

# Data Collection Strategies EDTC 3005

Adapted from the “Tutors with Vision” Project  
Center for Teacher Certification  
Austin Community College

Fall 2007

Use this packet that contains essentials for teaching, for learning, and how to use student data to teach based on student data. As you begin EDTC 3005, you need data from the fall that can be analyzed and used for student interventions.

## Teacher Strategies for Using Data

Math is sequential...For 8<sup>th</sup> grade math, Nancy begins with data about her students. Below is a chart showing a case study class from previous years. As a teacher, one of the skills that must be mastered is **seeing data, knowing what to do with it, analyzing it, and teaching based on actual student needs**. For example, study the case study information for three classes and follow the directions in the lower right hand corner. These students were selected by Ms. Shaer for a specific reason.

Student Names	7 <sup>th</sup> grade TAKS scores						7 <sup>th</sup> grade end of year report card							7 <sup>th</sup> grade Absences
	Obj 7-1	Obj 7-2	Obj 7-3	Obj 7-4	Obj 7-5	Obj 7-6	Art	Alg 1a	Tx His	PE	Sci	Eng	Reading	Abs
Betty	90	70	43	60	67	78	80	62	84	99	71	63	56	5
Billy	60	50	86	40	43	44	75	88	64	75	94	80	89	2
Carrie	60	80	43	60	57	67	60	70	75	60	82	93	88	4
John	20	30	29	20	29	56	60	50	45	90	62	50	62	9
Analisa	60	60	57	100	43	67	78	81	76	90	81	79	86	0
Thelma	20	30	0	20	29	44	97	40	45	98	54	60	50	12
Marty	50	60	29	40	71	56	89	94	88	75	89	95	80	2
Alex	50	40	57	20	71	78	78	86	56	81	75	82	76	1
Lucinda	40	50	14	60	43	67	90	77	68	85	95	81	90	3
Steve	50	60	100	60	29	78	99	70	71	89	72	93	98	4
Alma	70	40	43	80	71	56	70	50	60	63	44	70	61	10
Jose	50	60	43	20	29	78	100	73	65	99	55	50	50	14
Olson	70	60	100	20	57	56	80	98	77	74	83	70	84	7
Jerry	80	50	43	40	57	78	74	66	65	99	73	70	68	8
Tranika	50	70	71	60	57	56	73	70	67	84	66	71	60	7

Objective 7-1 Numbers, Operations, & Quantitative Reasoning (10 items)  
 Objective 7-2 Patterns, Relationships, and Algebraic Reasoning (10)  
 Objective 7-3 Geometry and Spatial Reasoning (7)  
 Objective 7-4 Measurement (5)  
 Objective 7-5 Probability and Statistics (7)  
 Objective 7-6 Mathematical Processes and Tools (9)

Study student information (TAKS, report card, absences) and look for patterns:

- ✓ natural ability
- ✓ testing ability
- ✓ possible physical issues
- ✓ effect of absences

Analyze the same case study chart, digging deeper...

Name	7 <sup>th</sup> grade TAKS scores						7 <sup>th</sup> grade end of year report card							7 <sup>th</sup> grade Absences
	Obj 7-1	Obj 7-2	Obj 7-3	Obj 7-4	Obj 7-5	Obj 7-6	Art	Alg 1a	Tx His	PE	Sci	Eng	Read	Abs
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- Objective 7-1 Numbers, Operations, & Quantitative Reasoning (10 items)
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Study student information (TAKS, report card, absences) and look for patterns:

What about Marty?

- ✓ testing ability for TAKS – did she feel ill that day? was she not prepared for the test? does she have test anxiety?
- ✓ She only had 2 absences, what is the effect?
- ✓ what are her strengths in the TAKS math objectives?
- ✓ does she have average ability in all classes?
- ✓ why is her 7<sup>th</sup> Algebra grade so high if she has not mastered the 7<sup>th</sup> TAKS objectives?
- ✓ does she need assistance in all TAKS math objectives or just specific objectives?

Analyze the same case study chart, digging even deeper...

Student Names	7 <sup>th</sup> grade TAKS scores					
	Obj 7-1	Obj 7-2	Obj 7-3	Obj 7-4	Obj 7-5	Obj 7-6
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Lucinda	40	50	14	60	43	67
Steve	50	60	<b>100</b>	60	29	78
Alma	70	40	43	80	71	56
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7 <sup>th</sup> grade end of year report card							7 <sup>th</sup> grade Absences	
Art	Alg Texas			PE	Sci	Eng	Read	Abs
	1a	His						
80	62	84		99	71	63	56	5
75	88	64		75	94	80	89	2
60	70	75		60	82	93	88	4
60	50	45		90	62	50	62	9
78	81	76		90	81	79	86	0
97	40	45		98	54	60	50	12
89	94	88		75	89	95	80	2
78	86	56		81	75	82	76	1
90	77	68		85	95	81	90	3
99	70	71		89	72	93	98	4
70	50	60		63	44	70	61	10
100	73	65		99	55	50	50	14
80	98	77		74	83	70	84	7
74	66							
73	70							

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Now, study all student TAKS math scores and look for patterns:

- ✓ These students are all on which tier level? (1, 2, or 3)
- ✓ Study objective 1. Which students are testing at 80 or above? Circle these students' score. Do the same for all 6 objectives. What conclusions can you make?
- ✓ Which objectives are most students needing help? Highlight those objectives as a vertical line.
- ✓ How would a Learning Styles Inventory help you diversify for specific students?
- ✓ Which students could help others?
- ✓ Which students could show mastery with a few problems rather than going at the class pace?
- ✓ How would you plan assistance for John G.?
- ✓ How does this analysis prepare you for parent conferences?
- ✓ How can you rewrite lessons for specific learning styles and student success?
- ✓ Would a weekly assignment sheet, signed by parent and returned to teacher, help increase scores?

Using Ms. Shaer’s first 6-weeks main ideas and TAKS Objectives Connections, Mr. Villarreal began a plan for tutoring. Remember that math objectives from 1<sup>st</sup> through 8<sup>th</sup> grade are essentially the same, so students master the foundations and then spiral upward to understand more complex problems and concepts. Based on the first six weeks of information that students have already mastered at a 7<sup>th</sup> grade level, students who have mastered the objectives (Tier 1 and possibly Tier 2) can be taught as one or two groups, with higher level questions/problems available for Tier 1 students). Often, Tier 1 students can become “Teacher Assistants” when their strengths can be used to show the class how to solve a problem, or work with a small group of students needing just a little more explanation. Middle School students especially like learning from their peers. As you studied the Case Study Information, did you find that in several instances, individual students who “almost have it” could strengthen their skills by helping others?

1<sup>st</sup> 6 weeks main ideas and TAKS Objectives Connections

Order of Operations	Objective 10
Evaluating formulas	Objective 4
Using Formulas	Objective 2
Coordinate (x, y) plane	Objective 6
Integer Addition	Objective 2
Multiplying Fractions	Objective 9
Reducing Fractions	Objective 9
Simple Proportions	Objective 9

2<sup>nd</sup> 6 weeks main ideas

Objective 8 TAKS Questions to study and review

Measurement	Objective 8	#23, 29, 35, 67, 83, 87, 40, 62, 1, 26, 79, 83
Solving Equations	Objective 4	

**Gathering and Interpreting Data**

Abel Villarreal  
 Sharon Duncan  
 Center for Teacher Certification  
 Austin Community College

Taking Students from A to B

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Taking a student from  
 point **A** to point **B**  
 is the essence of teaching.  
 Here's HOW...

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**Start with data**

Where do you find:

- a student's report card?
- a copy of a student's TAKS scores?
- an attendance record on a student?
- a whole class's attendance record?
- a copy of a student's 504 modifications?

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## Answers

- a student report card - from counselor, or teacher tools on computer (SASI)
- T.A.K.S. scores - from counselor
- Attendance records for student/class - from teacher computer (SASI) and from attendance clerk in front office
- 504 modifications/Special Ed – from Special Ed coordinator.

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## Locating and Selecting Data

- Focus – Which skills are students to master during the school year?
- Purpose – How will teacher, student, principal, and parent know that students have mastered the skills?

*Did you clearly define the focus and purpose of the data?*

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## Combining Data

Teachers have access to various forms of data, and each type has its own set of unique qualities and uses. The golden rule to remember about gathering and using data is that all data used in any improvement plan MUST complement each other. Eg: grades, absences, benchmark tests, ability to apply skills to more complex tasks, behavior issues may be related to lack of understanding of key skills that must be re-taught. Often, the behavior issues decrease when teachers and students fill the gaps.

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## TAKS

Texas Assessment of Knowledge and Skills state-mandated exam that covers the four core areas (science, mathematics, English, social studies). Each grade has a specific set of objectives and skills to master.

Math objectives are similar from Kindergarten through 8th grade

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## Objective 1: Numbers, Operations, and Quantitative Reasoning

### Objective 1

#49. Ms. Hill wants to carpet her rectangular living room, which measures 14 feet by 11 feet. If the carpet she wants to purchase costs \$1.50 per square foot, including tax, how much will it cost to carpet her living room?

Solution:  $\text{Area} = L \cdot W$   
 $= 14 \cdot 11$   
 $= 154$  square feet  
Total cost = (total square footage)  $\cdot$  (\$1.50 per square foot)  
 $= (154) \cdot (1.50)$   
 $= \$231$

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## Objective 2: Patterns, Relationships, and Algebraic Reasoning

#78. Flowers are often used to decorate parade floats. The table below shows the number of flowers used in each row of a parade float. Which equation best represents the data?

Row #	# of flowers
1	54
2	58
3	62
4	66
5	70
$r$	

- A.  $2r + 52$
- B.  $r + 54$
- C.  $4r + 50$
- D.  $4r + 4$

Solution: Notice that the number of flowers increase by 4 at every row from the previous row. One way to figure the correct formula is to "plug in" 1, then 2, then 3, and so on to see which formula will generate all the correct answers (54, 58, etc.). Another way is to plug in data into a graphing calculator as List1 (1, 1) and List2 (5, 2) and do a linear regression (LinReg). The correct answer is "C."

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**Objective 6: Mathematical Processes & Tools**

#15. Mr. Campos invested some money that will double in value every 12 years. If he invested \$5,000 on the day of his son's birth, how much will the investment be worth on the son's 60th birthday?

Solution: You can apply all sorts of algebraic tricks to this problem, but the easiest, most visual method is best. Consider:

Birth	\$5,000
12 years later	\$10,000(money doubles)
12 + 12 = 24 years	\$20,000(money doubles)
12 + 12 + 12 = 36 years	\$40,000(money doubles)
12 + 12 + 12 + 12 = 48 years	\$80,000 (money doubles)
12 + 12 + 12 + 12 + 12 = 60 years	\$160,000

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**Using Data for a purpose**

Should Johnny take 8th grade math or Algebra 1? Gather data on:

- 7th grade math TAKS scores (and 8th grade if available)
- 7th grade report card grades (especially math grade)
- attendance
- 504/special education modifications (if any)
- interview with student and parent/s
- counselor recommendation

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**Using Case Studies**

- Partner together with two case studies.
- Devise a reasonable and efficient plan to improve each student's academic standing and performance.
- Discuss the cases and solutions using "accountable talk" and agree on a plan for each case.

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**Practice: What data do you choose to**

write a non-multiple choice test on solving 2-step linear equations?

\*grades on solving 1-step and 2-step linear equation assignments, tests, quizzes, etc. Do these items have any application, synthesis, or analysis type questions?

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**What is the main difference between summative and formative assessments?**

- Summative assessments occur **after** instruction is done and evaluates instruction, checking for curriculum alignment. Summative measuring instruments include (but not limited to) SAT, TAKS, final exams, and end of course exams.
- Formative assessment is the process teachers and students use to recognize and respond to student learning. Formative assessments enhance the learning experience along the way and **before** a learning cycle is complete (end of six weeks, semester, etc.) Formative assessments include (but not limited to) checking homework, team presentations that show understanding by the team; quiz; review warm-ups.

*Formative assessment gives teachers and students valuable feedback on how and where to adjust or modify curriculum to improve teaching effectiveness and student learning.*

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**Can you answer:**

- Name three benefits of formative student assessments.
- Can summative assessments (TAKS) be used in formative assessments?
- How important is a student's role in formative assessments?
- How could formative assessments impact student behavior?
- What is a difficult task for teachers when using formative assessments?
- How can technology affect/influence formative assessments?

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## Answers

- Name three (3) benefits of formative student assessment - inform teachers about their student preparation to learn; provide a mechanism by which student feedback and data is used to adjust teaching strategies and maximize positive impact on instructional time; improves student motivation and encourages student ownership of their own learning.
- Can summative assessments (TAKS) be used in formative assessments? YES! TAKS data can be used to adjust and modify student instruction as needed. In conjunction with a Learning Styles Inventory (LSI), TAKS data could result in individualized learning structure and timetable to fit learners.
- How important is a student's role in formative assessments? Through student/teacher interactions, teachers get an insider's view of how students learn. Without student participation, teachers could not design nor implement appropriate instruction models and assessment instruments.
- How could formative assessments impact student behavior? Formative assessment impacts student behavior by giving students a structure through which they can develop self-regulating learning behaviors in the classroom. Students can analyze tasks and set goals with the teacher and take ownership and responsibility for their own learning. During the performance phase (test taking), students can self-monitor and control their behavior, emotions, and motivations.
- What is a difficult task for teachers when using formative assessments? Selectivate learning tasks that enhance positive attributes and student interest; Correctly "read" (interpret) student body language and student responses.
- How can technology affect/influence formative assessments? Good and appropriate technology helps gather data more efficiently, test assumptions and goals sooner, and shed a variety of statistical views on the data. Good technology also enhances the student environment by maintaining the integrity of student anonymity, keeping student responses in a low stress mode without bringing attention to themselves, and encouraging more student responses and interaction in class. The simple rule of thumb is to balance the use of technology with available class time.

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## Reading between the lines

Collecting data and learning how to use it is essential to being an effective teacher.

Walking the thin line between processing concrete, irrefutable, objective data and "reading" a class' subjective body language and behavior creates a **paradox**.

In small groups, discuss this paradox and come to common understandings about data.

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## Did you consider...

- kinds of data
- sources of data
- Interpreting body language
- balance between data and body language is like balancing left and right sides of the brain

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### [ Elements of an effective strategy ]

- reliable data
- easily accessible data
- goal/s dictate the sources and types of data needed
- students must be active contributors.
- design student-friendly, but meaningful activities and assignments to gather data.
- use all 6 senses (your "gut feeling" is #6) to "read" students as you go through the teaching experiences.

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### [ Tier 1 ]

- Tier 1 students are usually the top performing ones. They are quick learners, get the assignment done, and ready to move to the next task with little to no teacher help. Eg: Nerds, honor roll kids.
- Tier 1 students usually function/learn at two or more levels simultaneously (visual, auditory, kinesthetic)

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### [ Tier 2 ]

- Tier 2 students will struggle a bit but with a little instruction and practice they will eventually successfully complete assigned tasks. Eg: average teens
- Tier 2 students will usually function and learn at one of the three levels.

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### Tier 3

- Tier 3 students have no clue as to what the task is, how to do it, or when it's due. Often they do not care whether they get a zero or not and tend to divert attention away from their academic deficiencies by acting up or being disciplinary problems.
- Tier 3 academic skills in that specific class keep students in "intensive care" with little hope, desire, or need to improve their status. Eg: Dropouts, Zeros.

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### Good news for Tier 3

- Tier 3 students are usually kinesthetic learners at the beginning of their remediation and many move to another level later.

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### Elements of a successfully re-written lesson

**One of the basic steps is to take a lesson or quiz and rewrite it. Here's HOW**

- start out easy and slightly below the student's ability and gradually reach the intended level of mastery within a few questions.
- use appropriate vocabulary & reading level for student.
- start with simple knowledge and comprehension problems and gradually move to critical thinking, applied, synthesis type problems (Bloom's Taxonomy).

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### More on rewriting...

- construct lesson for appropriate length, number of problems, and varying difficulty. These standards are seamlessly woven into the lesson.
- leave space between lesson items so that students can show their work.

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### Structuring a rewritten lesson

- look over the lesson and pinpoint area/s that students missed.
- determine whether or not the student/s understood the directions and vocabulary.
- determine whether the student/s made careless errors or had no clue what to do.
- determine student/s' skills level on the vocabulary and language of sections missed and rewrite instructions and problems accordingly. Examples in key spots may be necessary.
- rewrite ONLY parts that are necessary
- build new problems/tasks from easy to challenging.
- Don't overdo the rewrite.

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### Connect to TAKS objectives

#### Review the TAKS objectives (slides 10-15)

- determine which TAKS objectives are connected to the rewritten lesson and assign a few problems from the TAKS booklet provided.
- assign as many TAKS problems as necessary (you and the classroom teacher will decide).
- Each tutor will do a lesson rewrite based on information, topics, and targeted students; try it and analyze outcomes.
- Share/compare experiences with other tutors.

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[ Re-evaluate rewritten lesson ]

- Once the rewritten lesson is mastered, prepare a short quiz to confirm mastery of concepts on rewritten lesson. If successful, student is ready for a new task.
- If not successful, rewrite again using the same criteria.

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[ Remember to: ]

- praise and reward student success
- build on successful interactions and expand/enhance them toward more of a teacher type interaction.
- Strike a balance between extrinsic and intrinsic rewards.

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[ Remember: We learn... ]

- 10% of what we read
- 20% of what we hear
- 30% of what we see
- 50% of what we see and hear
- 70% of what we discuss with others
- 80% of what we experience
- 90% of what we teach someone else!

*William Glaser*

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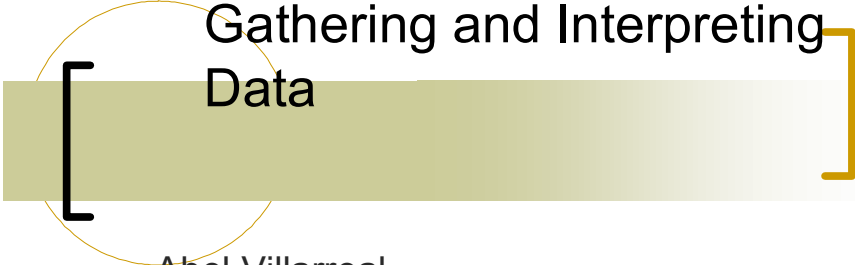
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# Gathering and Interpreting Data

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Taking Students from A to B

**Double-click for Presentation**