North Carolina Mathematics Standard Setting

Grades 3–8, Math 1, and Math 3

Bookmark Training Session
July 9, 2019

Training Session

Rick Mercado
Director, Research
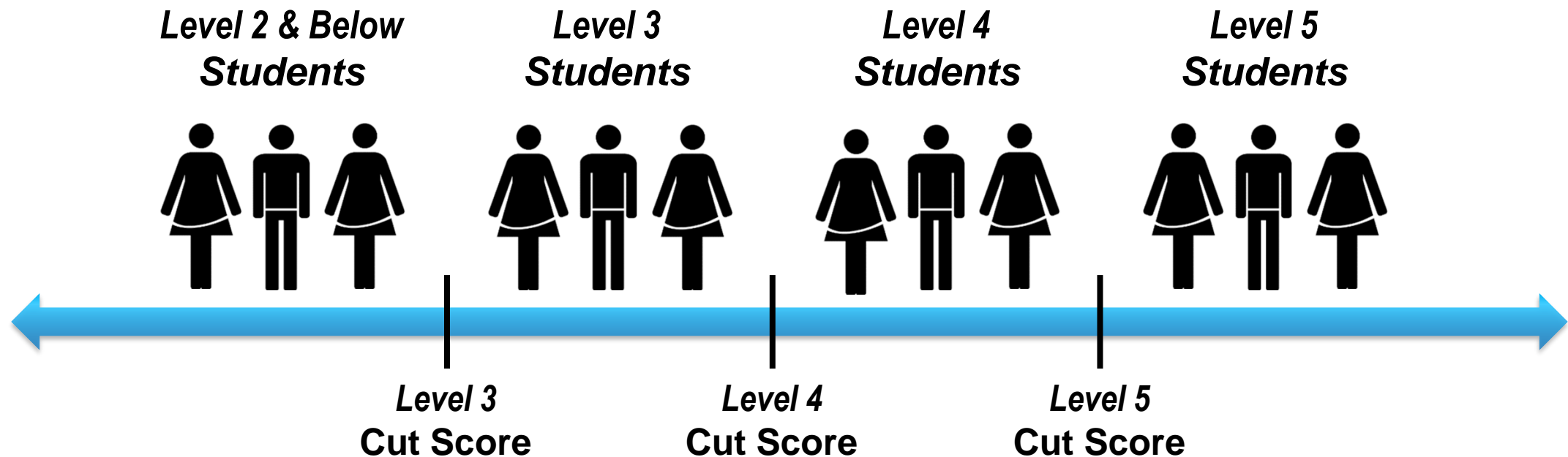Data Recognition Corporation

Workshop Goal

- To recommend cut scores that categorize students into one of four achievement levels:
  - *Level 2 & Below*
  - *Level 3*
  - *Level 4*
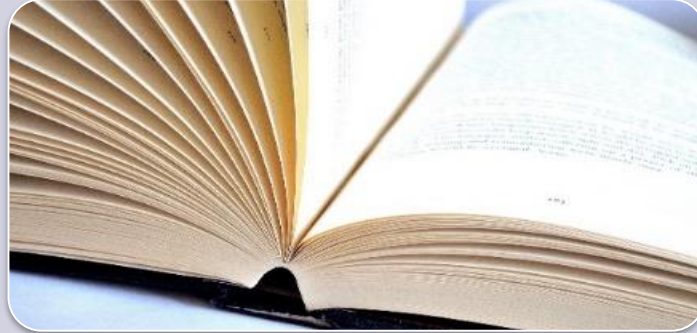 - *Level 5*

Cut Scores & Achievement Levels

- Three cut scores classify students into four achievement levels.

Level 2 & Below Students   Level 3 Students   Level 4 Students   Level 5 Students

Level 3 Cut Score   Level 4 Cut Score   Level 5 Cut Score

Bookmark Procedure

Item-centered method

Content-based decisions

Iterative process

Process Overview

Today

- Discuss the threshold students for grade 4, grade 7, or Math 1
- Study the ordered item booklet
- **Round 1**: Make cut score recommendations on your own

Tomorrow and Thursday

- **Round 1**: Make cut score recommendations on your own
- Discuss recommendations with your table
- **Round 2**: Make cut score recommendations on your own
- Discuss your recommendations with your group
- **Round 3**: Make cut score recommendations on your own
- Repeat the process for remaining grades
- Review the group's recommendations
- Evaluate the workshop

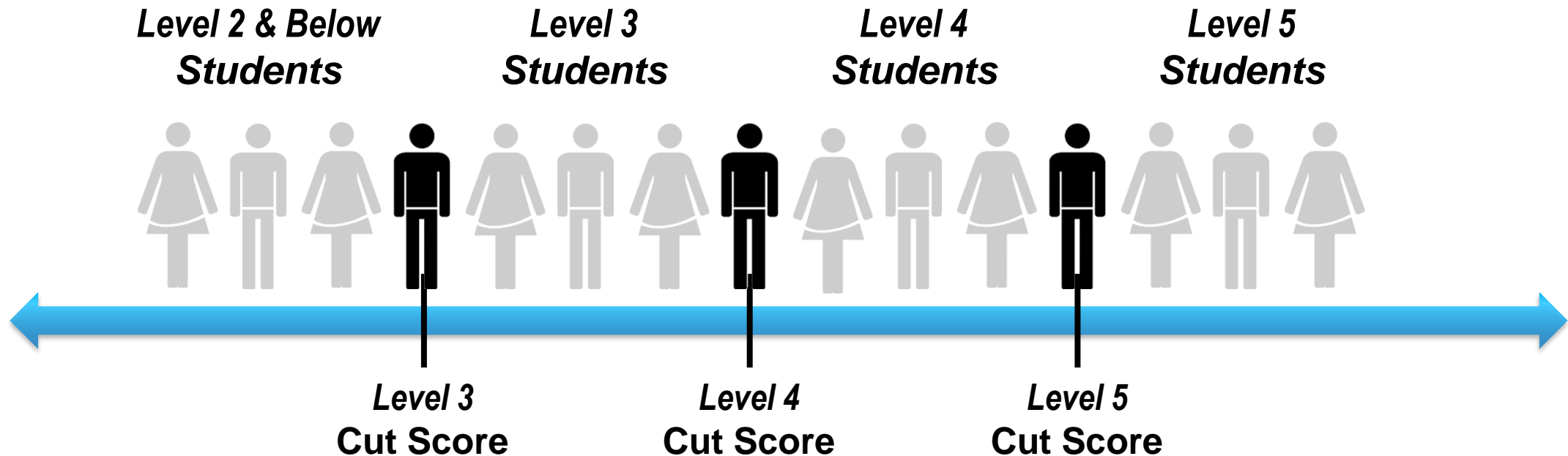# Achievement Level Descriptors (ALDs)

- ALDs describe the knowledge, skills, and abilities expected of students in each achievement level.
  - They are linked to the content standards.
  - ALDs describe students in the middle of each level, not on the *thresholds*.

ALDs and Achievement Levels

- ALDs describe the student in the middle of each achievement level.

Three Threshold Students

- Threshold students are those just barely leaving one level and entering the next level.
  - The ALDs do *not* describe these students directly.
  - There are three threshold students.

Threshold
Level 2 & Below/**Level 3**
Student

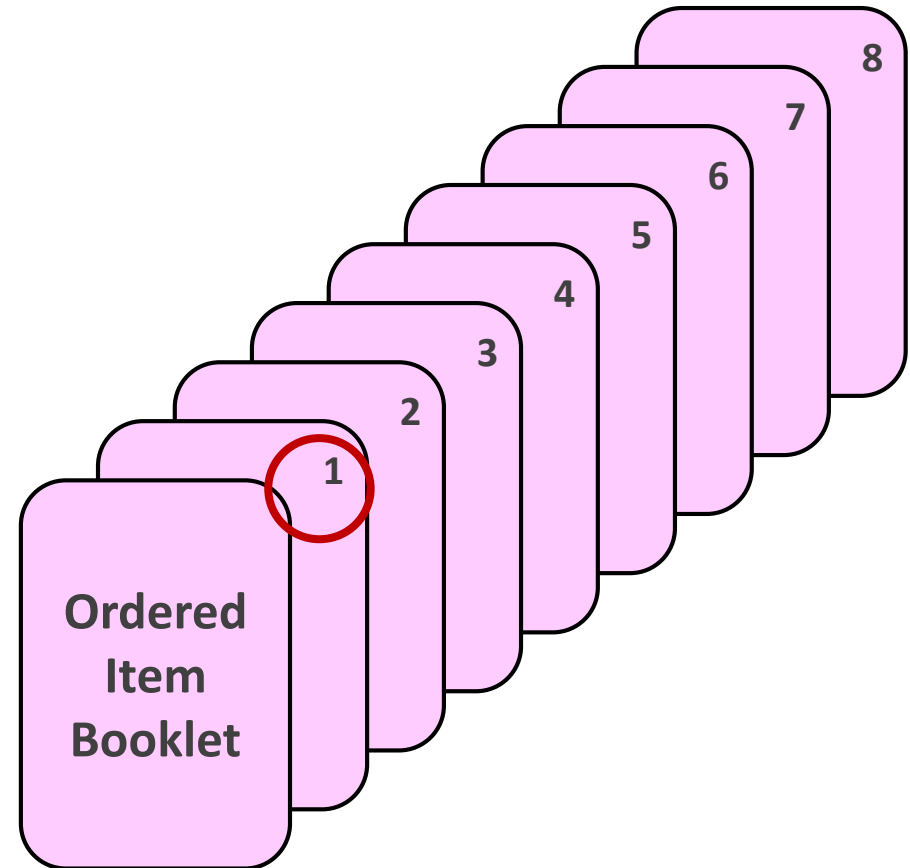**Threshold**
Level 3/**Level 4**
Student

Threshold
Level 4/**Level 5**
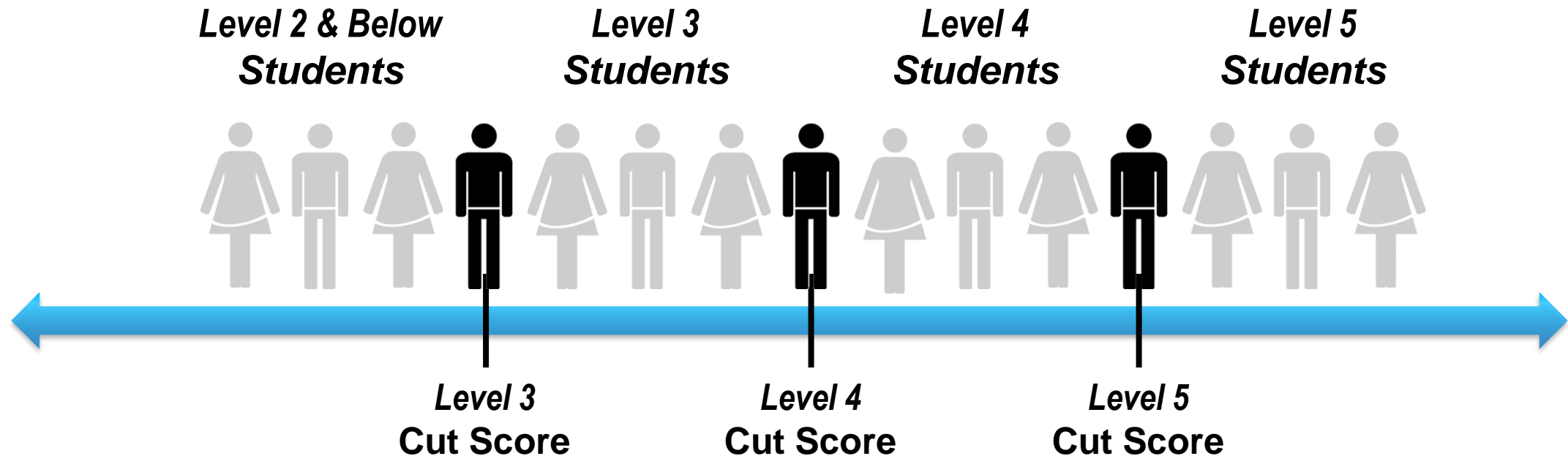*Student*

Ordered Item Booklet (OIB)

- The OIB comprises items from the spring test.
  - One item per page
  - Easiest item first
  - Hardest item last
  - Items ascend in difficulty as based on student performance
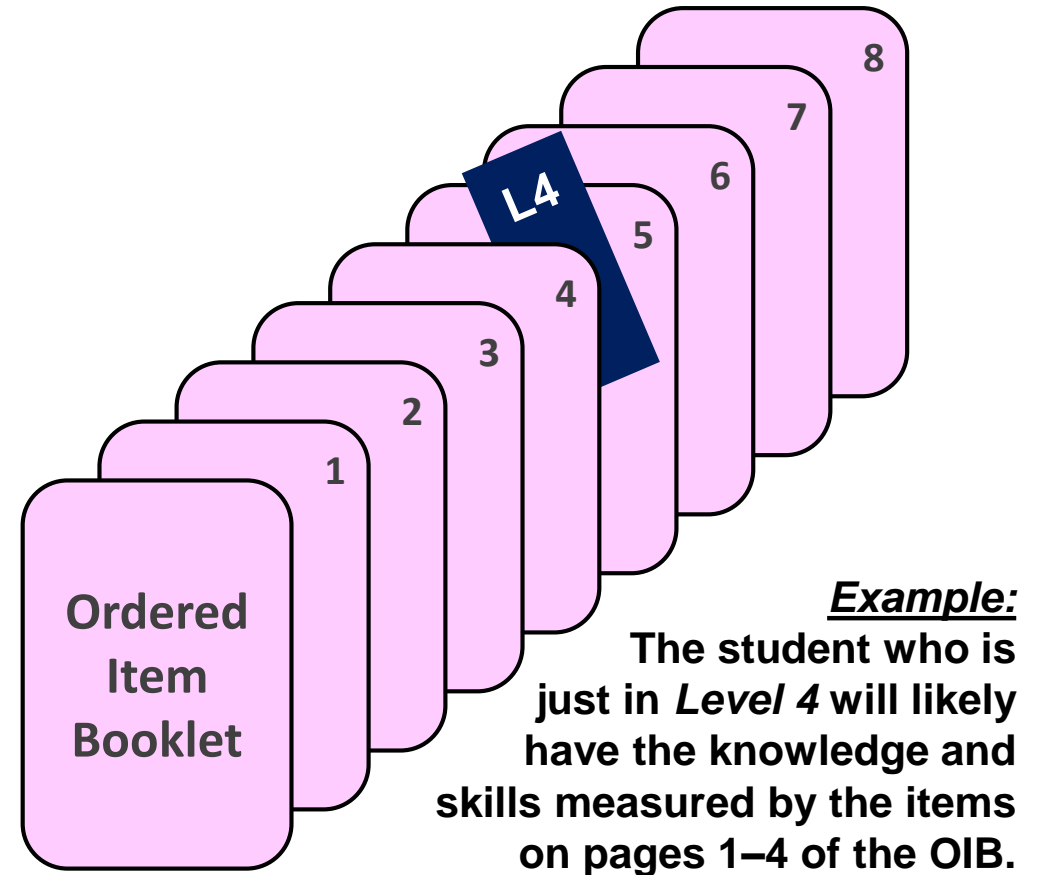
Three Threshold Students

- Bookmark judgments and cut scores are linked to the student *just* in each level.

Level 2 & Below Students *Level 3 Students* *Level 4 Students* *Level 5 Students*

Level 3 Cut Score   Level 4 Cut Score   Level 5 Cut Score

Threshold Students and the OIB

- You will consider the three threshold students.
- You will make statements in the OIB using *bookmarks.*
- These bookmarks are linked to cut score recommendations.

Ordered Item Booklet

L4

8
7
6
5
4
3
2
1

Example:
The student who is just in *Level 4* will likely have the knowledge and skills measured by the items on pages 1–4 of the OIB.

Three Rounds

Round 1

Study OIB and make your own bookmark judgments

Discuss your ratings with your tablemates

Round 2

On your own, make your own bookmark judgments

See feedback and discuss your ratings with your group

Round 3

On your own, make your own bookmark judgments

Then review recommended cut scores

Roles and Responsibilities

- You will recommend achievement standards to DPI.
- During the workshop, remember to:
    - Contribute to discussions at your table
    - Participate in group-wide discussions
    - Place your bookmarks independently
    - Ask a member of staff any questions
    - Use workshop materials only in meeting rooms
    - Keep workshop conversations confidential

Workshop Security

- Your facilitators will collect your materials each afternoon in a structured way.

- Always leave the workshop materials in the meeting rooms. Do not discuss the contents of the materials outside your meeting room.

- You are welcome to use phones, tablets, and laptops in the lunchroom and hallways, but never in the meeting rooms.

Training Materials

- Item map
- Training ordered item booklet (OIB)

Item Map

North Carolina Math Standard Setting

Training **Item Map for Grade 6 Math**

Order of Difficulty	Standard	Score Key	What does this item or score point measure? What do you know about a student who can answer this item or score point correctly?
1	NC.6.RP.4	C	
2	NC.6.EE.9	D	
3	NC.6.NS.7.a	C	
4	NC.6.EE.8	D	
5	NC.6.EE.1	C	

Illustration: Item Separation Chart

Item Difficulty (y-axis)

Items in the OIB (x-axis: 1, 2, 3, 4, 5, 6, 7, 8)

Examining an Item

Seventy-five 6th-grade students chose to watch a movie on the last day of school. This is 25% of the 6th-grade class. How many total students are in the 6th grade?

A   100

B   200

C   300

D   400

1
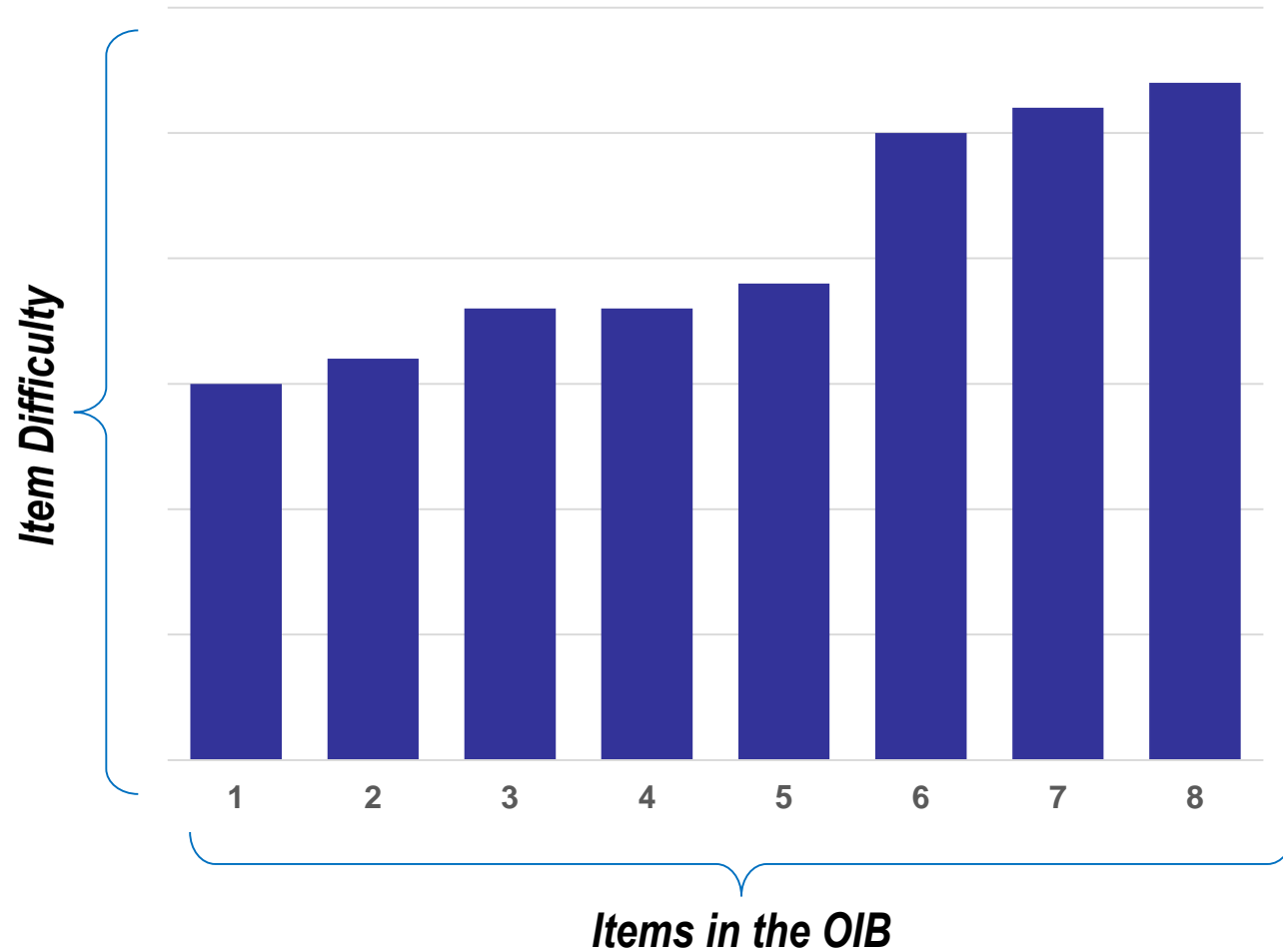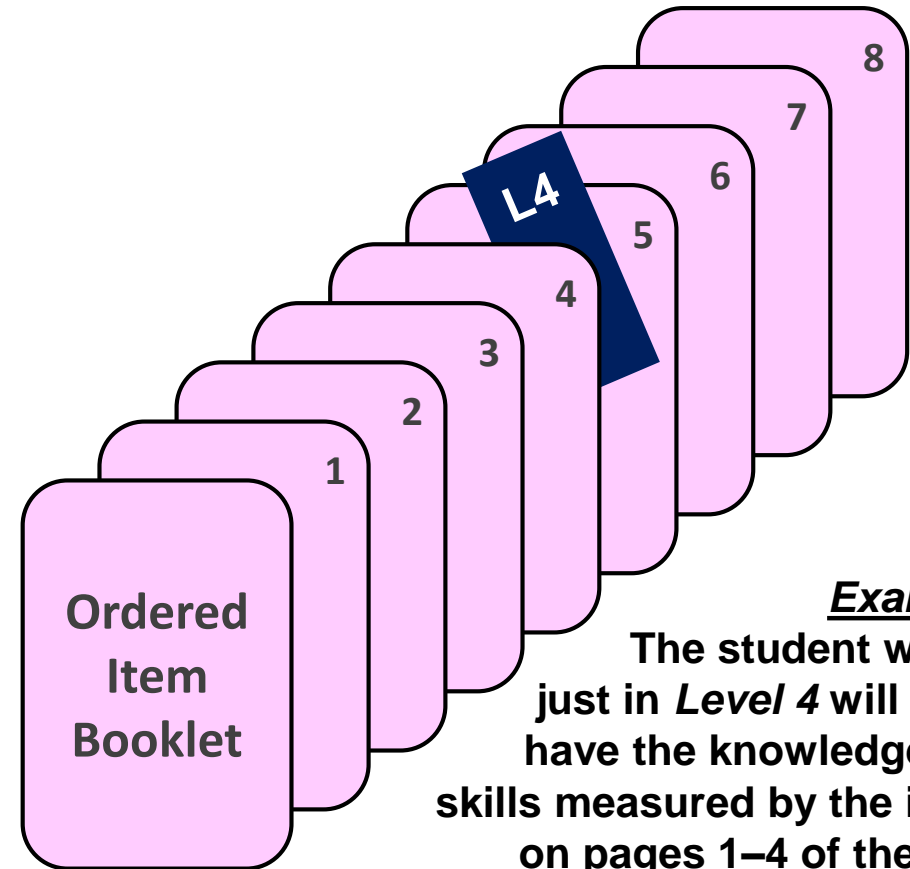
- Make a brief note to yourself about what the item measures.
  - What knowledge and skills does a student need to have in order to answer the item correctly?
  - If a student answers the item correctly, what do you know about the student?
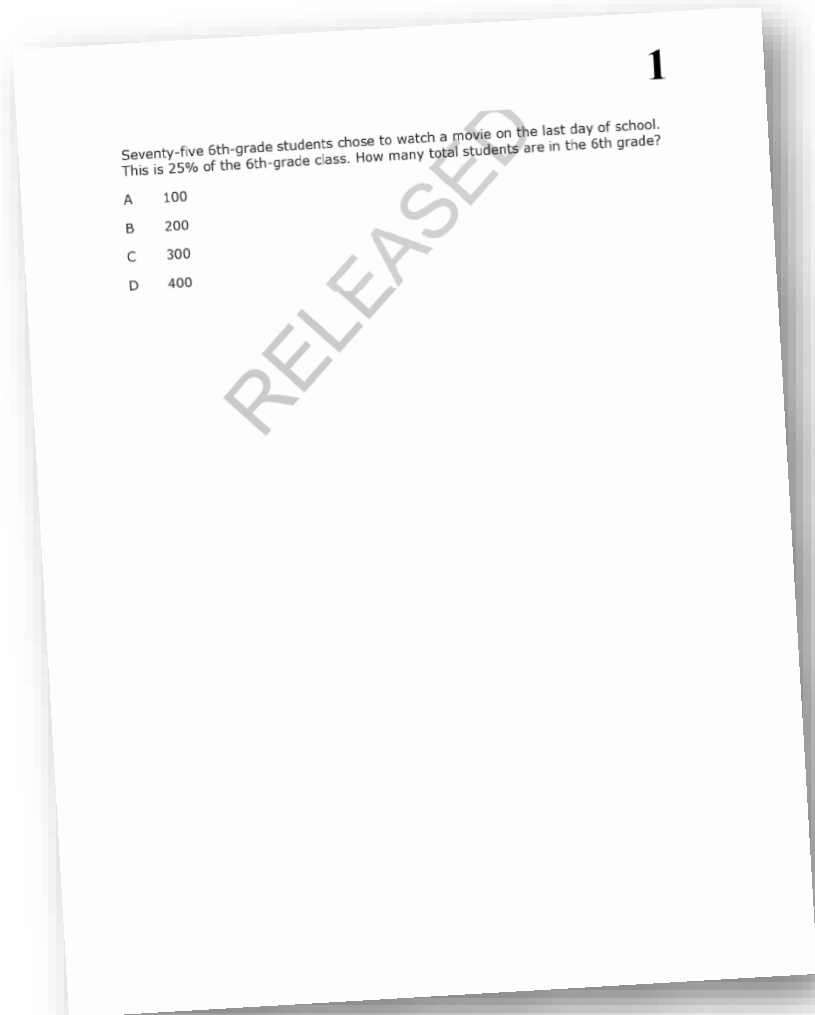
Finding a Possible Bookmark Range

- You will consider the three threshold students.

- You will make statements in the OIB using *bookmarks.*

- These bookmarks are linked to cut score recommendations.

Ordered Item Booklet

1
2
3
4
5
6
7
8

L4

Example:
The student who is just in *Level 4* will likely have the knowledge and skills measured by the items on pages 1–4 of the OIB.

Possible Bookmark Range

- You will find a range of items where you could set your bookmark.

  - The possible bookmark range may be a couple of items wide, or may be more than that.
  - Do not get stuck on a single item.

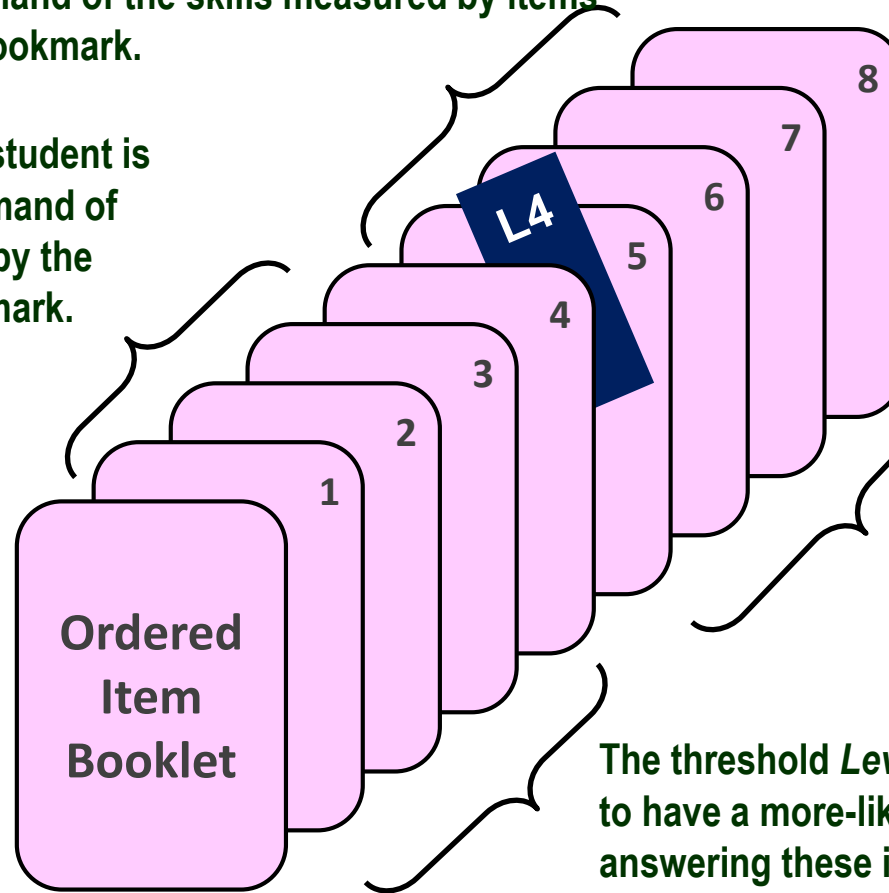# Finding the Possible Bookmark Range

- Progress through the OIB until you reach an item that the threshold student would not have a more-likely-than-not chance of answering correctly.

  – This is the start of your possible bookmark range.

- Keep going until you have reached the last item that a student would have a more-likely-than-not chance of answering correctly.

  – The possible bookmark range ends after that page.

The threshold *Level 4* student is not expected to have command of the skills measured by items after the bookmark.

The threshold *Level 4* student is expected to have command of the content measured by the items before the bookmark.
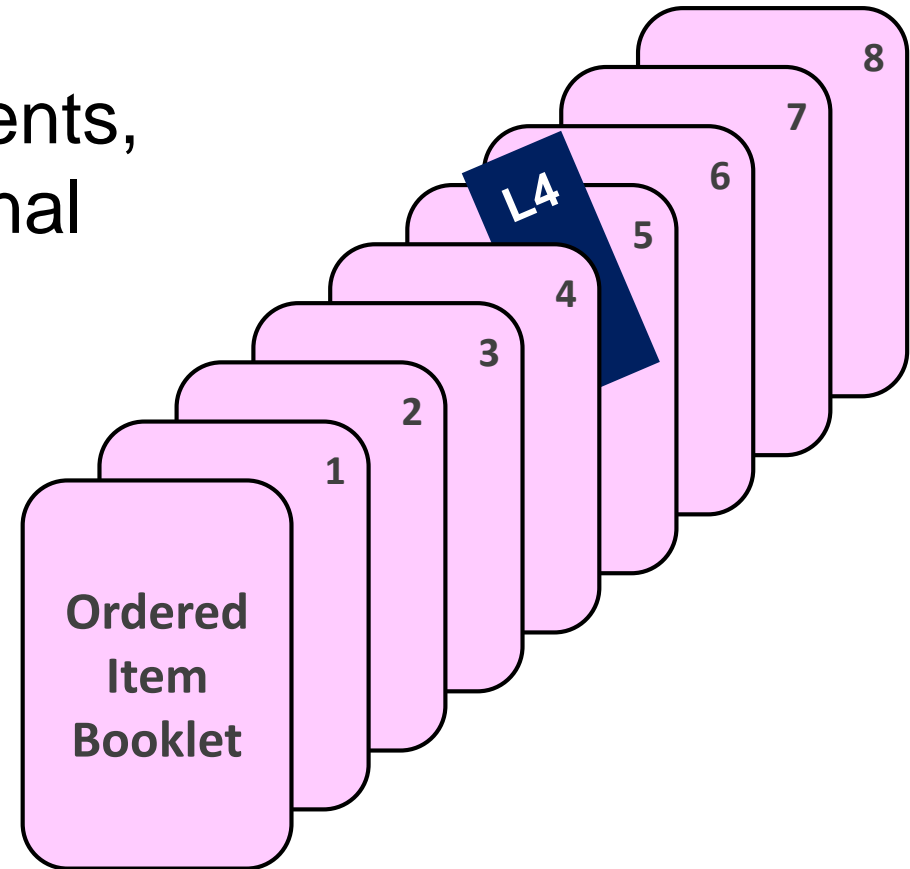
Some students in *Level 4* may have some of the skills measured by items after the bookmark.

The threshold *Level 4* student is expected to have a more-likely-than-not chance of answering these items correctly.

Ordered Item Booklet

L4

8
7
6
5
4
3
2
1

Recording Your Bookmark

- Place your bookmark within your possible bookmark range.
  - Use the ALDs, the threshold students, the test items, and your professional judgment as guides.

- Record the page number **after** your bookmark.

Bookmark Worksheet

- Write your bookmarks on the *Bookmark Worksheet*.
  - You will place three bookmarks.
  - Write a few words to help you remember why you placed your bookmarks where you did.

Recording Your Bookmarks

- In the actual workshop, you will then record your bookmarks in an online system.
  - You will record your bookmarks online, *not* your rationales.

Pacing

- Some people will take longer than others to study the test items and place their Round 1 bookmarks.

  - Today, completing Round 1 is the last activity for the day. Please be considerate of others as you leave the workshop.

  - Tomorrow, before Round 2, please be considerate of others at your table and in the room.

Practice Exercise

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Consider the Threshold Student

- Review these policy ALDs for *Level 4* and *Level 5*.
  - Consider the student who is just barely in *Level 4*.
  - What knowledge, skills, and abilities would you expect of this threshold student?

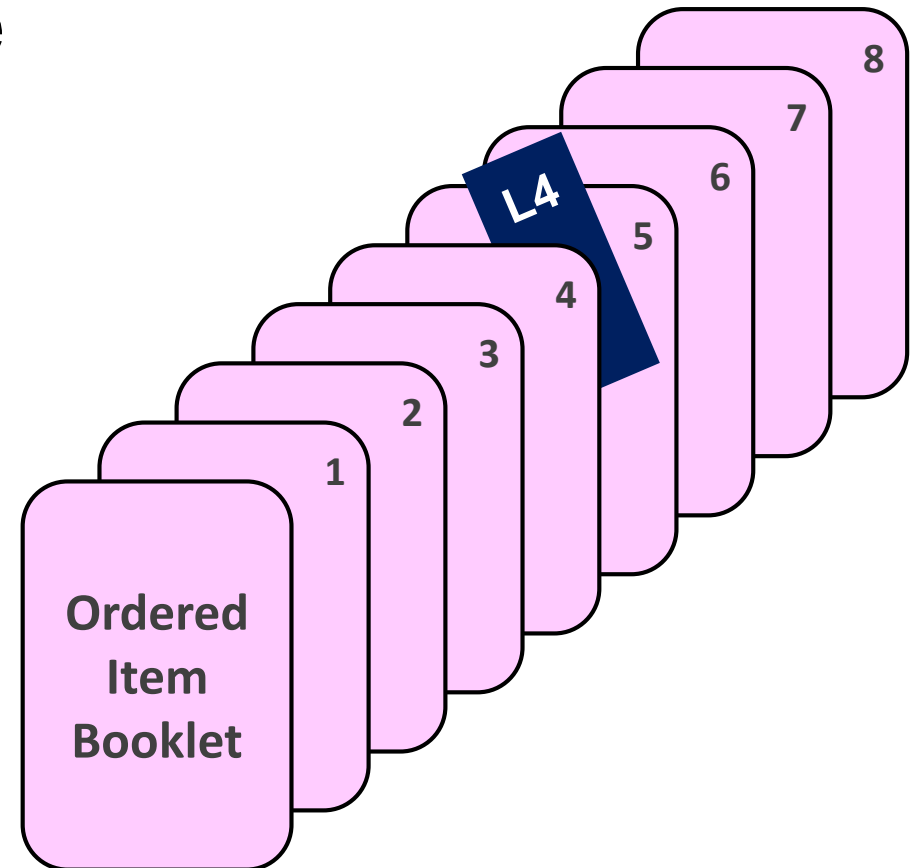| Level 4	Level 5
Students at Level 4 demonstrate a thorough understanding of grade level content standards and are on track for career and college.	Students at Level 5 demonstrate comprehensive understanding of grade level content standards, are on track for career and college, and are prepared for advanced content at the next grade/course.

Study the Test Items

- For each question, ask yourself:
  - what does the item measure?
  - if a student can answer the item correctly, what do we know he or she can do?

Place Your Bookmark

- Consider the *Level 4* threshold student.
- The student is expected to have at least a more-likely-than-not chance of answering items correctly before the bookmark.
- The probability after the bookmark is less than half, but not zero.

Ordered Item Booklet

1
2
3
4
5
6
7
8
L4

Evaluating a Bookmark Holistically

Imagine you are evaluating a *Level 4* bookmark on Page 5.

L4

8
7
6
5
4
3
2
1

Ordered Item Booklet
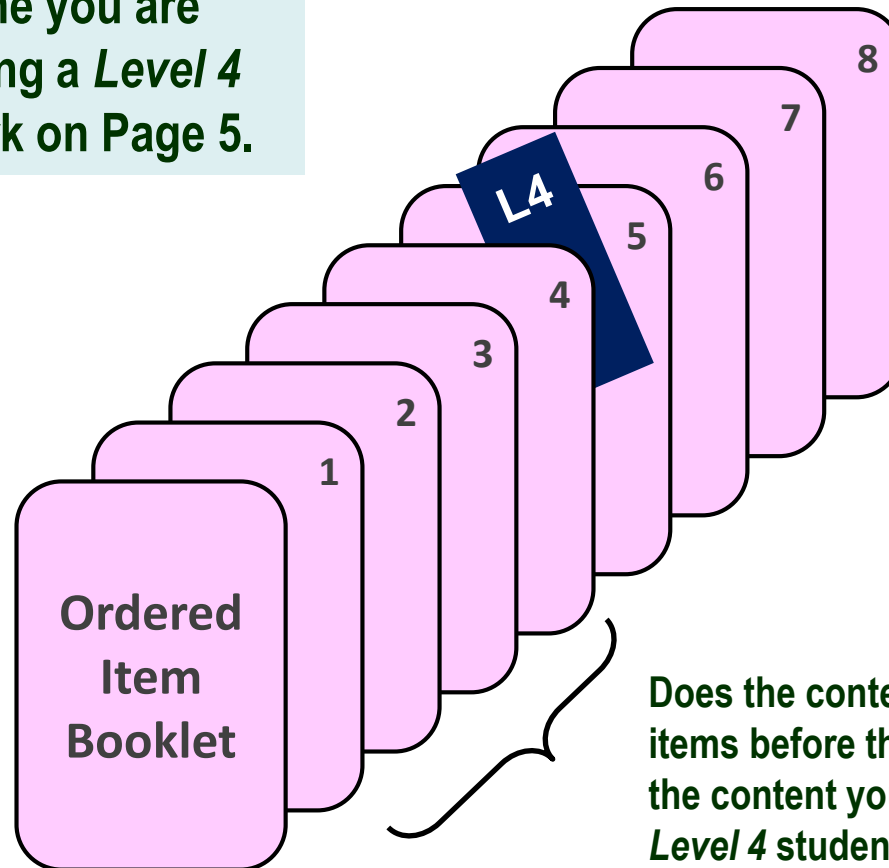
Does the content measured by the items before the bookmark best match the content you expect of the just *Level 4* student?

Write a Rationale

- Good rationales link the content of the items in front of the bookmark to the content-based expectations for the threshold student.

  - For example, "Students must apply algebraic strategies in a real-world, multi-step problem, as expected of the threshold student."
  - Or, "Students have to calculate simple descriptives on data provided explicitly, as listed in ALDs."

- Not-so-good rationales don't make reference to the content of the items.

 - For example, "The first grid question is just after the bookmark."

Make Your Bookmark Placements

- Write your bookmark placement on your training Bookmark Worksheet.

- Turn your Worksheet over when you're done.

Name

Training Bookmark Worksheet

	Training Bookmark	Content-Based Rationale
Level 3	– –	– –
Level 4		
Level 5	– –	– –

Training Round: Write a few words about why you placed your bookmark where you did.

After Round 1

- ## After Round 1, you will see:
  - the medians from the group's Round 1 bookmarks
  - a histogram of the recommended bookmarks
  - *benchmarks*, based on last year's test results

- ## The benchmarks are provided as contextual information for you to consider.

Frequency of Bookmark Placements Round 1
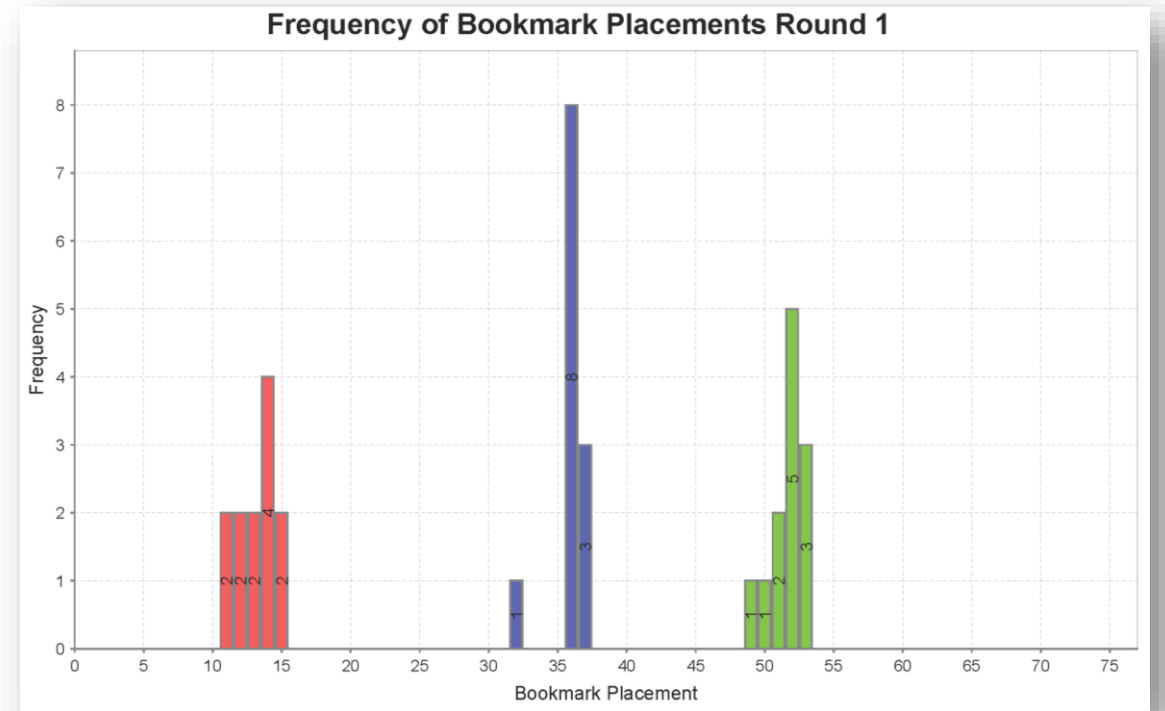
Discussion of Round 1 Ratings

- In the actual workshop, you will discuss your Round 1 bookmarks at your table.

- Feel free to discuss:
  - Your bookmarks
  - Your possible bookmark ranges (and any overlaps)

- After discussion, you will have a second opportunity to make bookmark judgments.
  - You can change any, all, or none of your bookmarks.
  - Bookmark placement is always an individual activity.

Suggestions for Discussions

- Practice active listening.
- Be open to changing your mind.
- Work to understand your colleagues' rationales for their bookmark placements.
- In a respectful manner, feel free to ask questions of your colleagues.
- Do not discuss your bookmarks until everyone at the table has placed theirs.
- Keep the contents of your discussions private.

After Round 2

- After Round 2, you will see:
  - the medians and histogram from the group's Round 2 bookmarks
  - *benchmarks*, based on last year's test results
  - *impact data*, the percent of students that would be classified in each achievement level if the Round 2 cut scores were implemented

Round 3

- After Round 2, you will discuss your bookmark placements *across tables*.

  – Again, you will share where you placed your bookmarks and why you placed them there.

- Then you will place your Round 3 bookmarks.

  – Bookmark placement is always an individual activity.

Repeat the Process

- After Round 3, you will see the impact data for your grade *plus* the other grades.

- Then you will repeat the process.
  - The group will likely pick up speed as it goes.

Grades 3-5 Group	Grades 6-8 Group	High School Group
Grade 4	Grade 7	Math 1
Grade 3	Grade 6	Math 3
Grade 5	Grade 8	

Reviewing the Recommendations

- After the Bookmark Procedure is complete for the final grade, your facilitator will show you a presentation of the Round 3 recommendations from all eight tests.

  - You will be asked to look at the articulation of the achievement standards across grades.

  - You may wish to consider adjustments to your recommendations to improve the articulation across grades.

  - The table leaders will convene in a special session to look over the recommendations and, if needed, recommend adjustments to promote better across-grade articulation.

After the Workshop

- Your recommendations will be considered by DPI.
  - The recommendations from all groups will be considered by DPI and its advisors.

Workshop Structure

- Discuss threshold students
- Study OIB and make Round 1 ratings
- Discuss Round 1 at tables
- Make Round 2 ratings
- Discuss Round 2 as a group
- Make Round 3 ratings
- Repeat the process for remaining grades
- Review recommendations

Questions

- Do you have any questions?
  - If questions come up later, ask your facilitator, or write them on an index card.

Bookmark Refresher Training

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Cut Scores & Achievement Levels

- Three cut scores classify students into four achievement levels.
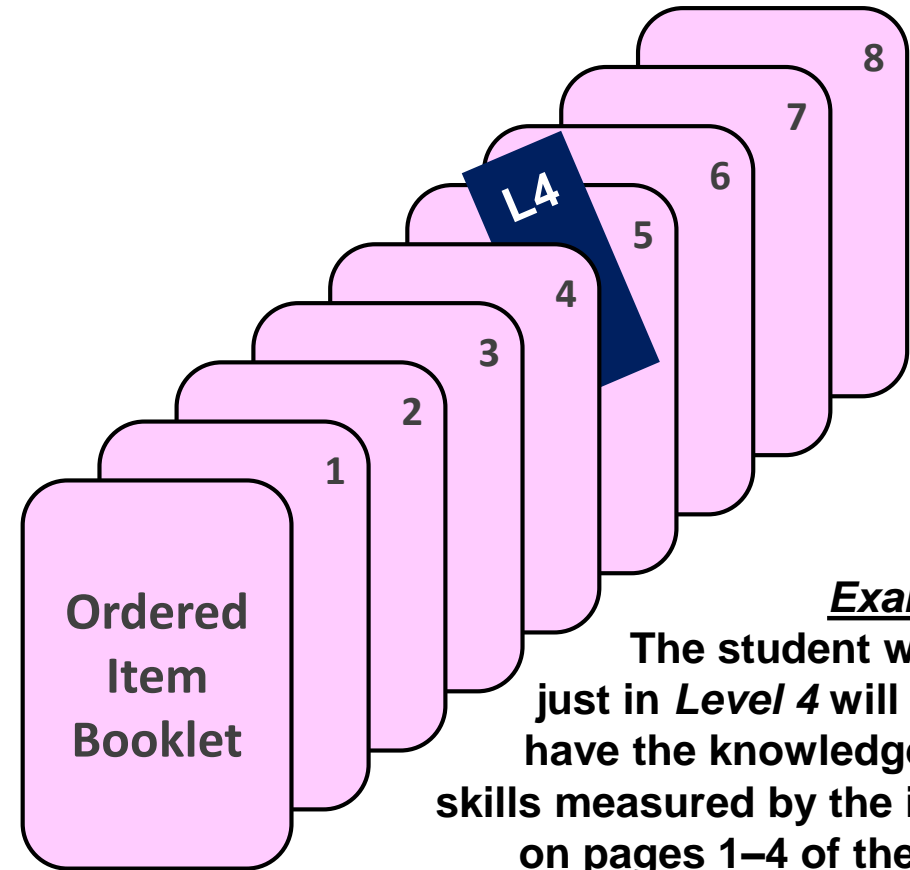
Three Threshold Students

- Bookmark judgments and cut scores are linked to the student *just* in each level.

Level 2 & Below Students

Level 3 Students

Level 4 Students

Level 5 Students

Level 3 Cut Score

Level 4 Cut Score

Level 5 Cut Score

Threshold Students and the OIB

- You will consider the three threshold students.
- You will make statements in the OIB using *bookmarks.*
- These bookmarks are linked to cut score recommendations.

Ordered Item Booklet

1 2 3 4 5 6 7 8

L4

Example:
The student who is just in *Level 4* will likely have the knowledge and skills measured by the items on pages 1–4 of the OIB.

Possible Bookmark Range

- You will find a range of items where you could set your bookmark.
  - The possible bookmark range may be a couple of items wide, or may be more than that.
  - Do not get stuck on a single item.

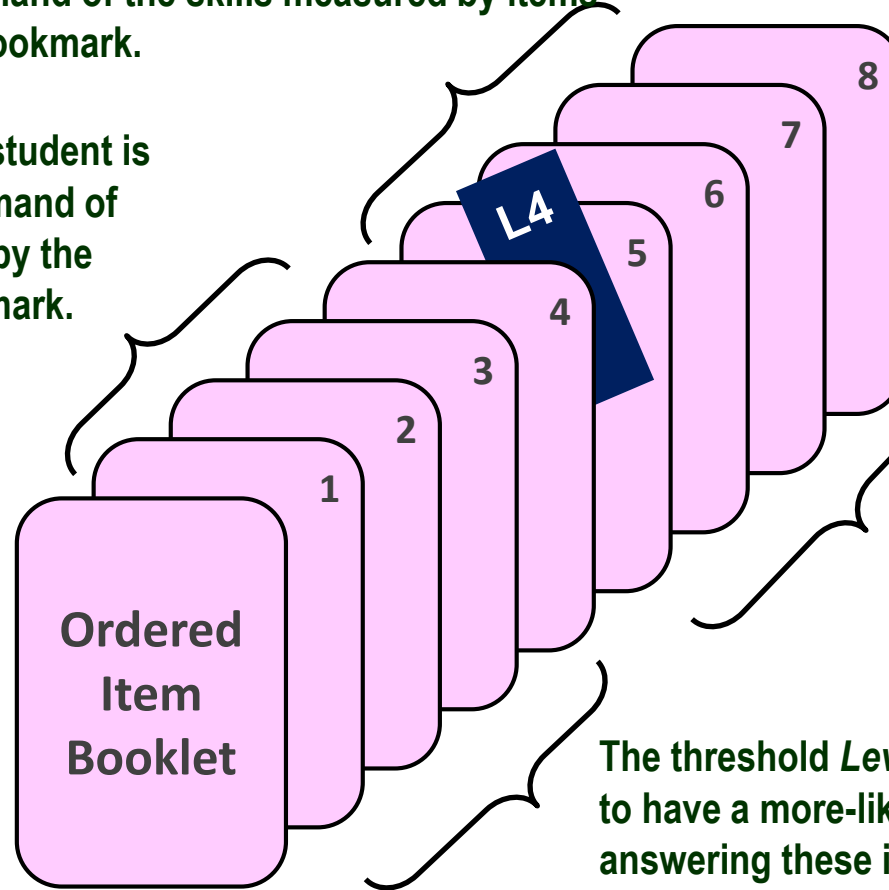# Finding the Possible Bookmark Range

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    – This is the start of your possible bookmark range.

- Keep going until you have reached the last item that a student would have a more-likely-than-not chance of answering correctly.

    – The possible bookmark range ends after that page.

The threshold *Level 4* student is not expected to have command of the skills measured by items after the bookmark.

The threshold *Level 4* student is expected to have command of the content measured by the items before the bookmark.

8

7

6

L4

5
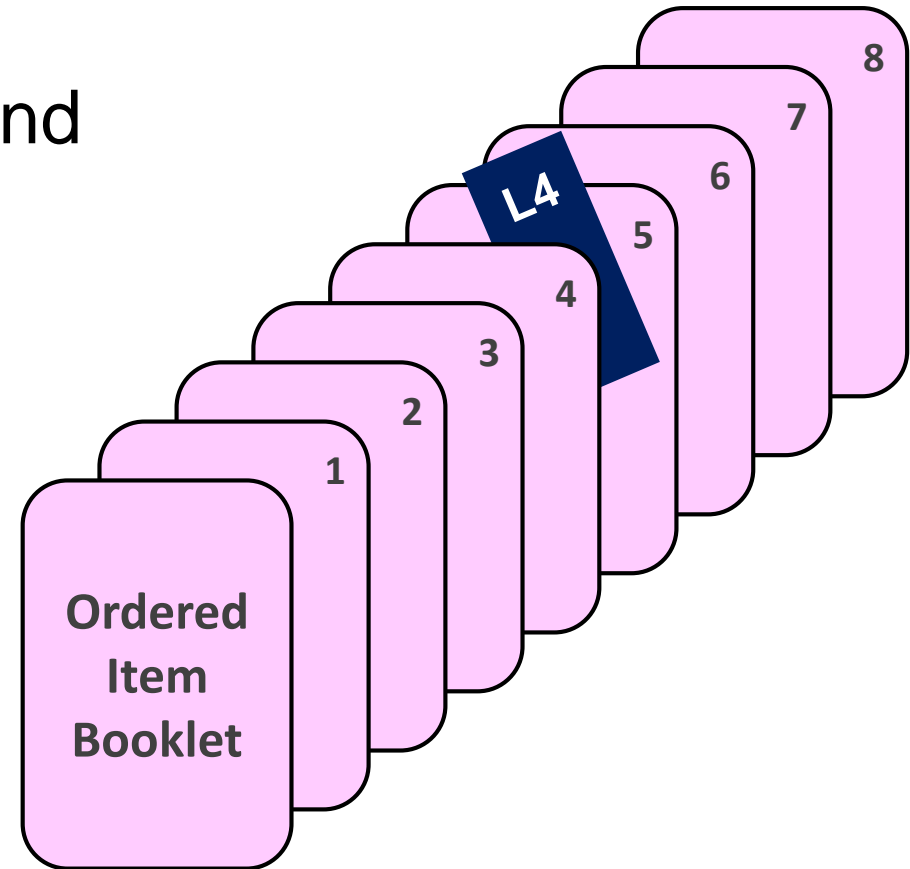
4

3

2

1

Ordered Item Booklet

Some students in *Level 4* may have some of the skills measured by items after the bookmark.

The threshold *Level 4* student is expected to have a more-likely-than-not chance of answering these items correctly.

Recording Your Bookmark

- Place your bookmark within your possible bookmark range.
  - Use the ALDs, the benchmarks, and your professional judgment as guides.
- Record the page number **after** your bookmark.

Bookmark Worksheet

- Write your bookmarks on the *Bookmark Worksheet*.
  - You will place three bookmarks.
  - Write a few words to help you remember why you placed your bookmarks where you did.

Not "Number Correct"

- Your bookmark placement does **not** correspond directly with the number of points a student needs to earn to be classified in an achievement level.

    – For example, if you place your *Level 4* bookmark on Page 10, this does *not* mean a student needs to get 10 points on the test to be in *Level 4*.

- Instead, your cut score recommendations are made on the test scale.
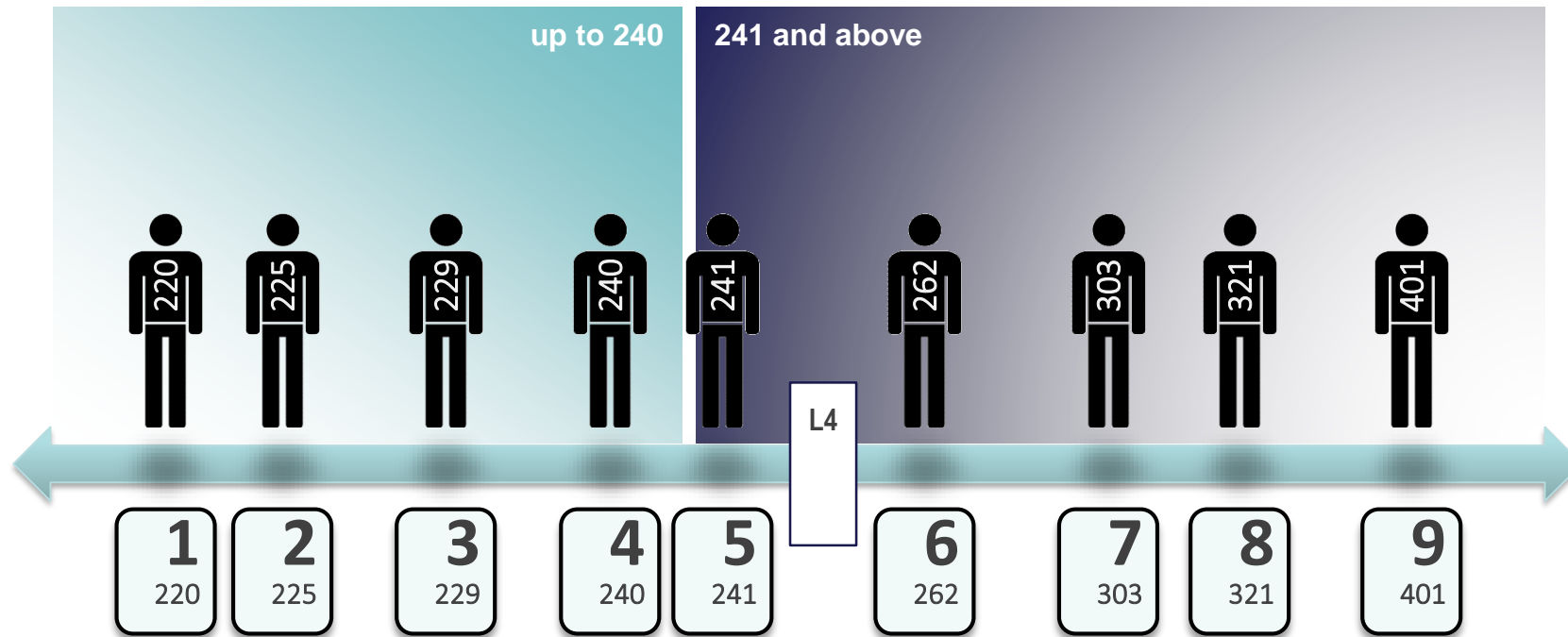
Test Scale

- Items are ordered by difficulty, easy to hard.
- Students are ordered by performance, low to high.
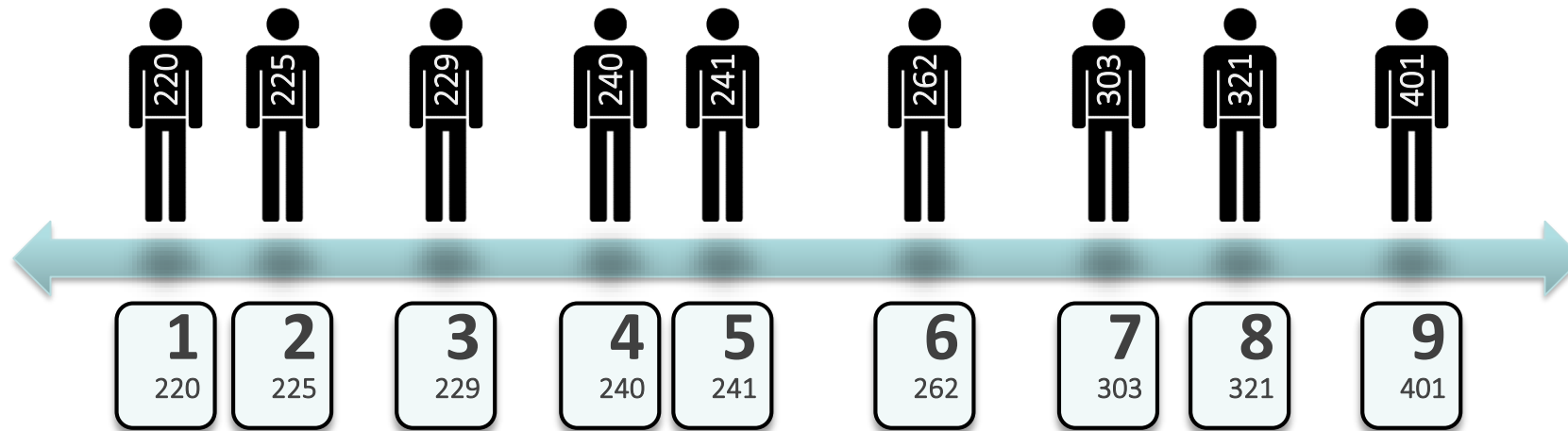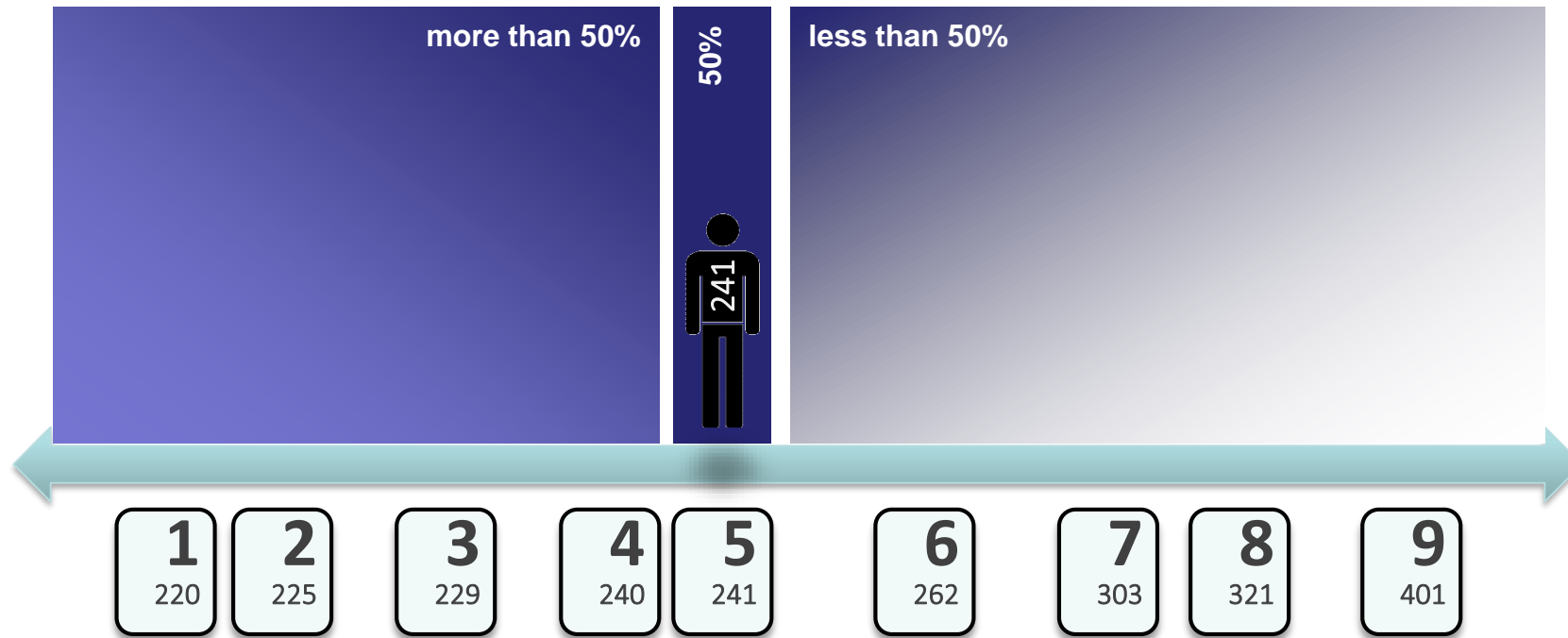
Cut Score

- The bookmark separates items.
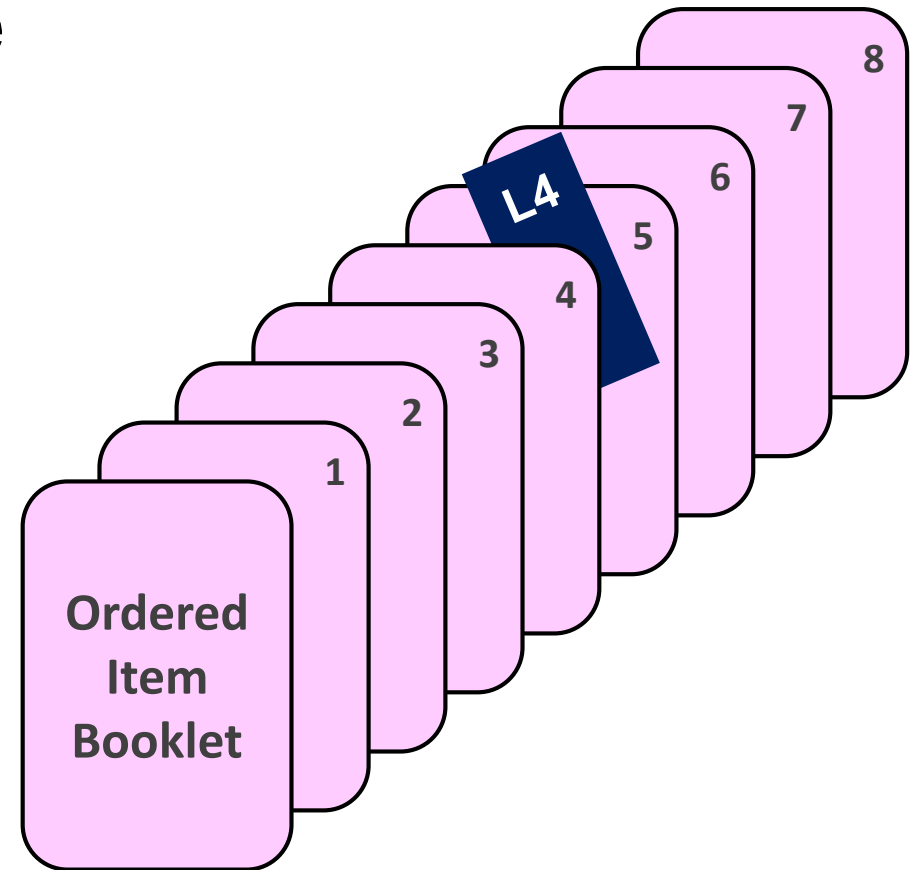- The cut score separates students.

Threshold Student

- The threshold student has a 50% chance of answering the item just before the bookmark.

Place Your Bookmark

- Consider the *Level 4* threshold student.
- The student is expected to have at least a more-likely-than-not chance of answering items correctly before the bookmark.
- The probability after the bookmark is less than half, but not zero.

Evaluating a Bookmark Holistically

Imagine you are evaluating a *Level 4* bookmark on Page 5.

L4

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Ordered Item Booklet
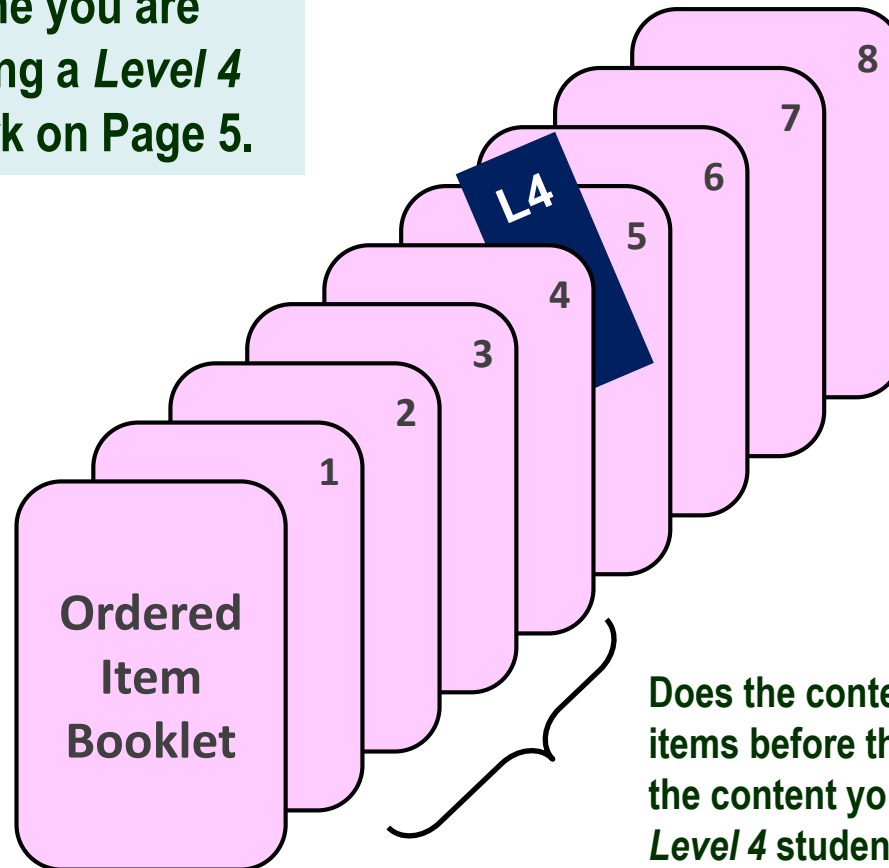
Does the content measured by the items before the bookmark best match the content you expect of the just *Level 4* student?

Bookmark on Page 5

If the *Level 4* bookmark is on **Page 5**, the threshold *Level 4* student will show command of the content measured by the items on **Pages 1 through _____**.
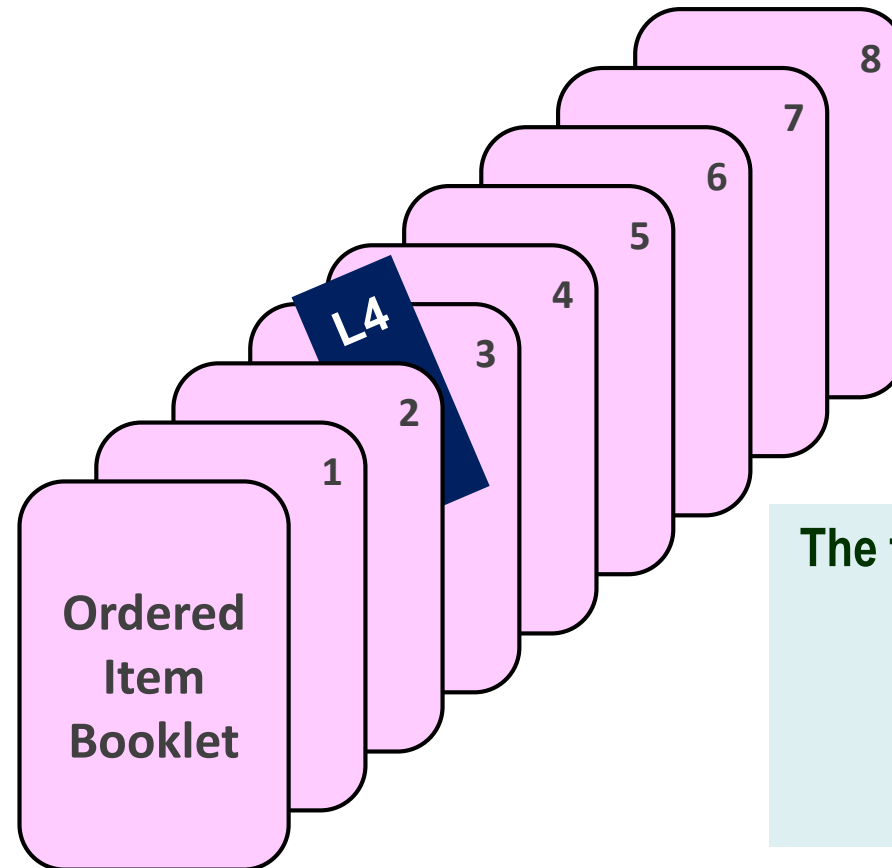
L4

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Ordered Item Booklet
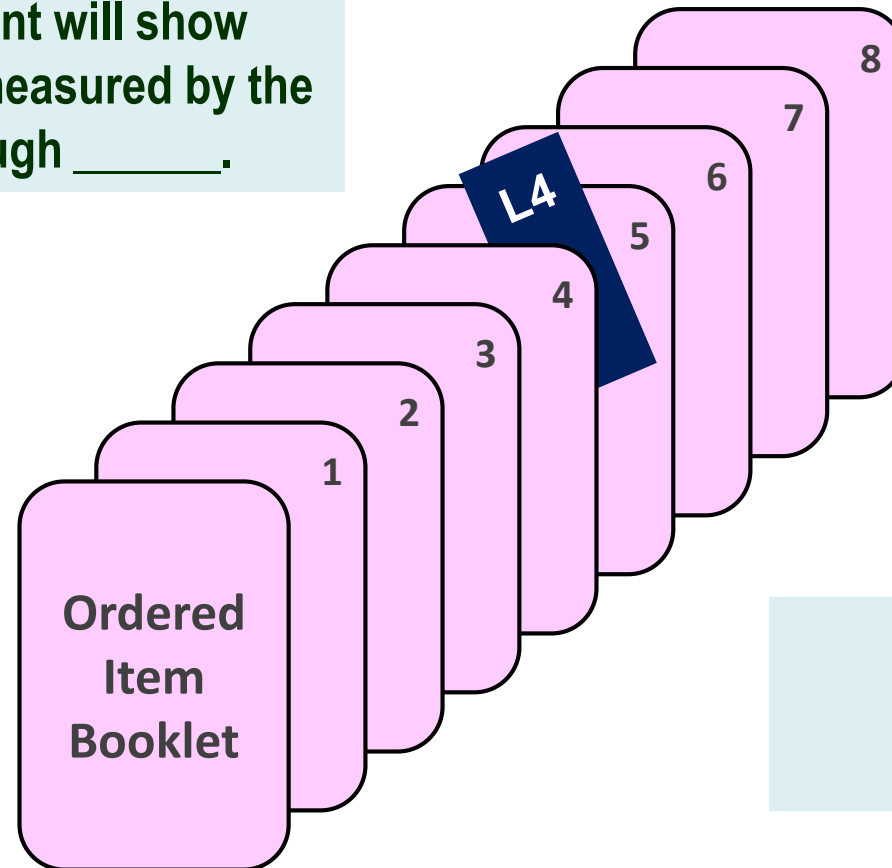
Item 2 is _____ than Item 7.
a) Easier
b) Harder

Bookmark on Page ___

This is a bookmark on Page ____.

Ordered Item Booklet

L4

1 2 3 4 5 6 7 8

The threshold *Level 4* student would have a ____ chance of answering Items 1–2 correctly.
a) More likely than not
b) Nearly 100% chance

Write a Rationale

- Good rationales link the content of the items in front of the bookmark to the content-based expectations for the threshold student.
  - For exainple, "Students must apply algebraic strategies in a real-world, multi-step problem, as expected of the threshold student."
  - Or, "Students have to calculate simple descriptives on data provided explicitly, as listed in ALDs."
- Not-so-good rationales don't make reference to the content of the items.
  - For example, "The first grid question is just after the bookmark."

Rounds

- **Round 1**: Place bookmarks on your own

- **Round 2**: See feedback and benchmarks, discuss with your tablemates, place bookmarks on your own

- **Round 3**: See feedback and impact, discuss with the group, place bookmarks on your own

Mid-Process Evaluation

- Before we continue, let's complete the mid-process evaluation.