STUDENT
ACHIEVEMENT
PARTNERS

Instructional Practice Toolkit

Mathematics – Kindergarten

Facilitator Resources

Table of Contents

Components & Resources **Page**

Facilitator Guide..... 4

Introduction to the Instructional Practice Guide & Beyond the Lesson Discussion Guide..... 8
- College- and Career-Ready Shifts in Mathematics
- IPG and Beyond the Lesson Guide, Mathematics

Experience the Content of the Lesson..... 15
- Experience the Content of the Lesson - Discussion Guide
- Student Assignment - Participant Handout
- Focus Document

Engage with the Instructional Practice Guide..... 20
- The Observation and Feedback Cycle: Best Practices for Low Inference Notes
- IPG - Model Response

Analyze the Lesson Plan..... 28
- Teacher-created Lesson Plan
- Lesson Plan Analysis - Participant Handout
- Lesson Plan Analysis - Model Response

Analyze the Student Work..... 37
- Student Work Samples
- Student Work Analysis - Participant Handout
- Student Work Analysis - Model Response

Summarize Lesson Feedback..... 51
- Feedback Summary - Participant Handout
- Feedback Summary - Model Response

Facilitator Guide: Instructional Practice Toolkit (Mathematics)

Purpose and Audience
The Instructional Practice Toolkit (IPT or Toolkit) is designed for use by coaches and instructional leaders to help teachers, and those who support teachers, build understanding and experience with College and Career Readiness (CCR) standards-aligned instruction. It is designed to highlight the throughline from designing and planning a lesson, to teaching it, and finally to analyzing student work to see if the intended outcomes were achieved for students. Learning how to recognize and support effective teaching and learning practices that reflect the specific Shifts of CCR standards helps to develop shared, complementary expertise across districts, schools, and classrooms.

The IPT is designed for educators with varying levels of experience with the CCR standards and the Shifts. However, the IPT requires the facilitator and participants to have basic knowledge of the Instructional Shifts required by the standards as well as familiarity with the Instructional Practice Guide (IPG). Throughout the IPT, there are recommendations for resources and additional training to build the capacity of all learners in key content areas. Facilitators should be aware of the capacity and goals of the participants and adjust the content and the pace of learning to meet the specific needs of the audience.

The three Shifts in instruction for mathematics are:

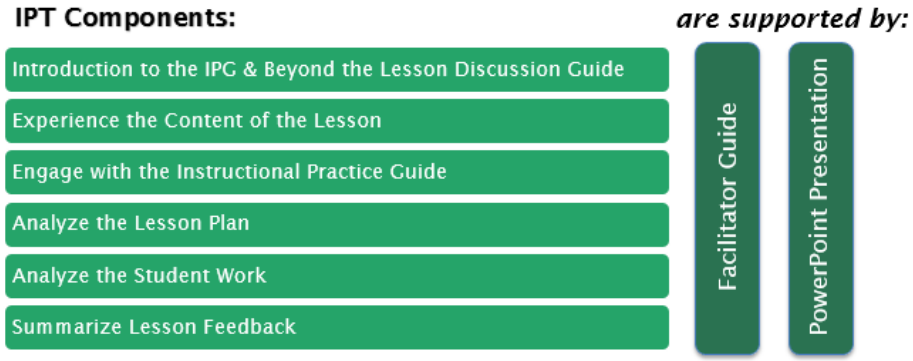
Focus strongly where the standards focus.

Coherence: Think across grades and link to major topics within grades.

Rigor: In major topics pursue conceptual understanding, procedural skill and fluency, and application with equal intensity.

Learning Goals
- Examine and discuss evidence of standards-aligned practice using content-specific tools and resources including Instructional Practice Guide and Beyond the Lesson Discussion Guide
- Engage with authentic lesson content and discuss the related Shifts and specific standards required (e.g., do the math problem)
- Observe lesson video and gather evidence of teacher and student actions that exemplify standards-aligned instruction
- Analyze and interpret lesson plans and student work to collect and discuss evidence of standards-aligned practice
- Summarize overall trends of standards-aligned practice and discuss implications and next steps based on a variety of specific roles and context

Overview of the Instructional Practice Toolkit



The Instructional Practice Toolkit is anchored in the Core Actions of the Instructional Practice Guide. In addition to observing a lesson using the IPG and reflecting on the Beyond the Lesson: Discussion Guide (BTL) questions, participants will analyze the lesson plan and the student work associated with that lesson. The provided Feedback Summary form will be used at the end of the IPT to summarize feedback. It will highlight both the lesson's strengths and opportunities for improvement specifically against the Core Actions and their indicators. A PowerPoint presentation is provided to guide the learning and activities throughout the IPT and serves as the anchor for delivering the material.

How to Facilitate the IPT
To prepare to facilitate the IPT, first read through the entire PowerPoint including the notes section on each slide. The notes sections detail key talking points, instructions for activities, and resources for providing additional background knowledge for participants as needed. In addition, before delivering the IPT, facilitators should complete each of the activities that the participants will be assigned. Model responses are provided for the facilitator to reference as they prepare for the session.

It is recommended that participants be organized into groups small enough to promote evidence-based discussion and participation from every member of the group, but large enough to allow for varied opinions. Four to eight people per group is ideal.

Timeframe to Complete all Components of the Toolkit: 6 - 8 hours
The Toolkit could be delivered:

- In a one-day professional learning session
- Broken into shorter sessions as part of an extended professional development learning opportunity or PLC

Facilitators should be aware of the capacity and goals of the participants and adjust the content and the pace of learning to meet the specific needs of the audience.

The information in the table below can be adapted to be used with any video and associated materials.

Components and Activities	Time	Materials Needed
Introduction ▪ *Essential Question* ▪ *Learning Goals* ▪ *The Teaching and Learning Cycle* ▪ *Overview of IPT Components* ▪ *Norms*	10 - 15 minutes	For the facilitator: ▪ PowerPoint
Introduction to the Instructional Practice Guide & Beyond the Lesson Discussion Guide ▪ *The Shifts* ▪ *IPG Design* ▪ *Beyond the Lesson Guide*	30 minutes: For participants with prior knowledge of the Shifts and the IPG.	For each participant: ▪ College- and Career-Ready Shifts in Mathematics ▪ IPG (for the grade level featured, K-8 or HS) and Beyond the Lesson Guide, Mathematics
Experience the Content of the Lesson ▪ *Core Action 1* ▪ *Do the Math* ▪ *Reflection*	45 - 60 minutes	For each participant: ▪ Student Assignment - Participant Handout ▪ Standards document for the grade level featured (CCSS linked here) or your state's corresponding CCR standards ▪ Focus document (for grade level featured, K-8 only) For the facilitator: ▪ Experience the Content of the Lesson: Discussion Guide

Components and Activities	Time	Materials Needed
Engage with the Instructional Practice Guide ▪ *Core Actions 2 & 3* ▪ *Low Inference Notes* ▪ *Watch the Lesson Video* ▪ *Complete the IPG* ▪ *Beyond the Lesson Guide* ▪ *Reflection*	90 minutes If calibration is a goal, an additional 30 - 45 minutes will be required for norming discussion.	For each participant: ▪ The Observation and Feedback Cycle: Best Practices for Low Inference Notes For the facilitator: ▪ Edited video of a lesson & optional transcript ▪ IPG - Model Response ▪ Optional: Tool for capturing participant evidence (*note: must be prepared ahead of time*)
Analyze the Lesson Plan ▪ *Lesson Plan Analysis* ▪ *Reflection*	45 - 60 minutes	For each participant: ▪ Teacher-created Lesson Plan ▪ Lesson Plan Analysis - Participant Handout For the facilitator: ▪ Lesson Plan Analysis - Model Response
Analyze the Student Work ▪ *Student Work Analysis* ▪ *Reflection*	45 - 60 minutes	For each participant: ▪ Student Work Samples ▪ Student Work Analysis - Participant Handout For the facilitator: ▪ Student Work Analysis - Model Response
Summarize Lesson Feedback ▪ *The Teaching and Learning cycle* ▪ *Beyond the Lesson Guide* ▪ *Synthesize evidence from the IPG, Lesson Plan Analysis, and Student Work Analysis* ▪ *Reflection*	45 minutes	For each participant: ▪ Previously Completed Participant Handouts ▪ Feedback Summary - Participant Handout For the facilitator: ▪ Feedback Summary - Model Response

Shifts at a Glance

College- and Career-Ready Shifts in Mathematics

Focus strongly where the standards focus.

Focus: The Common Core and other college- and career-ready (CCR) standards call for a greater focus in mathematics. Rather than racing to cover topics in a mile-wide, inch-deep curriculum, CCR standards require us to significantly narrow and deepen the way time and energy the way time and energy are spent in the math classroom. We focus deeply on the Major Work* of each grade so that students can gain strong foundations: solid conceptual understanding, a high degree of procedural skill and fluency, and the ability to apply the math they know to solve problems inside and outside the math classroom.

Coherence: Think across grades and link to major topics within grades.

Thinking across grades: College- and career-ready standards are designed around coherent progressions from grade to grade. Learning is carefully connected across grades so that students can build new understanding onto foundations built in previous years. Each standard is not a new event, but an extension of previous learning.

Linking to major topics: Instead of allowing additional or supporting topics to detract from the focus of the grade, these concepts serve the grade-level focus. For example, instead of data displays as an end in themselves, they are an opportunity to do grade-level word problems.

Rigor: In major topics*, pursue conceptual understanding, procedural skill and fluency, and application with equal intensity.

Conceptual understanding: CCR standards call for conceptual understanding of key concepts, such as place value and ratios. Students must be able to access concepts from a number of perspectives so that they are able to see math as more than a set of mnemonics or discrete procedures.

Procedural skill and fluency: CCR standards call for speed and accuracy in calculation. Students are given opportunities to practice core functions such as single-digit multiplication so that they have access to more complex concepts and procedures.

Application: CCR standards call for students to use math flexibly for applications in problem-solving contexts. In content areas outside of math, particularly science, students are given the opportunity to use math to make meaning of and access content.

High-level Summary of Major Work in Grades K-8

K–2	Addition and subtraction—concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions—concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

*For a list of major, additional, and supporting clusters by grade, please refer to 'Focus in Math' at achievethecore.org/focus

INSTRUCTIONAL PRACTICE GUIDE

MATH
SUBJECT

K–8
GRADES

Date

Teacher Name

School

Grade / Class Period / Section

Topic / Lesson / Unit

About The Instructional Practice Guide

Content-specific feedback is critical to teacher professional development. The Instructional Practice Guide (IPG) is a K–12 classroom observation rubric that prioritizes what is observable in and expected of classroom instruction when instructional content is aligned to college- and career-ready (CCR) standards, including the Common Core State Standards (CCSS), in Mathematics (corestandards.org/Math). It purposefully focuses on the limited number of classroom practices tied most closely to content of the lesson.[1]

Designed as a developmental rather than an evaluation tool, the IPG supports planning, reflection, and collaboration, in addition to coaching. The IPG encompasses the three Shifts by detailing how they appear in instruction:[2]

Focus strongly where the standards focus.

Coherence: Think across grades and link to major topics within grades.

Rigor: In major topics, pursue conceptual understanding, procedural skill and fluency, and application with equal intensity.

This rubric is divided into the Core Actions teachers should be taking. Each Core Action consists of indicators which further describe teacher and student behaviors that exemplify CCR-aligned instruction.

Using The Instructional Practice Guide

For each observation, you should make note of what you see and hear. It may be helpful to supplement what you've recorded with further evidence from artifacts such as lesson plans, tasks, or student work. Although many indicators will be observable during the course of a lesson, there may be times when a lesson is appropriately focused on a smaller set of objectives or you observe only a portion of a lesson. In those cases you should expect to not observe some of the indicators and to leave some of the tool blank. Whenever possible, share evidence you collected during the observation in a follow-up discussion.

After discussing the observed lesson, use the Beyond the Lesson Discussion Guide to put the content of the lesson in the context of the broader instructional plan. The questions in the Beyond the Lesson Discussion Guide help delineate what practices are in place, what has already occurred, and what opportunities might exist to incorporate the Shifts into the classroom during another lesson, further in the unit, or over the course of the year.

To further support content-specific planning, practice, and observation, explore the collection of free IPG companion tools, resources, and professional development modules at achievethecore.org/instructional-practice.

1. Refer to Aligning Content and Practice (achievethecore.org/IPG-aligning-content-and-practice) for the research underpinning the Core Actions and indicators of the Instructional Practice Guide and to learn more about how the design of the tool supports content-specific observation and feedback.
2. Refer to Common Core Shifts at a Glance (achievethecore.org/shifts-mathematics) and the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics (achievethecore.org/publisherscriteria-math-k-8) for additional information about the Shifts required by the CCSS.

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Core Action 1

Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by college- and career-ready standards in mathematics.

A. The enacted lesson focuses on the grade-level cluster(s), grade-level content standard(s), or part(s) thereof.

Mathematical learning goal: _____

Standard(s) addressed in this lesson: _____

B. The enacted lesson appropriately relates new content to math content within or across grades.

C. The enacted lesson intentionally targets the aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, application) called for by the standard(s) being addressed.

Circle the aspect(s) of Rigor targeted in the standard(s) addressed in this lesson: Conceptual understanding / Procedural skill and fluency / Application

Circle the aspect(s) of Rigor targeted in this lesson: Conceptual understanding / Procedural skill and fluency / Application

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Core Action 2

Employ instructional practices that allow all students to learn the content of the lesson.

A. The teacher makes the mathematics of the lesson explicit through the use of explanations, representations, tasks, and/or examples.

B. The teacher strengthens all students' understanding of the content by strategically sharing students' representations and/or solution methods.

C. The teacher deliberately checks for understanding throughout the lesson to surface misconceptions and opportunities for growth, and adapts the lesson according to student understanding.

D. The teacher facilitates the summary of the mathematics with references to student work and discussion in order to reinforce the purpose of the lesson.

Core Action 3

Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.

A. The teacher provides opportunities for all students to work with and practice grade-level problems and exercises.
Students work with and practice grade-level problems and exercises.

B. The teacher cultivates reasoning and problem solving by allowing students to productively struggle.
Students persevere in solving problems in the face of difficulty.

C. The teacher poses questions and problems that prompt students to explain their thinking about the content of the lesson.
Students share their thinking about the content of the lesson beyond just stating answers.

D. The teacher creates the conditions for student conversations where students are encouraged to talk about each other's thinking.
Students talk and ask questions about each other's thinking, in order to clarify or improve their own mathematical understanding.

E. The teacher connects and develops students' informal language and mathematical ideas to precise mathematical language and ideas.
Students use increasingly precise mathematical language and ideas.

If any uncorrected mathematical errors are made during the context of the lesson (instruction, materials, or classroom displays), note them here.

Name: Date: Observer Name:

CORE ACTION 1: Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by college- and career-ready standards in mathematics.

INDICATORS / NOTE EVIDENCE OBSERVED OR GATHERED FOR EACH INDICATOR	RATING
A. The enacted lesson focuses on the grade-level cluster(s), grade-level content standard(s), or part(s) thereof. Mathematical learning goal: Standard(s) addressed in this lesson:	Yes- The enacted lesson focuses only on mathematics within the grade-level standards. No- The enacted lesson focuses on mathematics outside the grade-level standards.
B. The enacted lesson appropriately relates new content to math content within or across grades.	Yes- The enacted lesson builds on students' prior skills and understandings. No- The enacted lesson does not connect or has weak connections to students' prior skills and understandings.
C. The enacted lesson intentionally targets the aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, application) called for by the standard(s) being addressed. Circle the aspect(s) of Rigor targeted in the standard(s) addressed in this lesson: Conceptual understanding / Procedural skill and fluency / Application Circle the aspect(s) of Rigor targeted in this lesson: Conceptual understanding / Procedural skill and fluency / Application	Yes- The enacted lesson explicitly targets the aspect(s) of Rigor called for by the standard(s) being addressed. No- The enacted lesson targets aspects of Rigor that are not appropriate for the standard(s) being addressed.

Name: Date: Observer Name:

CORE ACTION 2: Employ instructional practices that allow all students to learn the content of the lesson.

INDICATORS[3] / NOTE EVIDENCE OBSERVED OR GATHERED FOR EACH INDICATOR	RATING
A. The teacher makes the mathematics of the lesson explicit through the use of explanations, representations, tasks, and/or examples. ☐ NOT OBSERVED	4- A variety of instructional techniques and examples are used to make the mathematics of the lesson clear. 3- Examples are used to make the mathematics of the lesson clear. 2- Instruction is limited to showing students how to get the answer. 1- Instruction is not focused on the mathematics of the lesson.
B. The teacher strengthens all students' understanding of the content by strategically sharing students' representations and/or solution methods. ☐ NOT OBSERVED	4- Student solution methods are shared, and connections to the mathematics are explicit and purposeful. If applicable, connections between the methods are examined. 3- Student solution methods are shared, and some mathematical connections are made between them. 2- Student solution methods are shared, but few connections are made to strengthen student understanding. 1- Student solution methods are not shared.
C. The teacher deliberately checks for understanding throughout the lesson to surface misconceptions and opportunities for growth, and adapts the lesson according to student understanding. ☐ NOT OBSERVED	4- There are checks for understanding used throughout the lesson to assess progress of all students, and adjustments to instruction are made in response, as needed. 3- There are checks for understanding used throughout the lesson to assess progress of some students; minimal adjustments are made to instruction, even when adjustments are appropriate. 2- There are few checks for understanding, or the progress of only a few students is assessed. Instruction is not adjusted based on students' needs. 1- There are no checks for understanding; therefore, no adjustments are made to instruction.
D. The teacher facilitates the summary of the mathematics with references to student work and discussion in order to reinforce the purpose of the lesson. ☐ NOT OBSERVED	4- The lesson includes a summary with references to student work and discussion that reinforces the mathematics. 3- The lesson includes a summary with a focus on the mathematics. 2- The lesson includes a summary with limited focus on the mathematics. 1- The lesson includes no summary of the mathematics.

3. These actions may be viewed over the course of 2–3 class periods.

www.achievethecore.org/instructional-practice Published 08.2018.

Name: Date: Observer Name:

CORE ACTION 3: Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.[4]

INDICATORS[5][6] / NOTE EVIDENCE OBSERVED OR GATHERED FOR EACH INDICATOR / RATING

4- Teacher provides many opportunities, and most students take them.
3- Teacher provides many opportunities, and some students take them; or teacher provides some opportunities and most students take them.
2- Teacher provides some opportunities, and some students take them.
1- Teacher provides few or no opportunities, or few or very few students take the opportunities provided.

A. The **teacher** provides opportunities for all students to work with and practice grade-level problems and exercises. **Students** work with and practice grade-level problems and exercises.	4 3 2 1 ☐ NOT OBSERVED
B. The **teacher** cultivates reasoning and problem solving by allowing students to productively struggle. **Students** persevere in solving problems in the face of difficulty.	4 3 2 1 ☐ NOT OBSERVED
C. The **teacher** poses questions and problems that prompt students to explain their thinking about the content of the lesson. **Students** share their thinking about the content of the lesson beyond just stating answers.	4 3 2 1 ☐ NOT OBSERVED
D. The **teacher** creates the conditions for student conversations where students are encouraged to talk about each other's thinking. **Students** talk and ask questions about each other's thinking, in order to clarify or improve their own mathematical understanding.	4 3 2 1 ☐ NOT OBSERVED
E. The **teacher** connects and develops students' informal language and mathematical ideas to precise mathematical language and ideas. **Students** use increasingly precise mathematical language and ideas.	4 3 2 1 ☐ NOT OBSERVED

If any uncorrected mathematical errors are made during the context of the lesson (instruction, materials, or classroom displays), note them here.

4. There is not a one-to-one correspondence between the indicators for this Core Action and the Standards for Mathematical Practice. These indicators represent the Standards for Mathematical Practice that are most easily observed during instruction.
5. Some portions adapted from 'Looking for Standards in the Mathematics Classroom' 5x8 card published by the Strategic Education Research Partnership (http://math.serpmedia.org/5x8card/).
6. Some or most of the indicators and student behaviors should be observable in every lesson, though not all will be evident in all lessons. For more information on teaching practices, see NCTM's publication Principles to Actions: Ensuring Mathematical Success for All for eight Mathematics Teaching Practices listed under the principle of Teaching and Learning (http://www.nctm.org/principlestoactions).

BEYOND THE LESSON: DISCUSSION GUIDE

MATHEMATICS

INTRODUCTION

The Beyond the Lesson Discussion Guide is designed for the post-observation conversation using the Instructional Practice Guide (achievethecore.org/instructional-practice) or any other observation rubric. The questions put the content of the lesson in the context of the broader instructional plan for the unit or year. The conversation should first reflect on the evidence collected during the observation to consider what worked, what could improve, and what resources are available to support improvement. If any parts of the Lesson Planning Tool (achievethecore.org/lesson-planning-tool) were used in preparing for the lesson, refer to that information during the discussion. After discussing the observed lesson, use the "Beyond the Lesson" questions to help clearly delineate what practices are in place, what has already occurred, and what opportunities might exist in another lesson, further in the unit, or over the course of the year to incorporate the Shifts into the classroom.

1. **Is this unit targeting the Major Work of the Grade? Does the prior unit target Major Work? Does the next unit target Major Work? How much time would you estimate will be spent on the Major Work in this class this year? (K–8)** Focus means significantly narrowing the scope of content in each grade so that students achieve at higher levels and experience more deeply that which remains. For more information on Major Work of the Grade, see achievethecore.org/focus.

2. **Does this unit target the Supporting Work of the Grade? If so, will this unit highlight the connection to the Major Work of the Grade? Explain how. (K–8)** Supporting content enhances Focus and Coherence simultaneously by engaging students in the Major Work of the Grade. For example, materials for K–5 generally treat data displays as an occasion for solving grade-level word problems using the four operations (see 3.MD.3); materials for grade 7 take advantage of opportunities to use probability to support ratios, proportions, and percents.

3. **Summarize how this lesson fits within the unit. Describe how the other lessons and tasks in this unit are intentionally sequenced to help students develop increasingly sophisticated understanding, skills, and practices.** For more information on coherent connections across and within grades, see http://ime.math.arizona.edu/progressions/.

4. **Which of the three aspects of Rigor (conceptual understanding, procedural skill and fluency, and application) are attended to within this unit? If more than one aspect is attended to, when in the unit are they attended to individually, and when are students using them together?** Rigor is defined as pursuing conceptual understanding, procedural skill and fluency, and application with equal intensity. The standards are written using language that informs the reader as to which aspect of Rigor certain standards address. Some clusters or standards specifically require one aspect of Rigor; some require multiple aspects. All aspects of Rigor need not be addressed in every lesson.

5. **How will you meet all students' needs while working on grade/course-level content in this unit? (e.g., How will you provide scaffolding for students below grade/course level so they can reach the grade/course-level expectations? How will you create opportunities for students who are advanced to go deeper into the grade/course-level content?)** For more information, see Adapting the Lesson under Problems & Exercises in the Lesson Planning Tool: achievethecore.org/lesson-planning-tool.

6. **What off-grade/course-level standards have you taught this year and why?** There may be reasons for addressing topics in a strategic way before or after the grade in which the topic is central in the standards. However, any such purposeful discrepancies should enhance the required learning, not unduly interfere with or displace grade/course-level content, and be clearly aimed at helping students meet the standards as written.

7. **In what ways do you provide diagnostic feedback to students? Do students have opportunities to revise their thinking? Does student work include revisions of solutions, explanations, and justifications?**

8. **In what ways have your students made progress towards mastering the grade/course-level content standards? How are you monitoring and tracking their achievement of the standards? What work still needs to be done to ensure all students achieve mastery of each standard by the end of the year?** For more information on the Standards for Mathematical Content, see corestandards.org/Math.

9. **In what ways have you seen your students increase their independence in applying the Standards for Mathematical Practice in learning content this year? Which practice standards do students still need to develop and how can you support them in doing so?** For more information on the Standards for Mathematical Practice, see corestandards.org/Math/Practice.

10. **What tools are appropriate for students to independently access when solving mathematical problems in this unit? Do students frequently choose and use appropriate tools strategically in this class?** For more information on SMP5, see corestandards.org/Math/Practice.

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Experience the Content of the Lesson: Discussion Guide
Decomposing the Number 10 – Kindergarten

Ideas that may emerge from the discussion:
Facilitators should choose which points to address based on the needs of the participants and the time allotted for this activity.

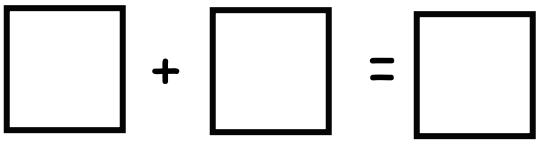
- The hearts are configured in a scattered arrangement that may make it more difficult for
- Kindergarteners to accurately count them.
- Since the total number of hearts is the same on all of the worksheets, the sum in all of the equations will be 10. Since the total remains the same, it is not necessary to count the hearts, or even add the two addends that are created in the decomposition to know that the total is 10.
- Representations of the same decomposition (e.g., 4 and 6) may look different, if different arrangements of 4 and 6 are circled. This does not represent a different decomposition since the two addends remain the same, regardless of position.
- There are 5 unique decompositions that can be created from 10 objects:
    - 9 and 1
    - 8 and 2
    - 7 and 3
    - 6 and 4
    - 5 and 5

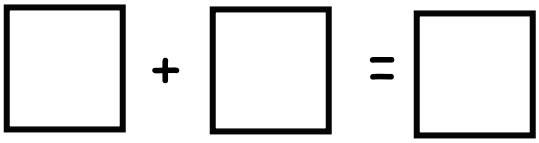
  It may be helpful to engage participants in a discussion about the connections between these different decompositions. For example, as one addend increases, the other addend decreases by the same number.
- The commutative property shows that there are two equations that can be written for each decomposition (e.g., 8+2=10 and 2+8=10.) *This idea relates to 1.OA.B.3 Apply properties of operations as strategies to add and subtract.*

Student Assignment: Participant Handout

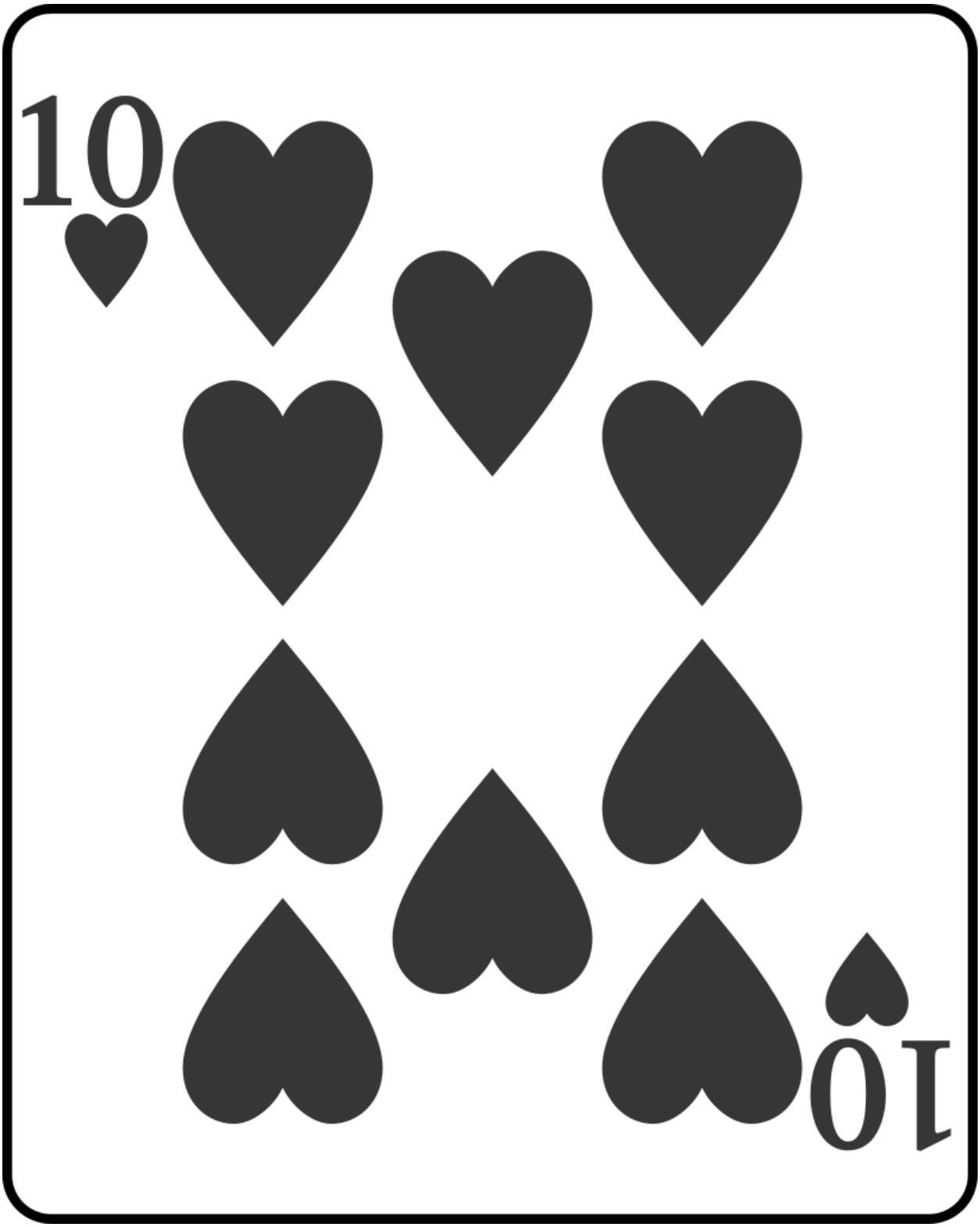
Decompose 10 into 2 groups.

Find as many different ways as you can.





Facilitator: Make at least 5 copies per participant of this page.



CCSS WHERE TO FOCUS KINDERGARTEN MATHEMATICS

MATH — MATHEMATICS
K — KINDERGARTEN
F — FOCUS

This document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Standards.

Not all content in a given grade is emphasized equally in the Standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the Standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

Students should spend the large majority[1] of their time on the major work of the grade (■). Supporting work (□) and, where appropriate, additional work (○) can engage students in the major work of the grade.[2, 3]

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR KINDERGARTEN

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters □ Supporting Clusters ○ Additional Clusters

K.CC.A	■	Know number names and the count sequence.
K.CC.B	■	Count to tell the number of objects.
K.CC.C	■	Compare numbers.
K.OA.A	■	Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.
K.NBT.A	■	Work with numbers 11–19 to gain foundations for place value.
K.MD.A	○	Describe and compare measureable attributes.
K.MD.B	□	Classify objects and count the number of objects in categories.
K.G.A	○	Identify and describe shapes.
K.G.B	□	Analyze, compare, create, and compose shapes.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

REQUIRED FLUENCIES FOR KINDERGARTEN

K.OA.A.5	Add/subtract within 5

1 At least 65% and up to approximately 85% of class time, with Grades K–2 nearer the upper end of that range, should be devoted to the major work of the grade. For more information, see Criterion #1 of the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publisherscriteria.
2 Refer also to criterion #3 in the K–8 Publishers' Criteria for the Common Core State Standards for Mathematics www.achievethecore.org/publisherscriteria.
3 Note, the critical areas are a survey of what will be taught at each grade level; the major work is the subset of topics that deserve the large majority of instructional time during a given year to best prepare students for college and careers.

CCSS WHERE TO FOCUS KINDERGARTEN MATHEMATICS

An important subset of the major work in grades K–8 is the progression that leads toward middle school algebra.

K	1	2	3	4	5	6	7	8
Know number names and the count sequence Count to tell the number of objects Compare numbers Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from Work with numbers 11-19 to gain foundations for place value	Represent and solve problems involving addition and subtraction Understand and apply properties of operations and the relationship between addition and subtraction Add and subtract within 20 Work with addition and subtraction equations Extend the counting sequence Understand place value Use place value understanding and properties of operations to add and subtract Measure lengths indirectly and by iterating length units	Represent and solve problems involving addition and subtraction Add and subtract within 20 Understand place value Use place value understanding and properties of operations to add and subtract Measure and estimate lengths in standard units Relate addition and subtraction to length	Represent & solve problems involving multiplication and division Understand properties of multiplication and the relationship between multiplication and division Multiply & divide within 100 Solve problems involving the four operations, and identify & explain patterns in arithmetic Develop understanding of fractions as numbers Solve problems involving measurement and estimation of intervals of time, liquid volumes, & masses of objects Geometric measurement: understand concepts of area and relate area to multiplication and to addition	Use the four operations with whole numbers to solve problems Generalize place value understanding for multi-digit whole numbers Use place value understanding and properties of operations to perform multidigit arithmetic Extend understanding of fraction equivalence and ordering Build fractions from unit fractions by applying and extending previous understandings of operations Understand decimal notation for fractions, and compare decimal fractions	Understand the place value system Perform operations with multi-digit whole numbers and decimals to hundredths Use equivalent fractions as a strategy to add and subtract fractions Apply and extend previous understandings of multiplication and division to multiply and divide fractions Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition Graph points in the coordinate plane to solve real-world and mathematical problems*	Apply and extend previous understandings of multiplication and division to divide fractions by fractions Apply and extend previous understandings of numbers to the system of rational numbers Understand ratio concepts and use ratio reasoning to solve problems Apply and extend previous understandings of arithmetic to algebraic expressions Reason about and solve one-variable equations and inequalities Represent and analyze quantitative relationships between dependent and independent variables	Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers Analyze proportional relationships and use them to solve real-world and mathematical problems Use properties of operations to generate equivalent expressions Solve real-life and mathematical problems using numerical and algebraic expressions and equations	Work with radical and integer exponents Understand the connections between proportional relationships, lines, and linear equations** Analyze and solve linear equations and pairs of simultaneous linear equations Define, evaluate, and compare functions Use functions to model relationships between quantities

* Indicates a cluster that is well thought of as a part of a student's progress to algebra, but that is currently not designated as major by the assessment consortia in their draft materials. Apart from the one asterisked exception, the clusters listed here are a subset of those designated as major in the assessment consortia's draft documents.
** Depends on similarity ideas from geometry to show that slope can be defined and then used to show that a linear equation has a graph which is a straight line and conversely.

The Observation and Feedback Cycle: Best Practices for Low Inference Notes

Observe

The school leader visits the classroom and takes low-inference notes on teacher and student actions.

Best Practices for Observation
1. **Eliminate effects of bias.** Enter the classroom without judgment and work from evidence.
2. **Take low-inference notes.** Write down only what teacher and students say and do.
3. **Look for learning.** Seek evidence of what students know and are able to do.
4. **Remain, review, reflect.** Pause to organize your evidence before rating.

Collecting low inference evidence during an observation

Capturing high-quality notes during the observation is the first step in ensuring that ratings are accurate and feedback aligns to teachers' needed areas of improvement. **Low-inference note-taking is a skill**, not knowledge. Knowing how to do a push-up doesn't mean you can do 25 of them in 60 seconds; it comes with practice. When taking low-inference notes, the school leader describes what is taking place without drawing conclusions or making judgments about what he or she observes. When taking notes on instruction, ask:

- What do you see and hear the teacher and students saying and doing?
- What evidence can you gather of student learning?
- What will students know and be able to do at the end of the lesson?

Common mistakes/pitfalls to avoid

- Distinguish between low-inference statements and opinions. For instance, you can identify key words that give away subjectivity: e.g., *"I think,"* or *"I feel."* Be cognizant of keeping evidence separate from opinions, using this framework:

Evidence	Opinion
• Is observable • Is not influenced by the observer's perspective • Is free of evaluative words • Does not draw conclusions	• Makes inferences • Depends on observer's perspective • Includes evaluative words • Draws conclusions

- Replace vague quantifiers by capturing more specific evidence: e.g., *"a lot of students raised their hands"* vs. *"17 of 20 students raised their hands."*
- Swap Edu-Speak for Evidence. For example, rather than saying, *"You differentiated by scaffolding questions during the mini-lesson,"* identify the actual questions that the teacher asked, such as *"What is the name of this shape? How is it different from a square or rectangle? Where in real life have you seen this shape?"*

For electronic version, visit: https://www.weteachnyc.org/media2016/filer_public/2a d3/2ad3839feeae-42ba-8249-614b33136717/best_practices_for_low_inference_notes.pdf

Tips for low inference note taking

Where to find the data for student outcomes during an observation:

- Sit with a table/group of students. Write down the questions asked and answers given by the students in that group.
- Copy down what each student has written on their paper VERBATIM into your observation notes (e.g., answer to #2 on handout, response to quick-write prompt). The observer can obtain a handout from the teacher, if available, and record the answers directly onto it.
- Write down the time and circulate in the room. Record the item that all students are working on in that moment. Then, go around a second time.
- Select a problem, determine the correct answer, and tally the number of students who have the correct response written on their papers.
- If recording observation notes using an iPad, use the iPad to take pictures of actual student work during the classroom observation.
- Move around the classroom and identify students performing at high, medium, low levels and strategically capture their work
- Monitor observation notes to ensure that the "student side" is not neglected.
- Ask students to tell you what they are learning/doing, why they are learning, and if they have learned anything new today.
- Collect the lesson plan and/or copies of student work prior to leaving the classroom.

How do I capture as much evidence as possible?

- Set up a coding system (T= teacher, S= student, HU= hands up)
- Time transitions, each section of the lesson, work time, etc.
- Copy objective or aim, or make a note if it is not posted
- Draw circles to represent groups of students or teacher interaction with students

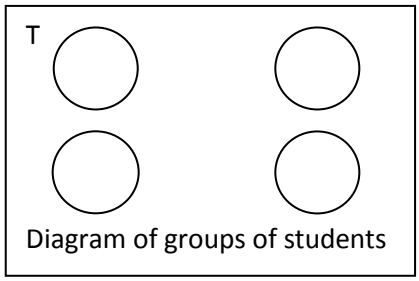
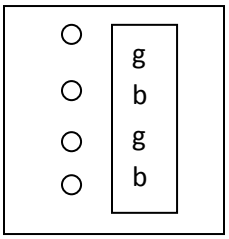


Diagram of groups of students



- If you notice a trend, create a tally on the side, so you can capture other evidence that may be occurring while also documenting the trend. For example, Jane is the only one responding to the teacher's questions. You may capture several instances verbatim, but you can also capture how many times it occurs if you can't capture everything Jane said.

  Use tallies or shorthand in the diagram or a chart:

Jane is called on	~~||||~~ |
Times teacher provides feedback to front table	|||

- Quality over quantity: collect a full interaction.
  - *When teacher did __, student __. When student said __, teacher said__.*

Low-Inference Note-Taking Samples: Strong versus Weak

Strong example of low-inference notes:

Time	Teacher Actions	Student Actions
1:00	Teacher says to walking students, "You need to be on the rug in 3-2-1."	Twenty-four students on the carpet facing the front of the room. 3 students walking around the classroom. As teacher said "one" students joined classmates.
1:01	Teacher asked "How many days are there in the week?" Teacher repeated question and then said, "Anyone?" Teacher asked kids to stand and lead them in "The Days of the Week" song.	5-6 kids spoke to each other when teacher spoke. She called on Terrence who said "7." 16 of the 27 kids stood up for the song.
1:02	Teacher asked "What day comes after Saturday?"	Steven shouted out, "Monday!" Most students laughed – 2 boys physically rolled around and knocked over 2 girls. Steven walked away from the group, and sat in the opposite corner of the classroom.
1:03	Teacher said, "OK boys and girls if you hear my voice clap once, If you hear my voice clap twice."	After two claps, all but 2 boys were quiet and looking at her.

Weak example of low-inference notes:

Time	Teacher Actions	Student Actions
1:00		Students on carpet during mini-lesson. Lots of students walking around the classroom while the teacher tried to get their attention.
1:01	Teacher asked questions about the calendar.	Many students were not listening while the teacher reviewed the days of the week.
1:02		Steven called out over and over again when you asked the question about the days of the week.
1:03		Steven walked away from the group and the class fell apart.
1:04	Mini-lesson is not successful. Little student learning accomplished as teacher has no classroom management skills.	
1:05	Poor classroom management continues through sloppy transitions from carpet to desks.	Several students are talking to one another.
1:06	The teacher seemed to be okay with this.	A few students go to the round table. Some start reading and some don't.

Instructional Practice Guide – Decomposing the Number 10 (Kindergarten): Model Response

Indicator	Evidence
Core Action 1: Ensure the work of the lesson reflects the Focus, Coherence, and Rigor required by college and career ready standards in mathematics.	
A. The enacted lesson focuses on the grade-level cluster(s), grade-level content standard(s), or part(s) thereof.	Mathematical learning goal: • Understand addition as putting together and adding to, and the standard within it. Standard(s) addressed in this lesson: • This lesson seems to target K.OA.A.3 with specific focus on decomposing the number 10 and recording the decomposition of 10 with an equation.
B. The enacted lesson appropriately relates new content to math content within or across grades.	• The teacher begins the lesson by referencing the previous activity of decomposing 7, 8, and 9 using the objects (i.e., hearts) on playing cards as a visual support for their decompositions. The teacher launches the lesson using examples of student work that the class was talking about at the end of the previous lesson. While the teacher works with small groups during the lesson, he asks students to write and read equations that relate composition and decomposition to their previous work with addition. • The teacher uses this lesson to further develop students' skill in counting and cardinality. The teacher emphasizes the highest level of K.CC.B.5 using playing cards. • The teacher uses a discussion at the end of the lesson to pique students' interest to the next math lab lesson.
C. The enacted lesson intentionally targets the aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, application) called for by the standard(s) being addressed. .	Aspect(s) of Rigor targeted in the standard(s) addressed in this lesson: • Standard: K.OA.A.3 falls under the cluster "Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from." The work of decomposing in kindergarten is based on this understanding. The concept of decomposing a number in different ways is addressed as students are asked to create different decompositions of 10. Aspect(s) of Rigor targeted in this lesson:

Indicator	Evidence
	• Lesson: conceptual understanding and procedural skill - During the lesson, students engage in the procedural skill of counting and writing numerals. Examples of the teacher cuing students to count are at ~1:22 and ~26:41.
Core Action 2: Employ instructional practices that allow all students to learn the content of the lesson.	
A. The teacher makes the mathematics of the lesson explicit through the use of explanations, representations, tasks, and/or examples.	• The focus of the classroom discussion never gets to the idea that the total number of objects is always 10, no matter how you decompose it. • When working with a student who made an error by writing 10 + 2 =8 (~12:00) the teacher talks with students about how the 10 represents "all of them." This has the potential to make the central idea of decomposing explicit. • Teacher uses visual models and helps make the connection between the equations and the pictures on the cards.
B. The teacher strengthens all students' understanding of the content by strategically sharing students' representations and/or solution methods.	• In small group opportunities, the teacher frequently uses student work to clarify individual student misconceptions and enhance student learning. One example of this can be found at ~11:34. • In the whole group, the teacher uses selected student work to highlight specific content he would like students to wonder about or notice. During the share at the end of the lesson, the teacher asks two students if he can display their work. The example he shows follows the same structure as previous examples (i.e., comparing two different arrangements of a decomposition of 10 into 6 and 4) and it is not clear if multiple exposures to the same idea strengthen all students' understanding. • The teacher does not bring the misconceptions or the variety of decompositions discovered in small groups to the full class.
C. The teacher deliberately checks for understanding throughout the lesson to surface misconceptions and opportunities for growth, and adapts the lesson according to student understanding.	• The teacher uses small group instruction to better understand the progress of each student. During each table visit, the teacher celebrates students' multiple ways of decomposing 10 (~10:42) or wonders out loud to redirect students about the

Indicator	Evidence
	accuracy of their number sentence (~11:05) that represents their decomposition. • There isn't evidence that instruction was adjusted for students who were successful at decomposing 10.
D. The teacher facilitates the summary of the mathematics with references to student work and discussion in order to reinforce the purpose of the lesson.	• The lesson includes a summary with references to student work and student discussion, but selected student work does not reinforce all the intended mathematics (~22:38). The discussion emphasizes how two students selected different arrangements of four hearts to show an addend that pairs with 6 to make 10, but this emphasis distracts from the mathematical target of the standard which is to show different ways to make 10 (i.e., different pairs of addends). • The questions and discussions in the summary are very similar to the discussion that began the lesson.
Core Action 3: Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.	
A. The teacher provides opportunities for all students to work with and practice grade-level problems and exercises. Students work with and practice grade-level problems and exercises.	• All students are given the opportunity to create decompositions of 10 using playing cards. The majority of class time was spent on students engaging with grade-level work. The teacher kept students focused on the grade-level content by ensuring that they were only decomposing 10 into two addends.(~14:14). • The teacher repeatedly asks all students to notice the difference between different arrangements of the same number. Most students are able to share their developing thinking about this idea (~29:50).
B. The teacher cultivates reasoning and problem solving by allowing students to productively struggle. Students persevere in solving problems in the face of initial difficulty.	• When giving the directions for the activity, the teacher emphasizes finding "as many different ways as you can" to decompose 10 (~5:06). • It is unclear whether the problem of finding multiple ways to decompose 10 is a challenge for students. Most students appear to be quickly moving through creating multiple decompositions of 10. It appears that many students would be ready for more challenging problems or questions.

Indicator	Evidence
	• At ~26:15 teacher says, "This is an important mathematical idea and we are going to get it - you can do it." • The teacher uses wait time to allow students to formulate their ideas before sharing them (~2:12).
C. The teacher poses questions and problems that prompt students to explain their thinking about the content of the lesson. Students share their thinking about the content of the lesson beyond just stating answers.	• As students observe two decompositions of 10 (~1:52), the teacher asks, "What do you notice about these compositions? How are they the same or similar? And how are they different?" • There are a few questions that ask students to consider why there are different equations that represent 10 or how the decomposition relates to the total number of objects. (~12:00, ~16:15). • At ~5:55, ~7:06 and ~23:42, the teacher prompts students to discuss their thinking with their partners and asks students to explain their partner's thinking to illustrate their decompositions. • Once students have started working, the teacher stops the class and says, "Do you have important things to say to your friends right now? It's totally OK for you to be talking" (~7:31).
D. The teacher creates the conditions for student conversations where students are encouraged to talk about each other's thinking. Students talk and ask questions about each other's thinking, in order to clarify or improve their own mathematical understanding.	• At ~2:30, the teacher says, "In a moment I am going to invite you to share what you are noticing with a friend sitting next to you. You're going to tell them 'I notice' or 'something that's similar…' or 'something that the same is…' or 'something that is different is…' Please turn and tell something you are noticing to the person sitting next to you." Students turn to their partners and begin to share using the stem "I notice" or "Something different is." While it was difficult to pinpoint a specific conversation, students were animatedly talking about what they notice about the decompositions. • Before sending students off to work at their tables, the teacher takes time to model what conversations about the work should sound like. (~5:16). He models again before students engage in a turn and talk on the rug (~20:18). • At ~16:50, teacher intentionally supports a student to share her decomposition of 10 (10 + 0) with a partner and facilitates the pair to discuss her work.

Indicator	Evidence
	• The teacher uses talk moves to ensure that students are able to explain the ideas of other students, sometimes asking for ideas to be repeated (~24:26).
E. The teacher connects and develops students' informal language and mathematical ideas to precise mathematical language and ideas. Students use increasingly precise mathematical language and ideas.	• The teacher provides sentence frames for students to use as they share their mathematical ideas (~2:38.) • The directions include precise mathematical language: "Decompose 10 into two groups." • As a student is talking about her groups she says, "There are 5 and 5." The teacher revoices her thought as, "There's a group of 5 and a group of 5 and together that makes…" (~9:20) • At ~10:06, the teacher works with a student to "read her number sentence." • At ~19:33, a student says, "They are both the same equation." • The teacher's use of language is not always precise. Throughout the lesson, the teacher talks about "a group of 3" or "a group of 5" without naming that they are groups of 3 hearts, therefore missing the precision of defining that the 3 represents the group of 3 hearts.

If any uncorrected mathematical errors are made during the context of the lesson (instruction, materials, or classroom displays), note them here:

- No mathematical errors were observed.

Topic: Composing and Decomposing 10 (5 lessons)

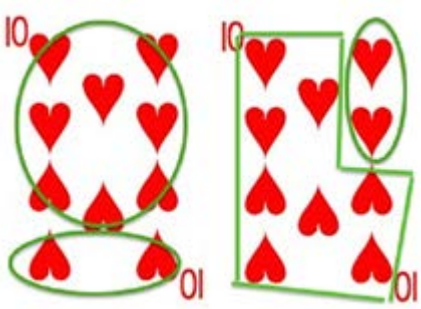
Stage 1 - Desired Results

Target Standards:

- K.OA.A.3 Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).
- K.OA.A.4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record the answer with a drawing or equation.

Review Standards:

- K.CC.B.4.b Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted

Understandings:	**Essential Questions:**
• numbers 1-10 can be broken into smaller groups in many different ways • the count sequence can be used to count individual items as well as groups of items • we can represent number compositions/decompositions with addition number sentences that are connected to the smaller groups that compose the whole • finding the number that makes 10 given a number 1-9 is a special composing/decomposing context	• When we decompose numbers (ex. 3+4=7), which part of the decomposed set of objects is represented by the 3? the 4? the 7? • How are decompositions like this the same? How are they different?  • What are the different ways to decompose 10?

Students will know / students will be able to…

- Decompose numbers less than or equal to 10 into pairs in more than one way .. and record each decomposition with a drawing or equation
- For any number 1-9, find the number that makes 10 when added to the given number (by using objects or drawings)

Stage 2 - Assessment Evidence

Performance tasks:	**Other Evidence:**
• Daily work (decompositions on playing cards with equations) - - multiple small problems to check for understanding	• ideas surfaced through talk

Stage 3 - Learning Plan

Lesson	Title	Learning Goal
1	Decomposing the numbers seven. eight, and nine	Students will decompose numbers less than 10 and represent them with a number sentence.
2	Comparing decompositions	Students will compare different ways of decomposing numbers and understand that the total doesn't change.
3	Decomposing the number ten	Students will decompose the number 10 in different ways and represent them with a number sentence.
4	Comparing decompositions of ten	Students will compare different ways of decomposing 10 and understand that the total doesn't change.
5	How many more do you need to make 10?	Students will find the number needed to make 10 when given a number.

Lesson 3 of 5. Decomposing the number ten[1]

Lesson Steps	Anticipated Student Responses	T responses, prompts, talk moves; language supports
Introducing (10 minutes) 1. Remind the students that they worked yesterday on decomposing the 7, 8, or 9 of hearts in many different ways. 2. Present students with two decompositions of the 10 of hearts card. Both will represent the 10=2+8, but the decompositions will be visually different. 3. Ask a student to describe what they see; ask other students to repeat the first student's description. 4. Ask students what is the same and what is different about the two cards (both show 2+8, but the group of 2 and the group of 8 are in different places). 5. Once students have come to agree (or perhaps disagree) that these decompositions are described by the same equation (or that the quantity of each group is the same even though the two decompositions are visually different), students move into the independent work phase of the lesson to find find as many different possible decompositions of 10 as possible.	Depending on students' developmental levels, I expect that it may be very difficult for some students to accept that two visually different representations of the same decomposition are the same, even if they accept that the quantities and equations are the same. If this happens, I will focus the discussion on what is the same (the group of 8, the group of 2, and the total 10).	**Clarify and share thoughts.** Wait time, turn and talk, stop and jot, say more, revoicing, tell us more, give an example **Orient to the thinking of others.** Who can repeat? Who can say that again? Who can put it in their own words? Tell us what your friend said? **Engage with reasoning of others**. Do you agree or disagree? What do you think about that? Who can add on? Can you think of a different way? Does anyone have more evidence? **Deepen own thinking.** Why do you think that? How did you get the answer? What is your evidence? Why do you think that worked? Can you prove that? Can you explain step by step?
Exploring / extending (20 minutes) 1. Students work to decompose 10 in as many	Some students will be able to decompose by	

[1] Based on *Classroom Discussions in Math* (Math Solutions, 2012).

different ways as possible by circling two groups on their 10 of hearts cards; they will record these decompositions using equations. 2. Push students who are finding multiple decompositions that are visually different but mathematically identical to articulate that difference -- and move to finding a different combination. 3. An extension is for students to find as many different ways (visually) to represent the same decomposition.	drawing groups, but will need support: ● linking these groups to the total ● using numbers or equation symbols to represent their decomposition	
Summarizing (15 minutes) 1. Bring students to the carpet. Give them time to share their work with the person sitting next to them. 2. Collect work. 3. Have students discuss work from two students that are visually different but represent the same combination (ex. 3+7=10). Push students to describe using precise mathematical language what is the same (the number in the groups) and what is different (where the groups are visually).		

Lesson Plan Analysis

Lesson: _____

Use this document to record information/evidence from the sample lesson plan. Evidence should consider the Core Actions. Evidence recorded will be integrated into the Feedback Summary worksheet.

Core Action 1: **Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by the college- and career-ready standards in mathematics.**
Discussion Questions
• **Which standard(s) and/or cluster(s) are targeted in this lesson? Does the lesson address a part of the standard(s) or all aspects of the standard(s)? Are they grade-level standards? Are they part of the Major Work of the grade?** • **If the standard(s) targeted are Supporting Work of the grade, how will connections be made to engage students in the Major Work of the grade?** • **What is the mathematical learning goal for students in this lesson?** • **Which aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, and application) do the targeted standards require? What features of the lesson support the aspect(s) of Rigor present in the targeted standards?** • **How does the teacher plan to make explicit connections to build on students' prior skills and understandings? What will the teacher say to students or show students to make this connection clear?**

Core Action 2:
Employ instructional practices that allow all students to learn the content of the lesson.

Discussion Questions

- How does the teacher plan to use explanations, representations, tasks, and/or examples that will make the mathematics of this lesson clear to students?
- What will students produce? Are they expected to produce only answers?
- What ideas/concepts will be the focus of discussions?
- How will students share/present their mathematical work to support all students' understanding of the topic?
- When in the lesson does the teacher plan to check for understanding?
- How does the teacher plan to summarize the mathematics of the lesson? Will the summary include student work and discussion to reinforce the mathematical learning goal of the lesson?

Core Action 3:
Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.

Discussion Questions

- **What mathematical language will be used in this lesson? How will the teacher support students' use of increasingly precise language, including for English language learners if applicable?**
- **Are mathematical models, mathematical representations, mathematical arguments, and mathematical counter-arguments expected from students, as required by the standards? What problem(s) and question(s) will allow students to share their thinking and/or justify their conclusions?**
- **When will students be doing grade-level problems and exercises? Will all students have this opportunity?**

Lesson Plan Analysis: Model Response

Lesson: Kindergarten – Decomposing the Number 10

Use this document to record information/evidence from the sample lesson plan. Evidence should consider the Core Actions. Evidence recorded will be integrated into the Feedback Summary worksheet.

Core Action 1:
Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by the college- and career-ready standards in mathematics.

Discussion Questions

- **Which standard(s) and/or cluster(s) are targeted in this lesson? Does the lesson address a part of the standard(s) or all aspects of the standard(s)? Are they grade-level standards? Are they part of the Major Work of the grade?**
- **If the standard(s) targeted are Supporting Work of the grade, how will connections be made to engage students in the Major Work of the grade?**
- **What is the mathematical learning goal for students in this lesson?**
- **Which aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, and application) do the targeted standards require? What features of the lesson support the aspect(s) of Rigor present in the targeted standards?**
- **How does the teacher plan to make explicit connections to build on students' prior skills and understandings? What will the teacher say to students or show students to make this connection clear?**

The plan provides information on a series of five lessons. For the lessons, two Kindergarten standards are identified as targets (K.OA.A.3 and K.OA.A.4) and one Kindergarten standard is designated as review (K.CC.B.4b.) All three standards are part of the Major Work of the grade for Kindergarten.

The stated learning goal for the individual lesson reflects the language of K.OA.A.3: "Students will decompose the number 10 in different ways and represent them with a number sentence." However, the lesson plan explicitly states that the focus is on helping students see that "two visually different representations of the same decomposition are the same" (noted in introducing and summarizing). Although, lesson 3 does not focus on the full meaning of K.OA.A.3 (that there are different decompositions of a given number, e.g., 10 can be decomposed into 2+8 or 7+3.) , it appears that the next lesson in the sequence will allow students to compare decompositions of ten and recognize that the total number of objects does not change.

Both K.OA.A.3 and K.CC.B.4b primarily target conceptual understanding and the lesson supports that by allowing students to discuss decomposing numbers in different ways and connecting these decompositions to equations. In addition, students engage in procedural skill work of counting and writing numerals as they complete the worksheets. The teacher plans to connect to prior knowledge by emphasizing previous work with counting, writing numerals to represent the quantity of groups, and decomposing 7, 8, and 9 in different ways. Students will also have opportunities to continue to develop their practice with counting and cardinality in the context of decomposing numbers. They will also discuss the idea that the quantity of objects in a group can be the same as the quantity in another group, even if the arrangements of the objects in the two groups looks different.

Core Action 2:
Employ instructional practices that allow all students to learn the content of the lesson.

Discussion Questions

- **How does the teacher plan to use explanations, representations, tasks, and/or examples that will make the mathematics of this lesson clear to students?**
- **What will students produce? Are they expected to produce only answers?**
- **What ideas/concepts will be the focus of discussions?**
- **How will students share/present their mathematical work to support all students' understanding of the topic?**
- **When in the lesson does the teacher plan to check for understanding?**
- **How does the teacher plan to summarize the mathematics of the lesson? Will the summary include student work and discussion to reinforce the mathematical learning goal of the lesson?**

The teacher plans to use the visual representations of quantities on playing cards and record the decompositions with equations. He will show different representations and ask students to compare, but the plan does not make clear how he will help students to understand the idea that the cardinalities are the same even though the collections look different. There is no explanation of how he will address the idea that 10 can be decomposed into different parts.

Students will work to decompose 10 in different ways and produce visual models and matching equations to describe the decompositions. In the "Introducing" section, students will be asked to compare two decompositions of 10 into 2 and 8. Students will be asked to describe the similarities and differences. In Step 5, discussion will focus on connecting the two visual models to the same equation. In whole group and small group, students will share and compare their decompositions of 10.

The teacher has identified that he will use the daily work as well as multiple small problems to check for understanding. Questions in the third column of the lesson plan may be used as checks for understanding, but they do not always relate to the specific work of the lesson.

There is a plan for summarizing the lesson by having students share two or more pieces of work. The selected responses mirror the work displayed at the beginning of the lesson. The plan is for students to be guided to articulate the key similarity (same cardinality) and difference (arrangement) between the two pieces of work.

Core Action 3:
Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.

Discussion Questions

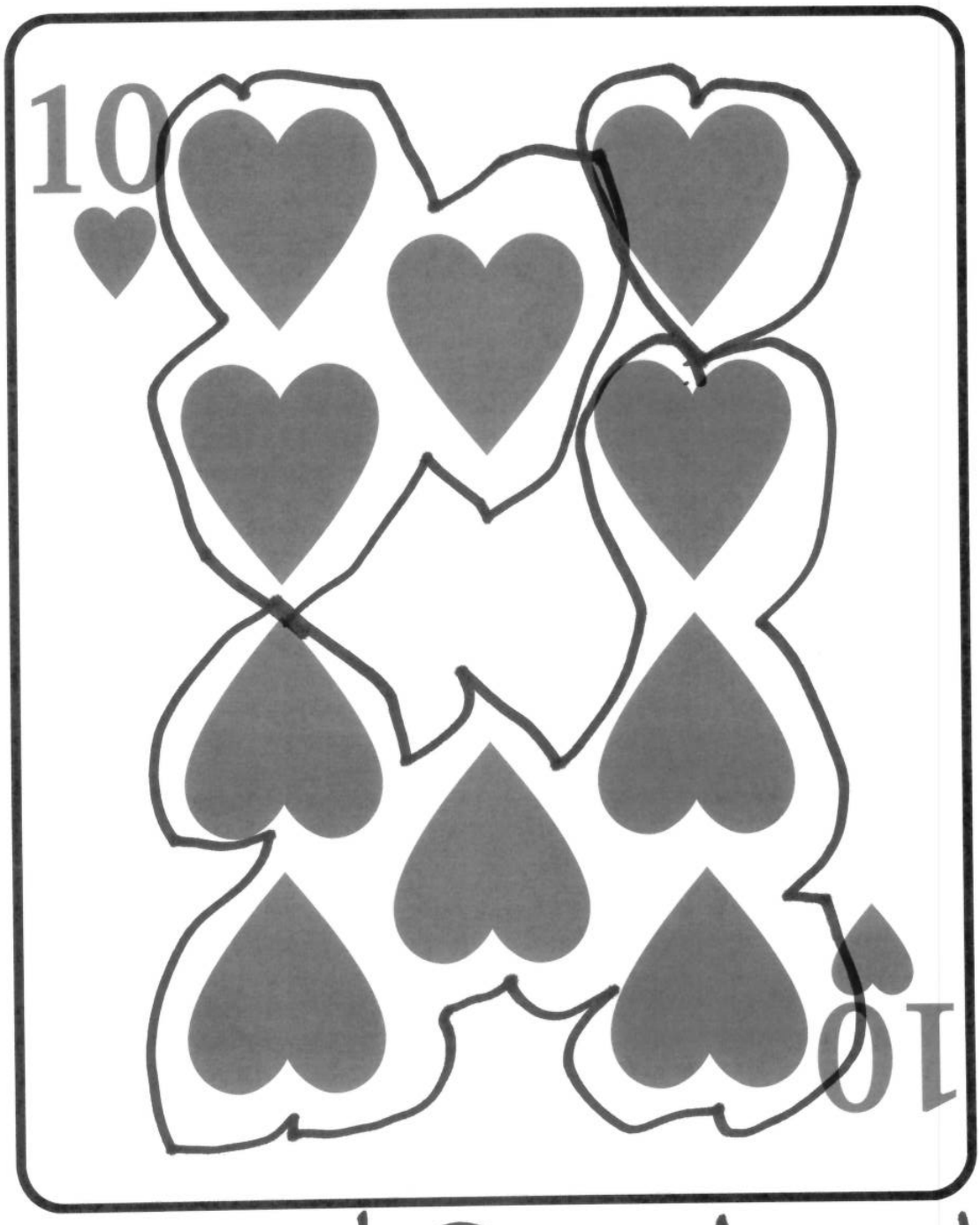
- **What mathematical language will be used in this lesson? How will the teacher support students' use of increasingly precise language, including for English language learners if applicable?**
- **Are mathematical models, mathematical representations, mathematical arguments, and mathematical counter-arguments expected from students, as required by the standards? What problem(s) and question(s) will allow students to share their thinking and/or justify their conclusions?**
- **When will students be doing grade-level problems and exercises? Will all students have this opportunity?**

The lesson plan does not contain a list of the precise mathematical terms and language the students will use during the lesson. However, the teacher does plan to ask students to restate ideas frequently, which is a strategy that supports English language learners. In the "summarizing" section, the plan notes that the teacher will "push students to describe using precise mathematical language what is the same (the number in the groups) and what is different (where the groups are visually)."

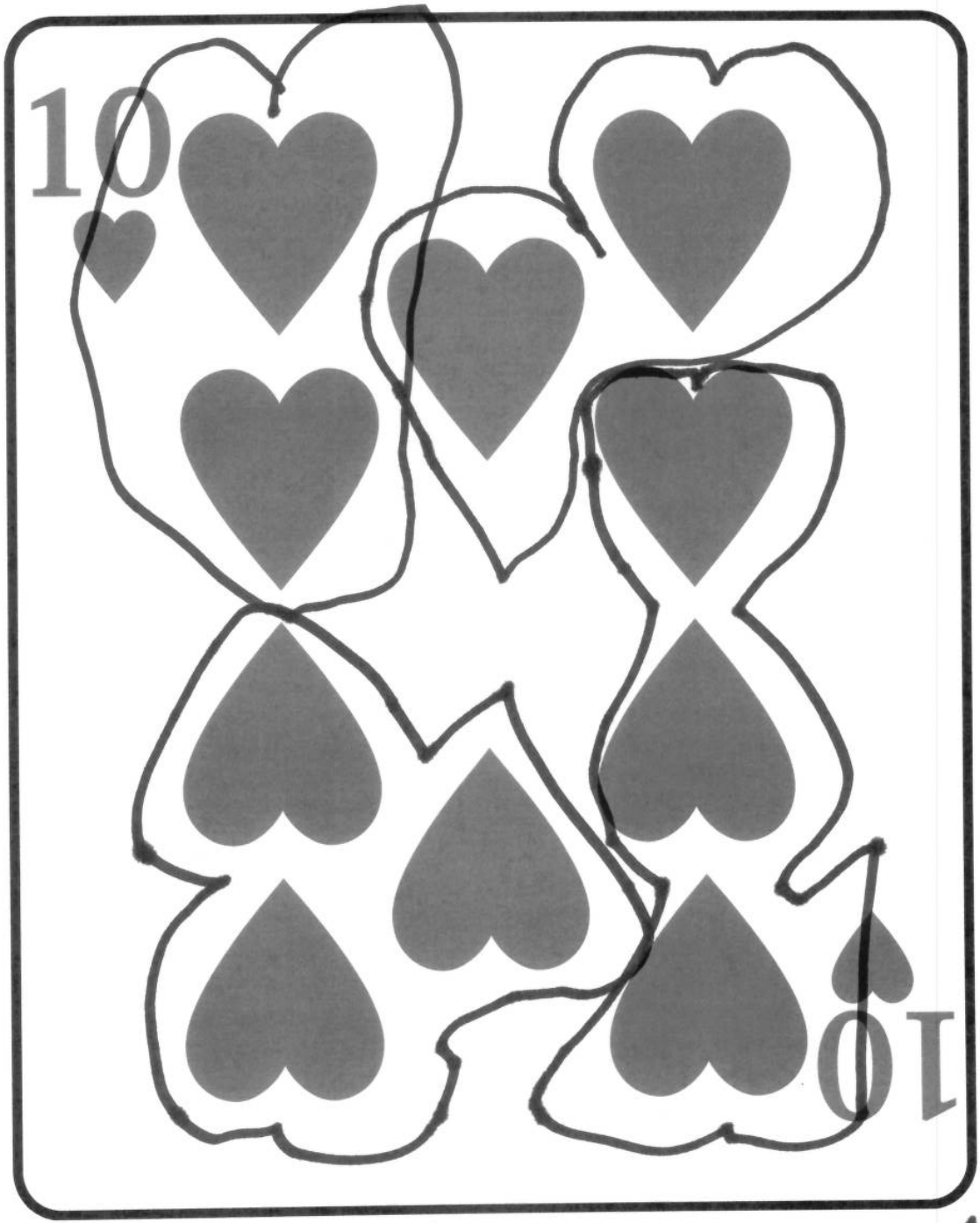
Some of the questions in the third column may allow students to share their thinking and justify their conclusions (e.g., "Why do you think that?"; "How did you get your answer?").

Student Work Samples

Student A

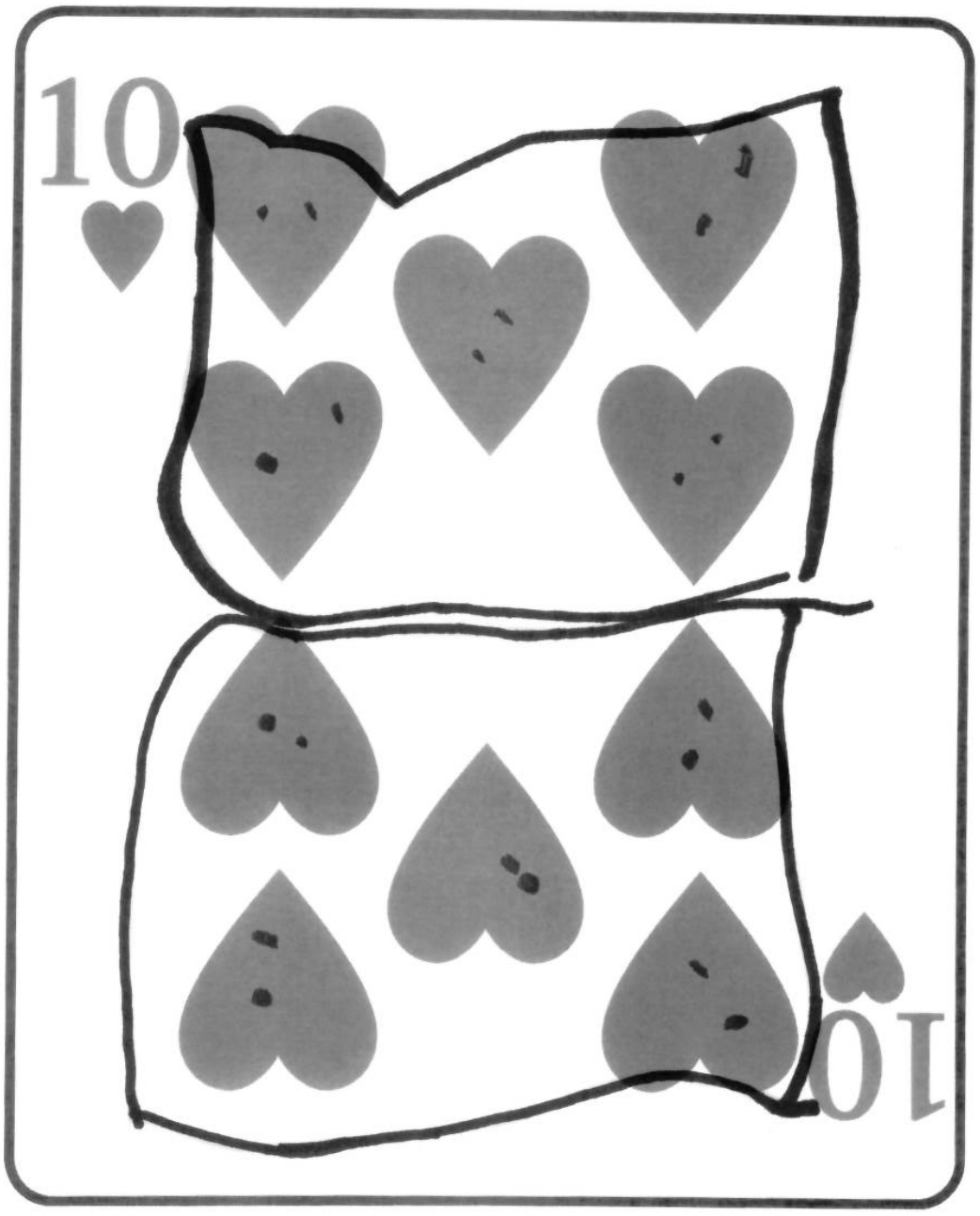


Student A



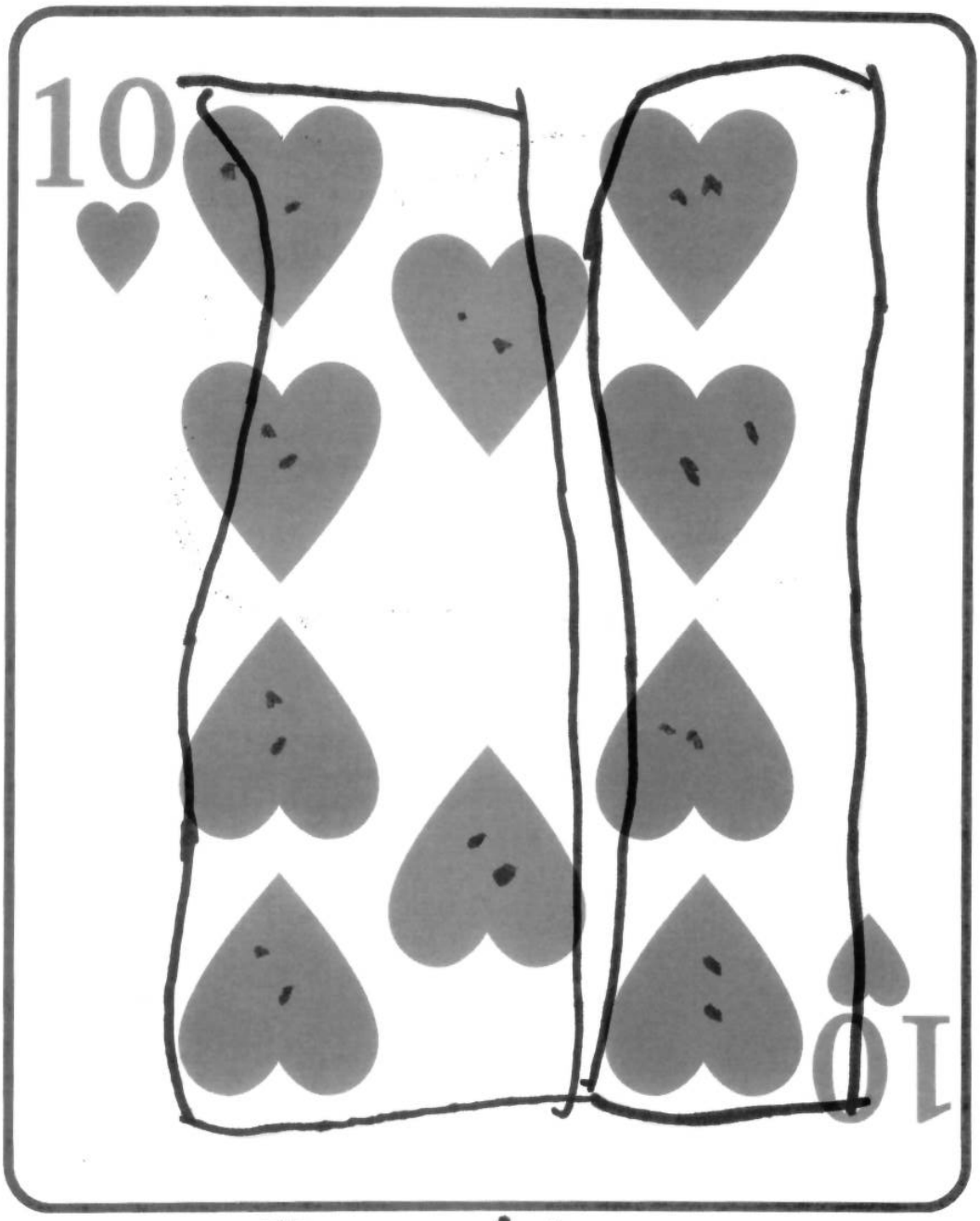
6 × 4 = 10

Student B



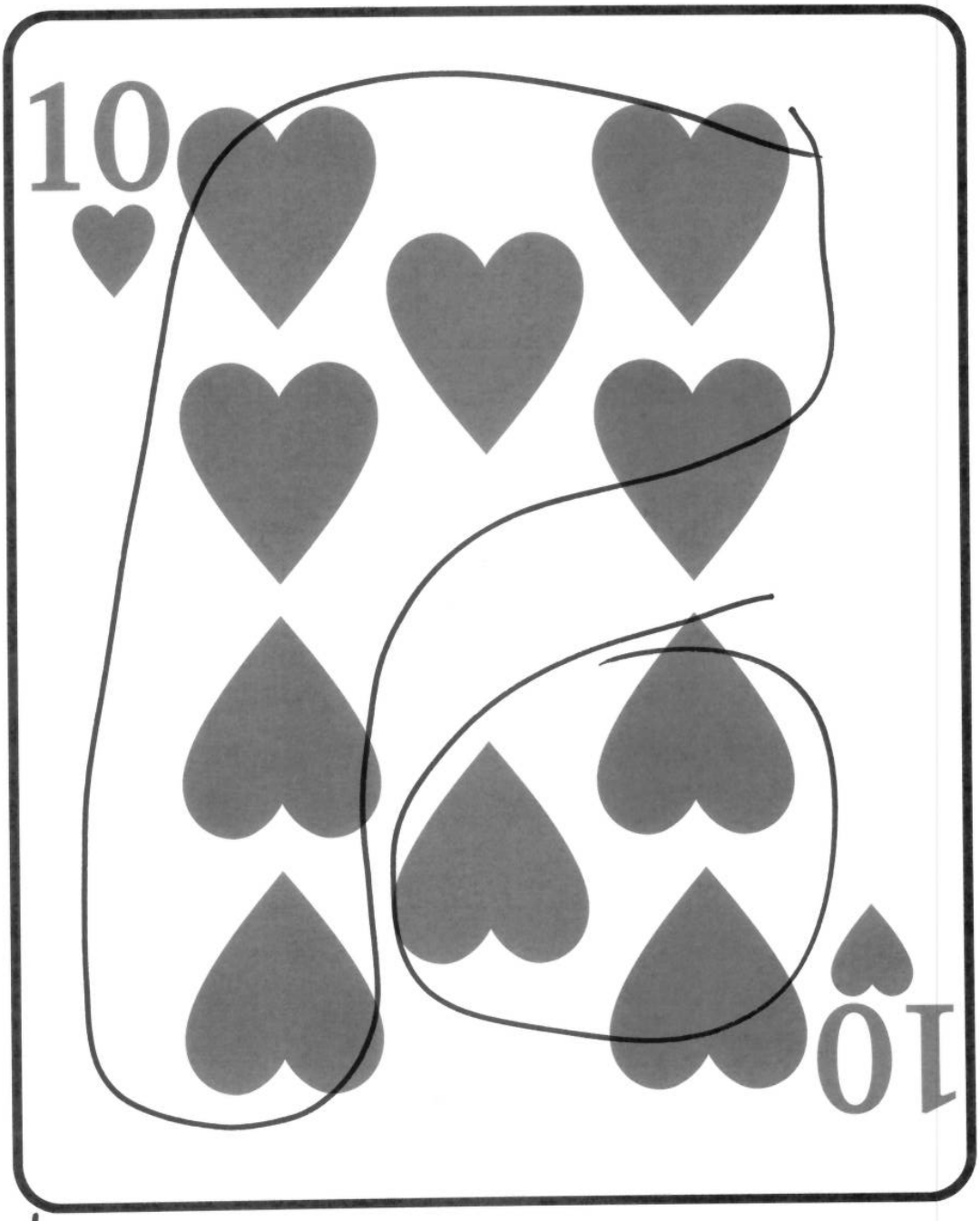
5≠5=10

Student B



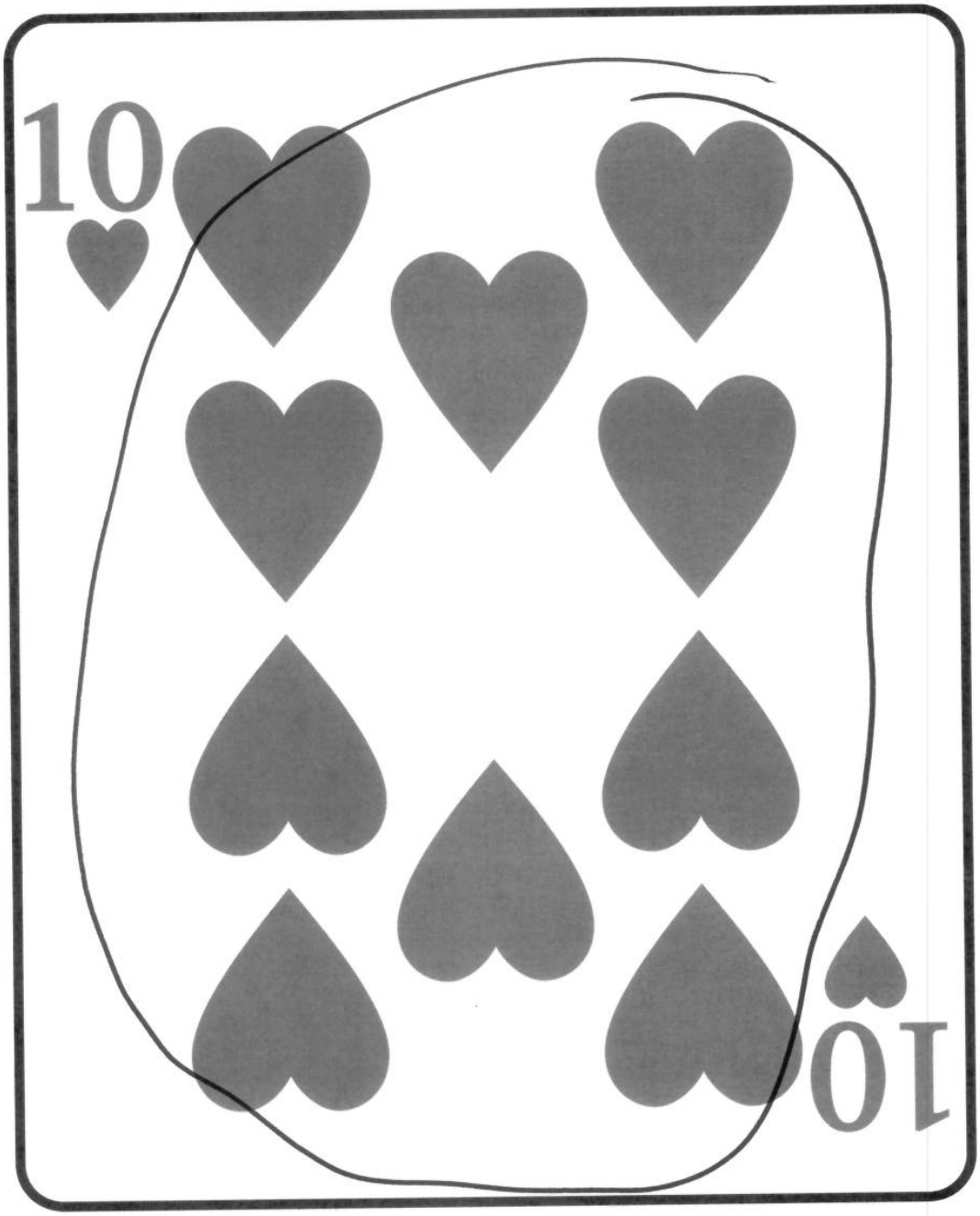
6+4=10

Student C



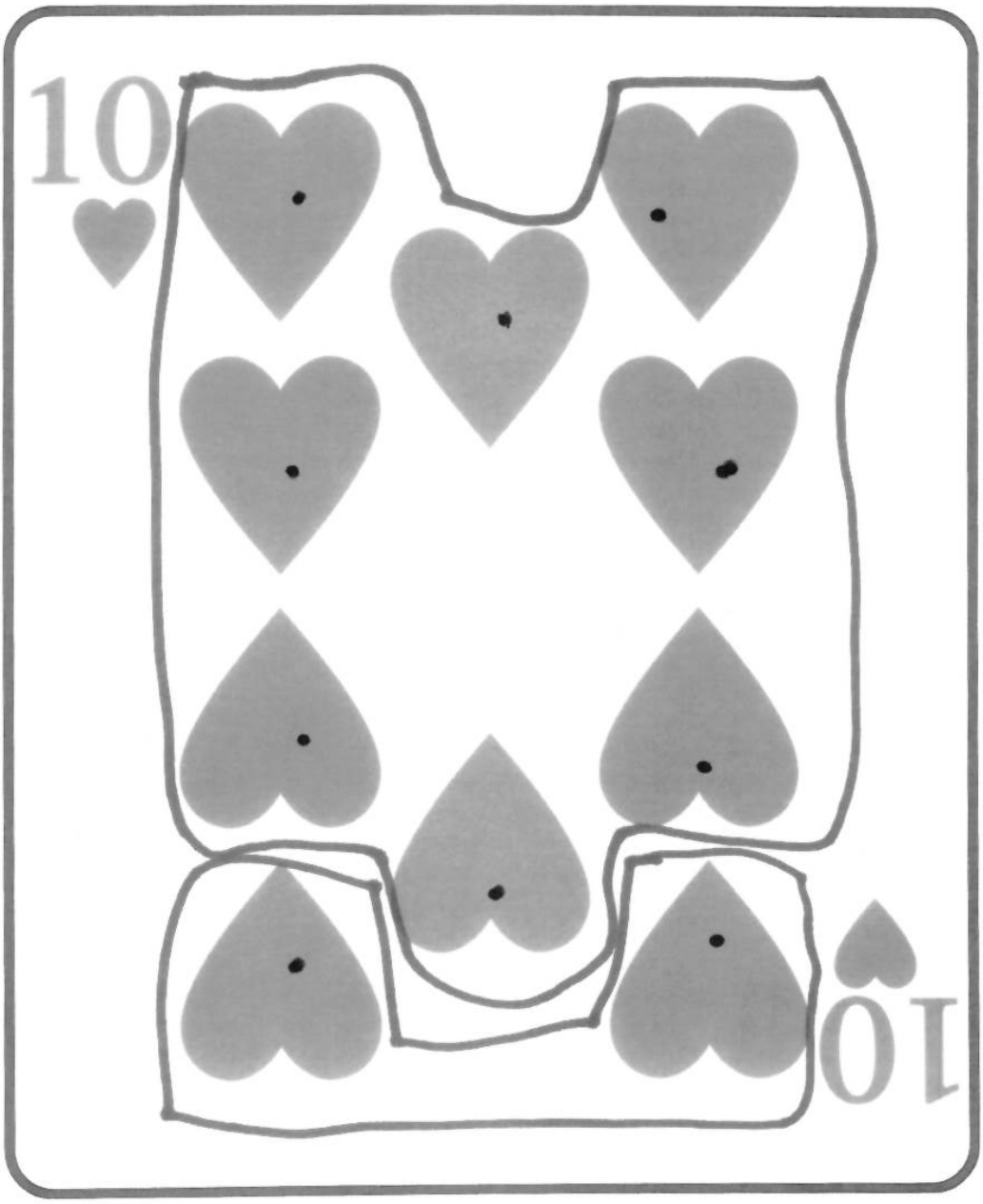
$10 = 3 + 7$

Student C



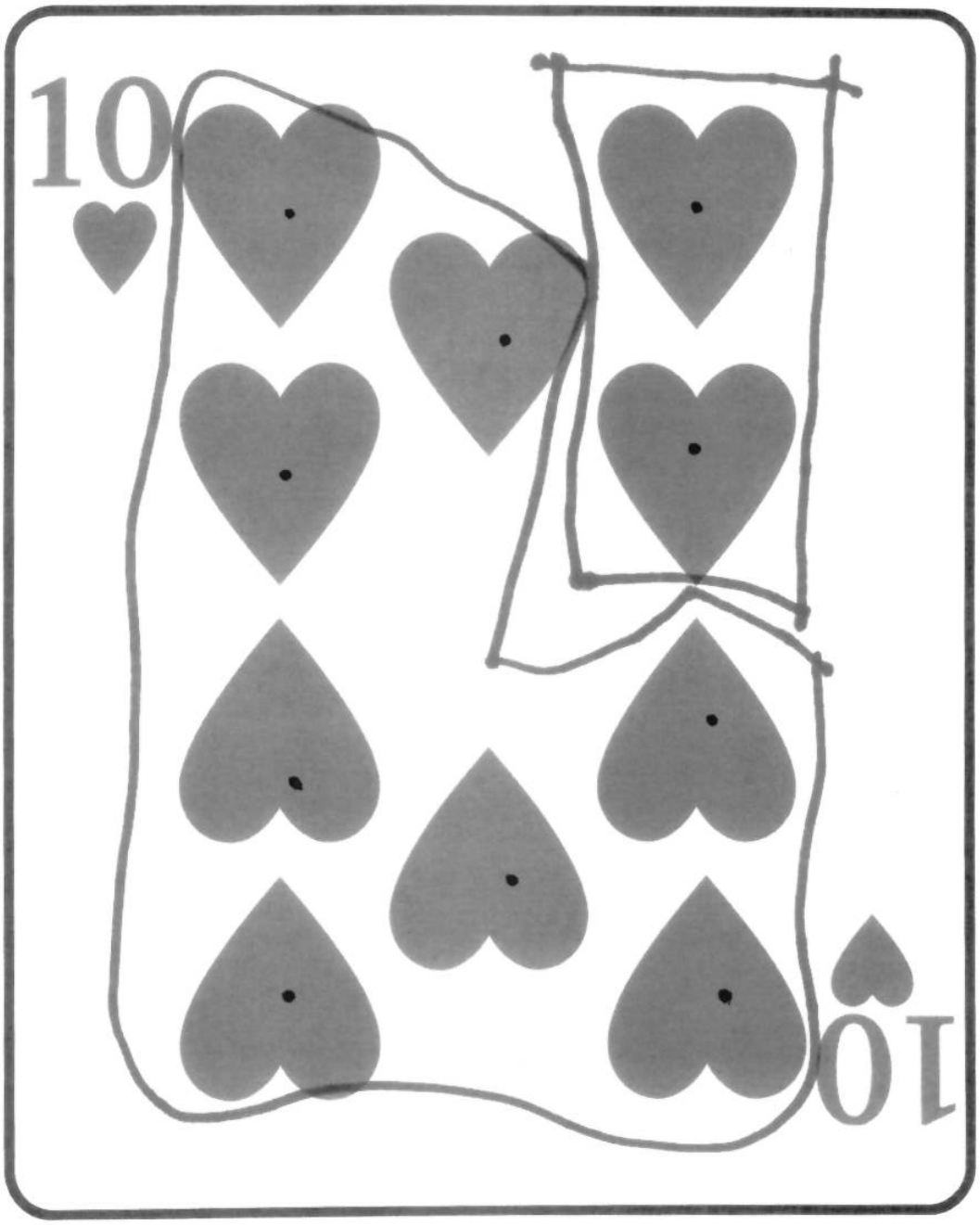
$10 = 10 + 0$

Student D



10+2=8

Student D



8+2=10

Student Work Analysis

Lesson: _____

Use this document to record information/evidence from the sample student work. Evidence should consider the Core Actions. Evidence recorded will be integrated into the Feedback Summary worksheet. ***Before analyzing student work, be sure to have first completed the student assignment.***

General notes and observations about the task:

1. **Which standard(s) and/or cluster(s) are targeted in this assignment? Are they grade-level standards?**

2. **What is the mathematical purpose of the assignment?**

3. **What aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, and application) does the assignment address? Explain.**

Analyzing individual student samples (worksheet on next page):

1. **What does the student's work demonstrate about his/her understanding of the expectations of the assignment?**

2. **What does the student's work demonstrate about his/her proficiency with the requirements of the targeted standard?**

(See worksheet)

Student Work Analysis Worksheet

Student Work Sample	What does the student's work demonstrate about his/her understanding of the expectations of the assignment?	What does the student's work demonstrate about his/her proficiency with the requirements of the targeted standard?
Student A		
Student B		
Student C		
Student D		

Note: For a collection of more than four samples of student work, print this page multiple times.

After looking at student work:

1. **How did the directions and/or prompts for the assignment allow students to demonstrate the requirements of the targeted standard(s)?**

2. **How did the mathematical content of the assignment allow students to demonstrate the requirements of the targeted standard(s)?**

3. **What patterns do you notice in the student work?**
   - **What did students do consistently well?**
   - **Were there any common errors?**

Student Work Analysis: Model Response

Lesson: Kindergarten – Decomposing the Number 10

Use this document to record information/evidence from the sample student work. Evidence should consider the Core Actions. Evidence recorded will be integrated into the Feedback Summary worksheet. ***Before analyzing student work, be sure to have first completed the student assignment.***

General notes and observations about the task:

1. **Which standard(s) and/or cluster(s) are targeted in this assignment? Are they grade-level standards?**

   The assignment targets Kindergarten standard K.OA.A.3: Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

2. **What is the mathematical purpose of the assignment?**
   Students examine a visual representation of 10 objects and decompose it into two groups. They record the decomposition with an addition equation. By completing multiple sheets, students should show different decompositions of 10.

3. **What aspect(s) of Rigor (conceptual understanding, procedural skill and fluency, and application) does the assignment address? Explain.**
   The assignment addresses conceptual understanding. Students need to connect the visual model to a written equation. This assignment also addresses procedural skill. Since the objects on playing cards are arranged in fairly scattered arrangements, most kindergarteners will use counting, not subitizing, to determine the number of objects in the two groups.

Analyzing individual student samples (worksheet on next page):

1. **What does the student's work demonstrate about his/her understanding of the expectations of the assignment?**

2. **What does the student's work demonstrate about his/her proficiency with the requirements of the targeted standard?**

(See worksheet)

Student Work Analysis Worksheet

Student Work Sample	What does the student's work demonstrate about his/her understanding of the expectations of the assignment?	What does the student's work demonstrate about his/her proficiency with the requirements of the targeted standard?
Student A	The student understands that he/she is supposed to decompose the group of 10 hearts into groups, and that it is necessary to write an equation that equals 10 for each decomposition. However, the student does not understand that the instructions were to decompose into only two groups.	The two examples show that the student is able to decompose 10 in different ways. In the second sheet, the equation written does not match the grouping. The student circles 4 groups (3, 3, 2, and 2) and writes 6 + 4 = 10. This student may have combined the 3+3 and 2+2 shown in the visual model prior to writing the equation in only two addends. While it is unclear whether the student is using their representation to formulate the equation, he/she does effectively show that they can record a decomposition of 10 into two addends as evidenced by the equation, which is the intent of the standard.
Student B	The student understands that he/she is supposed to decompose the 10 hearts into two groups and that it is necessary to write an equation that shows the two addends equal to a sum of 10 for each decomposition.	The student is able to decompose 10 in two different ways and record each decomposition with an equation. The dots on each heart likely mean that the student tagged each heart as they counted. Since there are two dots on each heart, it is likely that the student counted the hearts in each group and then recounted all the hearts to find the total number of hearts.
Student C	The student understands that he/she is supposed to decompose the 10 hearts into two groups and that it is necessary to write an equation that shows the two addends equal to a sum of 10 for each decomposition.	The student is able to write two different equations that show sums of 10. Although 10+0 is not technically a decomposition of 10, since it does not show two groups of objects, it shows a sophisticated understanding of the meaning of 0 which is applying the understanding from K.CC.A.3.
Student D	The student understands that he/she is supposed to decompose the 10 hearts into two groups and that it is necessary to write an equation for each decomposition.	The student decomposes 10 in the same way on both papers (into 8 and 2), so he/she is not meeting the expectation of the standard to decompose in different ways. On the first sheet, the student writes an incorrect equation that might highlight a misconception about the meaning of addition or may just mean that the student is not yet able to articulate the understanding of addition through a written equation. The dots on each heart likely mean that the student tagged each heart as they counted. There is only one dot on each heart which may mean that the student did not have to recount all of the hearts to know the total number of hearts.

Note: For a collection of more than four samples of student work, print this page multiple times.

After looking at student work:

1. **How did the directions and/or prompts for the assignment allow students to demonstrate the requirements of the targeted standard(s)?**
   Directions posted during the lesson: "Decompose 10 into 2 groups. Find as many different ways as you can." (4:38)

   The directions are clear that students are to decompose 10 into two groups. The prompt from the teacher does not make clear whether "different" refers to decomposing into different-sized groups or decomposing into the same sized groups where the objects in each group are arranged differently.

2. **How did the mathematical content of the assignment allow students to demonstrate the requirements of the targeted standard(s)?**
   The arrangement of the hearts on the page encourages a variety of ways of grouping (there are rows, columns, diagonals). Since students are completing a single page at a time, it is unclear whether this assignment will address the part of the standard that requires students to decompose a number in more than one way.

3. **What patterns do you notice in the student work?**
   - **What did students do consistently well?**
     Students were consistently able to decompose the 10 objects into two groups and all students wrote equations. Almost all of the work shows correct equations to represent the decompositions.

   - **Were there any common errors?**
     There were no errors that more than one student made.

Feedback Summary

Lesson: _____

Using the completed Instructional Practice Guide, the Lesson Plan Analysis, and Student Work Analysis, consider the aggregate strengths and considerations for the lesson. Choose relevant Beyond the Lesson questions to guide longer-term reflection.

Evidence of the Shifts and standards-aligned practice	Areas where alignment to the Shifts and standards can improve
Core Action 1: Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by the college- and career-ready standards in mathematics.	
Core Action 2: Employ instructional practices that allow all students to learn the content of the lesson.	

Evidence of the Shifts and standards-aligned practice	Areas where alignment to the Shifts and standards can improve
Core Action 3: Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.	
Beyond the Lesson ***Choose relevant Beyond the Lesson questions to guide longer-term reflection.***	

Implications and Next Steps

Feedback Summary

Lesson: Kindergarten – Decomposing the Number 10

Using the completed Instructional Practice Guide, the Lesson Plan Analysis, and Student Work Analysis, consider the aggregate strengths and considerations for the lesson. Choose relevant Beyond the Lesson questions to guide longer-term reflection.

Note for Facilitator: *The italicized statements can be used for group discussions, as a basis for developing questions for a coaching conversation with the teacher, or for participants to take a deeper dive into adapting the lesson and deepening their understanding of mathematics and the Shifts required by college- and career-ready standards.*

Evidence of the Shifts and standards-aligned practice	Areas where alignment to the Shifts and standards can improve
Core Action 1: Ensure the work of the enacted lesson reflects the Focus, Coherence, and Rigor required by the college- and career-ready standards in mathematics.	
• The mathematics planned for and executed in the lesson is on grade-level. • There were many opportunities for students to engage with new content while reinforcing their developing concepts and skills with counting and cardinality. • Although the single lesson doesn't get to the full intent of the standard K.OA.A.3, the planned sequence of lessons in the unit may address the full intent.	• The lesson would have been more strongly aligned to the standard if there was a stronger emphasis on the conceptual understanding that the total number of hearts will always be 10 regardless of the chosen decomposition into two smaller groups. *Consider alterations to the lesson, including question prompts that would encourage students to understand that decomposing a number in multiple ways does not change the total.* • Though the lesson plan shows students will work on comparing decompositions of 10 in future lessons, there were opportunities in this lesson to begin naming and discussing the different decompositions of 10 (not just different arrangements.) *Consider alterations to the task or discussion questions that would encourage students to begin considering the multiple ways 10 can be decomposed, as expected in standard K.OA.A.3.*
Core Action 2: Employ instructional practices that allow all students to learn the content of the lesson.	
• The teacher consults with small groups to check for understanding and adapts instruction (through questioning) to individual students based on their work. • The teachers strategically chooses when to share student work, particularly in small group discussions, to help students think about different arrangements of the same number of hearts.	• The teacher does not bring the misconceptions or the variety of decompositions discovered in small groups to the full class. *Consider which ideas that came up in small group discussion would have been beneficial to share with the class. Consider the relationship of these ideas to standards in the OA and CC domain.* • The lesson summary didn't move the learning along or help students *progress from where they were in their learning at the start of class. Consider which student work (from the work samples) could have been shared in the summary to move students along with their*

Evidence of the Shifts and standards-aligned practice	Areas where alignment to the Shifts and standards can improve
	understanding of decomposing numbers to 10. Also consider whether there is a particular order to sharing the work that may support all students in understanding the mathematics targeted in this lesson.
Core Action 3: Provide all students with opportunities to exhibit mathematical practices while engaging with the content of the lesson.	
• Students are fully engaged in doing grade-level mathematics. • The teacher encourages perseverance and productive struggle by providing wait time, being supportive of student's mistakes, and spending extended time with many students in the class to talk about their work. • The teacher frequently asks students to restate and repeat their thinking or their peers thinking. He models what this looks like. This has clearly resulted in an environment where students are eager to share their thinking with each other. • The teacher repeatedly asks students to consider the work and thinking of others in the class.	• In the lesson, students quickly completed many worksheets, both creating the decompositions and writing the corresponding equations. Many students seemed ready for more challenging work. *Consider follow-up questions or tasks for students who are showing initial success.* • The conceptual understanding in the lesson could have been strengthened using representations of 10 objects other than playing cards. Since students used the cards in previous lessons, it is unclear whether they are now just following a set of steps or whether they can generalize the idea of decomposition of a number of objects regardless of their arrangement and presentation. *Consider other representations that would strengthen student understanding.*
Beyond the Lesson ***Choose relevant Beyond the Lesson questions to guide longer-term reflection.***	
• Summarize how this lesson fits within the unit. Describe how the other lessons and tasks in this unit are intentionally sequenced to help students develop increasingly sophisticated understanding, skills, and practices. • Which of the three aspects of rigor (conceptual understanding, procedural skill and fluency, and application) are attended to within this unit? If more than one aspect is attended to, when in the unit are they attended to individually, and when are students using them together? • In what ways have you seen your students increase their independence in applying the Standards for Mathematical Practice in learning content this year? Which practice standards do students still need to develop and how can you support them in doing so?	

Implications and Next Steps

Note for facilitator: Participants could use this space to reflect on questions 1 & 2, the role-specific questions, or one or more of the italicized statements from above.

1. Based on your role in the learning community, how did examining all aspects of this lesson impact your work?
2. Based on your role in the learning community, what resources and strategies could be used to encourage and support aligned instructional practice in the classroom?

Role-Specific Reflection Questions:

- **Superintendent/District Leader** – How can I direct resources to improve standards-aligned instruction in classrooms?
- **School Leader** – What building conditions must exist to support standards-aligned instruction in classrooms?
- **Coach** – How can content-based feedback help prioritize professional learning and coaching activities to support teachers with standards-aligned instruction?
- **Teacher** – Which aspects of your instructional practice provide all students with access to grade-level standards-based content and tasks? Which aspects do not?
- **Parent** – Where do you see evidence of standards-aligned instruction in your child's classroom?
- **Partner organization** – How does our organization's theory of action and activities with districts and partners support standards aligned instruction in classrooms?