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ABSTRACT

The improvement of student engaged time leads to instructional improvement. Major steps for improving instruction by increasing student engaged time are information collection, comparison of information and identification of strategies, selection and preparation of strategies, and implementation and re-evaluation. This leader's guide covers the topics of comparison and identification by teaching program participants how to: (1) compute student engaged time: (2) compare information collected with research findings: (3) identify opportunities for improvement: and (4) set tentative goals for student engaged time, allocated time, and engagement rate. Instructional materials to be used in this program are included. (CJ)

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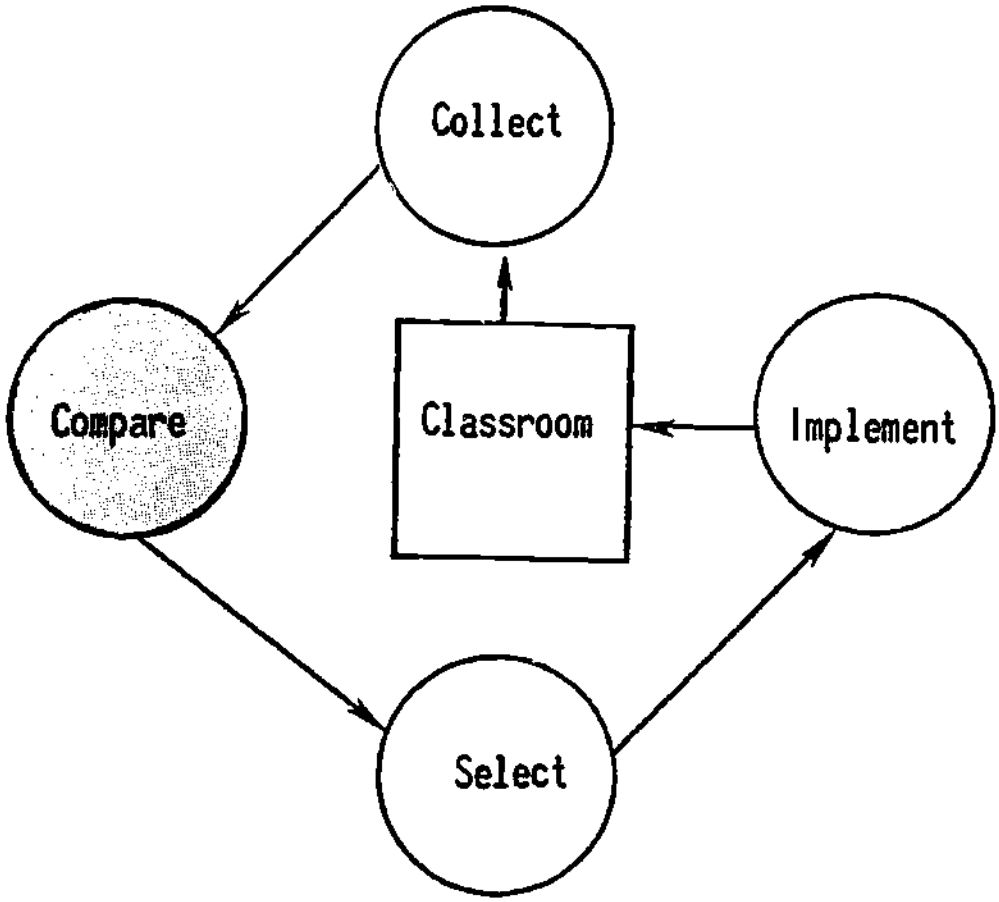
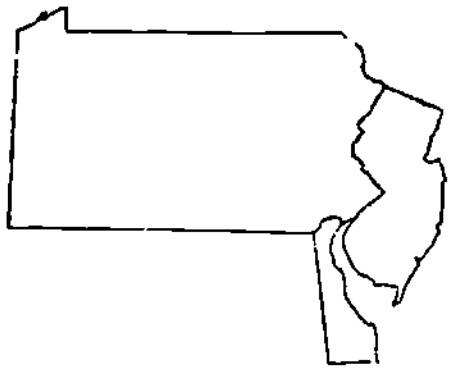
TIME LEADER'S GUIDE

COMPARISON AND IDENTIFICATION



Basic Skills Instructional Improvement Program



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COMPARISON AND IDENTIFICATION

Preview

Purpose:

To compute student engaged times for each classroom for reading/language arts and for math, to compare information collected in classrooms with research findings, to identify opportunities for improvement, and to set tentative goals for student engaged time, allocated time, and engagement rate.

Objectives:

To teach participants to find their own average student engaged times for reading/language arts and for math.

To provide a rationale for and overview of the activities associated with the Comparison and Identification Phase of the instructional improvement cycle.

To teach participants to select appropriate graph(s) or data base for comparison.

To teach participants to read and interpret graphs, deciding whether to change student engaged time and, if so, setting a tentative goal.

To teach participants to examine allocated time and engagement rate in terms of their own situations, setting tentative goals for these variables and revising the tentative goal for student engaged time if necessary.

Expected Outcomes:

Average student engaged times for reading/language arts and for math for each classroom; identification of opportunities for improvement; goals for student engaged time, allocated time, and engagement rate for both reading/language arts and mathematics for all teachers.

Time:

About 2-3 hours of meeting time is needed for an in-depth presentation of all topics. This time is allocated by topics as follows:

A. Agenda: Rationale, activities, and outcomes (10 minutes)

B. Summary Sheet for Time (45 minutes)

C. Selecting a data base (10 minutes)

D. Comparing data to research (30-50 minutes)

E. Making a decision (30-50 minutes)

The time needed to complete the starred minimal activities is about 2-3 hours.

Materials:

Completed Allocated Time Log(s) and Engagement Rate Form(s) for each classroom

Agenda

Major Activities Chart

Handouts: 2H4, 2H6, 2H7, 2H9, 2H12, 2H14, 2H16, 2H22, 2H23, 2H24, 2H26

Transparencies: 2T1-2T3, 2T5, 2T8, 2T10-2T13, 2T15, 2T19-2T21, 2T25

Checkpoints (for leaders only): √2H17

Answer Keys for Checkpoints: 2T18

Calculators

Rulers

Overhead projector and screen

Follow-up:

Make arrangements for the Selection and Preparation meeting. Find out about national, regional, and local resources for strategies. Leaders may wish to develop additional handouts describing these resources for participants. Remind teachers to being schedules and completed Engagement Rate Forms with them to the next meeting.

Note: Leaders may wish to provide multiple copies (or a reusable laminated copy) of the nomograph (2H4).

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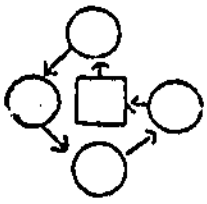


COMPARISON AND IDENTIFICATION

AGENDA

A. REVIEW OF AGENDA

- Rationale, activities, and outcomes

B. SUMMARY SHEET FOR TIME

- Explanation of how to determine student engaged time
- Calculation of student engaged time in reading/language arts and math for each classroom

C. SELECTING A DATA BASE

- Background considerations
- Some selection guidelines

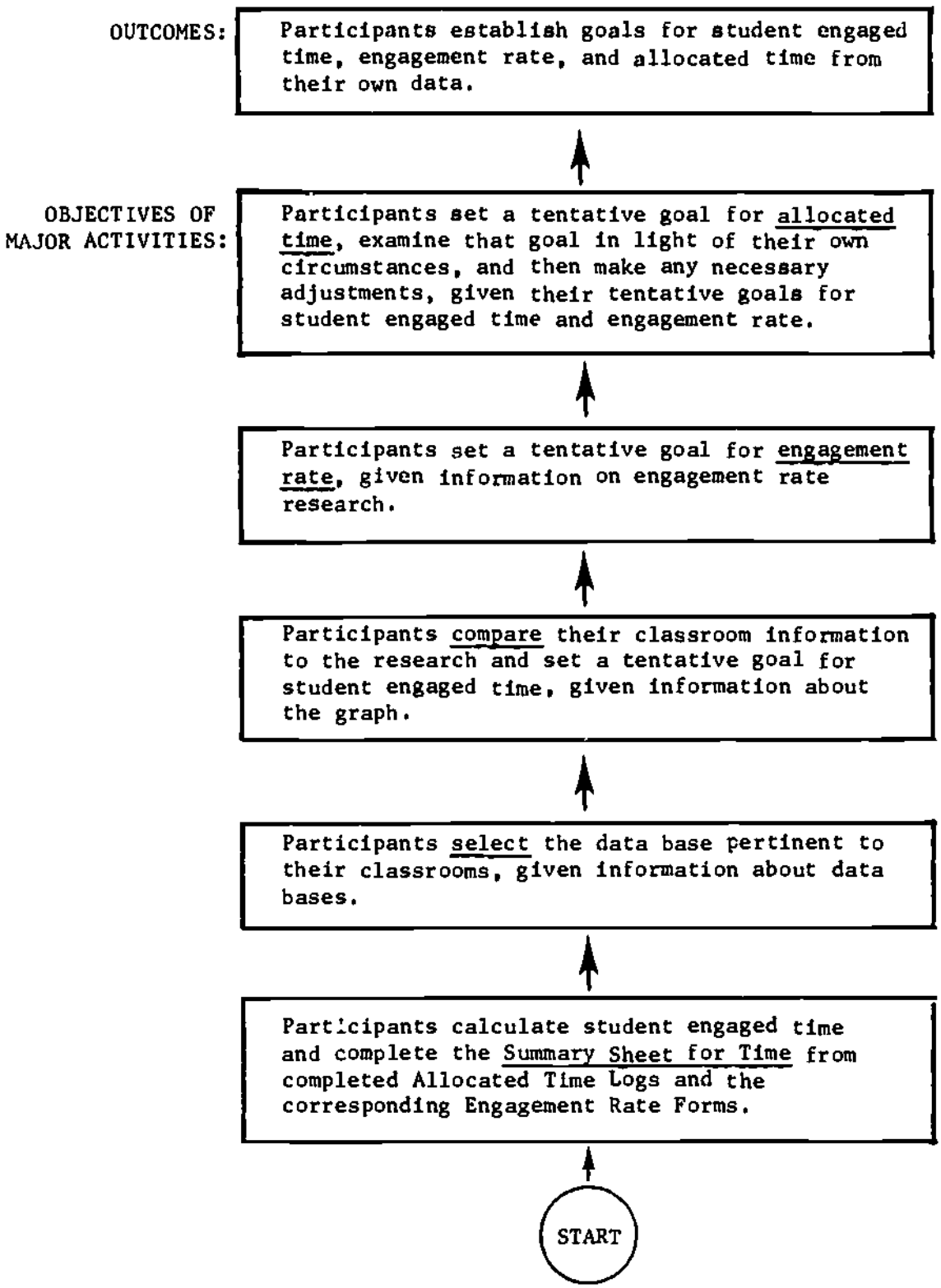
D. COMPARING DATA TD RESEARCH

- Parts of the graphs
- Reading the graphs
- Setting a tentative goal for student engaged time

E. MAKING A DECISION

- Setting feasible tentative goals for engagement rate
- Computing tentative goals for allocated time
- Deciding if allocated time goals are feasible
- Recording and/or revising goals

MAJOR ACTIVITIES FOR COMPARISON AND IDENTIFICATION



Glossary for Comparison and Identification

Above Expected Level of Achievement	Difference from expected raw score is positive. Students have higher posttest scores than expected.
At Expected Level of Achievement	Difference from expected raw score is zero. Students have posttest scores equal to what was expected.
Below Expected Level of Achievement	Difference from expected raw score is negative. Students have lower posttest scores than expected.
Data Base	Research study providing specific information about a variable (e.g., for student engaged time the data bases are Stallings & Kaskowitz and the Beginning Teacher Evaluation Study).
Difference from Expected Raw Score	Difference between actual posttest score and posttest score as predicted from pretest. This difference is used as a measure of student achievement.
Inverted U Graph	Graph shaped like an inverted U (∩), implying that a moderate amount of a variable (such as student engaged time) corresponds to the highest achievement levels.
Minimum Change Unit	Smallest change in student engaged time to be made in setting a tentative goal for student engaged time.
Positive Linear Graph	Straight line graph indicating that increases in a variable (such as student engaged time) are accompanied by increases in student achievement (i.e., more is better).
Raw Score	Number of correct answers.
Summary Sheet for Time	Form used to summarize collected information on allocated time, engagement rate, and student engaged time.
Zones	Ranges on a scale (such as student engaged time) that correspond to ranges on another scale (such as student achievement). Zones are determined according to the relationship (shape of the graph) between these two variables. For each graph included in this section, positive, zero, and negative zones are specified on the student engaged time scale, which correspond to positive, zero, and negative differences from expected raw scores on the student achievement scale.

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Materials for Comparison and Identification

The following materials are included in thia section:

Topic A

★2T1 Now What Do I Do With My Data?

★2T2 Comparison Phase Activities

2T3 Student Engaged Time Formula

Topic B

2H4 Time Nomograph

★2T5 (a-b) Completed Summary Sheet for Time

★2H6 (a-b) Summary Sheet for Time

(L) 2H7 (a-h) Summary Sheet for Time

(L) 2T8 (a-b) Answer Key for 2H7

Topic C

★2T10 Some Selection Guidelines

Topic D

★2T11 First Grade Reading and Word Analysis Total Graph

★2T12 Third Grade Reading and Language Total Graph

★2T13 Reading a Graph

★2H14 Reading the Graphs

★2T15 Considerations in Setting a Tentative Goal

★2H16 Comparing Your Data to Research

(L) √2H17 (a-b) Comparing Data to Research

(L) 2T18 Key for √2H17

★--Minimal activity for all participants
(L)--Minimal activity for leaders only

Topic E

★	2T19	Making a Decision
	2T20	Different Ways of Getting 90 Minutes of Student Engaged Time
★	2T21	Setting Engagement Rate Goals
	2H22 (a-c)	Tony Casini's Goals
★	2H23 (a-b)	Making a Decision
Ⓛ	2H24 (a-c)	Making a Decision
Ⓛ	2T25 (a-b)	Key for 2H24

Graphs

★	2H26 (a-f)	Graphs

★--Minimal activity for all participants
Ⓛ--Minimal activity for leaders only

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Notes for Comparison and Identification

The following notes are included in this section:

D.1.d. Student Achievement--Difference from Expected Raw Score

D.1.e. Minimum Change Units

D.1.f. Zones

E.2.b. Guidelines for Setting an Engagement Rate Goal

A. Agenda: Rationale, activities, and outcomes (10 minutes)

Rationale. Participants now have data on their own classrooms and are anxious to answer the question, "How am I doing?" The rationale of, activities in, and outcomes of a session addressed to that question are outlined. The overview and discussion of the agenda provide a way of organizing the meeting for all present.

Materials	Strategy
★2T1--Now What Do I Do With My Data?	Briefly review events in Information Collection. Provide rationale for comparison phase.
★2T2--Comparison Phase Activities --Agenda 2T3--Student Engaged Time Formula	Outline major activities in this phase. Review major activities--computing student engaged time, selecting a graph, reading a graph or data base, setting goals. Address questions/concerns about the activities planned for the session. Review by stating the expected outcomes. Then show how those outcomes lead to the final two phases of the improvement cycle.

★1. Rationale (2T1) (1 minute)

a. Participants have data--amount of allocated time and engagement rate in his/her class

b. Participant's question--So what? What kind of achievement can be expected given my values for allocated time and engagement rate?

c. Answer to questions--compare student engaged time values with research data

d. Decision for action based on:

(1) Unique classroom circumstances/values

(a) Constraints (e.g., allocated time controlled by bell, schedule, clock, changing classes, etc.)

(b) Values--how much time can be allocated

(2) Implications of research

★2. Purpose of session (1 minute)

a. Compare data collected in classroom with data from research

b. Set goals for student engaged time desired in reading/ language arts and mathematics

★3. Proposed agenda (2T2, Agenda) (3 minutes)

a. Calculating student engaged time

b. Selecting a data base

(1) Data differ from grade to grade and subject to subject

(2) Therefore, guidelines provided for selecting graph or data base

c. Reading a graph

(1) Terms to understand

(2) Practice in reading and interpreting

d. Making decisions about student engaged time

(1) Research and teacher judgment suggest a tentative goal

(2) Examine engagement rate and allocated time to determine:

(a) How a change in student engaged time might be accomplished (2T3)

(i) Change engagement rate

(ii) Change allocated time

(iii) Change both allocated time and engagement rate

(b) Whether or not a change in allocated time or engagement rate is desirable

(3) Revised goal for student engaged time, allocated time, and engagement rate--based on research, teacher's knowledge/ values/judgment, constraints

★4. Discussion of agenda (3 minutes)

5. Expected outcomes--participants will have: (1 minute)

a. Calculated student engaged times for reading/language arts and for math

b. Decided whether or not they wish to change the student engaged time, allocated time, or engagement rate

c. Established goals for student engaged time in reading/language arts and mathematics

★6. Next steps (1 minute)

a. Select modification or strategy for attaining goals

(1) Review data collected

(2) Review strategies from research, other teachers, brainstorming

(3) Describe modification and plan steps for implementing

b. When modification is in place, collect data on student engaged time

(1) Data tell if and to what extent goals are met

(2) Can lead to changes in strategy

MATERIALS

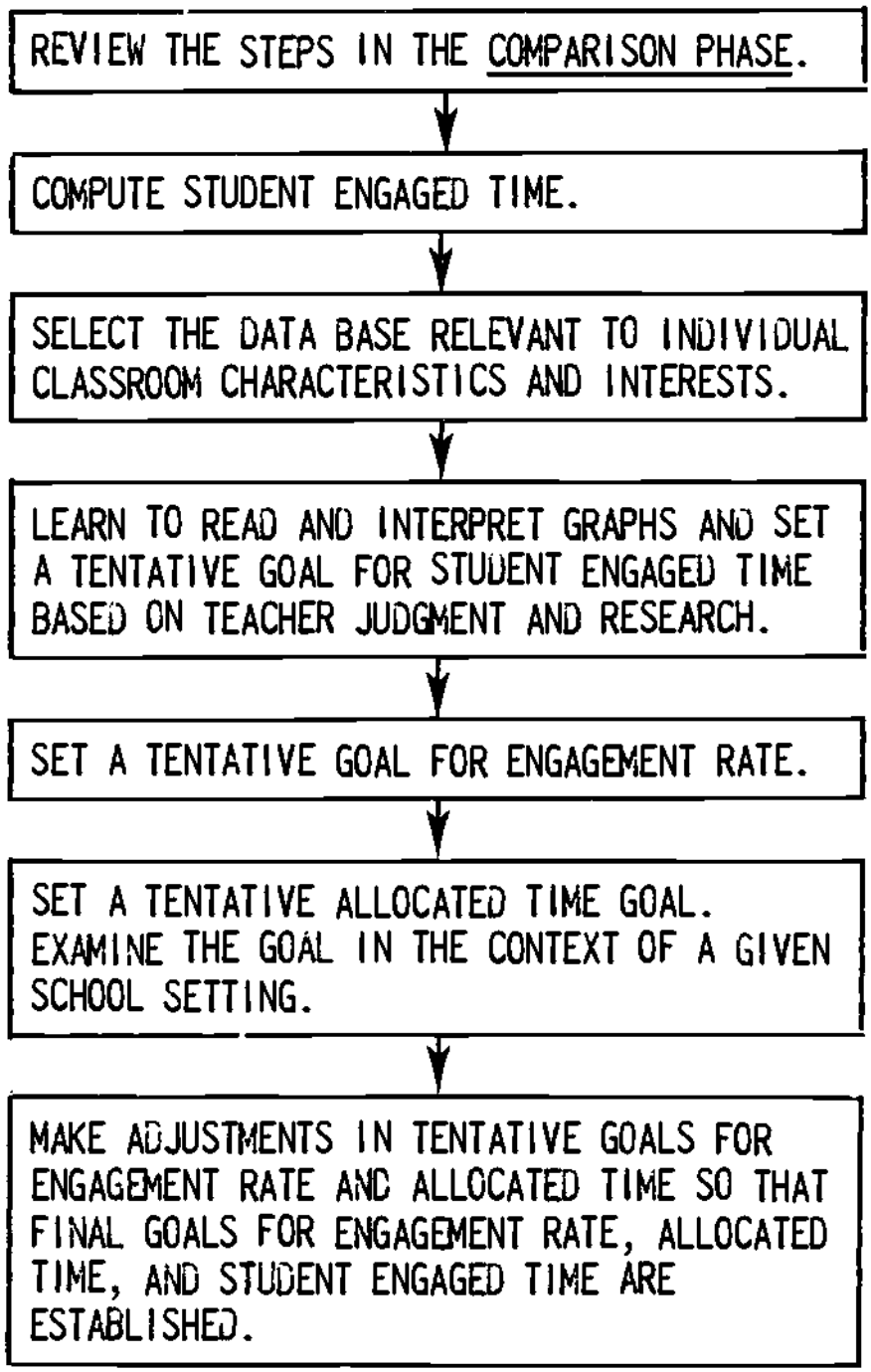
7/28/80

NOW WHAT DO I DO WITH MY DATA?

SUMMARY SHEET FOR 009		
Allocated Time	Engagement Rate	Student Engaged Time
READING		
170	80%	
150	85%	
180	75%	
MATH		
45	70%	
40	75%	
40	85%	

SUMMARY SHEET FOR 008		
Allocated Time	Engagement Rate	Student Engaged Time
READING		
110	90%	
120	85%	
112	82%	
MATH		
60	85%	
45	90%	
70	84%	

COMPARISON PHASE ACTIVITIES



STUDENT ENGAGED TIME FORMULA

Student Engaged Time = Allocated Time X Engagement Rate

B. Summary Sheet for Time (45 minutes)

Rationale. Participants need to learn how to find student engaged time by using the time nomograph or calculator and the collected data on allocated time and engagement rate. Teachers need to compute their own student engaged time to compare to research data. Leaders need to be sure participants understand how to compute student engaged time.

Materials	Strategy
--Calculator 2H4 --Time Nomograph	Discuss how to use the nomograph.
★ 2T5 --Completed Summary (a-b) Sheet for Time	Describe the Summary Sheet for Time, stressing that it can he used for several sets of observations (see note B.2).
★ 2H6 --Summary Sheet for (a-b) Time --Completed Allocated Time Logs --Completed Engagement Rate Forms	Have teachers complete their own Summary Sheets.
Ⓛ 2H7 --Summary Sheet for (a-h) Time Ⓛ 2T8 --Answer Key for (a-b) 2H7	Help leaders to complete 2H7, using the nomograph or calculator to find student engaged time. Give directions for each step as needed. Check and discuss answers. If an answer is incorrect, try to give a hint that will help the person correct the error (e.g., you skipped a column, how about the top, look at this column again). If procedures used were incorrect or numerous arithmetic errors were made, correct these errors.
Ⓛ 2H8 --Using the Summary Sheet in Departmentalized Situations	Review the use of the Summary Sheet in unusual circumstances with leaders.

Alternative Strategies

1. Participants who need additional practice in using the nomograph (2H4) should complete worksheets CH14 and/or CH15 in Appendix C of Section 1.

2. Have participants needing practice in completing the Summary Sheet use numbers from previously completed activities in Section 1, such as 1H38 and/or 1H40 (Allocated Time Log) and 1V32 and 1V33 (Engagement Rate Form).

1. Using the nomograph (2H4) (5 minutes)

   a. Purpose--tool for multiplying allocated time by engagement rate to get student engaged time

      (1) Can use to estimate answer

      (2) Can use calculator instead

      (3) Can use to estimate/check work on calculator

   b. Procedures

      (1) Need straightedge--ruler or sheet of paper

      (2) Locate allocated time on allocated time scale (120 minutes)

      (3) Locate engagement rate on engagement rate scale (75%)

      (4) Place straightedge on point for allocated time and for engagement rate

      (5) Point where straightedge crosses student engaged time scale is student engaged time (about 90 minutes)

★2. Summary Sheet for Time (2T5) (10 minutes)

   a. Purpose--record classroom information on time throughout the year

   b. Format

      (1) One sheet used to record information on time for reading/language arts and for math for the whole year

         (a) If you teach the same subject to more than one class, you may wish to use different sheets for each class

      (2) Information at top

         (a) State, district, school, and teacher--use codes if desired

         (b) Year

      (3) One line used for each day of observation (2T5a)

         (a) One observation made on first day

            (i) Date observed (10-5)

            (ii) Coder number (ED28), part of period (beginning), and engagement rate (75%) from Engagement Rate Form

            (iii) Allocated time from Allocated Time Log

               • Use total for all activities (134 minutes)

               • If students receive instruction in a subject area from another teacher in addition to yourself (e.g., you teach reading and Tony Casini teaches language arts), add the estimated allocated time for that teacher's

classroom to your own and record the total (see 2H9) or observe that class, compute student engaged time, and add it to your own

(iv) Student engaged time (101 minutes)

- Use nomograph or calculator
- Allocated time x engagement rate (134 minutes x .75)

(b) Two observations made on second day

(i) Date (10-9)

(ii) Allocated time

- Record total allocated time from all activities on front (171 minutes)
- Record brief description of each activity and time in minutes for each in small table on back (2T5b)

(iii) Coder numbers (ED28 and XX36), parts of period (beginning and middle), and engagement rates (70% and 68%) from Engagement Rate Form on front

(iv) Engagement rate

- Use table on back to record engagement rates for each activity observed--70% for reading seatwork, 68% for spelling
- If an activity was not observed, use either average or engagement rate of most similar activity--used average of 69% for reading groups (circled)

(v) Student engaged time

- Calculate for each activity (time in minutes x engagement rate)
- Add to get total and record on front (119 minutes)

(c) Two observations made on third day

(i) Same procedures as on previous day except for missing engagement rates

(ii) For missing engagement rates in small table on back, used engagement rate of most similar activity rather than average (2T5b)

- Used reading groups engagement rate for reading seatwork (70%)
- Used spelling engagement rate for language (80%)

(d) Average student engaged time--add all entries in student engaged time column and divide by number of entries $\left(\frac{101 + 119 + 79}{3} = 100\right)$

3. Own data (2H6) (20 minutes)

a. Fill in information at top on 2H6a

★3 or 4 b. Record date(s) observed, coder number(s), part(s) of period, and engagement rate(s) from Engagement Rate Forms

c. Record allocated time(s) from Allocated Time Log(s)

d. Find student engaged time(s)--allocated time x engagement rate

e. Find average student engaged time for each subject area

Ⓛ4. Example (2H6, 2H7, 2T8) (20 minutes)

★3 or 4 a. Fill in information at top on 2H6a

b. Reading/language arts

(1) October 8--only one observation made

(a) Record coder number, part of period, engagement rate, and allocated time

(b) Find studert engaged time--allocated time x engagement rate

(2) October 9--two observations made

(a) Record date, coder numbers, parts of period, engagement rates, and total allocated time on front of 2H6

(b) Record each activity, time in minutes, and engagement rate in small table on back

(c) Find student engaged time for each activity, add to get total, and record on front

(3) October 10--two observations made so same procedure as for October 9

(4) Average student engaged time--add student engaged time column and divide by number of entries

c. Math

(1) First two days--only one observation made so same as procedure for reading/language arts on October 8

(2) Last day--get information from completed forms

Ⓛ5. Use of Summary Sheet in departmentalized situations (2H9) (5 minutes)

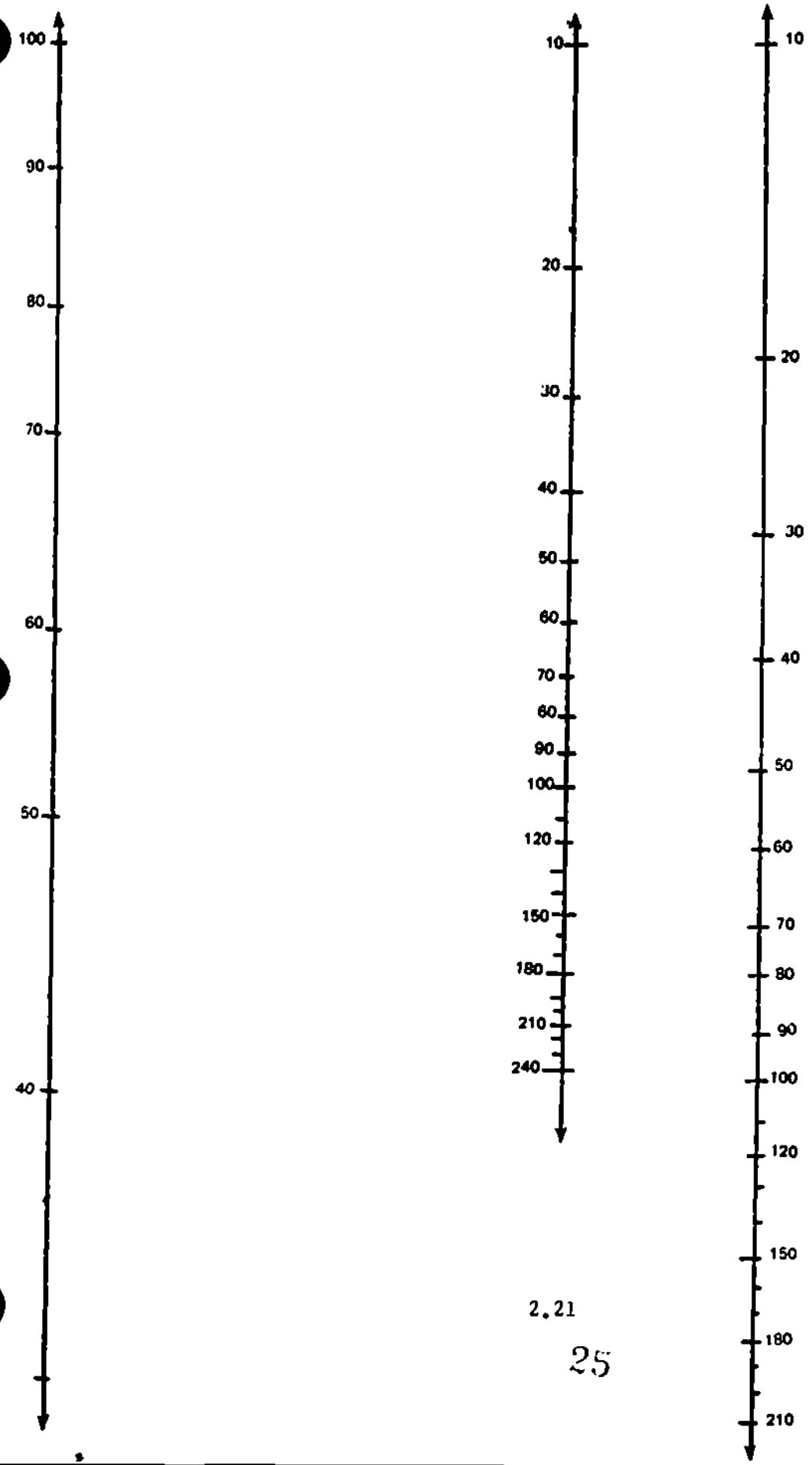
a. Situation A--groups of students are same for reading and language arts

b. Situation B--groups of students vary for reading and language arts

Materials

TIME NOMOGRAPH

Engagement Rate X Allocated Time = Student Engaged Time



State Atlantic
District Eastern
School New Delpen
Teacher Casini

SUMMARY SHEET FOR TIME

State # _____ School # _____
District # _____ Teacher # _____ Year 1979-1980

6/19/80

READING/LANGUAGE ARTS

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10-5	ED28	Beg.	75%	134 min.	101 min.	
10-9	ED28 XX36	Beg. Mid.	70% 68%	171 min.	119 min.	
10-10	XX36 ED28	End Mid.	70% 80%	110 min.	79 min.	100

2.22

215a

Date 10-9 Subject Reading / Language

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1	Reading groups	106 min.	(69%)	73 min.
2	Reading seatwork	45 min.	70%	32 min.
3	Spelling	20 min.	68%	14 min.
4				
5				
6				
			Total	119 min.

Date 10-10 Subject Reading / Language

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1	Reading groups	60 min.	70%	42 min.
2	Reading seatwork	30 min.	(70%)	21 min.
3	Spelling	10 min.	80%	8 min.
4	Language	10 min.	(80%)	8 min.
5				
6				
			Total	79 min.

State _____
District _____
School _____
Teacher _____

SUMMARY SHEET FOR TIME

State # _____ School # _____
District # _____ Teacher # _____ Year _____

2116a

7/25/80

READING/LANGUAGE ARTS

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time

MATH

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time

Student Engaged Time = Allocated Time x Engagement Rate

DIRECTIONS

1. Use this form to summarize data throughout the school year.
2. Fill in the information at the top of the form.
3. Record the date(s) of observation. One line on the form is used for each day.
4. Record the total allocated time (in minutes) from the Allocated Time Log for each subject.
5. Record the coder numbers, parts of the period observed, and engagement rates for all observations made on that date.
   If only one observation was made in a subject area (reading/language arts and/or math):
   - Record the engagement rate from the Engagement Rate Form.
   - Find the student engaged time by using the nomograph (2H4) or a calculator (allocated time x engagement rate).

   If more than one observation was made in a subject area, complete one of the tables below:
   - Record the time in minutes for each activity in the subject area from the last column of the Allocated Time Log.
   - Record the engagement rates for each activity observed from the Engagement Rate Forms. If an activity was not observed, record either the average of the engagement rates from the observed activities or the engagement rate of the most similar observed activity.
   - Find the student engaged time for each activity by using the nomograph (2H4) or a calculator (time in minutes x engagement rate).
   - Add the student engaged time column and record the total on the front of this form.
6. Find the average student engaged time for all observations by adding all of the entries in the student engaged time column and dividing by the number of entries.

Date_____ Subject_____

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1				
2				
3				
4				
5				
6				
			Total	

Date_____ Subject_____

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1				
2				
3				
4				
5				
6				
			Total	

Date_____ Subject_____

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1				
2				
3				
4				
5				
6				
			Total	

Date_____ Subject_____

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1				
2				
3				
4				
5				
6				
			Total	

SUMMARY SHEET FOR TIME

Jerome Kenyatta, one of the fifth grade teachers at New Delpen Elementary School, has collected information on allocated time and engagement rate in his classroom for three days, October 8-10. He believes that the data obtained on these days are representative of activities in his classroom.

- *Complete the information at the top of the Summary Sheet.*

State--03
District--47
School--08
Teacher--K8KE
Year--1979-1980

READING/LANGUAGE ARTS

First Day (10/8)

- *Only one observation was made, so record the following information on the front of the Summary Sheet.*

Coder -- XX36
Part of Period -- Beginning
Engagement Rate -- 64%
Allocated Time -- 170 minutes

- *Find the student engaged time (allocated time x engagement rate).*

Second Day (10/9)

- *Two observations were made on October 9, so record the following information on the front of the Summary Sheet.*

Coder #	Part of Period	Engagement Rate	Allocated Time
XX36	Middle	60%	175 minutes
1176	End	66%	

- *Use one of the small tables on the back to record the time in minutes and engagement rate of each activity on October 9.*

Activity	Time in Minutes	Engagement Rate
Reading groups and seatwork	145 minutes	60%
Spelling	30 minutes	66%

- *Find the student engaged time for each activity (time in minutes x engagement rate) and add to find the total.*

- *Record the total student engaged time on the front of the form.*

Third Day (10/10)

- *Two observations were also made on October 10. Record the date, coder numbers, parts of period observed, engagement rates, and total allocated time on the front of the Summary Sheet.*

Activity	Time in Minutes	Engagement Rate	Coder #	Part of Period
Reading groups	120 minutes	no observation	--	--
Language seatwork	30 minutes	70%	1176	Beginning
Sustained silent reading	17 minutes	66%	XX36	Middle
	167 minutes			

- *Use another small table on the back to record the time in minutes and engagement rate for each activity. Use the language seatwork engagement rate (70%) for the missing engagement rate (reading groups). Find the total student engaged time.*

- *Record the total student engaged time on the front of the Summary Sheet.*

Average

- *Find the average student engaged time for reading/language arts over the three days of observation.*

MATH

First Two Days (10/8 and 10/9)

The data for Jerome's classroom are shown below:

Date	Coder #	Part of Period	Engagement Rate	Allocated Time
10/8	XX36	Beginning	80%	50 minutes
10/9	1176	Middle	78%	60 minutes

- *Record this information and find the student engaged time.*

Third Day (10/10)

- *On the front of the Summary Sheet, record the date and total allocated time from the Allocated Time Log* (√2H7d).

- *On the front of the Summary Sheet, record the coder numbers, parts of period observed and engagement rates for both of the Engagement Rate Forms completed on October 10* (√2H7e-h).

- *Since two observations were made on this date, complete a small table on the back of the Summary Sheet:*

  --Describe each activity and indicate the time in minutes for each (from the Allocated Time Log).
  --Record the engagement rate of each of the observed activities, using the time of observation to place each correctly.
  --Use the average engagement rate for the observed activities for any missing engagement rates.
  --Find the student engaged time for each activity (time in minutes x engagement rate).
  --Find the total student engaged time.

- *Record the total student engaged time on the front of the Summary Sheet.*

Average

- *Find the average student engaged time for math.*

STATE _____
DISTRICT _____
SCHOOL _____
TEACHER _____

ALLOCATED TIME LOG

STATE # 03 SCHOOL # 08 DATE 10/10
DISTRICT # 47 TEACHER # K8KE GRADE 5

SUBJECT Math
NO. OF STUDENTS PRESENT 20

	ACTIVITY	BEGINNING TIME	ENDING TIME	TIME IN MINUTES
1	Seatwork	11:00	11:19	19
2	Lesson	1:05	1:41	27*
3	Problem Solving	2:15	2:30	15
4				
5				
6				
			TOTAL	61

*Adjusted since only 3/4 of class assigned

2.29

34

35

p.142

STATE Atlantic
DISTRICT Eastern
SCHOOL NewDelpen
TEACHER Kenyatta
CODER MacKenzie

ENGAGEMENT RATE FORM

STATE # 03 SCHOOL # 08 DATE 10/10/79 GRADE 5

DISTRICT # 47 TEACHER # K8KE CODER # XX36 # STUDENTS PRESENT 20

PART OF CLASS OBSERVED Beg.___ Mid. X End X

	TIME	1 11:10	2 11:11	3 11:12	4 11:13	5 11:14	6 11:15	7 11:16	8 11:17	9 11:18
READING/LANGUAGE ARTS	ASSIGNED									
	MANAGEMENT/ TRANSITION									
	SOCIALIZING									
	DISCIPLINE									
	UNOCCUPIED/ OBSERVING									
	OUT OF ROOM									
	TOTAL UNENGAGED									
	ENGAGED									
MATHEMATICS	ASSIGNED	15	15	15	15	15	15	15	15	15
	MANAGEMENT/ TRANSITION	~~HHT~~ IIII	III	I			I			
	SOCIALIZING	II	II	II				II		
	DISCIPLINE				II					
	UNOCCUPIED/ OBSERVING	I	II	III	III	II	II	I	I	
	OUT OF ROOM							I		
	TOTAL UNENGAGED	12	7	6	5	2	3	4	1	0
	ENGAGED	3	8	9	10	13	12	11	14	15
	OTHER ASSIGNED									
	PULL OUT ASSIGNED	5	5	5	5	5	5	5	5	5
	NO. OF STUDENTS PRESENT									

	TIME	10 11:19	11 11:20	12 11:21	13 11:22	14 11:23	15 11:24	TOTAL	ENGAGEMENT RATE
READING/LANGUAGE ARTS	ASSIGNED								ENGAGED / ASSIGNED
	MANAGEMENT/ TRANSITION								
	SOCIALIZING								
	DISCIPLINE								
	UNOCCUPIED/ OBSERVING								
	OUT OF ROOM								
	TOTAL UNENGAGED								
	ENGAGED								
MATHEMATICS	ASSIGNED	15	15	15	15	15	15	225	ENGAGED / ASSIGNED
	MANAGEMENT/ TRANSITION				11	1		17	
	SOCIALIZING	11	111			1		14	149/225
	DISCIPLINE			15				17	
	UNOCCUPIED/ OBSERVING	111	11		111	1	1	25	(66%)
	OUT OF ROOM	1	1					3	
	TOTAL UNENGAGED	6	6	15	5	3	1	76	
	ENGAGED	9	9	0	10	12	14	149	
	OTHER ASSIGNED								
	PULL OUT ASSIGNED	5	5	5	5	5	5	75	
	# STUDENTS PRESENT								

STATE Atlantic
DISTRICT Eastern
SCHOOL NewDelpen
TEACHER Kenyatta
CODER MacKenzie

ENGAGEMENT RATE FORM

STATE # 03 SCHOOL # 08 DATE 10/10/79 GRADE 5

DISTRICT # 47 TEACHER # K8KE CODER # XX36 # STUDENTS PRESENT 20

PART OF CLASS OBSERVED Beg.___ Mid. ✓ End ✓

	TIME	1 1:20	2 1:21	3 1:22	4 1:23	5 1:24	6 1:25	7 1:26	8 1:27	9 1:28
READING/LANGUAGE ARTS	ASSIGNED									
	MANAGEMENT/ TRANSITION									
	SOCIALIZING									
	DISCIPLINE									
	UNOCCUPIED/ OBSERVING									
	OUT OF ROOM									
	TOTAL UNENGAGED									
	ENGAGED									
MATHEMATICS	ASSIGNED	20	20	20	20	20	20	20	20	20
	MANAGEMENT/ TRANSITION		/					HHT		/
	SOCIALIZING	//		//					/	
	DISCIPLINE				//					
	UNOCCUPIED/ OBSERVING	/	/	//	/	//	///	/		//
	OUT OF ROOM				/	/	/			
	TOTAL UNENGAGED	3	2	4	4	3	4	6	1	3
	ENGAGED	17	18	16	16	17	16	14	19	17
	OTHER ASSIGNED									
	PULL OUT ASSIGNED									
	NO. OF STUDENTS PRESENT									

	TIME	10 1:29	11 1:30	12 1:31	13 1:32	14 1:33	15 1:34	TOTAL	ENGAGEMENT RATE
READING/LANGUAGE ARTS	ASSIGNED								ENGAGED / ASSIGNED
	MANAGEMENT/ TRANSITION								
	SOCIALIZING								
	DISCIPLINE								
	UNOCCUPIED/ OBSERVING								
	OUT OF ROOM								
	TOTAL UNENGAGED								
	ENGAGED								
MATHEMATICS	ASSIGNED	20	20	20	20	20	20	300	ENGAGED / ASSIGNED
	MANAGEMENT/ TRANSITION	III			III		II	15	
	SOCIALIZING		II			III		10	245/300
	DISCIPLINE							2	
	UNOCCUPIED/ OBSERVING	II	I	III	I	II	I	23	(82%)
	OUT OF ROOM			I	I			5	
	TOTAL UNENGAGED	5	3	4	5	5	3	55	
	ENGAGED	15	17	16	15	15	17	245	
	OTHER ASSIGNED								
	PULL OUT ASSIGNED								
	# STUDENTS PRESENT								

2.33

State Atlantic
District Eastern
School New Delpen
Teacher Kenyatta

Key for 2H7
SUMMARY SHEET FOR TIME

2T8a

State # 03 School # 08
District # 47 Teacher # K8KE Year 1979-1980

9/2/80

READING/LANGUAGE ARTS

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10-8	XX36	Beg.	64%	170 min.	109min.	
10-9	XX36 1176	Mid. End	60% 66%	175min.	107min.	
10-10	1176 XX36	Beg. Mid.	70% 66%	167min.	116 min.	111 min.

MATH

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10-8	XX36	Beg.	80%	50 min.	40 min.	
10-9	1176	Mid.	78%	60 min.	47 min.	
10-10	XX36 XX36	Mid/End Mid/End	66% 82%	61 min.	46 min.	44 min.
				2.34	40	

9/2/80

2T8b

Key for 2H7

Student Engaged Time = Allocated Time x Engagement Rate

DIRECTIONS

1. Use this form to summatize data throughout the school year.
2. Fill in the information at the top of the form.
3. Record the date(s) of observation. One line on the form is used for each day.
4. Record the total allocated time (in minutes) from the Allocated Time Log for each subject.
5. Record the codet numbers, patts of the period observed, and engagement rates for all observations made on that date.
   If only one observation was made in a subject area (reading/language arts and/ur math):
   - Record the engagement rate from the Engagement Rate form.
   - Find the student engaged time by using the nomograph (2H4) or a calculatot (allocated time x engagement rate).

   If more than one observation was made in a subject area, complete one of the tables below:
   - Record the time in minutes for each activity in the subject area from the last column of the Allocated Time Log.
   - Recotd the engagement rates for each activity observed from the Engagement Rate Forms.
     If an activity was not observed, record either the average of the engagement rates from the observed activities or the engagement rate of the most similar observed activity.
   - Find the student engaged time for each activity by using the nomograph (2H4) or a calculator (time in minutes x engagement rate).
   - Add the student engaged time column and record the total on the front of this form.
6. Find the average student engaged time for all observations by adding all of the entries in the student engaged time column and dividing by the number of entries.

Date 10-9 Subject Reading/Lang.

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1	Reading	145	60%	87
2	Spelling	30	66%	20
3				
4				
5				
6				
			Total	107

Date 10-10 Subject Reading/Lang.

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1	Groups	120	70%	84
2	Seatwork	30	70%	21
3	Silent Reading	17	66%	11
4				
5				
6				
			Total	116

Date 10-10 Subject Math

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1	Seatwork	19	66%	13
2	Lesson	27	82%	22
3	ProblemSolving	15	74%	11
4				
5				
6				
			Total 41	46

Date Subject

	Activity	Time in Minutes	Engagement Rate	Student Engaged Time
1				
2				
3				
4				
5				
6				
			Total	

USING THE SUMMARY SHEET IN DEPARTMENTALIZED SITUATIONS

Situation A

Ann Riley, Peter Demetrios, and Maria Malenkoi teach a group of about 85 fifth and sixth graders divided into three classes. Ann teaches reading and social studies to each class, Peter teaches language arts and health, and Maria teaches math and science. The three teachers jointly complete three Summary Sheets, one for each class. Ann records allocated times and engagement rates for reading, Peter records this information for language arts, and Maria records data for math. Ann and Peter use the tables on the back of the Summary Sheet whenever the same group of students is observed in both classrooms. Otherwise, they add together their allocated times for reading/language arts and use the engagement rate for whichever class was observed.

Situation B

Susan Brown teaches five different groups of students; she has two average seventh-grade English classes, one seventh-grade remedial English class, and two advanced seventh-grade English classes. Students also attend reading classes for 30 minutes each day. Students are grouped differently for instruction in reading, however, so Susan cannot combine her data with anyone else's. She decided earlier to collect information for only two classes: the remedial class and one of the average classes. She uses two Summary Sheets, one for each class, to analyze her data. In finding allocated time, she adds the 30-minute reading period to her own time to record a total before multiplying to find the student engaged time.

NOTES

I.3. Summary Sheet for Time

The Summary Sheet for Time is used to record classroom information on time throughout the year. In general, each teacher uses only one sheet. However, if a teacher has more than one group of students for the same subject (e.g., two or more different math classes), he/she may wish to use different sheets for each class.

The information at the top of the form may be recorded even before any information is collected. For each day on which observations were made, the teacher first records the date. In the example on 2T5, there was only one observation made in reading/language arts on the first day, October 5. Next to the date, the teacher records the coder number of the observer (ED28), the part of the period observed (beginning) and the engagement rate (75%) from the Engagement Rate Form. Then the teacher records the total allocated time for all activities from the Allocated Time Log (134 minutes). The teacher next uses either the nomograph or a calculator to find student engaged time (allocated time x engagement rate = 134 minutes x .75 = 101 minutes).

On the second day of information collection, two reading/language arts observations were made. The teacher first records the date (10-9), the total allocated time for all activities from the Allocated Time Log (171 minutes), and the coder numbers (ED28 and XX36), parts of the period observed (beginning and middle), and engagement rates (70% and 68%) from the Engagement Rate Form. Then, since two observations were made on the same day, he/she uses one of the small tables on the back of the Summary Sheet to record a brief description of each activity and its time in minutes from the Allocated Time Log and the engagement rates for all activities observed from the Engagement Rate Forms. Engagement rates can be matched to activities by looking at the times when observations were made and the times when activities began and ended. For those activities which were not observed, an engagement rate must be estimated, either by taking the average (as in the example where, on 10-9, the engagement rate for spelling was estimated to be 69%) or by taking the engagement rate of the most similar activity observed (as in the example, on 10-10, where the engagement rate for language was estimated to be the same as that of spelling, 80%). Student engaged time is calculated for each activity by multiplying the time in minutes by the engagement rate. These numbers are then added to find a total which is recorded on the front. In the example on 2T5, on 10-9 the student engaged time is calculated as follows:

106 minutes x .69 =		73 minutes
45 minutes x .70 =		32 minutes
20 minutes x .68 =		14 minutes
	TOTAL	119 minutes

The student engaged time for the third day of observations is calculated in a similar manner, using another small table on the back since two observations were made on that day.

Finally, the teacher finds the average student engaged time thus far for the year by adding all the student engaged times (101 + 119 + 79 = 299) and dividing by the number of days on which observations were made (299 ÷ 3 = 100).

C. Selecting a data base (10 minutes)

Rationale. Participants need to know what graphs and data bases are available to use in a comparison and what considerations to weigh in selecting graphs or data base for comparison.

Materials	Strategy
★2T10--Some Selection Guidelines	Review characteristics of sample classes from which data base was derived. Then review the selection guides using 2T10.

1. Background considerations (5 minutes)

★a. Data from Stallings and Kaskowitz study of Follow Through Eligible Classrooms [see note C.3.d in Section 1] based on--

(1) All students in 108 first grade classrooms and 58 third grade classrooms--variety of curriculum and classroom organizations

(2) Children from low-income families

(3) Wide variety of geographic locations and variety in ethnic composition of classes

(4) Posttest achievement measure was the Metropolitan Achievement Test (MAT), a norm referenced, standardized achievement test

b. Data from Beginning Teacher Evaluation Study--Phase III-B

★(1) Twenty-one fifth grade teachers who were volunteers

★(2) Urban and suburban classrooms in San Francisco Bay area

★(3) About 120 students (roughly 6 per classroom) were studied

(a) 43% girls; 57% boys

(b) 30% non-white; 70% white

(c) Socioeconomic status--roughly:

(i) 10% of parents were executives, managers, or professionals

(ii) 28% of parents were semi-professionals, clerical, sales, or technical workers

(iii) 47% of parents were skilled or semi-skilled workers

(iv) 15% of parents were unskilled workers

(d) Achievement--almost all students fell within the 30th to 60th percentiles in achievement in reading and mathematics

(4) Achievement measures

★(a) Criterion-referenced batteries for reading and mathematics

★(b) Developed by the Beginning Teacher Evaluation Study to reflect typical grade 5 content

(c) Administered in October and the following May

(d) Reading items only

(i) Syllables

(ii) Synonyms

(iii) Word meaning in context

(iv) Comprehension

- Literal
- Inferential
- Main idea--literal
- Main idea--inferential
- Topic sentence
- Fact and opinion

(e) Mathematics items

(i) Multiplication--products and missing factors, some items timed

(ii) Division

(iii) Fractions

(iv) Computation-including patterns and properties

(v) Word problems

(vi) Geometry

★c. Degree to which your class and achievement measures are like those involved in study is an important consideration

2. Some selection guidelines (5 minutes)

★a. Subject considerations--separate graphs/data source for reading/language arts and mathematics

★b. Grade level considerations

(1) Graphs from Stallings and Kaskowitz include grades 1 and 3 only; Beginning Teacher Evaluation Study data for grade 5

(2) Final selection based on teacher judgment regarding similarities between his/her classroom and classrooms from research study

(3) Suggested guidelines (2T10)

(a) Kindergarten--first grade graphs

(b) First grade--first grade graphs

(c) Second grade--first or third grade graphs

(d) Third grade--third grade graphs

(e) Fourth grade--third grade graphs or fifth grade data from BTES

(f) Fifth grade--fifth grade data from BTES

(g) Sixth grade and above--BTES fifth grade data

(4) No graph for fifth grade math since relationship of student engaged time to total math achievement not significant

MATERIALS

SOME SELECTION GUIDELINES

- Consider Subject

  Math
  Reading/Language Arts

- Consider Grade Level--Final selection always based on teacher judgment regarding similarities between his/her classroom and classrooms from research study

Kindergarten	First Grade Graphs
First Grade	First Grade Graphs
Second Grade	First or Third Grade Graphs
Third Grade	Third Grade Graphs
Fourth Grade	Third Grade Graphs or BTES* Fifth Grade Data
Fifth Grade	BTES* Fifth Grade Data
Sixth Grade or Above	Fifth Grade BTES* Data

*Beginning Teacher Evaluation Study

D. Comparing data to research (30-50 minutes)

Rationale. Participants need to know how to read and interpret the graphs. They need to learn how to decide if they want to change student engaged time and how to set tentative goals for student engaged time.

Materials	Strategy
★ 2T11--First Grade Reading and Word Analysis Total Graph ★ 2T12--Third Grade Reading and Language Total Graph	Explain the parts of each graph, using 2T11 as an example of a linear graph. Illustrate these points by using 2T12 as an example of an inverted U graph.
★ 2T13--Reading a Graph 2H26--Graphs (a-f) ★ 2H14--Reading the Graphs	Demonstrate how to find the expected achievement zone for any given level of student engaged time. Have participants identify the student engaged time zones corresponding to the expected level of achievement for each graph on 2H14.
★ 2T15--Considerations in Setting a Tentative Goal	Discuss considerations in setting a tentative goal for student engaged time.
2H6 --Summary Sheet for Time (a-b) ★ 2H16--Comparing Your Data to Research Ⓛ √2H17--Comparing Data to Research (a-b) Ⓛ 2T18--Key for √2H16	Have teachers complete 2H16 for their own collected data; they should also indicate the zone corresponding to each day's student engaged time in the right margin of their own completed Summary Sheet for Time. Leaders will complete the checkpoint instead.

★1. Parts of the graph (2T11, 2H26a) (10-15 minutes)

a. Identifying information

(1) Grade shown in upper left corner

(2) Title shown at top

b. Relationship between student engaged time and achievement shown by straight line

c. Student engaged time on bottom (horizontal axis)--amount of time in which students are actively engaged in a subject area

†d. Student achievement on side (vertical axis)--difference from expected raw score

(1) Students take pretest--raw score is number of right answers

(2) Performance on later test (posttest) predicted on basis of relationship between pretest and posttest scores

(3) Difference between actual posttest score and predicted posttest score (actual - predicted)

(a) Shown on side (vertical axis)

(b) Tells whether above (positive), at (zero), or below (negative) expected level of achievement

†e. Zones--bars shown on each axis corresponding to above, at, or below expected raw score

(1) If student engaged time falls in range marked by a bar at bottom, then chances are <u>at least</u> 2 out of 3 that student achievement will fall in area marked by same type of bar at side

(2) No difference from expected raw score (<u>2T11</u>)

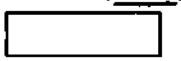
(a) Solid black bars

(i) Student engaged time of about 109-130 minutes

(ii) Difference from expected raw score of about zero

(b) If student engaged time falls in range marked by black bar at bottom, then chances are <u>at least</u> 2 out of 3 that student achievement will be the same as expected as marked by black bar on side

(3) Above expected raw score (<u>2T11</u>)

(a) Shaded bars 

(i) Student engaged time of 130 minutes and above

(ii) Positive difference from expected raw score

(b) If student engaged time falls in range marked by shaded border at bottom, then chances are <u>at least</u> 2 out of 3 that student achievement will be above expected level as marked by shaded bar on side

(c) As student engaged time increases within the zone, the likelihood that student achievement will be above the expected level increases

(4) Below expected raw score (2T11)

(a) Slashed bars

(i) Student engaged time of about 109 minutes and below

(ii) Negative difference from expected raw score

(b) If student engaged time is in range marked by slashed bar at bottom, then chances are at least 2 out of 3 that student achievement will be below expected level as marked by slashed bar on side

(c) As student engaged time decreases within zone, likelihood that student achievement will be below expected level increases

†f. Minimum change units

(1) Shown at bottom left of each graph

(2) Smallest change in student engaged time that is likely to be reflected in student achievement

(3) Example (2T11)

(a) Minimum change--10 minutes

(b) Change less than 10 minutes may not really be a change because of measurement error

g. Example of different graph shapes

(1) So far have been looking at positive linear graph (2T11)

(a) Increases in student engaged time are accompanied by increases in achievement

(b) Straight line shows more is better

(c) Same change in student engaged time always has same effect--increase of 20 minutes in student engaged time (from 40 to 60 minutes or from 100 to 120 minutes or from 180 to 200 minutes) accompanied by same change in difference from expected raw score (increase of about 3 points)

(2) Inverted U graph--Third Grade Reading and Language Total (2T12)

(a) Moderate amount of student engaged time corresponds to highest achievement

(b) Same change in student engaged time has different effects when made at different points on graph

(i) Increase in student engaged time from 50 to 75 minutes increases student achievement about seven points

(ii) Increase in student engaged time from 125 to 150 minutes does not change student achievement

(iii) Increase in student engaged time from 150 to 175 minutes decreases student achievement by about 3 points

(c) Five zones for student engaged time

(i) Above expected raw score ([redacted])--corresponding student engaged times of about 113-172 minutes

(ii) At expected level ([redacted])

- Two zones
- Corresponding student engaged times of about 88-113 minutes and 172-198 minutes

(iii) Below expected raw score ([redacted])

- Two zones on far left and far right
- Corresponding student engaged times of below 88 minutes and above 198 minutes

★2. Reading the graphs (5-10 minutes)

a. Graph helps find expected achievement for a classroom given the level of student engaged time

b. Example (2T13)

(1) Locate student engaged time (80 minutes) on bottom (horizontal axis)

(2) In slashed zone so below expected raw score

(3) Draw vertical line up to straight line

(4) Draw horizontal line across from point on line to side (vertical axis)

(5) Difference from expected raw score is where line intersects vertical axis

(a) About halfway between 0 and -9

(b) Closer to -9 so probably about -5 units

c. Practice (2H14)

3. Fifth grade math--no graph (2H26f) (2 minutes)

a. Relationship between student engaged time and total math achievement not significant

b. Relationship between student engaged time and achievement in fractions, multiplication, geometry, and decimals was significant--more is better

4. Setting a tentative goal for student engaged time (5-10 minutes)

a. Some suggested guidelines

(1) Probably want to change by at least minimum change unit (shown below each graph) if any change is made

(2) Changes of at least the minimum change unit made across zones are likely to affect student achievement

(3) Changes within zones may or may not bring about changes in student achievement

b. Considerations in setting a tentative goal (2T15)

(1) Similarity of students to those in research study

(a) First and third grades--Follow Through eligible classrooms

(b) Fifth grade--students at 30th to 60th percentiles in reading and math achievement

(2) Desired level of achievement--probably want student engaged time to be at least within zone corresponding to expected level of achievement

(3) Importance of student engaged time--research has shown to be significantly related to student achievement

(4) Relative importance of subject area to district, school, teacher, students' needs--amount of time available

★5. Own data (2H16) or example (✓2H17, 2T18) (10-15 minutes)

a. Graphs--titles of selected graphs

b. Student engaged times--from Summary Sheet for Time

c. Zone--check column indicating in which area student engaged time falls and indicate by +, 0 or - on Summary Sheet for each day

d. Tentative goal

MATERIALS

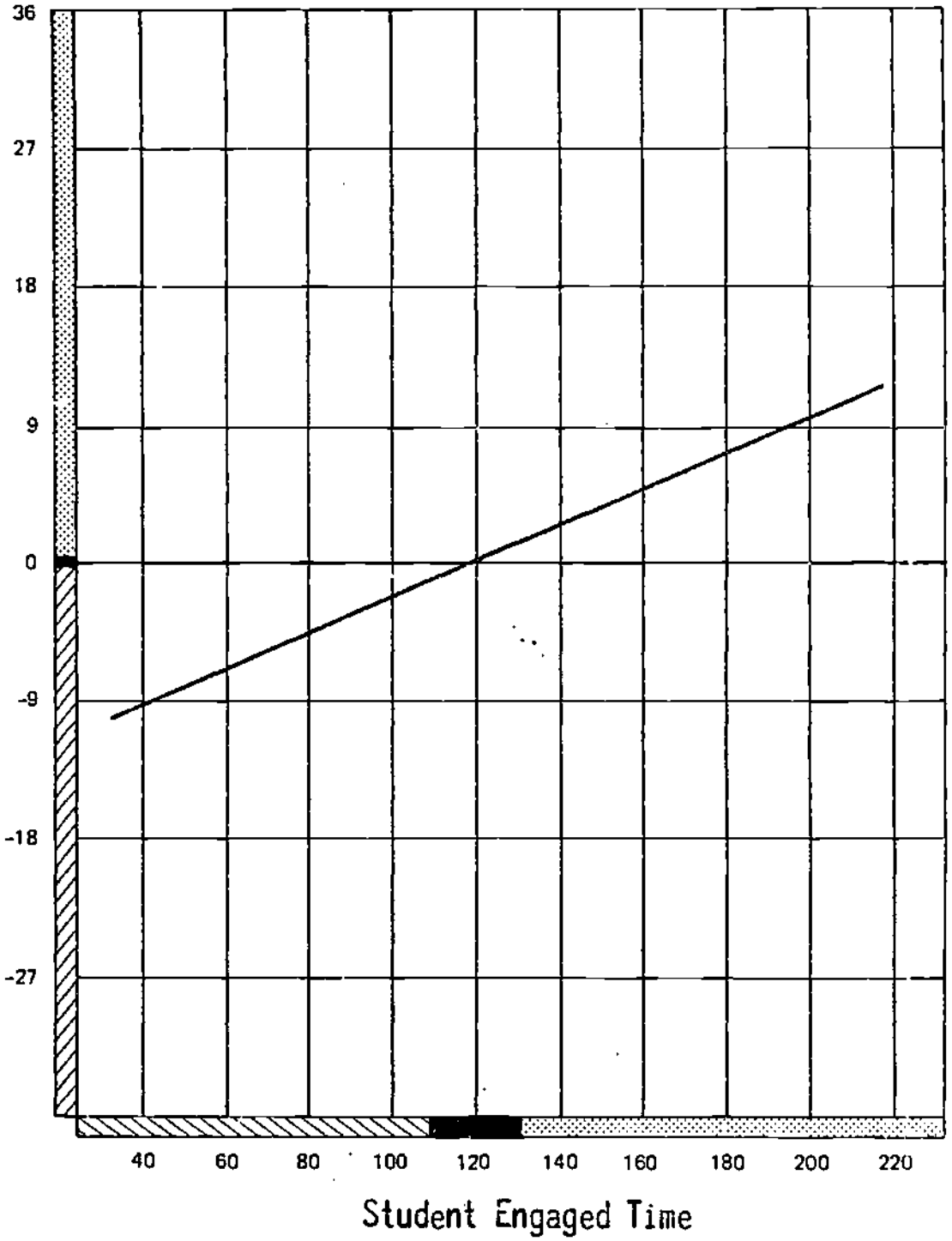
In addition to the materials included here, the following will be needed:

2H26--Graphs
(a-f)

2H6 --Summary Sheet for Time
(a-b)

READING AND WORD ANALYSIS TOTAL

GRADE 1



Minimum change of at least 10 minutes.

Source: Stallings & Kaskowitz (1974)

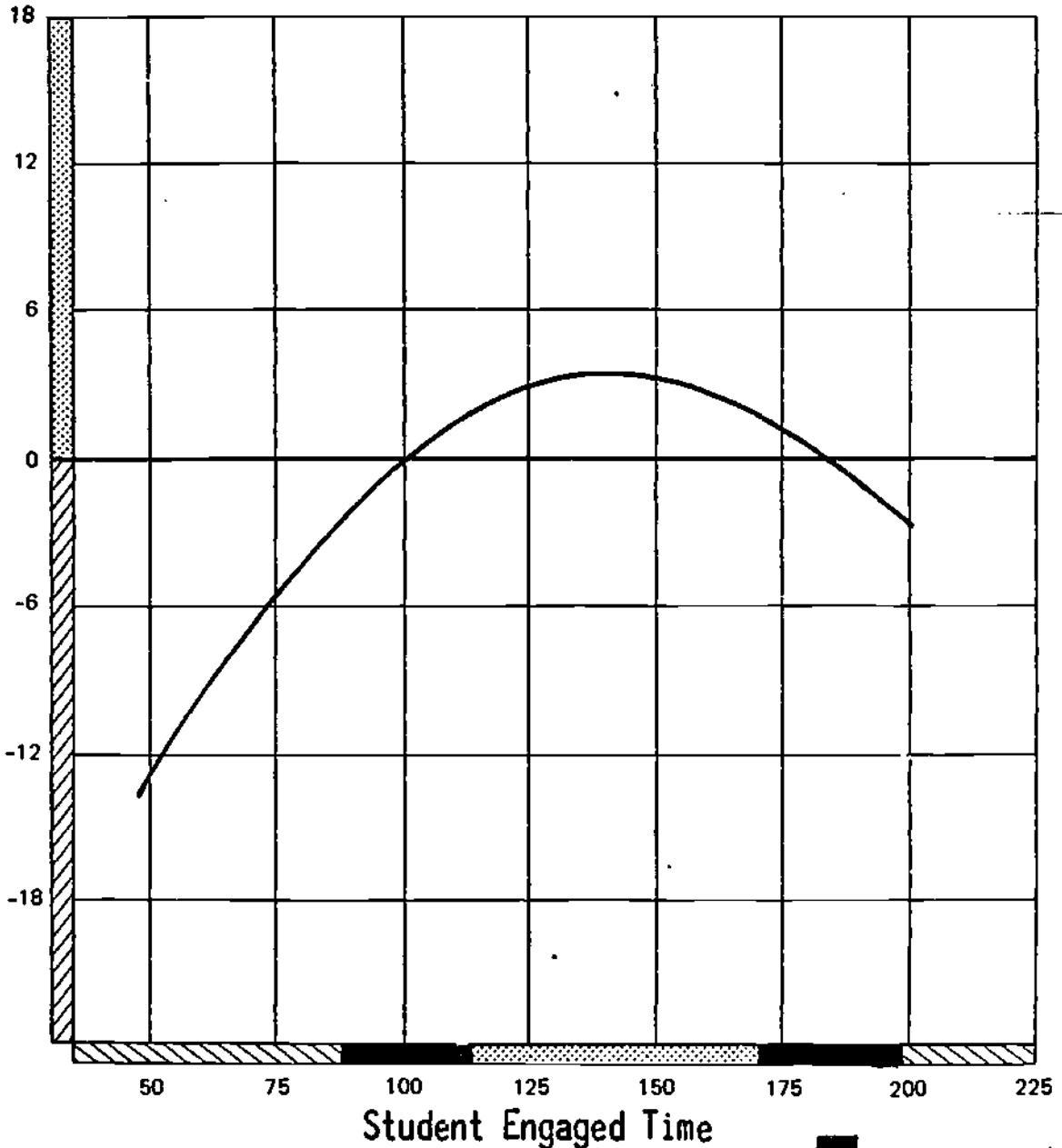
--Above expected level of achievement

--At expected achievement level

--Below expected level of achievement

READING AND LANGUAGE TOTAL

GRADE 3



Minimum change of at least 13 minutes.

--Above expected level of achievement

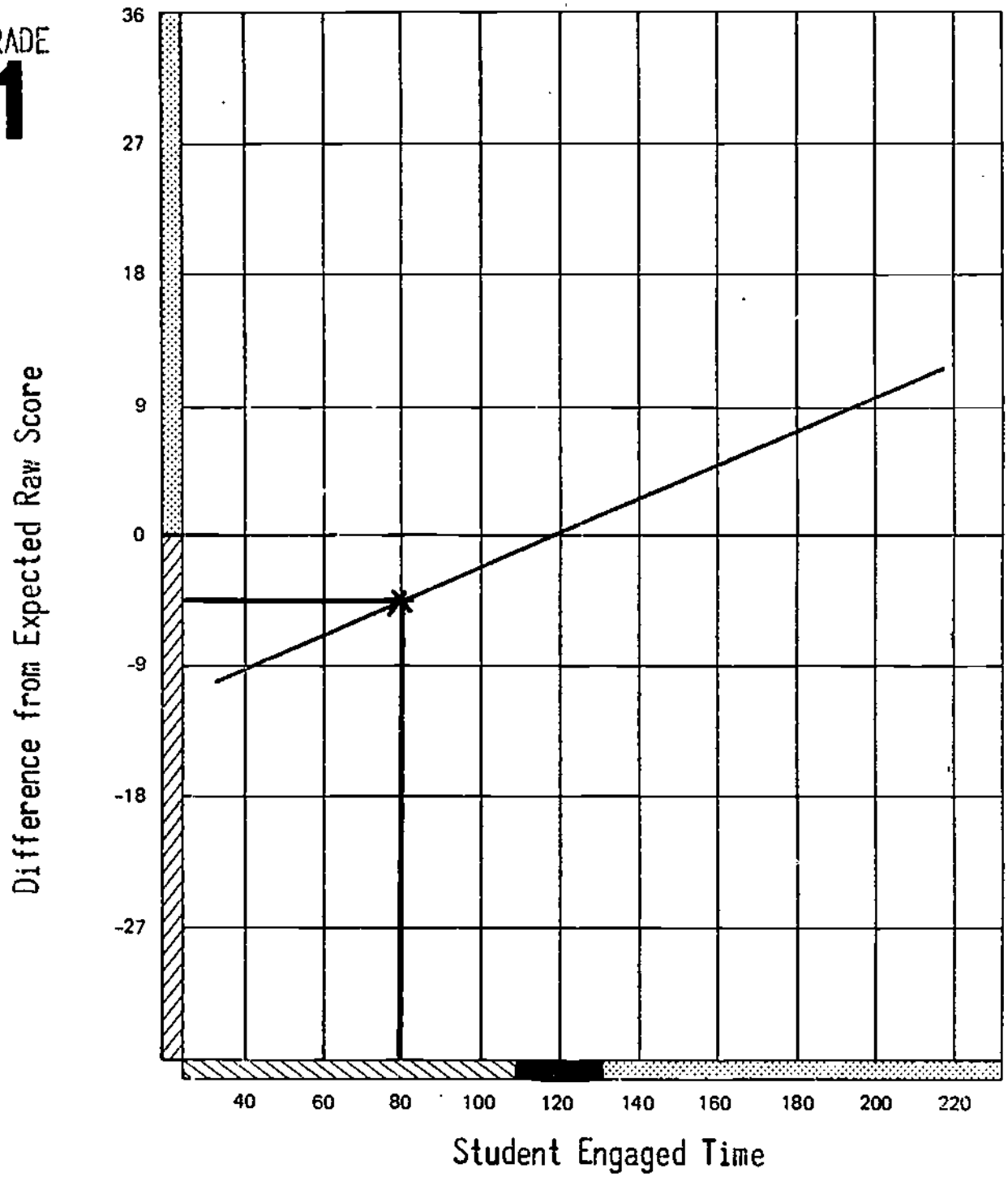
--At expected level of achievement

--Below expected level of achievement

Source: Stallings & Kaskowitz (1974)

READING AND WORD ANALYSIS TOTAL

GRADE 1



Minimum change of at least 10 minutes.

Source: Stallings & Kaskowitz (1974)

- --Above expected level of achievement
- --At expected achievement level
- --Below expected level of achievement

READING THE GRAPHS

Consider three third grade classes. The student engaged time in math for each class is shown below. Use the Third Grade Math Total Graph to locate student engaged time on the bottom axis and check the column corresponding to its zone.

Class	Student Engaged Time	Zone		
		Above	At	Below
A	45 min.			
B	72 min.			
C	96 min.			

Esther Freedman is a third grade teacher at the fictional New Delpen Elementary School. Find her average student engaged times on the bottom axis of each graph and check the column corresponding to the zone.

Graph	Student Engaged Time	Zone		
		Above	At	Below
Third Grade Reading and Language Total	96 min.			
Third Grade Math Total	39 min.			

(A) ▨ , Below (B) ▩ , Above (C) ▩ , Above
Freedman's Reading/Language Arts-- ■ , At
Freedman's Math-- ▨ , Below

CONSIDERATIONS IN SETTING A TENTATIVE GOAL

Some suggested guidelines:

- Most teachers will probably want to change by at least the minimum change unit if any change is made.
- Changes of at least the minimum change unit made across zones are likely to affect student achievement
- Changes within zones may or may not bring about changes in student achievement
- Importance of student engaged time
- Relative importance of subject area--amount of time available
- Desired level of achievement
- Similarity of your students to those in research study

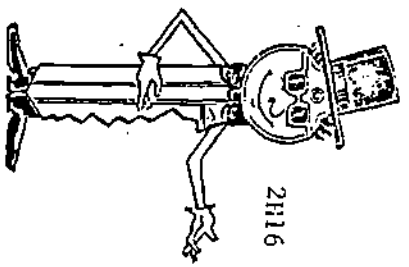
7/30/80

COMPARING YOUR DATA TO RESEARCH

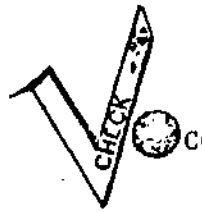
List the title(s) of the graph(s) you have selected for use in comparison in the first column. Record your most recent average student engaged time from your Summary Sheet for Time in the second column. For each of the selected graphs, indicate the zone in which student engaged time falls by checking the appropriate column. Set a tentative goal for student engaged time for reading/language arts and for math by considering the graphs, the zone in which achievement falls, and the minimum change unit shown below each graph.

Title of Selected Graph	Student Engaged Time	Zone			Tentative Goal for Student Engaged Time
		Above	At	Below	

2.56



2H16



COMPARING DATA TO RESEARCH

Tony Casini, a third grade teacher at the fictional New Delpen Elementary School, has collected information in his classroom and completed his calculations. The front of his completed Summary Sheet for Time is shown on the next page.

The titles of the graphs Tony has selected are shown in the first column below. Record his most recent average student engaged time in the second column. For each of the graphs, indicate the zone in which student engaged time falls by checking the appropriate column. Set tentative goals for Tony for student engaged time for reading/language arts and for math by considering the graphs, the zone in which achievement falls, and the minimum change unit shown below each graph.

Title of Selected Graph	Average Student Engaged Time	Zone			Tentative Goal for Student Engaged Time
		Above	At	Below	
Third Grade Reading and Language Total					
Third Grade Math Total					

State Atlantic
District Eastern
School New Delpen
Teacher Casini

SUMMARY SHEET FOR TIME

State # 03 School # 08 Teaching Day 300
District # 47 Teacher # 384R Year 1979-1980

READING/LANGUAGE ARTS

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
3/14	ED28	Beg.	75%	150	112 or 113	
3/15	ED28	Mid.	70%	106	130	121 or 122
3/16	ED28	End	75%	197	148	130

MATH

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
3/14	ED28	Mid.	80%	45	36	
3/15	ED28	Beg.	75%	42	32	34
3/16	ED28	End	80%	40	32	33

KEY FOR ✓2H17

Title of Selected Graph	Student Engaged Time	Zone			Tentative Goal for Student Engaged Time
		+	0	-	
Third Grade Reading and Language Total	130 min.		X		AT LEAST 130 min. (No change)
Third Grade Math Total	33 min.			X	AT LEAST 41 min.

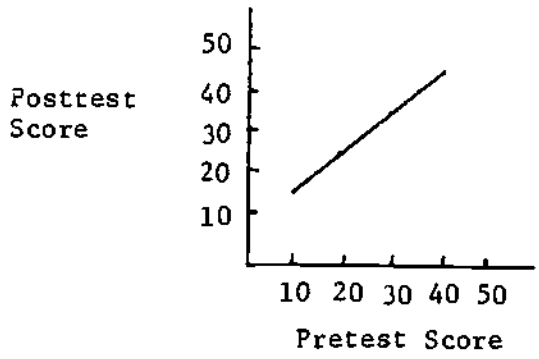
NOTES

D.1.d. Student Achievement--Difference from Expected Raw Score

This note provides a technical explanation of the difference from the expected raw score.

Suppose the third grade students in a school were grouped into three classes according to their previous year's reading achievement test scores: high, medium, and low reading level classes. Suppose, also, that they receive similar instruction for the same amount of time using appropriate instructional materials. If a posttest were administered to them at the end of the school year, one may easily predict that the posttest mean of the high reading level class would be greater than that of the medium reading level class, which, in turn, would be greater than that of the low reading level class. Even if special reading instructions were given to certain classes, the posttest mean scores would still depend largely upon their pretest mean scores (initial reading level).

The difference from the expected raw score (residual score) is the remaining posttest score after the difference on the pretest (initial reading levels) has been statistically controlled. That is, given pretest and posttest scores for numerous classes at a given grade level, a best-fitting graph of the relationship between them can be drawn.



Such a graph provides a way of locating the predicted posttest score for a given pretest score. By drawing perpendicular lines from the bottom axis to the graph of the relationship and then over to the vertical axis, the predicted posttest score can be found for a given pretest score. Such a graph may look like the one above. For a pretest score of 30, the predicted posttest score is approximately 35. When the predicted posttest score is subtracted from the actual posttest score for that classroom. the difference from the expected raw score is called the residual score. Now, it can be seen that a 0.0 difference from the expected raw score does not necessarily mean that there was no gain but, rather, that the gain was precisely what was predicted. It is also clear that a negative difference, as -9.0, does not necessarily mean that there was actually a decrease in achievement. It does mean that the actual gain (if any) was less than the predicted gain. Or, to put it another way, the students did not learn as much as was predicted for students with that pretest score.

The specific relationship of the residual scores in the Stallings and Kaskowitz study to percentile scores, grade equivalent scores, or stanine scores is not known.

To obtain residual scores, a predicted posttest score is calculated for each pretest score from the linear regression of the posttest scores on the pretest scores. Then a residual score is calculated by subtracting the predicted posttest score from the actual posttest score. For each classroom, then,

Residual Score = (Actual Posttest Score) - (Predicted Posttest Score)

The predicted posttest score for each classroom is obtained by means of the following formula.

$$\left(\begin{array}{c}\text{Predicted Posttest Score of a Classroom}\end{array}\right) = \left(\begin{array}{c}\text{Posttest Mean Score}\end{array}\right) + \left(\begin{array}{c}\text{Correlation Between Pretest and Posttest Scores}\end{array}\right) \left(\begin{array}{c}\dfrac{\text{Standard Deviation of Posttest Scores}}{\text{Standard Deviation of Pretest Scores}}\end{array}\right) \left(\begin{array}{c}\text{Pretest Score of a Classroom} - \text{Pretest Mean Score}\end{array}\right)$$

Technically, the residuals are defined as the n differences $d_i = Y_i - Y_i'$, $i = 1, 2, \ldots, n$, where Y_i is an observation and Y_i' is the corresponding fitted value obtained by use of the fitted regression equation.

The residuals are the differences between what is actually observed and what is predicted by the regression equation--that is, the amount the regression equation has not been able to explain. For more information, see Applied Regression Analysis by N. R. Draper and H. Smith (New York: Wiley, 1966), p. 86.

D.1.e. Zones

On each graph, student engaged time (horizontal axis) is marked with three kinds of zones (bars) which correspond to the positive, zero, and negative zones on the student achievement scale (vertical axis showing difference from the expected raw score). Generally, if the student engaged time of a classroom falls within the range marked by a bar on the horizontal axis, then it is likely (at least two out of three times) that student achievement will fall in the corresponding range on the vertical axis.

The zones were derived from the shape of each graph and a statistical measure.* When a graph developed on the basis of classroom data is used for making a prediction (e.g., predicting student achievement from student engaged time), some errors are always expected (unless the relationship is perfect). When these errors of prediction are taken into consideration, the deviations of the values of student achievement predicted from all of the points in the "zero" student engaged time zone from a zero difference from the expected raw score are all quite small. These deviations can essentially be regarded as zero on the student achievement axis. The positive and negative zones were placed around the "zero" student engaged time zone(s) according to the shape of the graph.

*An estimated standard error of prediction was the basic statistic used to determine the zones. For the procedures used to calculate the zones, see Rim, E., & Segars, J. A conceptual framework for the evaluation of the RBS basic skills instructional improvement effort in the tri-state region. Philadelphia, Pa.: Research for Better Schools, Inc., 1979.

D.1.f. Minimum Change Unit

A minimum change unit is specified at the bottom left of each graph. This minimum change unit is the smallest amount of change in student engaged time that is likely to produce a change in student achievement. The minimum change unit is based on a statistic* that indicates the uncertainty involved in predicting student achievement from student engaged time. The value of this statistic varies from graph to graph because the uncertainty in prediction varies from graph to graph and test to test. For each graph, the minimum change unit has been established so that if student engaged time changes by that amount, the chances are at least two out of three that there will be a change in student achievement. If changes in student engaged time are less than this unit, changes in student achievement are much less likely to occur.

*An estimated standard error of prediction was the basis of computing each minimum change unit. For the computational procedures involved, see Rim, E., & Segars, J. A conceptual framework for the evaluation of the RBS basic skills instructional improvement effort in the tri-state region. Philadelphia, Pa.: Research for Better Schools, Inc., 1979.

E. Making a decision (30-50 minutes)

Rationale. Participants need to examine allocated time and engagement rate in order to determine tentative goals needed to reach their goal level of student engaged time. They need to consider the reasonableness and value of such changes, revising their tentative goal for student engaged time if necessary.

Materials	Strategy
★2T19--Making a Decision 2T20--Different Ways of Getting 90 Minutes of Student Engaged Time	Provide an overview of the activities involved in making decisions about student engaged time.
--Rulers ★2T21--Setting Engagement Rate Goals 2H22--Tony Casini's Goals (a-b) 2H16--Comparing Your Data to Research 2H6--Summary Sheet for (a-b)Time ★2H23--Making a Decision (a-b) Ⓛ 2H24--Making a Decision (a-c) Ⓛ 2T25--Key for 2H24	Review the research on engagement rate. Discuss the example on 2H22. Have teachers complete Table 1 on 2H23 for their own classrooms while leaders complete Table 1 on 2H24.
★2H4--Time Nomograph	Explain how to use the nomograph (2H4) to find the tentative goal for allocated time corresponding to the tentative goals for student engaged time and engagement rate. Look at the example on 2H22 and then have teachers complete Table 2 on 2H23 for their own classrooms while leaders complete Table 2 on 2H24. Discuss considerations involved in deciding whether the tentative goal for allocated time is feasible. Look at the example on 2H22 and have participants decide whether allocated time goals are feasible for their own classrooms (teachers use 2H23) or for the checkpoint (leaders use 2H24).

★1. Overview (2T19) (5 minutes)

a. Current status

(1) Have tentative goal for student engaged time

(2) Student engaged time = allocated time x engagement rate

(a) Given level of student engaged time (90 minutes) may be result of different levels of allocated time and different engagement rates (2T20)

(i) Allocated time of 90 minutes and 100% engagement rate--engagement rate not likely

(ii) Allocated time of 120 minutes and 75% engagement rate--allocated time could be reduced or student engaged time increased somewhat by increasing engagement rate

(iii) Allocated time of 180 minutes and 50% engagement rate--allocated time could be reduced or student engaged time increased considerably by increasing engagement rate

(iv) Allocated time of 300 minutes and 30% engagement rate--allocated time not likely

(b) Need to look at both allocated time and engagement rate in order to decide on student engaged time goals

b. Step 1

(1) Look at current engagement rate

(2) Use teacher judgment and research findings to set tentative goals

c. Step 2

(1) Given tentative goal for student engaged time and for engagement rate, find allocated time goal

(a) Allocated time = $\frac{\text{student engaged time}}{\text{engagement rate}}$

(b) Use nomograph or calculator

(2) Decide if tentative goal for allocated time is feasible for your classroom

d. Step 3--record or revise goals

2. Setting tentative goals for engagement rate--step 1 (2T21) (5-10 minutes)

★a. Research findings

(1) Average: 60%

(2) Range: 30-90%

(3) Students with higher engagement rates usually learn more

★†b. Guidelines for setting an engagement rate goal

(1) Probably want to set a tentative goal of at least an average engagement rate--60%

(2) Probably do not want to set a tentative goal above highest engagement rates found--90%

(3) In 60-85% range, probably want increase of at least 5% if possible

(4) Feasible for situation

c. Examples

★(1) Current average engagement rate is 50%--probably want to try to increase engagement rate to at least 60%

(2) Tony Casini (2H22)

(a) Current engagement rates--80%, 75%, 70%

(b) Tentative goal for engagement rate--Tony sets at 80%

★d. Setting tentative goal for engagement rate for own data (2H23) or example (2H24, 2T25a) by completing Table 1

(1) Daily engagement rates from Summary Sheet for Time

(2) Set tentative goals for engagement rates that are feasible for situation

3. Looking at allocated time--step 2 (15-20 minutes)

★a. Setting tentative goals for allocated time

(1) Use nomograph or calculator to find (2H4, 2H22b)

(a) Given tentative goal for student engaged time (60 minutes)

(b) Given tentative goal for engagement rate, or current engagement rate if no change is desired (80%)

(c) Nomograph

(i) Place straightedge on point for tentative goal student engaged time and for tentative goal engagement rate

(ii) Point where straightedge crosses allocated time scale is tentative goal for allocated time (about 75 minutes)

(d) If using calculator, divide student engaged time goal by engagement rate goal

(2) Finding tentative goal for allocated time for own data (2H23) or example (2H24, 2T25) by completing Table 2

(a) Tentative goals for engagement rate from last column of Table I

(b) Tentative goals for student engaged time from 2H16

(c) Tentative goals for allocated time computed by using nomograph (2H4) or calculator

b. Decide if tentative goals for allocated time are feasible

★(1) Change may affect other subject areas (e.g., science, music, art, social studies)

★(2) Change may conflict with school schedules or policies

(a) Schedule for each subject may be fixed

(b) Schedule for pullouts, music, gym, etc., may be difficult to change

(3) Example of Tony Casini (2H22)

(a) Currently spends at most 45 minutes on math each day

(b) Decides 75 minutes is not feasible because of lunch and music/gym schedules

★(4) Deciding if allocated time goals are feasible for own data (2H23) or example (2H24, 2T25)

★4. Recording and/or revising goals--step 3 (5-15 minutes)

a. If allocated time goal is feasible, record goals

b. If allocated time goal is not feasible, revise goals

(1) Decide if allocated time goal can or should be revised and record

(2) Check to see if engagement rate goal can be changed--if so, revise it and record

(3) Calculate student engaged time goal (allocated time x engagement rate), compare to original goal, and record

c. Example of Tony Casini--revises goals (2H22c)

(1) Sets allocated time goal of 65 minutes

(a) Current allocated time--42 minutes

(b) Goal found in step 3--75 minutes

(c) Revised goal closer to original goal

(2) Increases engagement rate goal to 85%

(a) Current engagement rate--75%

(b) First goal--80%

(3) Calculates student engaged time goal--about 55 minutes--close to original goal of 60 minutes

d. Recording and/or revising goals for own data (2H23) or example (2H24, 2T25).

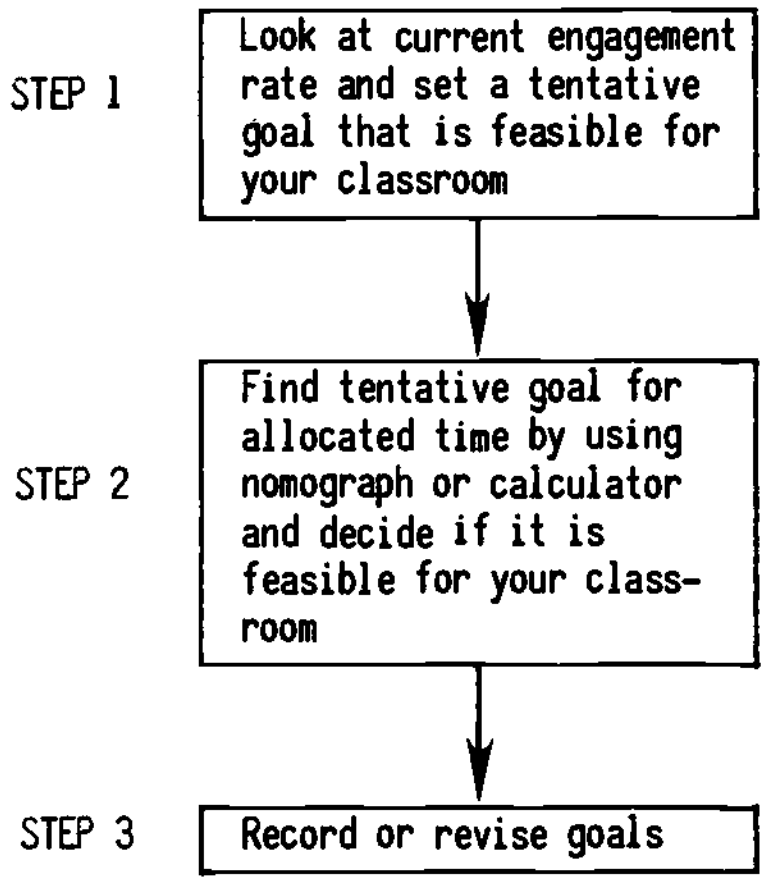
MATERIALS

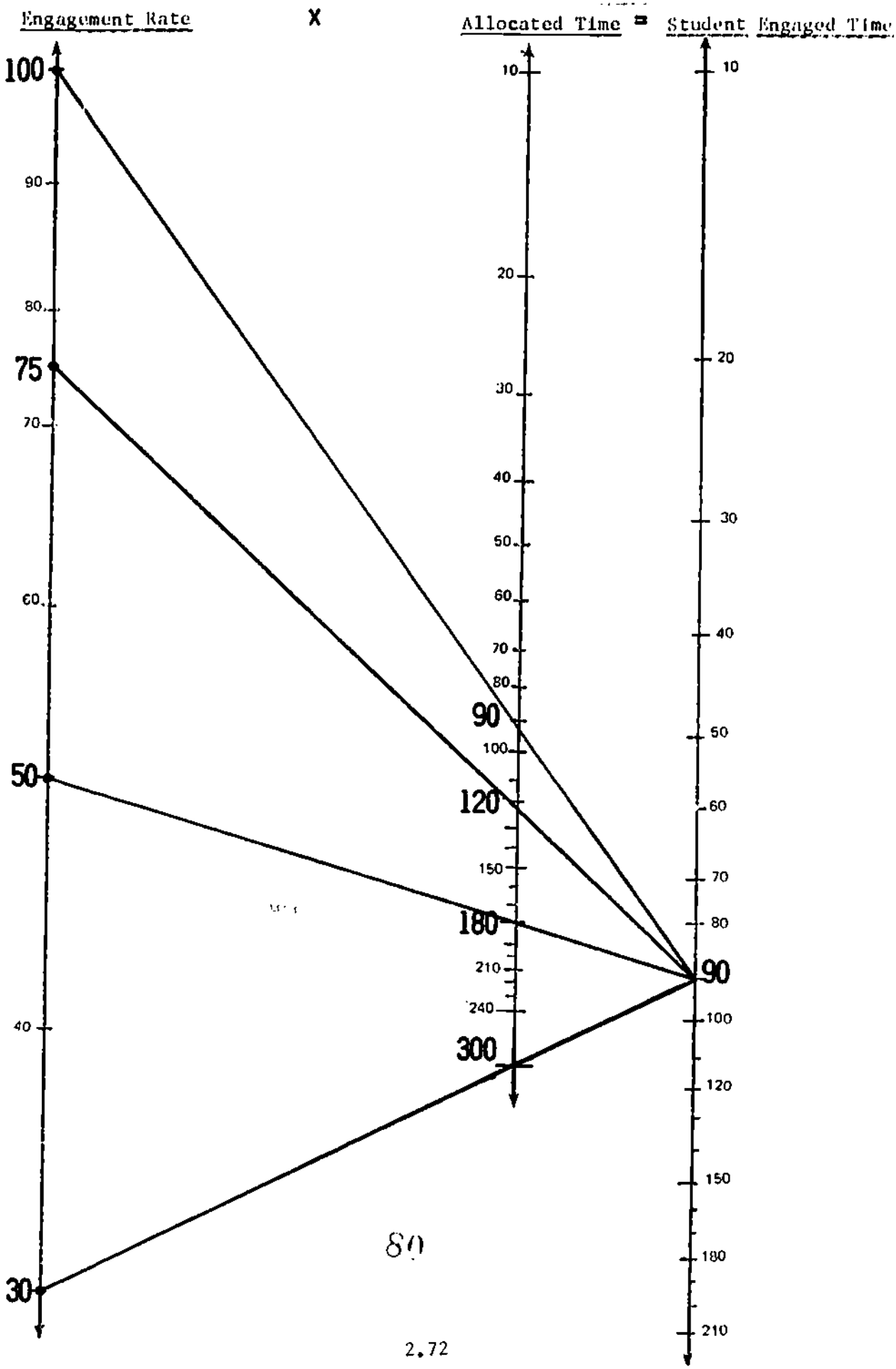
In addition to the materials included here, the following will be needed:

2H16--Comparing Your Data to Research

2H6 --Summary Sheet for Time
(a-b)

MAKING A DECISION




Engagement Rate
X
Allocated Time
=
Student Engaged Time
100
90
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SETTING ENGAGEMENT RATE GOALS

- Research Findings

  Average: 60%

  Range: 30-90%

  Students with higher engagement rates usually learn more.

- Guidelines for setting an engagement rate goal:

  Most teachers will probably want to set a tentative goal of at least an average engagement rate (60%).

  Most teachers probably will <u>not</u> want to set a tentative goal above the highest engagement rates found (90%).

  In 60-85% range, most teachers will probably want to increase engagement rates by at least 5% if possible.

  Most teachers will probably want to use their own judgment in considering the feasibility of tentative goals for their own particular situations.

TONY CASINI'S GOALS

Tony Casini, a third grade teacher at the fictional New Delpen Elementary School, has collected information in his classroom about student engaged time and has completed his calculations. He has set a tentative goal for student engaged time in math of 60 minutes.

Step 1:

Setting Feasible Goals for Engagement Rate

The engagement rates for Tony's classroom are 80%, 75%, and 70%. Tony decides that he wants to increase his engagement rate to 80%.

Step 2:

Computing Tentative Goals for Allocated Time

Tony records this tentative goal for engagement rate and the tentative goal for student engaged time which he found earlier in the table below.

Find the corresponding tentative goal for allocated time, using the nomograph (2H4) or a calculator $\left(\text{allocated time} = \frac{\text{student engaged time}}{\text{engagement rate}}\right)$.

Tentative Goal for Engagement Rate	Tentative Goal for Allocated Time	Tentative Goal for Student Engaged Time
80%		60 minutes

Deciding if Allocated Time Goals are Feasible

In order to decide whether this allocated time is feasible, Tony first examines his current situation. Tony's allocated times for math on the days on which information was collected were 45, 42, and 40 minutes. Tony decides that the goal of 75 minutes is not feasible for his classroom because of lunch and music/gym schedules.

Step 2--Allocated time goal is about 75 minutes.

Step 3:

Recording and/or Revising Goals

Since Tony decided that the goal for allocated time of 75 minutes was not feasible, he must revise his goals.

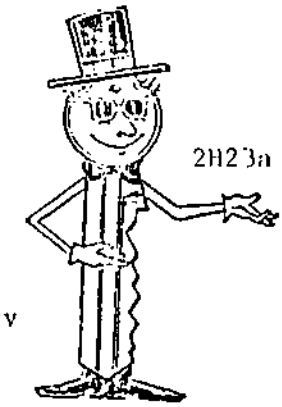
- Tony first decides that he can increase allocated time to 65 minutes. He records this revised goal in the table below.
- Next Tony decides that he can probably increase his engagement rate to 85%. He records this revised goal in the table below.
- *Find Tony's new goal for student engaged time by using the nomograph (2H4) or a calculator (allocated time x engagement rate). Record this goal below.*

Engagement Rate	Allocated Time	Student Engaged Time
85%	65 minutes	

Tony finds that this revised goal is slightly less than his original goal of 60 minutes. He decides to try to reach this revised goal for student engaged time in math and completes a similar sequence of steps to find goals for reading/language arts.

Step 3--Revised student engaged time goal is 55 minutes.

9/3/80



2H23a

MAKING A DECISION

Step 1: Setting Engagement Rate Goals

- Record your current engagement rates (from your Summary Sheet for Time) in the first column.
- Set tentative engagement rate goals that are feasible for your classroom. You will probably want to set goals in the range of 60-90%, with an increase of at least 5% if possible.

Table 1	Daily Engagement Rate	Tentative Goal for Engagement Rate
Reading/Language Arts	%	%
	%	
	%	
Math	%	%
	%	
	%	

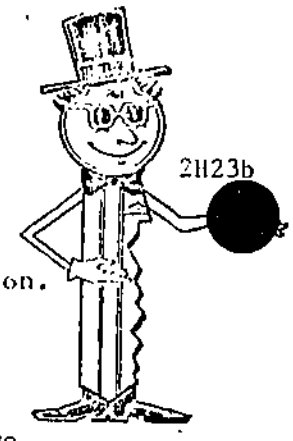
Step 2: Finding Allocated Time Goals

- Record below your tentative goals for engagement rate (from Table 1).
- Record your tentative goals for student engaged time (from 2H16).
- Find the corresponding tentative goals for allocated time by using the nomograph (2H4) or a calculator

$$\left(\text{allocated time} = \frac{\text{student engaged time}}{\text{engagement rate}}\right)$$

Table 2	Tentative Goal for Engagement Rate	Tentative Goal for Allocated Time	Tentative Goal for Student Engaged Time
Reading/ Language Arts	%		
Math	%		

- Decide whether these allocated time goals are feasible.



Step 3: Recording and/or Revising Goals

- If so, go on to the next phase, Selection and Preparation.
- If an allocated time is not feasible:

  First consider whether your current allocated time can or should be changed so as to be closer to the tentative goal established in Table 2. Record the allocated time goal below.

  Next reconsider your engagement rate goal in the last column of Table 1. If this goal can be revised, do so. Record your goal for engagement rate below.

  Find the corresponding student engaged time goals by using the nomograph (2H4) or a calculator (allocated time x engagement rate). Compare this to your original goal, going back to the graph if there is a difference of more than 5 minutes, and record it below.

Table 3	Allocated Time	Engagement Rate	Student Engaged Time
Reading/Language Arts		%	
Mathematics		%	

9/3/80

2H24a

MAKING A DECISION

Jim Heindricks teaches a below-average fourth grade class at New Delpen Elementary School in Eastern School District, Atlantic State. The principal and teachers in the school want to concentrate primarily on reading/language arts and math this year. The front of his completed Summary Sheet for Time is shown below.

State Atlantic
District Eastern
School New Delpen
Teacher Heindricks

SUMMARY SHEET FOR TIME

State # 03 School # 08
District # 47 Teacher # 1010 Year 1981-1982

READING/LANGUAGE ARTS

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10/19	YI99	End	60%	180 min.	108 min.	
10/20	GR135	Beg.	70%	150 min.	105 min.	107 min.
10/21	FOS	Mid.	65%	180 min.	117 min.	110 min.

MATH

Date	Coder #	Part of Period	Engagement Rate	Allocated Time	Student Engaged Time	Average Student Engaged Time
10/19	FOS	Mid.	55%	60 min.	33 min.	
10/20	YI99	End	66%	50 min.	33 min.	33 min.
10/21	GR135	Beg.	70%	60 min.	42 min.	36 min.

Jim used the third-grade graphs to set tentative goals for student engaged time in reading/language arts and math.

Title of Selected Graph	Student Engnged Time	Zone			Tentative Goal for Student Engaged Time
		Above	At	Below	
Third Grade Reading and Language Total	110 min.		✓		130 min.
Third Grade Math Total	36 min.			✓	50 min.

Jim thinks that both engagement rate and allocated time can probably be changed somewhat.

Step 1: Setting Engagement Rate Goals

- Record Jim's current engagement rates (from his Summary Sheet for Time) in the first column.
- Set tentative engagement rate goals which might be feasible for his classroom. You will probably want to set goals in the range of 60-90%, with an increase of at least 5% if possiole.

Table 1	Daily Engagement Rate	Tentative Goal for Engagement Rate
Reading/Language Arts	%	%
	%	
	%	
Math	%	%
	%	
	%	

Step 2: Finding Allocated Time Goals

- Record below Jim's tentative goals for engagement rate (from Table 1).
- Record his tentative goal for student engaged time (from the table on 2H24a).
- Find the corresponding tentative goals for allocated time by using the nomograph (2H4) or a calculator

$$\left(\text{allocated time} = \frac{\text{student engaged time}}{\text{engagement rate}}\right).$$

Table 2	Tentative Goal for Engagement Rate	Tentative Goal for Allocated Time	Tentative Goal for Student Engaged Time
Reading/Language Arts	%		
Math	%		

- Decide whether these allocated time goals are feasible.

Step 3: Recording and/or Revising Goals

If Jim's allocated time goal in a subject area is feasible, go on to the next phase, Selection and Preparation.

If his allocated time goal in a subject area is not feasible:

- First consider whether Jim's current level of allocated time can or should be changed so as to be closer to the tentative goal established in Table 2. Record the revised allocated time goal in Table 3.
- Next reconsider Jim's engagement rate goal in the last column of Table 1. If this goal can be revised, do so. Record his goal for engagement rate (revised or not) below.
- Find the corresponding student engaged time goals by using the nomograph (2H4) or a calculator (allocated time x engagement rate). Compare this to Jim's original goal in the last column of Table 2. If there is a difference between the two goals of more than 5 minutes, go back to the graph.

Table 3	Allocated Time	Engagement Rate	Student Engaged Time
Reading/Language Arts		%	
Mathematics		%	

2T25a

KEY FOR 2H24

TABLE 1	Daily Engagement Rate	Tentative Goal for Engagement Rate
Reading/ Language Arts	60%	70-90%
	70%	
	65%	
Math	55%	70-90%
	66%	
	70%	

KEY FOR 2H24

TABLE 2*	Tentative Goal for Engagement Rate	Tentative Goal for Allocated Time	Tentative Goal for Student Engaged Time
Reading/ Language Arts	70%	186 min.	130 min.
	80%	163 min.	
	90%	144 min.	
Math	70%	71 min.	50 min.
	80%	63 min.	
	90%	56 min.	

*Correct answers for three possible tentative goals for allocated time (corresponding to three different tentative goals for engagement rate) are shown. If you picked a different engagement rate goal, your answer for allocated time should be between those given for the goals above and below your own. Decisions as to the feasibility of these goals may differ.

NOTES

E.3.b. Guidelines for Setting an Engagement Rate Goal

There are two major research studies which have examined engagement rates, the percent of the class engaged in academic tasks. One of these studies, the Instructional Dimensions Study, found an average engagement rate of about 60% in first and third grade classrooms. This same study found that about one-third of the classes in the study had engagement rates above 70%. The other study, Phase III-B of the Beginning Teacher Evaluation Study, used a slightly different definition of engagement rate which disregarded the time spent in management and transition activities. The average engagement rates in this study of second and fifth grade classes were thus slightly higher, about 70-75%. About one-third of the teachers had engagement rates above 80%. The range of engagement rates found in these studies is from about 30% to 90%.

Since research indicates that students with higher engagement rates usually learn more, teachers will probably want to set tentative goals for engagement rate that are at least average (the average of 60% from the Instructional Dimensions Study is suggested since the definition used in this study more closely matches that used in information collection). Since no research study has found any classroom that consistently has an engagement rate above 90% and since some classroom time is needed for giving nonacademic directions and changing activities, teachers will probably not want to set goals above 90%.

In order to help teachers ascertain how much change is meaningful, a standard error of estimate was calculated for each research study, using the following formula:

$$\text{Standard Error of Estimate} = \left(\text{Standard Deviation for Engagement Rate}\right) \times \sqrt{\left(1 - \text{Reliability of Engagement Rate}\right)}$$

These standard errors of estimate were approximately equal to 5% (4.9% - 6.6%). It is thus recommended that changes of at least 5% be made.

7/31/80

The following graphs are included here:

Reading/Language Arts

Grade 1--Reading and Word Analysis Total

Grade 3--Reading and Language Total

Grade 5--Reading Total

Mathematics

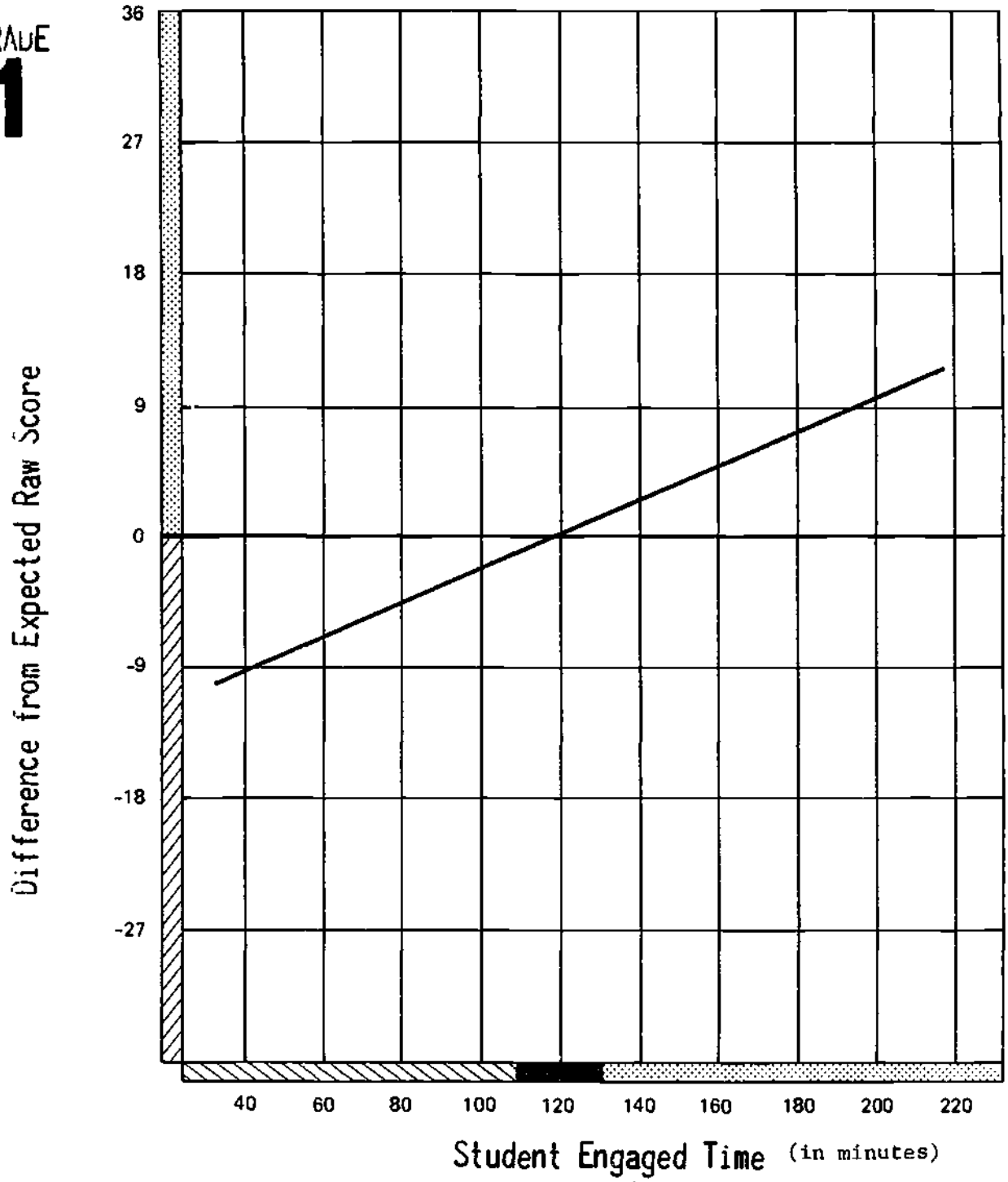
Grade 1--Math Total

Grade 3--Math Total

Grade 5--Math Total

READING AND WORD ANALYSIS TOTAL

GRADE 1



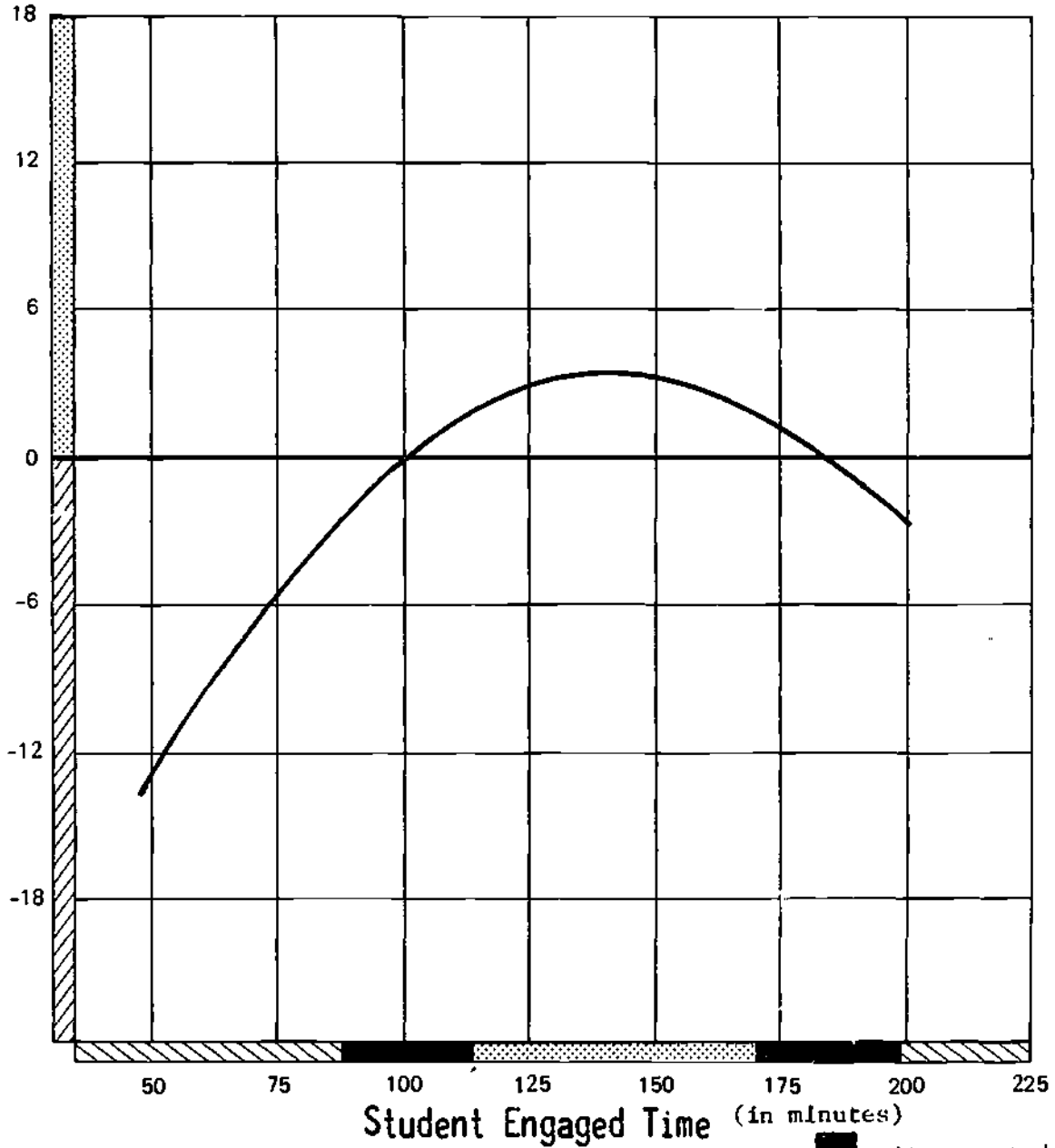
Minimum change of at least 10 minutes.

Source: Stallings & Kaskowitz (1974)

--Above expected level of achievement
--At expected achievement level
--Below expected level of achievement

READING AND LANGUAGE TOTAL

GRADE **3**



Minimum change of at least 13 minutes.

Source: Stallings & Kaskowitz (1974)

--Above expected level of achievement

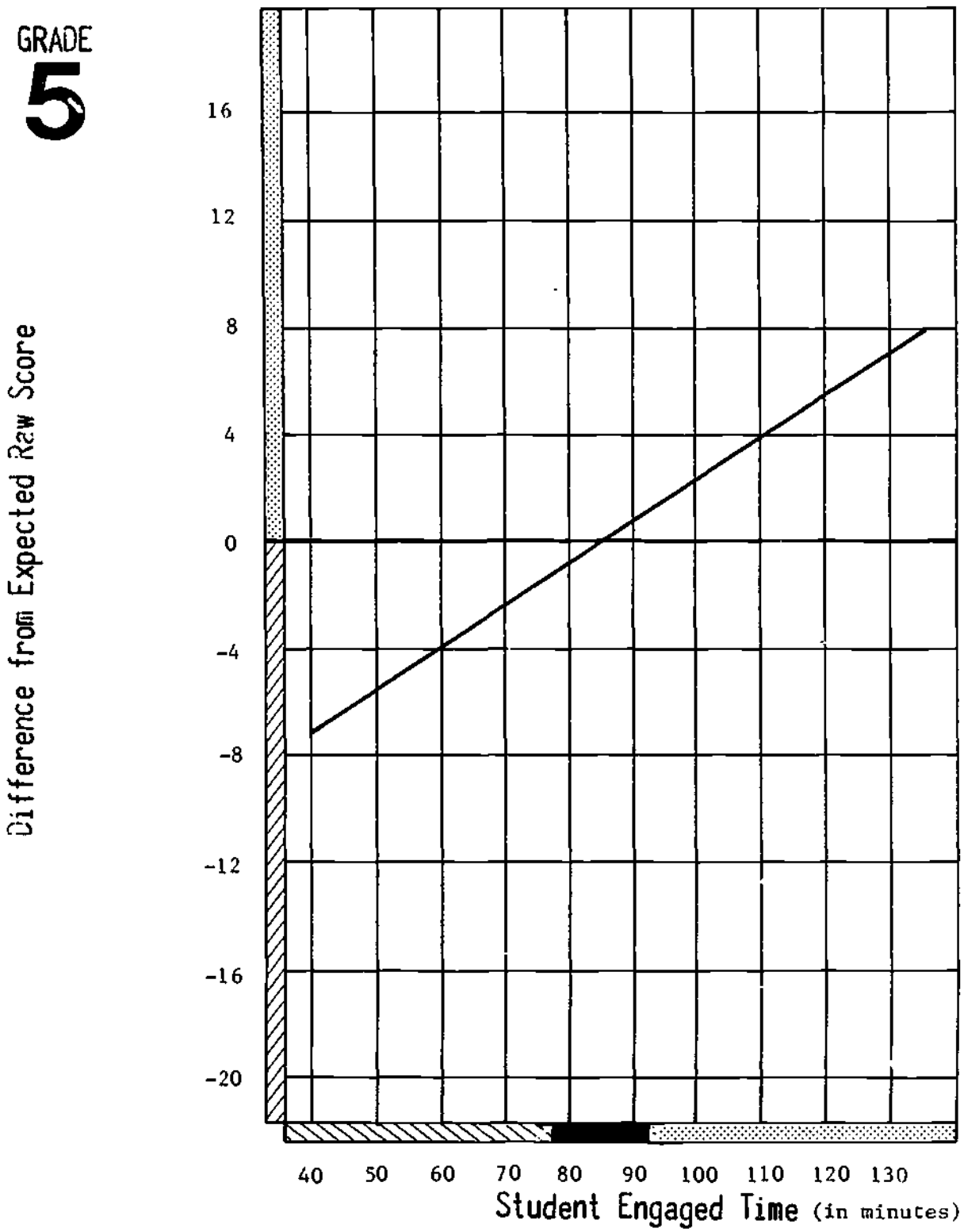
--At expected level of achievement

--Below expected level of achievement

9/2/80

READING TOTAL

GRADE 5



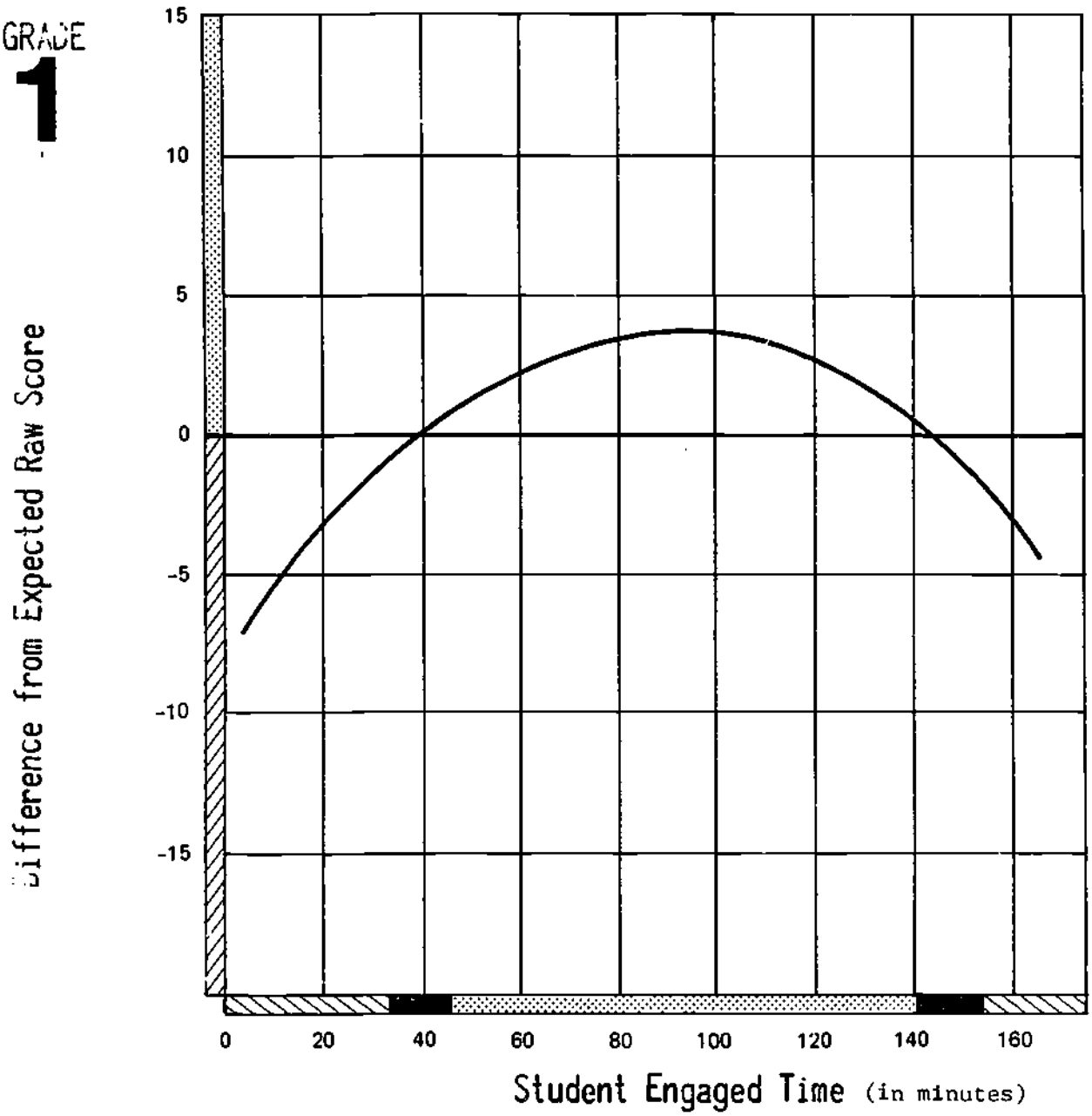
Minimum change of at least 7 minutes.

Source: Beginning Teacher Evaluation Study, 1978

--Above expected level of achievement
--At expected achievement level
--Below expected achievement level

MATH TOTAL

GRADE 1



Minimum change of at least 6 minutes.

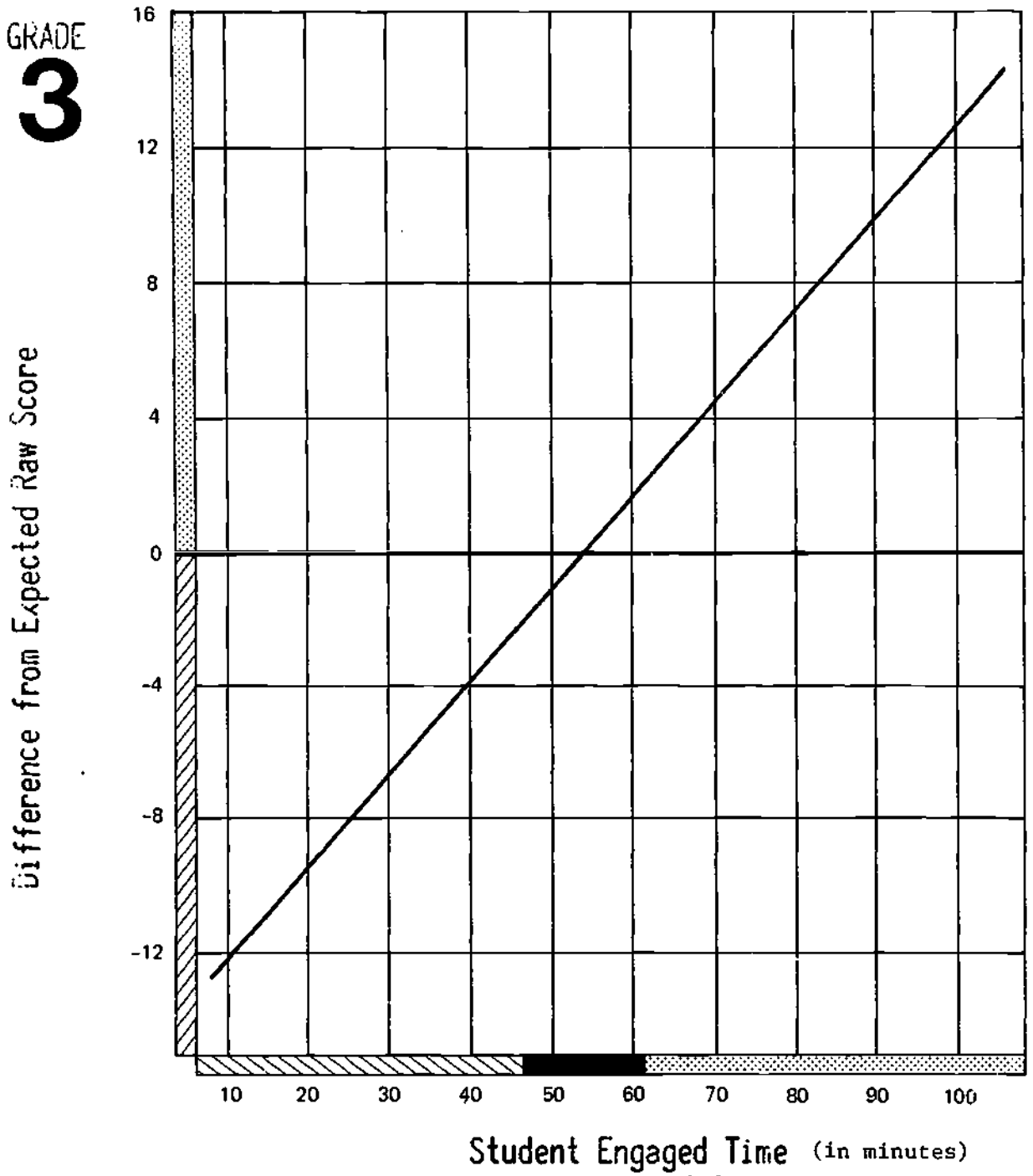
Source: Stallings & Kaskowitz (1974)

--Above expected level of achievement
--At expected achievement level
--Below expected level of achievement

2.89

MATH TOTAL

GRADE **3**



Minimum change of at least 8 minutes.

Source: Stallings & Kaskowitz, (1974)

--Above expected level of achievement

--At expected achievement level

--Below expected level of achievement

2.90

MATH TOTAL

GRADE

No significant relationship was found between student engaged time and students' total math achievement, with student engaged times ranging from 17 to 46 minutes.

Significant relationships were found between student engaged time and achievement in certain subtest areas. The more engaged time, the higher achievement in fractions, multiplication, geometry, and division.

Source: Beginning Teacher Evaluation Study
Phase III-B, 1978