TIER Computations Progress Monitoring System: Cousin Item Writing

RESEARCH IN
MATHEMATICS
EDUCATION

TIER Computations Progress Monitoring System: Cousin Item Writing

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Abstract

The purpose of this report is to describe the cousin item writing process to create assessment items and parallel forms for the Tiered Interventions with Evidence-Based Research (TIER) Computations Progress Monitoring System. We collaborated with 23 highly qualified and experienced educators as item writers across Grades K-6. This collaboration resulted in 4,180 cousin items based on the 220 item models approved by TEA for kindergarten through Grade 6. Upon finalization and verification, the RME project team determined item placement within the 20 assessment forms for each of the seven grades alongside the corresponding answer keys. This work is in collaboration with the University of Texas at Austin and the Texas Education Agency.

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TIER: Cousin Item Writing

Introduction

The purpose of the current technical report is to describe the cousin item writing, peer review, internal review, revision, and finalization processes for the Tiered Interventions using Evidence-Based Research (TIER) Computations Progress Monitoring system for Grades K-6. We also explain our process for item placement within the 20 assessment forms for each of the seven grades alongside the corresponding answer keys. The instrument development component of this project is part of the larger TIER project in collaboration with the University of Texas at Austin and the Meadows Center for Preventing Educational Risk and is funded by the Texas Education Agency (TEA).

Cousin item writing refers to the process of using an item model (or template) to create similar items of comparable difficulty. These similar items to as cousin items throughout the project. Previously, the project team created a content blueprint of computation standards from the Texas Essential Knowledge and Skills (TEKS) standards. Then, the content blueprint was used to create 30-40 items models per grade. The blueprint development process is described in Technical Report 21-02 which details the TIER item modeling phase (Haider et al., 2021). We sent these original item models for review by experts in the field of assessment design and development in mathematics education. The expert review process is described in the TIER Technical Report 21-03 (Sparks et al., 2021). This report describes the process of using those reviewed and TEA-approved models to write additional items, subsequently referred to as cousin items. For the purposes of this project, specific terminology is defined below:

- An **item** is a test question that is written to assess students' computational fluency, as described in the Texas Essential Knowledge and Skills (TEKS).

- An **item model** is a template that specifies the mathematical constraints for a specific item and is used in this project as the basis for future items (subsequently referred to as cousin items) assessing the same TEKS.

- A **cousin item** is an item written for a specific TIER item model as a cousin item. The primary goal for writing cousin items is to use the TIER item model to create a total of 20 items that are parallel in difficulty, format, and response options.

Preparations

We consulted with 24 item writers to participate in writing item models and 23 of these writers chose to participate in cousin item writing. Before cousin item writing could begin, preparations to ensure the success of item writers were necessary and are described in the next section.

Item Model Preparations

Before writing cousin items, the RME project team decided to re-examine the difficulty of the items after expert review. This involved looking across item models within standards to assess whether the item difficulty was appropriately indicated. In addition, another team member assessed each item model for difficulty. If discrepancies were found, the team member noted the discrepancy and the final decision was made by the principal investigator, drawing from both the feedback from the expert reviewers as well as any revisions that were made to the item based on these reviews.

In addition to assessing the difficulty of items, the team also reviewed the format of the item models to ensure consistency across models and to guide the cousin item writing process. For example, we used equation editor to ensure formatting consistency across the items. The team also checked the constraints and the sample items that were already generated.

Cousin Item Template Development

The original item model template (shown in Figure 1) was developed to outline the important components of the item models that were being written and to frame the work that was to be done throughout the item model workshop, including peer and RME project team reviews. In addition to the item model's algebraic form, the template was also designed to contain three item model examples, as well as any specific constraints and possible misconceptions with their corresponding correct and alternate responses. This template became the foundation for the cousin item model template that was designed to scaffold the cousin item model writing and review process.
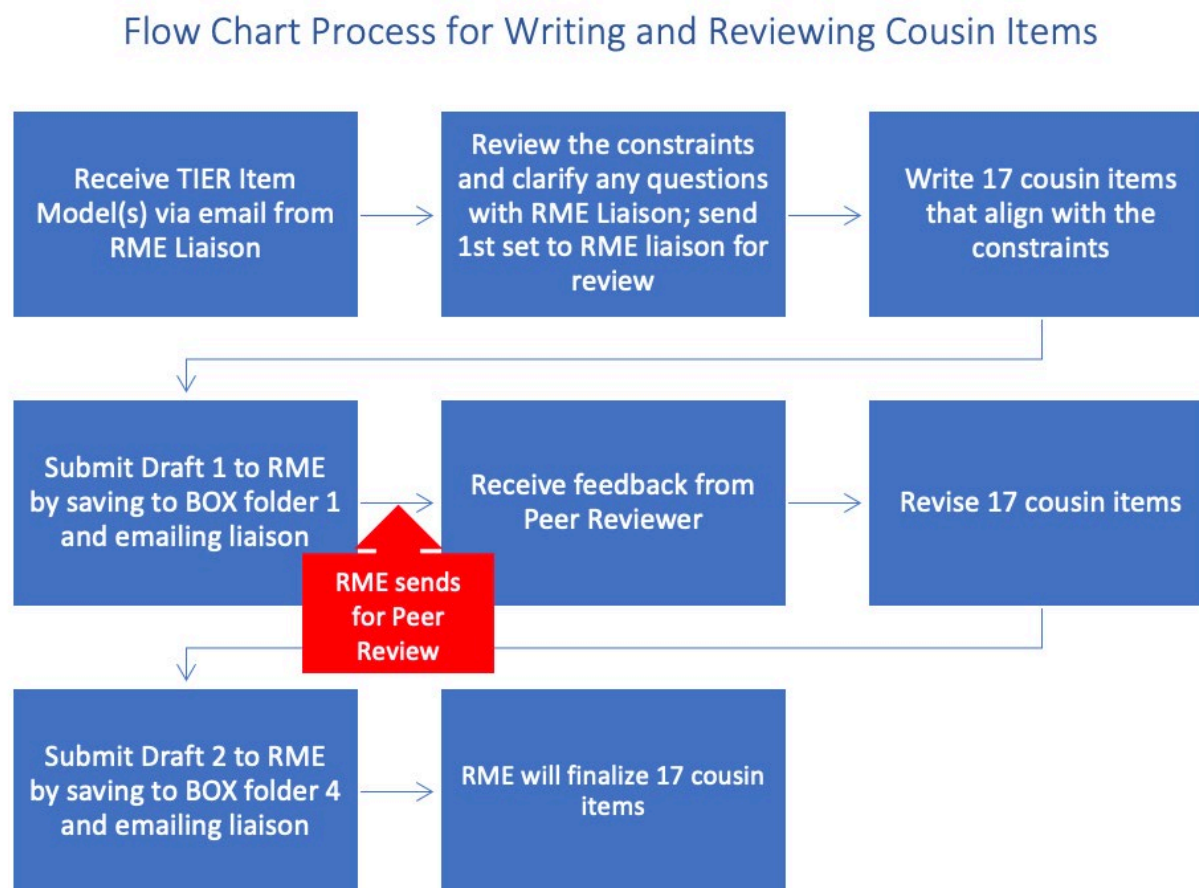
Figure 1

Original Item Model Template

TIER Item Writing Template			
TEKS Standard:			
Algebraic Form of Item:	**Example Item 1:**		**Responses**
			Correct Response:
Item Constraints:	Misconception 1:		Alternate Response 1:
	Misconception 2:		Alternate Response 2:
	Misconception 3:		Alternate Response 3:
Item/Constraint/Error Review			Final Responses
Item 2:	Reviewer's Feedback:	RME Approval:	Correct:
Correct Response:			Alt 1:
Alternate Response 1:			Alt 2:
Alternate Response 2:			Alt 3:
Alternate Response 3:	(Initials)	(Initials)	
Item 3:	Reviewer's Feedback:	RME Approval:	Correct:
Correct Response:			Alt 1:
Alternate Response 1:			Alt 2:
Alternate Response 2:	(Initials)		Alt 3:
Alternate Response 3:		(Initials)	

We drafted the TIER Cousin Item Writing Procedures document to delineate the process for cousin item writing and review, as well as layout the timeline with important submission dates for the process. Because of the cyclical nature of the writing and review process, there were multiple starting and ending points for writers and liaisons to coordinate over the course of the project. For this reason, a flowchart (Figure 2) was developed to visually communicate the process.

Figure 2

TIER Process Flow Chart

Flow Chart Process for Writing and Reviewing Cousin Items

Receive TIER Item Model(s) via email from RME Liaison → Review the constraints and clarify any questions with RME Liaison; send 1st set to RME liaison for review → Write 17 cousin items that align with the constraints

Submit Draft 1 to RME by saving to BOX folder 1 and emailing liaison → Receive feedback from Peer Reviewer → Revise 17 cousin items

RME sends for Peer Review

Submit Draft 2 to RME by saving to BOX folder 4 and emailing liaison → RME will finalize 17 cousin items

Cousin item writers and reviewers needed to have a clear understanding of both the expectations for deliverables and the logistics of managing files and sharing information online while collaborating remotely. The RME project team developed a webinar as a supplement to the TIER Cousin Item Writing Procedures document and shared it with cousin item writers and reviewers prior to the start of the project.

In the webinar, we emphasized the content of the cousin item models by using an analogy to DNA. As with DNA in the development of physical characteristics in human development among families, there are crucial components of the original item models that needed to be considered and reproduced in the construction of each cousin item model to ensure that they represented the core content properly. The structure of the cousin items and the accuracy of their mathematical content needed to be aligned very precisely with the algebraic form, constraints, and misconceptions that the original item models were crafted with. Additionally, the cousin items needed to be of the same difficulty level as determined in the blueprint (Haider et al., 2021) and original item model difficulty rating process.

Item writers needed to be familiar with the original items and understand both the TEKS that they originated from as well as the developmental appropriateness of their respective grade-level item models in order to ensure that the expectations for each cousin item and its set were aligned.

Preparation of Writers

All the TIER Cousin item writers and reviewers were highly qualified, experienced educators who were selected to write and review cousin items within the scope of this project. The writers and reviewers also had previous experience with the TIER Item Model Writing workshops for various grade levels and were trained in the process of writing Item Models aligned with the content blueprint for the K-6 numerical fluency assessments.

All writers and peer reviewers were asked to watch the TIER item writing webinar and were expected to review the procedures document prior to beginning the cousin item writing process. The webinar was prepared and recorded by the RME project team to communicate the expectations and process for writing, reviewing, and submitting TIER cousin item models. The TIER Cousin Item Writing Slide Deck and script were designed to supplement the detailed process outlined in the TIER Cousin Item Writing Procedures document (Appendix A). Emphasis was placed on the content of the item models and their cousin items using the earlier noted analogy of DNA to frame the structural components of the original item models and their corresponding cousins.

The DNA of the Item Model was described as its

1) Algebraic Form

2) Constraints

3) Misconceptions

We used this framework to scaffold the cousin item writing process and ensure that adequate focus was placed on aligning cousin items with the foundational characteristics of their given item models. This standard was established at the forefront of the process and enabled writers to creatively approach the use of numeracy patterns and fluency standards to develop a variety of cousin items needed to fulfill the requirement of generating 17 cousin items per item model. The original item models included three example items, so only 17 items were needed to complete the set of 20 cousin items for each model outlined in the scope of this project. Item writers wrote cousin item sets that were less likely to require extensive revision later in the process of review and submission as a result of communicating the framework and standards.

Schedule of Item Writers

The timeline for the TIER project was such that there were multiple due dates and turnaround times for sets of Cousin Item Models, as well as multiple release periods for new sets of items to be written and reviewed. The complex nature of the process required a detailed schedule and consistent communication between writers, reviewers, and RME Liaisons.

Prior to writing Cousin Items, we sent the item writers a survey to assess their availability of writing items within a certain date range that conformed with the timeline for the project. This survey included questions about availability to write cousin items and questions about reviewing cousin items. They were also asked out of 30, how many items would they be willing to write and/or review. Item writers also indicated what grades they were willing to write and/or review.

A project team member used this information from the survey to develop a schedule of assignments for item writing and peer review. Item writing was divided into two batches, with more items assigned in the first batch. This allowed the project team to finalize more items earlier. We also assigned each writer a team member liaison to be the direct contact at RME. The liaison's role was to assign items, monitor completion, and provide formative feedback on writing and reviews. In the next section, we describe the cousin item writing process.

Cousin Item Writing

RME project team members functioning as TIER liaisons established a collaborative feedback loop with cousin writers that was integral to the success of this project. By providing formative feedback throughout the writing and review process, the cousin item models were calibrated to meet the aforementioned standards for item model alignment. RME liaisons sent the cousin item writers a single item model within their assigned grade level to start writing cousin items. Writers were asked to write one complete set of 20 cousin items (which included the three example items from the original item model) and return it to their liaison before proceeding with their remaining assignments. This preliminary review was done to ensure that the cousin items met RME content and formatting expectations. After confirming that RME standards were met, the liaison released the rest of the items in the first batch to the writers. Figure 3 shows the template that item writers were provided to use during item writing. We requested that item writers download a copy of the original item model and attach their additional 17 items at the bottom.
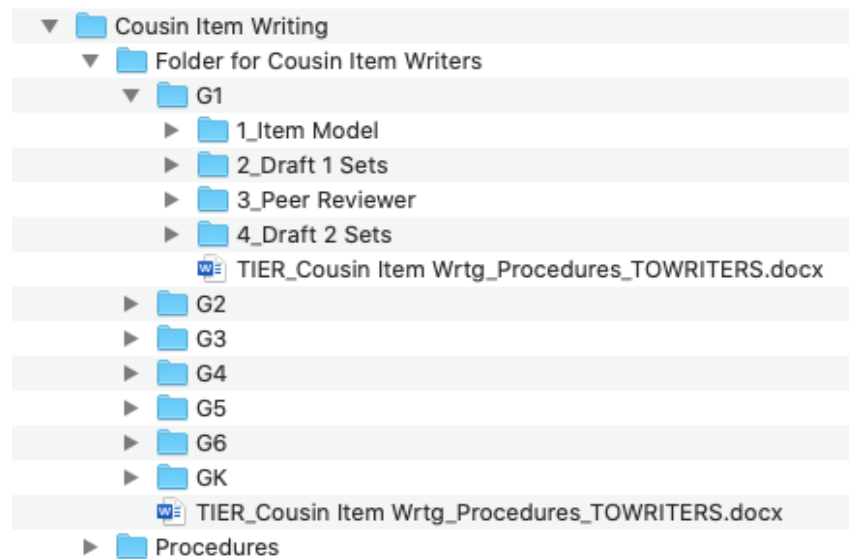
Figure 3

Cousin Item Template

Cousin Item 1			Final Responses	
	Peer Review Feedback Checklist	RME Feedback	Correct:	
			Alt 1:	
	Alignment ○ Algebraic Form ○ Constraints ○ Difficulty		Alt 2:	
			Alt 3:	
	Accuracy of Math ○ Item ○ Alternate responses ○ 20 items total (unless otherwise noted)		ITEM FINALIZED	
			DATE	*Initials*
	NOTES:			
		(Initials)		
	(Initials)			

Cousin item writers were asked to write 17 cousin items per item model using the template provided. Using the algebraic form of the original item model, they were expected to create unique items that met the designated constraints for the given item and provide alternative responses that aligned with the misconceptions provided for the original item model. Cousin item writers were encouraged at this stage to consider if there were any aspects of the items that did not align with the content blueprint or if there were missing constraints or misconceptions that should be considered. They were asked to provide feedback on the items to RME and note them in their draft files as they created their items.

Once their cousin item sets were complete, item writers saved them with a new naming convention and uploaded them to the appropriate folder on Box (Figure 4), a secure online sharing site. The RME project team created a detailed naming system and file structure to house the process for item writing and review. This structure aided the process of organizing multiple grade-levels and navigation for item writers and reviewers as the project progressed.

Figure 4

File Structure

```
▼ 📁 Cousin Item Writing
  ▼ 📁 Folder for Cousin Item Writers
    ▼ 📁 G1
      ▶ 📁 1_Item Model
      ▶ 📁 2_Draft 1 Sets
      ▶ 📁 3_Peer Reviewer
      ▶ 📁 4_Draft 2 Sets
        📄 TIER_Cousin Item Wrtg_Procedures_TOWRITERS.docx
    ▶ 📁 G2
    ▶ 📁 G3
    ▶ 📁 G4
    ▶ 📁 G5
    ▶ 📁 G6
    ▶ 📁 GK
      📄 TIER_Cousin Item Wrtg_Procedures_TOWRITERS.docx
  ▶ 📁 Procedures
```

Peer Review Process

Item writers uploaded their completed cousin item sets to the peer review folder on Box once they were ready for review and alerted their liaison that they had completed that step. The liaison then assigned the cousin item set to a peer reviewer and sent them the item model's numeral-alphabetic name to reference.

Next, the peer reviewer used the second column of the cousin item template to review each item in the cousin item set. Using the peer review feedback checklist, the reviewer was responsible for checking the alignment of the cousin item to original item model and the accuracy of the math of each cousin item and its corresponding correct and alternate responses. The RME project team provided space for the peer reviewer to write notes about the cousin item. Once the review was complete, the peer reviewer uploaded their review to Box and alerted their liaison.

After the peer review the RME liaison reviewed the feedback from the reviewer. Specifically, the liaison analyzed the content of the review. Sometimes, the feedback focused more on the structural aspect of the item model itself (e.g., item constraints, difficulty appropriateness). In this case, the liaison would review the item with the content blueprint and internal verification documents, adjust the item accordingly, and provide feedback to the writer. Furthermore, this item was then flagged for a second internal review due to the number of necessary modifications and highlighted in the RME project team meeting. If the liaison determined that the changes were only minor, then the liaison sent the item to the original author for updates and finalization.

Once finalized, the item writer uploaded the cousin items back to Box. The RME liaison then reviewed the items again, ensuring that the cousin items were updated to reflect any feedback provided and finalized by the writer. The liaison then proceeded to finalize the document by

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cleaning any extraneous notes, highlights, etc. and confirming all feedback had been applied. This process was repeated over two batches of items.

Cousin Item Finalization

The RME project team conducted a cross-grade level verification to confirm that the cousin items were accurate and complete in their final form before moving them to the student form creation process. This verification was performed by RME project team members who were assigned at least two other grade-levels to verify as a part of the finalization process. A second RME project team member evaluated and verified 20% of the items, in addition to any cousin items that were flagged for the second round of peer review. Once finalized, the cousin item sets were then uploaded to the appropriate folder on Box and the tracking spreadsheet was updated to reflect the completion of the process.

Preparation of the Final Forms

The next step of the work with the item writers and RME project team was to finalize the 4,180 cousin items that had been created based on the 220 item models approved by TEA for kindergarten through Grade 6. As each set was finalized and verified, the RME project team began work on the item placement within the 20 forms for each of the seven grades alongside the corresponding answer keys. We refer to this item placement as the form blueprint for the final test forms. The rationale for the item placement was formulaic and purposeful. For example, the project team ensured that none of the most difficult items appeared in the first row of items on each form and that the least to most difficult items were distributed equally across forms within a grade-level. Additionally, the project team designed the form blueprint so that it followed the number of items listed in the TEA-approved content blueprint. A copy of the form blueprint for the kindergarten number sequence items is displayed in Appendix B and Grades 1-6 items are in Appendix C.

Next, we also reviewed all 220 forms to verify that each item's placement would not cue a student about the answer to another item within the same form. Finally, we conducted a copy edit of the forms to ensure that the item format was consistent across the forms. Once these forms were finalized, they became the final answer key and student forms for the project.

Answer Key Forms and Student Forms

The creation of the answer key forms and student forms began with 20 documents with a 5 x 6 array of blank boxes. Two undergraduate researcher assistants began the process by creating the answer key forms. They started by opening all 20 blank answer key forms for a particular grade and one written item model document. Then they filled out the first box of the first answer key with the first written item model equation and answer. These steps were repeated until the first box on all twenty forms were filled in. This process was repeated until the first row was filled in across all forms, where the two then crosschecked each other's work, and after continued the above process for the whole sheet, one row at a time.

While initially the first row was checked, the project team found that this slowed down the process and it was more efficient to check a form once the entire form was completed. It was also found that the number sequence forms for kindergarten needed a very specific order to enter the items, so that items would not give away the answers to other items. The project team worked to make intentional placement decisions with these items to ensure that the effectiveness of the assessment wasn't compromised.

Final Form Verification

After an entire grade's answer key forms were completed another RME project team member verified them and created the student forms. The forms were verified by making sure what was entered on the answer sheet matched the written item model. The forms were checked to make sure there were no duplicate equations or items that gave away the answer to other items, this was especially important for kindergarten and Grade 1, as noted above. The verification was done in red pen by both student-assistants who marked their respective grades before trading sets. All of the equations and answers were converted into Equation Editor in Word to ensure that the alignment, layout, and function of the items was consistent across forms. Once the answer key forms were verified all 20 were uploaded to Box. Copies of the answer key forms were made and the answers were deleted to make 20 student forms.

Conclusions

Throughout the TIER cousin item writing project there were important themes of best practices that remained true for our project team's work and the work of our cousin writers and reviewers. We developed collaborative working relationships with external partners and internal teams while leaning into our strengths as learners in order to produce a high caliber assessment tool based on rigorous research and a wealth of expertise.

We developed the file structure for moving forward with the item writing phase of the TIER project. The organization of the files within the online storage platform expedited the sharing, storing, and movement of files and items. The intentional design of the file structure created a means of channeling large amounts of work through a narrow pipeline for review and revision.

We facilitated this work remotely and within a strict timeline by remaining nimble and collaborative with our project team, writers, and reviewers. By adapting the timeline to meet the needs of writers and reviewers individually (allowing for some flexibility within start times and turnaround cycles) we respected the professionalism of our writers and the constraints of team members working across multiple projects. We used a common language and file structure that helped align our internal processes, as well as a consistent communication pattern with writers and reviewers that established and maintained positive working relationships.

This phase of the Tiered Intervention using Evidence-Based Research (TIER) Computations Progress Monitoring System has successfully concluded with the development of a rigorous system of computational fluency assessments aligned with kindergarten through Grade 6 TEKS.

The team created 4,180 cousin items were based on the 220 item models that were developed in the item model phase of this project described in another technical report (Haider, et al., 2021)

Next steps for TIER include the formatting of final student forms and answer keys by the University of Texas, Austin. They will use the TEA-established guides to implement the TIER Computation Progress Monitoring system this fall with teachers.

References

Haider, M.Q., Sparks, A., McMurrer, J., & Ketterlin-Geller, L. (2021). *TIER computations progress monitoring system: Item modeling* (Tech. Rep. No. 21-02). Dallas, TX: Southern Methodist University, Research in Mathematics Education.

Sparks, A., McMurrer, J., & Ketterlin-Geller, L. (2021). *TIER computations progress monitoring system: Expert Review* (Tech. Rep. No. 21-03). Dallas, TX: Southern Methodist University, Research in Mathematics Education.
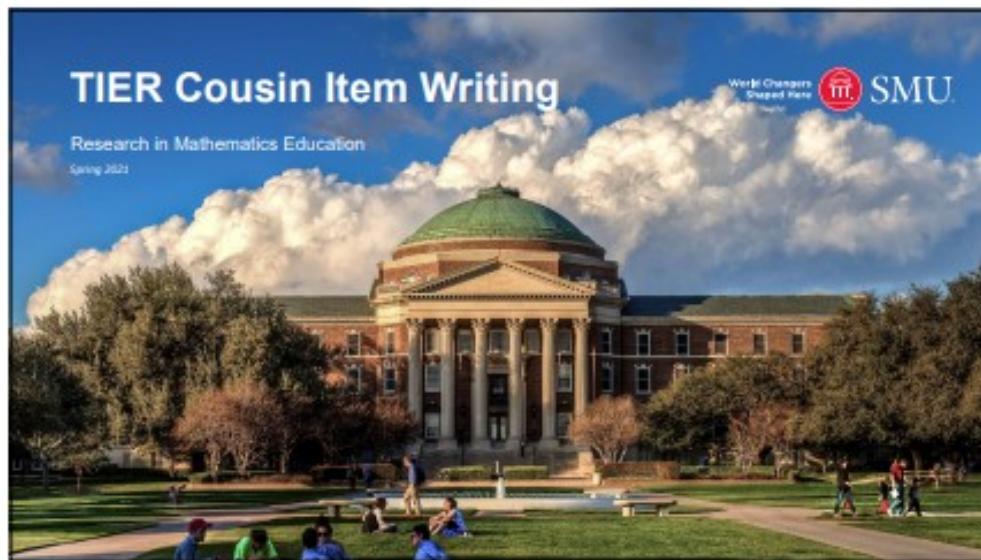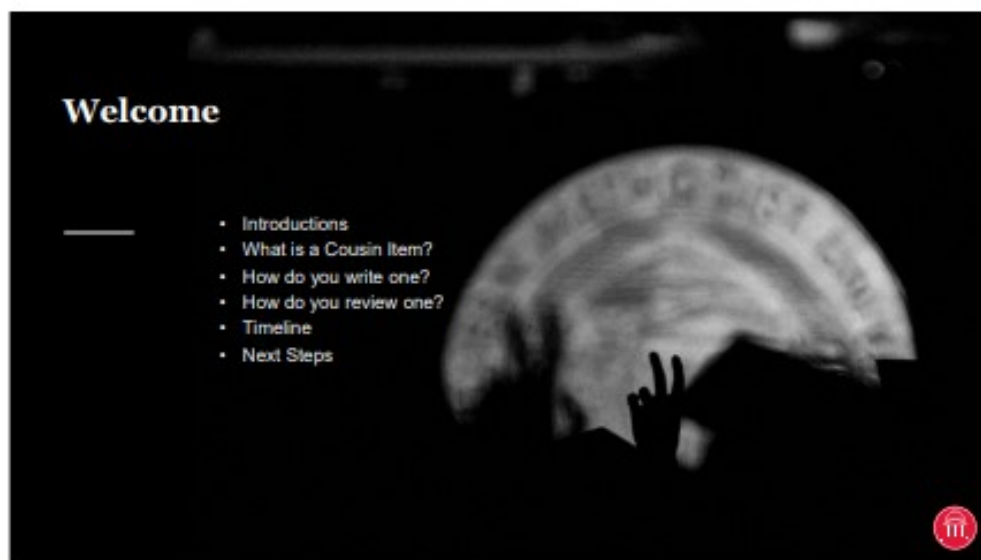
Introductions

Who we are:
Researchers at RME
&
Your liaisons for this project

Who you are:
Cousin Item Writers
&
Peer Reviewers
(& sometimes both!)

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What are Cousin Items?

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Item Models

TIER Item Writing Template TEKS Standard: 3.4 F Recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts. [Recall the corresponding division facts (< 100) Multiples of 5 (up to 100) divided by a number > or = 1 and <10]		
Algebraic Form of Item:	**Example Item 1:**	**Responses**
a + b = c a= any multiple of 5 (up to 100) greater than 5 but not a multiple of 10 b >1 and <10	35÷7	Correct Response: 5
Item Constraints: The Dividend must be a multiple of 5 (up to 100) greater than 5 but not a multiple of 10 The divisor must be a number >1 and <10 The equation used must be related to a corresponding multiplication fact up to within 10 x 10	Misconception 1: Operation misconception (adds)	Alternate Response 1: 42
	Misconception 2: Operation misconception (subtracts)	Alternate Response 2: 28
	Misconception 3:	Alternate Response 3:

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Cousin Item Building Blocks

The Item Model's DNA
1. Algebraic Form
2. Constraints
3. Misconceptions

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Item Models

Constraints

Algebraic Form and Constraints

$$a \div b = c$$

The dividend must be a multiple of 5 (up to 100) greater than 5 but not a multiple of 10

The divisor must be a number >1 and <10

The equation used must be related to a corresponding multiplication fact up to 10 X 10

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Item Model Examples

$$35 \div 7 \quad 45 \div 5 \quad 15 \div 3$$

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Item Model Examples

TIER Item Writing Template (ORIGINAL ITEM MODEL)
TEKS Standard:

Algebraic Form of Item:	Example Item 1:		Responses
			Correct Response:
Item Constraints:	Misconception 1:		Alternate Response 1:
	Misconception 2:		Alternate Response 2:
	Misconception 3:		Alternate Response 3:
Item Model Examples and Review			Final Responses
Item 2:	Reviewer's Feedback:	RME Approval:	Correct:
			Alt 1:
Correct Response:			Alt 2:
Alternate Response 1:			Alt 3:
Alternate Response 2:	(Initials)	(Initials)	
Alternate Response 3:			
Item 3:	Reviewer's Feedback:	RME Approval:	Correct:
			Alt 1:
Correct Response:			Alt 2:

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Misconceptions

TIER Item Writing Template
TEKS Standard: 3.4 F Recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts. [Recall the corresponding division facts (< 100) Multiples of 5 (up to 100) divided by a number > or = 1 and <10]

Algebraic Form of Item:	Example Item 1:	Responses
$a \div b = c$ a= any multiple of 5 (up to 100) greater than 5 but not a multiple of 10 b >1 and <10	35÷7	Correct Response: 5
Item Constraints: The Dividend must be a multiple of 5 (up to 100) greater than 5 but not a multiple of 10	Misconception 1: Operation misconception (adds)	Alternate Response 1: 42
The divisor must be a number >1 and <10	Misconception 2: Operation misconception (subtracts)	Alternate Response 2: 28
The equation used must be related to a corresponding multiplication fact up to within 10 x 10	Misconception 3:	Alternate Response 3:

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Misconceptions

1. Operation Misconception (adding)
2. Operation Misconception (subtraction)

35÷7 45÷5 15÷3

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Misconceptions

1. Operation Misconception (adding)
2. Operation Misconception (subtraction)

35÷7 45÷5 15÷3

Alternate Responses

| 42 | 28 | | 50 | 40 | | 18 | 12 |

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Alternate Responses

TIER Item Writing Template TEKS Standard: 3.4 F Recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts. [Recall the corresponding division facts (< 100) Multiples of 5 (up to 100) divided by a number > or = 1 and <10]		
Algebraic Form of Item:	**Example Item 1:**	**Responses**
a ÷ b = c a= any multiple of 5 (up to 100) greater than 5 but not a multiple of 10 b >1 and <10	35÷7	Correct Response: 5
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	Misconception 2: Operation misconception (subtracts)	Alternate Response 2: 28
	Misconception 3:	Alternate Response 3:

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Difficulty Level

- Cousin Items MUST have the same difficulty level
- It's like a family's trademark "nose" or "red hair"!

How do you write a Cousin Item?

Writing and Submitting for Review

How do you write a Cousin Item?

- Download the assigned Item Model
- Create a Cousin Item Template with RME file
- Save as:
Original filename_YOUR 3 LETTER INITIAL_CousinDRAFT1

COPY AND PASTE ENTIRE TABLE TO CREATE 17 COUSIN ITEMS PER ITEM MODEL

Cousin Item 1		Final Responses	
	Peer Review Feedback Checklist	RME Feedback	Correct:
	Alignment		Alt 1:
	o Algebraic Form		
	o Constraints		Alt 2:
	o Difficulty		Alt 3:
	Accuracy of Math		
	o Item		ITEM FINALIZED
	o Alternate responses		DATE Initials
	o 20 items total (unless otherwise noted)		
	NOTES:	(Initials)	
	(Initials)		

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Cousin Item Model Template

COPY AND PASTE ENTIRE TABLE TO CREATE 17 COUSIN ITEMS PER ITEM MODEL

Cousin Item 1				Final Responses	
		Peer Review Feedback Checklist	RME Feedback	Correct:	
				Alt 1:	
		Alignment		Alt 2:	
		○ Algebraic Form			
		○ Constraints		Alt 3:	
		○ Difficulty			
		Accuracy of Math		ITEM FINALIZED	
		○ Item		DATE	Initials
		○ Alternate responses			
		○ 20 items total (unless otherwise noted)			
		NOTES:			
			(Initials)		
		(Initials)			

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Item Model

TIER Item Writing Template
TEKS Standard: 3.4 F Recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts. [Recall the corresponding division facts (< 100) Multiples of 5 (up to 100) divided by a number > or = 1 and <10]

Algebraic Form of Item:	Example Item 1:	Responses
$a \div b = c$	35 ÷ 7	Correct Response: 5
a= any multiple of 5 (up to...) multiple of 10		
b >1 and <10		
Item Constraints:		Alternate Response 1: 42
The Dividend must be a ... than 5 but not a multiple ...		Alternate Response 2: 28
The divisor must be a nu... The equation used must be related to a corresponding multiplication fact up to within 10 x 10		Alternate Response 3:

The Item Model's DNA

1. Algebraic Form
2. Constraints
3. Misconceptions

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Step 1

Cousin Item 1		Final Responses	
$25 \div 5 =$	Peer Review Feedback Checklist	RME Feedback	Correct: 5
	Alignment		Alt 1: 30
	o Algebraic Form		Alt 2: 20
	o Constraints		Alt 3: NA
	o Difficulty		
	Accuracy of Math		ITEM FINALIZED
	o Item		DATE / Initials
	o Alternate responses		
	o 20 items total (unless otherwise noted)		
	NOTES:	(Initials)	
	(Initials)		

X 17

Step 2

> Folder for Cousin Item Writers > **GK**   ··· Upload ▾

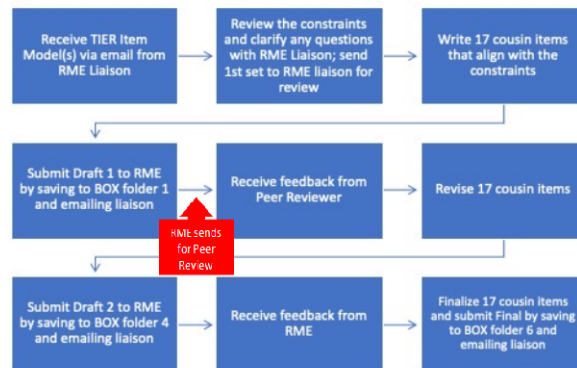| Name ^	Updated	Size	
1_Item Model	Yesterday by Jennifer Mc...	0 Files	
2_Draft 1 Sets	Yesterday by Jennifer Mc...	0 Files	
3_Peer Reviewed	Yesterday by Jennifer Mc...	0 Files	
4_Draft 2 Sets	Yesterday by Jennifer Mc...	0 Files	
5_RME Reviewed	Yesterday by Jennifer Mc...	0 Files	
6_Final Sets	Yesterday by Jennifer Mc...	0 Files	

SAVE complete Cousin Item Template to Box

UPLOAD to GRADE LEVEL Draft 1 Sets folder

EMAIL your Liaison to inform them that your Item Model Set is ready for review.

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12
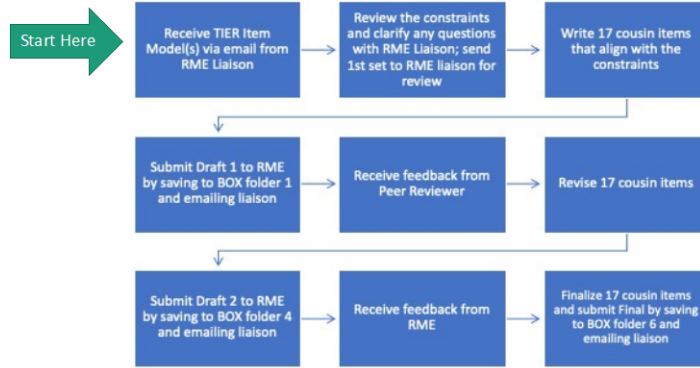
How do you review a Cousin Item?

- Download the Cousin Item Draft you are assigned to review.
- Save as:

Original filename_YOUR 3 LETTER INITIAL_PeerReview

For example, if my name is Jennifer McMurrer, and I am assigned to peer review the item model named

TIER_K2F_01_LKG_01M_MQH_CousinDRAFT1 then I would save the file as TIER_K2F_01_LKG_01M_JRM_PeerReview

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Item Model

Start Here

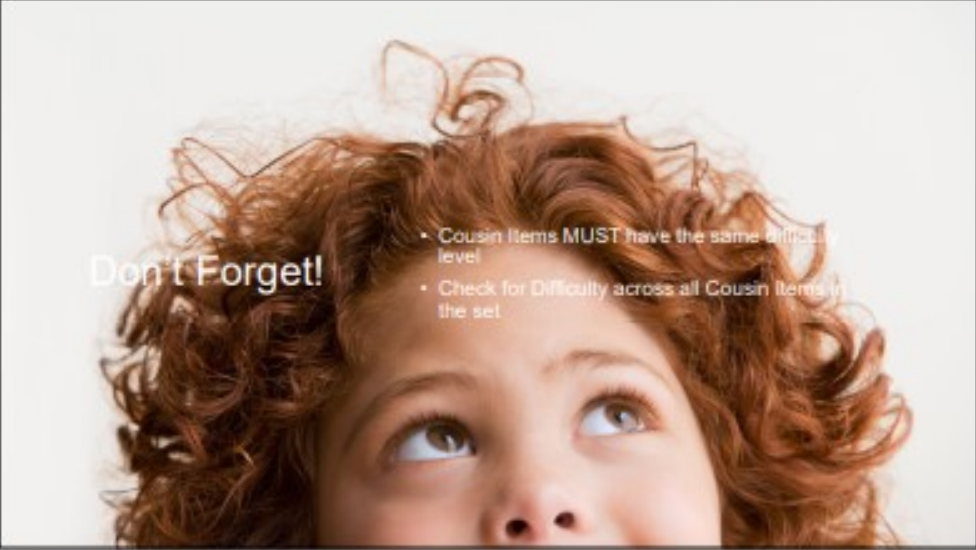TIER Item Writing Template
TEKS Standard: 3.4 F Recall facts to multiply up to 10 by 10 with automaticity and recall the corresponding division facts. [Recall the corresponding division facts (÷ 100) Multiples of 5 (up to 100) divided by a number ÷ or = 1 and <10]

Algebraic Form of Item:	Example Item 1:	Responses
a + b = c	35÷7	Correct Response: 5
a= any multiple of 5 (up to multiple of 10 b >1 and <10		
Item Constraints:		Alternate Response 1: 42
The Dividend must be ... than 5 but not a multiple		Alternate Response 2: 28
The divisor must be a ... The equation used must be related to a corresponding multiplication fact up to within 10 x 10		Alternate Response 3:

The Item Model's DNA

1. Algebraic Form
2. Constraints
3. Misconceptions

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Don't Forget!

- Cousin Items MUST have the same difficulty level
- Check for Difficulty across all Cousin Items in the set

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Save and Upload to Box

> Folder for Cousin Item Writers > GK

Name	Updated	Size
1_Item Model	Mar 30, 2021 by Jennifer ...	0 Files
2_Draft 1 Sets	Mar 30, 2021 by Jennifer ...	0 Files
3_Peer Reviewed	Mar 30, 2021 by Jennifer ...	0 Files
4_Draft 2 Sets	Mar 30, 2021 by Jennifer ...	0 Files
5_RME Reviewed	Mar 30, 2021 by Jennifer ...	0 Files
6_Final Sets	Mar 30, 2021 by Jennifer ...	0 Files

For Example: File saved as TIER_K2F_01_LKG_01M_IRM_PeerReview

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Final Round of Item Revision

- After Peer Reviewer uploads and RME reviews, Cousin Item Writers will be notified of last revisions to be made.
- Peer Reviewed File will be received.

Submit Draft 2 to RME by saving to BOX folder 4 and emailing liaison → Receive feedback from RME → Finalize 17 cousin items and submit Final by saving to BOX folder 6 and emailing liaison
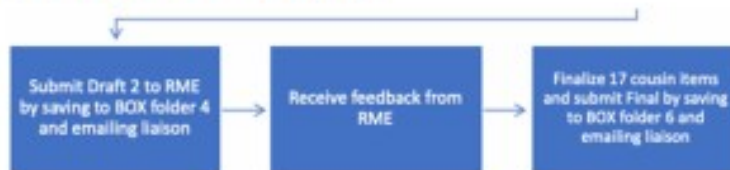
Save As: TIER_K2F_01_LKG_01M_IRM_Cousin Draft 2 Sets

Appendix B – Form Blueprint for Kindergarten Number Sequence Items

Form	Item1	Item2	Item3	Item4	Item5	Item6	Item7	Item8	Item9	Item10
Form01	A-1	C-1	B-7	G-7	D-3	I-5	E-5	H-1	F-6	J-4
Form02	C-2	A-2	G-8	B-6	D-4	I-4	E-6	H-6	F-7	J-5
Form03	A-3	C-3	B-5	G-1	D-5	I-3	E-7	H-4	F-1	J-6
Form04	C-4	A-4	G-2	B-4	D-6	I-1	E-1	H-3	F-2	J-7
Form05	A-5	C-5	B-3	G-3	D-7	I-2	E-2	H-5	F-3	J-8
Form06	C-6	A-6	G-4	B-2	D-1	I-6	E-3	H-7	F-4	J-1
Form07	A-7	C-7	B-1	G-5	D-2	I-7	E-4	H-6	F-5	J-2
Form08	C-8	A-1	G-6	B-7	D-3	I-8	E-5	H-7	F-6	J-3
Form09	A-2	C-1	B-6	G-7	D-4	I-5	E-6	H-8	F-7	J-4
Form10	C-2	A-3	G-8	B-4	D-5	I-1	E-7	H-2	F-1	J-8
Form11	A-4	C-3	B-5	G-1	D-6	I-2	E-1	H-8	F-2	J-1
Form12	C-4	A-5	G-2	B-3	D-7	I-3	E-2	H-7	F-3	J-2
Form13	A-6	C-5	B-2	G-3	D-1	I-4	E-3	H-6	F-4	J-3
Form14	C-6	A-7	G-4	B-1	D-2	I-5	E-4	H-4	F-5	J-2
Form15	A-1	C-7	B-6	G-5	D-3	I-6	E-5	H-5	F-6	J-3
Form16	C-8	A-2	G-6	B-5	D-4	I-7	E-6	H-3	F-7	J-4
Form17	A-3	C-7	B-4	G-7	D-5	I-8	E-7	H-2	F-1	J-5
Form18	C-2	A-4	G-8	B-3	D-6	I-8	E-1	H-1	F-2	J-6
Form19	A-5	C-3	B-2	G-1	D-7	I-7	E-2	H-8	F-3	J-7
Form20	C-4	A-6	G-2	B-1	D-1	I-6	E-3	H-1	F-4	J-8

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Appendix C – Form Blueprint for Grades 1 - 6 Items

ROW	n_Easy	n_Medium	n_Difficult	n_Standards
1	3	2	0	4
2	2	2	1	4
3	2	1	2	4
4	2	2	1	4
5	2	2	1	4
6	1	2	2	4