times correctly.



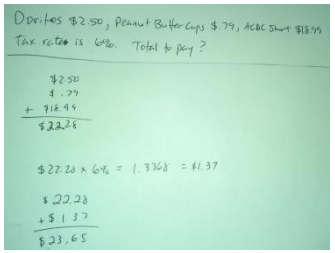
See example provided

Assessment Process Using Task Analysis Approach

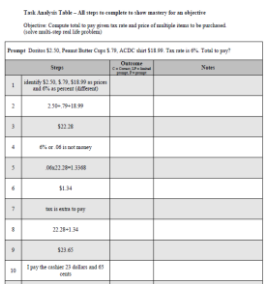
1: identify objective to address, e.g. *Compute total to pay given tax rate and price of multiple items to be*

2: identify example problem that is aligned with chosen objective, e.g. *Doritos $2.50, Peanut Butter Cups $.79, ACDC shirt $18.99. Tax rate is 6%. Total to pay?*

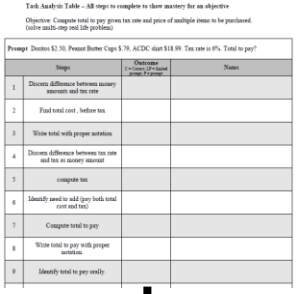
3: Work out the example problem showing every little step (see below).



4: Write out all the steps in the "steps" column of the task analysis table. (see below).



5: Generalize all the steps and write into "steps" column. (see below).

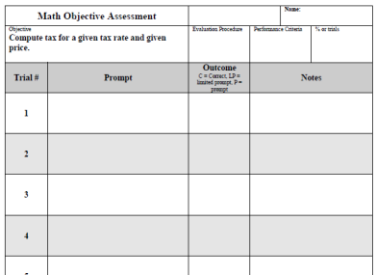


6: Conduct pretest assessment (use task analysis table (above).

1. Present reinforcer as reward for attempting to complete the problem (and to show work or explain).
2. Prompt student to work out problem.
3. Either ask student to show work or explain work orally.
4. Check off each step and label "C" for independently completed correctly, "LP" if minimal prompting provided, or "P" for prompting provided. (Prompting allows student to continue through steps.)

7: Provide instruction on chosen step, e.g IXL 7th grade K.5, *"percent of numbers and money amounts"* (see below)

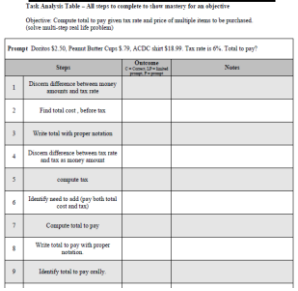
8: Fill in data sheet with objective based on the step, e.g. *Compute tax for a given tax rate and given price.* (see below)



9: Either provide additional instruction on this step (follow parts 7 and 8 again) or choose another step from the task analysis and follow parts 7 and 8.

10: When all steps missed on the pretest have been addressed and assessed (parts 7-9) conduct post-test assessment (part 6).

For any steps not completed independently redo parts 7-9 for these steps.



Task Analysis Table – All steps to complete to show mastery for an objective

Objective: Given a real life object, Xxxx will independently measure the length to the nearest half inch 4 out of 5 times correctly.

Prompt: Stick that is 10 ¼ inches long

Steps		Outcome C = Correct, LP = limited prompt, P = prompt	Notes
1	Identify inches side of ruler		
2	Place 0” at one end of object		
3	Line up ruler over object – parallel		
4	Identify end of object		
5	Identify whole inch marks		
6	Identify largest whole inch below length		
7	Identify half inch marks		
8	Identify half in mark closest to end of object		
9	Identify whole inch and half inch		
10	Write measurement correctly with units		
11			

Math Objective Assessment of step or group of steps from task analysis			Name:	
Objective (substep):		Evaluation Procedure	Performance Criteria	% or trials

Trial #	Prompt	Outcome C = Correct, LP = limited prompt, P = prompt	Notes
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			