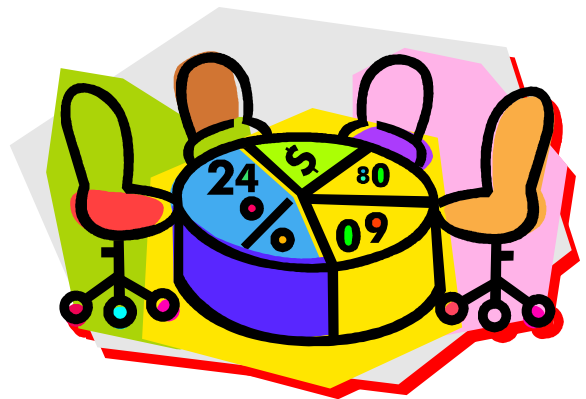

Formative Assessment Probes and Interventions

A Companion Tool for Math Trailblazers

Grade 5

2010–2011



State Board of Education

Teri Quinn Gray, Ph.D., President
Jorge L. Melendez, Vice President
Gregory B. Coverdale, Jr.
G. Patrick Heffernan
Barbara B. Rutt
Terry M. Whittaker, Ed.D.
James L. Wilson, Ed.D.
Lillian Lowery, Ed.D., Executive Secretary
Judi Coffield, Ed.D., State Board Policy Analyst

Officers of the Department of Education

Lillian Lowery, Ed.D.
Secretary of Education
Daniel Cruce, Esq.
Deputy Secretary/Chief of Staff
Amelia E. Hodges, Ed.D.
Associate Secretary of Education
College and Workforce Readiness
Karen Field Rogers
Associate Secretary of Education/Chief Financial Officer
Financial Reform and Resource Management
Linda B. Rogers, Ed.D.
Associate Secretary of Education
Teaching and Learning

The Department of Education is an equal opportunity employer. It does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, marital status, disability, age, or Vietnam Era veteran's status in employment or its programs and activities. Inquiries should be directed to the Department's Human Resource Officer, 401 Federal Street, Suite 2, Dover, Delaware 19901, Telephone No. (302) 735-4030.

Document No. 95-01/10/09/13

Table of Contents

A Case for Formative Assessment	1
Formative Assessment: Delaware’s Vision of Response to Intervention	3
Progress Monitoring	8
Acknowledgements	10
5 th Grade DPP Probes	12
5 th Grade Math Trailblazers Directions and Interventions	40

A Case for Formative Assessment

Delaware has adopted the definition of **Response to Intervention** as published by the National Association of State Directors of Special Education (2005):

“RTI is the practice of providing high-quality instruction and intervention matched to student need, monitoring progress frequently to make decisions about change in instruction or goals and applying child response data to important educational decisions. RTI should be applied to decisions in general, remedial and special education, creating a well-integrated system of instruction/intervention guided by child outcome data.”

Delaware’s three-tiered RTI model is an efficient and effective model that emphasizes high-quality differentiated instruction based on meeting the needs of each student using data collected during formative assessment, diagnostic assessment, and summative assessment.

Successful implementation of **Response to Intervention** requires Delaware educators to:

1. Believe that you can effectively teach all students.
2. Use a research-based, scientifically validated core curriculum with fidelity.
3. Use assessment data to inform your instructional decisions.
4. Use a problem-solving method to make decisions within a multi-tier model of service delivery.
5. Use research-based, scientifically validated interventions matched to student need.

In response to these five principles, the Delaware mathematics community designed the **Response to Intervention** project. Formative assessment is the cornerstone of the Delaware **RTI** model based on the strongest possible research-based evidence connecting the use of diagnostic assessment and descriptive feedback to improved student achievement (Black, P., & Wiliam, D., 1998; and Crooks, 1988). We adopted the Chief Council of State School Officers’ definition and five critical attributes of formative assessment listed below.

Formative assessment is a process used by teachers and students during instruction that provides feedback to adjust ongoing teaching and learning to improve students’ achievement of intended instructional outcomes.

Effective use of formative assessment requires attention to the following attributes:

- **Learning Progressions:** Learning progressions contain clearly articulated sub-goals of the ultimate learning goal.
- **Learning Goals:** Learning goals and criteria for success are clearly identified and communicated to students.
- **Descriptive Feedback:** Students receive evidence-based feedback linked to the intended instructional outcomes and criteria for success.
- **Self- and Peer-Assessment:** Substantial student self- and peer-assessment are important for providing students an opportunity to think meta-cognitively about their learning.

- *Collaboration:* Practitioners establish and support a classroom culture in which teachers and students are partners in learning.

(Developed and approved by the CCSSO Formative Assessment Advisory Group and Formative Assessment for Teachers and Students (FAST) SCASS, October 2006)

These formative assessment principles have been used to build curriculum-based templates that guide teachers through the process of identifying learning gaps and implementing interventions. The work is remedial in nature and designed to be integrated with acceleration strategies. We invite you to join this stage of development.

Formative Assessment: Delaware’s Vision of Response to Intervention

As much as possible, as we wrote this document, we tried to imagine what this kind of implementation of Response to Intervention would look like in classrooms. We tried to imagine formative assessment in all of its messiness, as well as its potential, in order to create a document that would provide practical support to teachers as well as vision.

Delaware’s RTI program is designed to occur within the classroom setting, using the curriculum materials that districts are already using. Teachers are supposed to analyze student work on pages that are part of the lessons themselves, and then use class time to intervene with students in need of Tier 1 intervention. While this may sound simple in conception, it is actually very complex and calls upon teachers to be experts in management, assessment, planning, and teaching.

Classroom Management and Classroom Culture

Tier 1 of RTI may require teachers to carefully observe students as they work, ask “in the moment” questions, and carry out interventions with individual, pairs, or small groups of students during class time. For this to be accomplished they need to establish a classroom culture which will allow this. Students need to learn to:

- Work productively by themselves and with others.
- Get, share, and return the materials they need.
- Ask and receive help from other students when the teacher is unavailable.
- Find something else productive to do when they are finished or stuck.

For help establishing such a culture, we recommend these resources:

- “Building the MTB Classroom,” Section 10 of the *Math Trailblazers Implementation Guide 3rd Edition*. This section focuses on establishing a flexible and challenging learning environment for all students. Strategies include addressing classroom culture, effectively grouping students, managing manipulatives, and pacing instruction.
- *The First Six Weeks of School* by Paula Denton and Roxann Kriete.
- Getting Metacognition Out of the Closet
(<http://investigations.terc.edu/library/implementing/qa-1ed/metacognition.cfm>)

Assessment

In order to gain as much information about students as possible, teachers need to assess their students in many ways. Teachers need to:

1. Observe students as they work and take notes in an organized way.
2. Carefully analyze student work on the formative assessment checkpoints after class.
3. Think about student understanding and misunderstanding not just in terms of “getting it” or “not getting it,” but in specific language that describes what the student does or does not understand. In analyzing student work as part of this project, we found that most student mistakes or difficulties fell into one of these categories:

- a. Lack of conceptual understanding;
- b. Inefficient strategy;
- c. Misusing or not using an important mathematical tool or representation;
- d. Difficulty with verbal or written communication;
- e. No connection to prior knowledge.

Recommended resources:

- “Assessment,” Section 8 of the *Math Trailblazers Implementation Guide 3rd Edition*. This section details the philosophy, goals, and components as well as a description of how to do observational assessment.
- The “ongoing assessment” section of each lesson in the curriculum.
- “Math Facts and Whole Number Operations,” Section 6 of the *Math Trailblazers Implementation Guide 3rd Edition*.
- How Do I Organize My Observations?
(http://investigations.terc.edu/library/implementing/qa-led/organize_observations.cfm)

Planning

In order to create lessons and interventions that help all students learn, teachers need to carefully plan their lessons. While management of materials and students is extremely important, **it is also extremely important that teachers plan the mathematical focus of their lessons**. For every activity, class discussion, or intervention, teachers need to figure out ahead of time what mathematical skills, concepts, or strategies they are trying to develop in their students. Much of this information can be gathered from

- Reading the “Background Information” section in each unit of the *Math Trailblazers Implementation Guide 3rd Edition*.
- Reading the lessons carefully.
- Doing the math ahead of time and anticipating student responses.
- Reading the “Lesson Overview” and the “At-A Glance” in each lesson of *Math Trailblazers Implementation Guide 3rd Edition*.

Class discussions are often not planned carefully ahead of time, and the students who are most affected by this lack of planning tend to be struggling students. Class discussions that are carefully focused, follow clear trains of thought, and draw clear connections among different strategies or ideas will extend the learning of all students in important ways.

Recommended resources for planning class discussions are:

- How Can I Help Special Needs Students Feel Included in Math Discussions?
(http://investigations.terc.edu/library/implementing/qa-led/special_needs_class_disc.cfm)
- “Inclusive Math Communities” (http://investigations.terc.edu/library/implementing/qa-led/inclusive_communities.cfm)
- “Meeting Individual Needs,” Section 11 of the *Math Trailblazers Teacher Implementation Guide 3rd Edition*. This section specifically focuses on the needs of the

English Language Learner, special education students, and talented and gifted students.

- “Language,” Section 12 of the *Math Trailblazers Teacher Implementation Guide 3rd Edition*. This section focuses on the use of language and gives strategies for working with reading comprehension, writing, and discourse in a math classroom.

Likewise, when teachers are intervening with students, they need to carefully think about the primary goal(s) for their intervention. Not all interventions are designed for the same purpose. Some are designed to help the student who is lagging behind in conceptual understanding of a topic. Others are written to improve computation, communication, representation, and connections.

- **Conceptual Leap** – This type of intervention is designed to prompt students to develop or clarify a particular concept or generalization. For example, a second-grade teacher might design an intervention to prompt a student to develop a generalization about breaking 2-digit numbers into 10s and 1s. Or, a teacher may need to diagnose where the child is in a specific learning trajectory and use an intervention based on the child’s concept knowledge.
- **Computation Efficiency** – This type of intervention is designed to help students understand and use more efficient computation strategies. For example, a third-grade teacher might design an intervention to prompt students who are drawing pictures to solve multiplication problems, to begin using skip counting instead. A primary teacher might look at a student who is counting all and design an intervention for counting on.
- **Use of Tools or Models** – This type of intervention is designed to help students learn to use a particular tool or model to solve problems. Students in need of this intervention may not understand how a model relates to the mathematics. A fourth-grade teacher might design an intervention to help students understand and begin to use an array model to solve multiplication problems with 2-digit numbers. A primary teacher may design an intervention to help students make sense of a tens frame.
- **Communication** – This category includes both interventions designed to help students read and understand what a problem is asking and interventions designed to help students clearly communicate their thinking both verbally and in writing. It also includes carefully structuring a lesson so that vocabulary that is unknown (like campfire) does not get in the way of solving a problem. A fifth-grade teacher might design an intervention to help students read and make sense of multi-step word problems. Another fifth-grade teacher might design an intervention to help students record their work on multi-step word problems in a way that was clear and concise.
- **Prior Knowledge or Experiences** – This category of intervention is designed to prompt students to make connections among work they did earlier in the year or in a previous year and a current mathematical concept or task. For example, a fourth-grade teacher might design an intervention in which students divided a paper brownie into fractional parts and labeled the parts as they had in third grade. The purpose of this intervention would be to remind students of what they did know about fractions in order to prepare them for the fourth-grade fraction tasks.

Teaching

In thinking about the teaching of interventions, we asked ourselves two basic questions:

- When would interventions happen?
- What would interventions look like?

Teachers who have a 15-minute class time for doing Daily Practice Problems (DPPs) have utilized this time to bring a small group together. Other teachers have started a lesson with the whole class and find time to pull a small group together while the rest of the class is working in small groups. Some schools are finding daily “intervention” time and sharing that time between English language arts and mathematics. While some students are receiving Tier 2 intervention outside of class, others can receive Tier 1 intervention or extension activities.

What the teaching of interventions should look like was a broader question for us. Most of the interventions we wrote are written as small-group activities, facilitated by the teacher, and can be implemented as such. However, we are aware that teachers may not always be available to lead small-group lessons, and sometimes the number of students needing an intervention might be more than a “small group.” We also recognize that teachers may also not find it beneficial to gather the same students for small-group lessons too frequently. We do not want these students to become stigmatized in the eyes of their peers or themselves, and we do not want these students to become overly dependent upon adult help. We imagined that most interventions could be accomplished in one of four forms, with different forms being preferable under different circumstances. The four forms are:

- **Small-group lessons with the teacher** – This form is suggested most frequently in our intervention probes. In this form of intervention, the teacher meets target group of students for 10 to 25 minutes during the regular math class to provide interventions.
- **Strategic partnering of students** – In this form of intervention, a teacher carefully chooses particular students to collaborate as partners based on the belief that in working together one or both children will help the other child develop a particular skill or understanding. For example, a teacher might choose to have a student who had difficulty using a number line to solve subtraction problems work with a student who is able to use a number line to solve subtraction problems with the goal that the student who is having difficulty using the number line will learn from the other child. We recommend that teachers who use strategic partnering tell students in clear, but tactful language, what they hope the students will each contribute to and gain from the partnership. Strategic partnering could be especially helpful for students who lack vocabulary or background knowledge.
- **Whole-class interventions** – In this form of intervention, a teacher may modify a task for the whole class or plan a whole-class discussion in a particular way, based upon information learned from analyzing student work. For example, a teacher who realized that many students in her class have difficulty with the initial tasks in the fourth-grade fraction unit might revisit a third-grade fraction lesson with her whole class in order to activate the prior knowledge of all of the students in the class. Another teacher whose class was not clearly recording their work might take a lesson for addition strategies and focus on how each strategy could be recorded clearly.
- **Modification of tasks for particular students** – In this form of intervention, a teacher

modifies a task or substitutes a different task for particular students based upon the learning goals for those students. For example, a third-grade teacher may have three students in her class who are just learning to add numbers by place. The teacher might give those three students the same word problems that she gives the other students in her class but changes the numbers in the word problems to make them 2-digit numbers instead of 3-digit numbers. That same teacher could also have the three students play a second-grade game during a Tier 1 math time as a way to improve their number sense and understanding of place value. This modification or substitution of a task is a good way to foster independence and perseverance among students who often ask for help. It can also be an effective homework strategy. By modifying a task or substituting a different task, a teacher can provide homework that can be done independently by the child and is focused on a targeted skill or concept.

We recommend the following resources for further ideas on implementing the types of interventions suggested above:

- “Meeting Individual Needs,” Section 11 of the *Math Trailblazers Teacher Implementation Guide 3rd Edition*. This section specifically focuses on the needs of the English language learner, special education students, and talented and gifted students.
- “Strategies for Special Needs Students”
(http://investigations.terc.edu/library/implementing/qa-led/special_needs_strategies.cfm)
- “How do I enrich math class to challenge gifted students?”
(http://investigations.terc.edu/library/implementing/qa-led/enrich_for_gift_students.cfm)
- “Teaching ALL Math Trailblazers Students” a differentiation opportunity in each unit.

Progress Monitoring

Selected Daily Practice Problems (DPPs) from the *Math Trailblazers* curriculum will serve as Progress Monitors for your Tier 1 students. Good teaching in the regular classroom along with a system to track students periodically will help all students meet the standards in mathematics. Look over the packet of DPPs for your grade level along with the spreadsheet that matches your grade level DPPs with the big ideas tested in the Universal Screening Tool.

Formative assessment is used to monitor student achievement.

- It is not graded but instead used to provide information about how each student in your classroom is doing based on the standards. Imagine giving each of these DPPs and walking around the room as students are working on them. The best part is that all students are doing the DPPs as a matter of fact each day, so asking students to do DPPs as you watch them work is not a new idea and children will not feel as though they are being graded.
- The teacher has a rare opportunity to watch students do math and ...
 - *ask them questions to clarify the problem,*
 - *stop them to redirect their thinking, and*
 - *probe the students who need additional help.*
- Then, by looking at the student work, the teacher can ...
 - *make a plan to have some students work in small groups based on your observations,*
 - *make a plan for whole-group instruction,*
 - *look to future lessons and use this information to teach what the students need.*
- The teacher directions are in a separate packet from the student DPPs but include a picture of the DPP formative assessment as well as three components.
 - *Suggestions for Implementation:* This section has been included and derived from the work that classroom teachers in the pilot study compiled. Since there are no teacher directions for administering DPPs in the curriculum, we asked teachers what worked best and included their findings here.
 - *Interventions:* Again, the teachers in the pilot tested some interventions and found some to be very workable. The teachers decided whether the intervention was to be large group, small group, individual, or sometimes whole class.
 - *Looking Ahead to Assess Again:* Since the DPPs do spiral, the authors looked ahead in the packet and made it very clear when this same topic was assessed in the Probes. There are many other opportunities to assess these skills during the curriculum as well, but this document takes you to the next DPP probe.
- The Universal Screening Tool includes a spreadsheet that groups questions into categories based on Numeric Reasoning. We have also grouped these DPPs into the same categories and have included a spreadsheet that shows how the student progresses. Instead of looking at one DPP at a time, the teachers decided to look at many chances to keep track of student progress by topic.

- In each grade level, there are certain manipulatives that are standard for your grade level. In almost every case, students should be given access to manipulatives when solving these problems. A rule of thumb for using manipulatives: Make available to each student what is usually given during the learning of the skill.

Please direct your questions to

- Jan Parsons, University of Delaware, janpar@juno.com
- Crystal Lancour, Department of Education, clancour@doe.k12.de.us
- Diana Roscoe, Department of Education, droscoe@doe.k12.de.us

Acknowledgements

The work on this document began in August 2008 when elementary teachers from around the state gathered with a common purpose. They were charged with interpreting the Response to Intervention (RtI) regulation to determine the path forward for implementation in mathematics. This group of teachers identified the big ideas in the elementary grades, analyzed their curriculum materials for specific formative assessment possibilities, and began the intervention writing process. Their contributions continued throughout the school year during several professional development sessions in which they provided student work to analyze and learned intervention techniques such as enhancing their questioning strategies and error analysis. The Delaware Department of Education would like to thank these dedicated professionals for the many hours of hard work that went into the initial planning and development of this document.

A Special Thank You to the Teachers and Specialists of –

Appoquinimink School District	Indian River School District
Brandywine School District	Lake Forest School District
Caesar Rodney School District	Laurel School District
Cape Henlopen School District	Milford School District
Capital School District	Red Clay Consolidated School District
Christina School District	Seaford School District
Colonial School District	Smyrna School District

Sincere thanks are also extended to the working group of mathematics educators who helped to shape, refine, and enhance the formative assessment probes to be a useful resource for Delaware teachers. Throughout the 2009–2010 school year, a consultant worked intensely with several schools during the pilot phase of this project. This dedicated group of professionals piloted the probes with their classes, participated in monthly professional learning communities throughout the year, provided student samples for analysis, and offered valuable insight to enhance the formative assessment probes and interventions.

Our Gratitude Extends to the Teachers and Specialists of –

Central Elementary School, Seaford
Welch Elementary School, Caesar Rodney
West Park Place Elementary School, Christina

The leadership team devoted a considerable amount of time and effort to the development of this document. Their invaluable contributions include countless hours of thoughtful planning, providing outstanding professional development, and providing support to teachers and schools with piloting this RtI project. The dedication and commitment to this vast and significant work demonstrates their passion and support for mathematics education!

With Great Respect, We Thank You –

Jon Manon, Valerie Maxwell, Jan Parsons, Sarah Ryan

We also express our sincere appreciation to Eric Shane, a teacher leader in the Caesar Rodney School District. He supported the work of this project through his participation in the writing and piloting phases, and also provided technical assistance with thorough edits and revisions to refine and enhance this document. Thank you!

Sincerely,

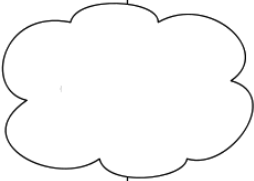
Crystal Lancour & Diana Roscoe, Delaware Department of Education

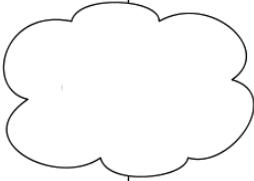
5th Grade DPP Probes

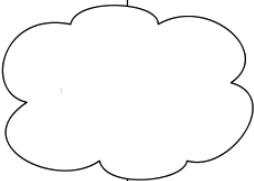
All Daily Practice Problems (DPPs) are reprinted with permission from the *Math Trailblazers 3rd Edition* (copyright 2008 by Kendall/Hunt Publishing Company), specifically the *Unit Resource Guides (URGs)*.

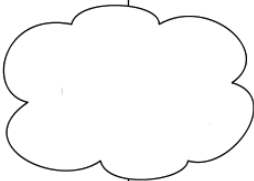
DPP A – Addition and Subtraction Practice**Unit 2**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

A. $356 + 76 =$ 

B. $1037 - 763 =$ 

C. $484 + 158 =$ 

D. $4656 - 2937 =$ 

DPP E – Making Change**Unit 2**

David buys a CD that costs \$14.49. He gives the sales clerk a \$20 bill. How much change will he receive? Name the least number of coins and bills he can receive. Show your work.

DPP G – Write the Number	Unit 2
---------------------------------	---------------

Write a number that has:
Show your work.

- A. 6 tens and 3 ones
- B. 91 hundreds and 6 tens
- C. 73 tens
- D. 8 hundreds and 14 ones
- E. 50 tens and 8 ones

.....

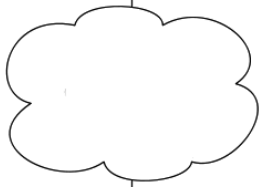
DPP O – A Juicy Problem	Unit 2
--------------------------------	---------------

Two shipments of fruit were delivered to the school cafeteria. One shipment delivered 8 sacks of oranges, 50 pounds to a sack. In the other shipment, there were 7 sacks, also 50 pounds to a sack. How many pounds of fruit were delivered to the cafeteria in all? Show your work.

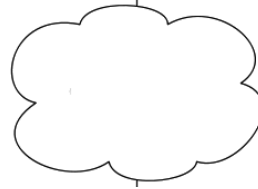
DPP V – Multiplication Practice**Unit 2**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

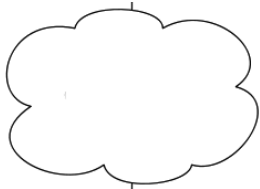
A.
$$\begin{array}{r} 46 \\ \times 7 \\ \hline \end{array}$$



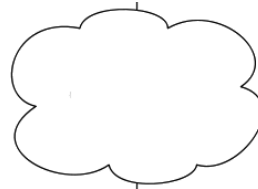
B.
$$\begin{array}{r} 77 \\ \times 16 \\ \hline \end{array}$$



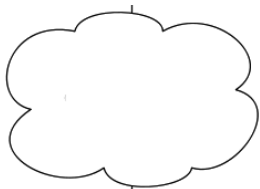
C.
$$\begin{array}{r} 54 \\ \times 35 \\ \hline \end{array}$$



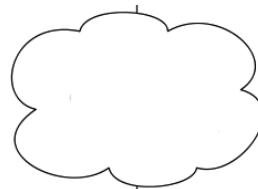
D.
$$\begin{array}{r} 38 \\ \times 30 \\ \hline \end{array}$$



E.
$$\begin{array}{r} 62 \\ \times 40 \\ \hline \end{array}$$



F.
$$\begin{array}{r} 7134 \\ \times 5 \\ \hline \end{array}$$



DPP C – Multiplying by 10s	Unit 3
-----------------------------------	---------------

Solve:

A. $30 \times 20 =$

B. $80 \times 30 =$

C. $200 \times 60 =$

D. $50 \times 300 =$

E. $1000 \times 30 =$

F. $900 \times 200 =$

G. $6000 \times 300 =$

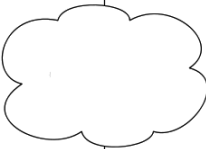
H. $20 \times 200 =$

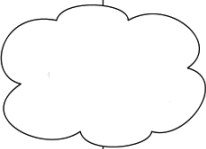
I. $7000 \times 3 =$

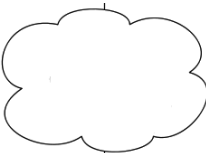
Write a rule for multiplying with zeros.

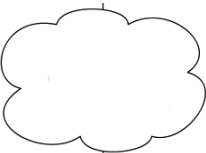
DPP G – Arithmetic Review**Unit 3**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper or mental math to find the answers.

A.
$$\begin{array}{r} 54 \\ \times 8 \\ \hline \end{array}$$
 

B.
$$\begin{array}{r} 534 \\ + 963 \\ \hline \end{array}$$
 

C.
$$\begin{array}{r} 730 \\ \times 6 \\ \hline \end{array}$$
 

D.
$$\begin{array}{r} 5001 \\ - 3989 \\ \hline \end{array}$$
 

DPP I – Mixed Numbers and Improper Fractions**Unit 3**

1. Write an improper fraction for each mixed number.

A. $\frac{15}{4}$

B. $\frac{24}{8}$

C. $\frac{29}{3}$

2. Write a whole number or a mixed number for each improper fraction.

A. $6\frac{2}{3}$

B. $9\frac{1}{2}$

C. $5\frac{1}{3}$

DPP C – Equivalent Fractions**Unit 4**

Complete the number sentences with the correct value for n.

A. $\frac{4}{8} = \frac{n}{2}$

B. $\frac{2}{3} = \frac{6}{n}$

C. $\frac{12}{9} = \frac{n}{3}$

D. $\frac{5}{12} = \frac{10}{n}$

E. $\frac{20}{16} = \frac{5}{n}$

DPP H – Fractions Between 0 and 1**Unit 4**

1. Name at least two fractions between $\frac{1}{2}$ and 1.

2. Name at least two fractions between $\frac{1}{4}$ and $\frac{3}{4}$.

3. Name at least two fractions between 0 and $\frac{1}{2}$ with a denominator of 10.

4. Name at least two fractions between $\frac{7}{8}$ and 1.

5. Name at least two fractions between 0 and $\frac{1}{2}$ with a numerator that is not 1.

DPP S – Multiplying and Dividing by Multiples of 10	Unit 4
--	---------------

A. $800 \times 80 =$

B. $25,000 \div 50 =$

C. $4900 \div 7 =$

D. $10,000 \div 10 =$

E. $40 \times 400 =$

F. $8100 \div 90 =$

.....

DPP E – Multiplying by 10s	Unit 5
-----------------------------------	---------------

A. $30 \times 90 =$

B. $80 \times 90 =$

C. $900 \times 60 =$

D. $50 \times 900 =$

E. $1000 \times 90 =$

F. $900 \times 200 =$

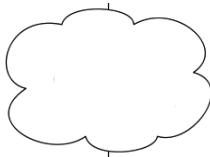
G. $4000 \times 900 =$

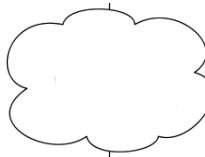
H. $70 \times 900 =$

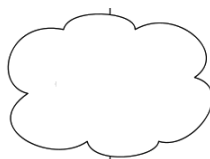
I. $9000 \times 9 =$

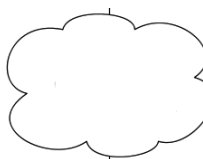
DPP N – Let's Practice**Unit 5**

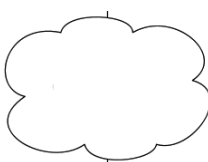
Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

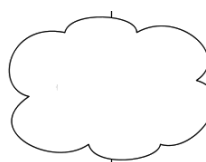
A.
$$\begin{array}{r} 18 \\ \times 63 \\ \hline \end{array}$$
 

B.
$$\begin{array}{r} 565 \\ + 739 \\ \hline \end{array}$$
 

C.
$$\begin{array}{r} 2,706 \\ - 1,187 \\ \hline \end{array}$$
 

D.
$$\begin{array}{r} 37 \\ \times 29 \\ \hline \end{array}$$
 

E. $5,170 \div 5 =$ 

F. $17,235 \div 9 =$ 

DPP T – Comparing Fractions**Unit 5**

Write a number sentence to compare the following fractions. Use $<$, $>$, or $=$ in your sentence.

A. $\frac{1}{10}$, $\frac{7}{8}$

B. $\frac{4}{8}$, $\frac{5}{10}$

C. $\frac{4}{5}$, $\frac{1}{2}$

D. $\frac{2}{3}$, $\frac{7}{12}$

E. $\frac{3}{10}$, $\frac{3}{8}$

F. $\frac{11}{12}$, $\frac{5}{12}$

Explain your thinking for Questions A and B.

DPP H – Fractions**Unit 6**

Circle the number closest to the actual sum or difference. Show how you estimated your answer.

1. $7/8 + 12/13$ is closest to:

- A. $1/2$
- B. 1
- C. $1\ 1/2$
- D. 2

2. $4/9 + 5/8$ is closest to:

- A. $1/2$
- B. $3/4$
- C. 1
- D. 2

3. $8/9 - 1/12$ is closest to:

- A. 0
- B. $1/2$
- C. 1

4. $1/2 - 4/9$ is closest to:

- A. 0
- B. $1/4$
- C. $1/2$

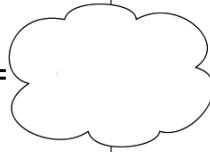
DPP I – Practice**Unit 6**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

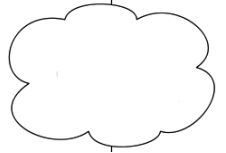
A. $870 \div 6 =$



B. $7,045 \div 8 =$



C. $34 \times 56 =$



DPP O – Multiplying and Dividing with Zeros**Unit 6**

A. $80 \times 400 =$

B. $2,800 \div 70 =$

C. $7 \times 80,000 =$

D. $700 \times 6,000 =$

E. $4,800 \div 600 =$

F. $240 \div 4 =$

Write a rule for dividing with zeros.

DPP U – Missing Decimal Points**Unit 7**

Professor Peabody forgot to put decimal points in the numbers below. He does know that the "6" in each number stands for six-tenths.

Rewrite each number and put a decimal point in each number so that the 6 stands for six-tenths.

A. 1360

B. 1206

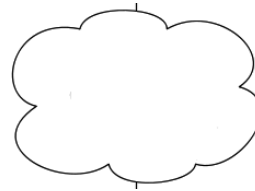
C. 603

D. 126

E. 367

D. 1634

Estimate the sum of the six numbers you wrote.



What is the actual sum? _____

DPP Y – Adding and Subtracting Fractions**Unit 7**

Solve the following problems. First, circle a number to estimate the answer to each problem. Then, solve each problem using pencil and paper to find the answers.

A. $\frac{3}{5} + \frac{3}{10} =$

B. $\frac{7}{8} - \frac{1}{2} =$

Answer is close to:

- A. 0
- B. $\frac{1}{2}$
- C. 1

Answer is close to:

- A. 0
- B. $\frac{1}{2}$
- C. 1

C. $\frac{1}{6} + \frac{1}{3} =$

D. $\frac{1}{2} - \frac{1}{3} =$

Answer is close to:

- A. 0
- B. $\frac{1}{2}$
- C. 1

Answer is close to:

- A. 0
- B. $\frac{1}{2}$
- C. 1

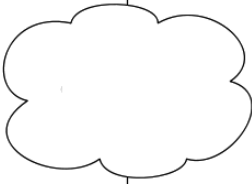
DPP G – Quick Change**Unit 8**

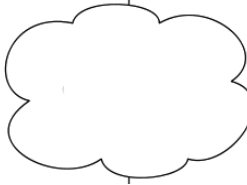
Change the following fractions to decimals and then to percents. Show your work.

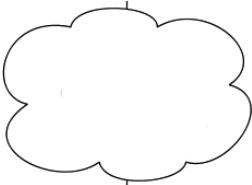
A. $\frac{23}{100}$	B. $\frac{3}{4}$	C. $\frac{30}{50}$	D. $\frac{68}{100}$
E. $\frac{5}{10}$	F. $\frac{2}{8}$	G. $\frac{9}{100}$	H. $\frac{2}{40}$

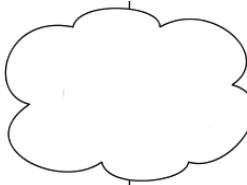
DPP A – Division Practice**Unit 9**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper or mental math to find the answers.

A. $678 \div 4 =$ 

B. $200 \div 5 =$ 

C. $56 \div 5 =$ 

D. $1264 \div 8 =$ 

DPP E – Estimating with Ease	Unit 9
-------------------------------------	---------------

See if you can figure out these problems in your head. Then, write down your reasoning for each answer.

A About how many 12s are in 140?
B. About how many 25s are in 370?
C. About how many 20s are in 345?

DPP E – Estimating with Ease**Unit 10**

Compare each pair of division problems. Fill in the box with $<$, $>$, or $=$.

A. $16 \div 2$ $16 \div 3$

B. $18 \div 4$ $18 \div 3$

C. $48 \div 4$ $48 \div 3$

D. $471 \div 4$ $471 \div 3$

E. $471 \div 4$ $471 \div 7$

F. $1000 \div 8$ $1000 \div 12$

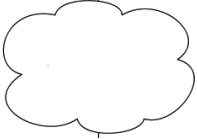
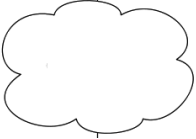
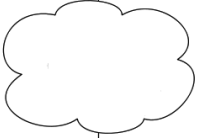
G. $1052 \div 8$ $1176 \div 8$

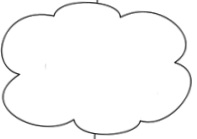
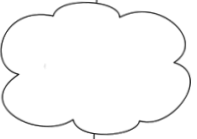
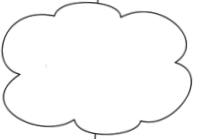
H. $1057 \div 432$ $100 \div 89$

Write an explanation for Questions F and G.

DPP L – Fractions**Unit 10**

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem by adding or subtracting the fractions.

A. $\frac{3}{8} + \frac{1}{4} =$  B. $\frac{4}{5} + \frac{2}{3} =$  C. $\frac{11}{12} - \frac{1}{3} =$ 

D. $\frac{8}{9} - \frac{1}{3} =$  E. $\frac{11}{12} + \frac{1}{6} =$  F. $\frac{7}{10} - \frac{2}{5} =$ 

Explain your estimation strategy for Question E.

DPP L – Divisibility Rules**Unit 11**

Put a mark in the box next to the number to show that a number is divisible by 2, by 3, by 6. Look at the example.

Remember, a number is divisible by 3 if the sum of its digits are divisible by 3.

	Divisible by 2	Divisible by 3	Divisible by 6
Example 12	X	X	X
26			
258			
368			
939			
1,032			

Write the divisibility rule for 6.

--

DPP O – Fractions**Unit 11**

Find at least one number for n that makes each sentence true. If there is more than one correct answer, explain. Example:

- $\frac{n}{4} > \frac{3}{8}$.
- n can be 2 because $\frac{2}{4} > \frac{3}{8}$.
- n can also be 3 because $\frac{3}{4} > \frac{3}{8}$.

A. $\frac{1}{5} = \frac{n}{25}$

B. $\frac{6}{21} = \frac{2}{n}$

C. $\frac{n}{12} < \frac{3}{4}$

D. $\frac{7}{8} < \frac{n}{16}$

DPP P – Finding Factors	Unit 11
--------------------------------	----------------

1. Find all the factor pairs for the following numbers. Tell which numbers are prime.

A. 23

B. 25

C. 39

D. 73

E. 1278

2. Draw a factor tree for each composite number above. Then, write its prime factorization. Use exponents when possible.

DPP Y – Mental Math	Unit 13
----------------------------	----------------

A. $\frac{1}{2} \times 100 =$ B. $\frac{1}{2} \times 60 =$ C. $\frac{1}{2} \times 80 =$ D. $\frac{1}{2} \times 82 =$

E. $\frac{1}{4} \times 200 =$ F. $\frac{1}{4} \times 80 =$ G. $\frac{1}{6} \times 60 =$ H. $\frac{1}{6} \times 54 =$

Explain your strategy for finding $\frac{1}{6}$ of a number.

.....

DPP F – Speaking of Parts	Unit 13
----------------------------------	----------------

Remember that fractions, decimals, and percents are all ways of speaking about parts of a whole. Fill in the chart with equivalent names for the given numbers. Reduce all fractions to lowest terms

	Fraction	Decimal	Percent
A.		0.10	
B.	$\frac{1}{2}$		
C.			15%
D.		0.4	
E.	$\frac{3}{100}$		
F.			30%
G.	$\frac{3}{4}$		
H.		0.01	

DPP A – Scheduling Activities

Unit 14

Ms. Internet schedules the following times for each of three activities she wants her students to complete at the computer. How many minutes are assigned for each activity? Show your work.

A. Word processing: 8:48 to 9:54 A.M.

B. Graphing data from an experiment: 9:55 to 10:17 A.M.

C. Geography game: 10:20 to 10:43 A.M.

DPP R – Shirts**Unit 14**

A closet has 20 shirts.

1. $\frac{1}{5}$ of the shirts are dress shirts. How many dress shirts are in the closet?
Show your work.

2. $\frac{1}{2}$ of the shirts are work shirts. How many work shirts are in the closet?
Show your work.

3. The rest of the shirts are t-shirts. What fraction of the shirts are t-shirts? Show your work.

DPP T – Fractions and Mixed Numbers**Unit 14**

Rewrite each of the following as mixed numbers with no improper fractions. All fractions should be in lowest terms.

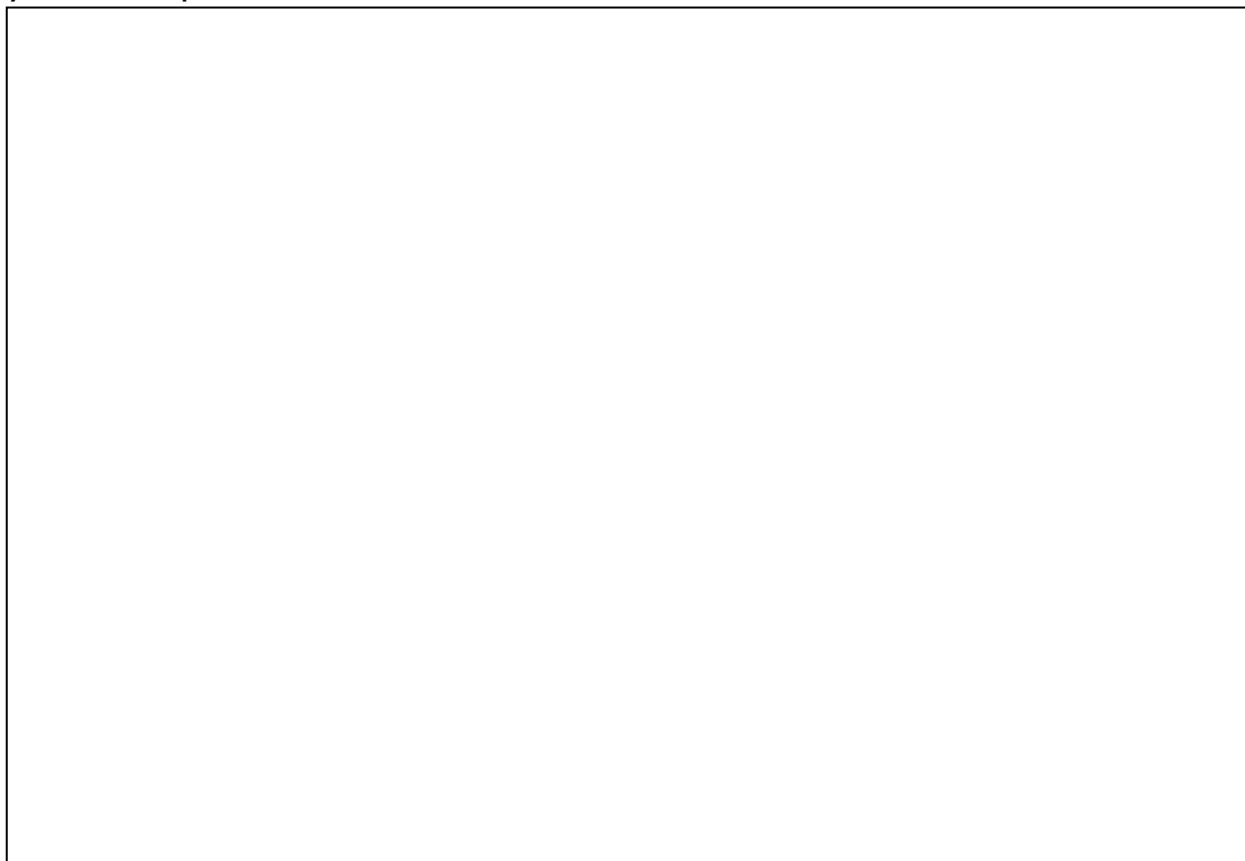
A. $8 \frac{10}{6}$

B. $\frac{27}{6}$

C. $3 \frac{9}{4}$

D. $\frac{88}{12}$

Create an example of a mixed number with an improper fraction. Solve your example.



DPP L – In Proportion**Unit 16**

Solve the following. Explain your solutions.

1. If a hotel charges \$270 for a 6-night stay, how much is a 2-night stay? Show your work.

2. If I walk half a mile in ten minutes, how far can I walk in one hour? Show your work.

3. For every eight children on a field trip there needs to be one adult chaperone. If there are 136 students going on the trip, how many chaperones are needed? Show your work.

4. For every \$20 the students collect in the school fundraiser, \$5 goes toward decorating the cafeteria. If \$1315 went toward the decoration project, how much money was collected in all? Show your work.

5th Grade Math Trailblazers Directions and Interventions

All Daily Practice Problems (DPPs) are reprinted with permission from the *Math Trailblazers 3rd Edition* (copyright 2008 by Kendall/Hunt Publishing Company), specifically the *Unit Resource Guides (URGs)*.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

A. $356 + 76 =$



B. $1037 - 763 =$



C. $484 + 158 =$



D. $4656 - 2937 =$



Implementation Suggestions

- The purpose of this assessment is to observe as students estimate sums and differences. Some teachers have the students do only the estimates, collect the papers, and redistribute the papers for actual computation after the teacher has assessed the estimates.
- The clouds should look something like this:
A. $400 + 50 = 450$, **B.** $1000 - 80 = 200$, **C.** $500 + 150 = 650$, **D.** $5000 - 3000 = 2000$
- Remind students to read the + and - signs, correct students, and have them redo problems.
- Provide base ten pieces for finding actual sums and differences.

Interventions

- Students who cannot use friendly number or front-end estimation will need to have interventions surrounding the number line. See 3rd grade Unit 6, “Close Enough.”
- Students who cannot do the actual computation should return to the optional lesson, Unit 2, Lesson 3, that reviews that base ten addition and subtraction algorithms.

Follow-Up DPP

- Unit 5 – DPP N, is the next DPP that checks on this topic.

David buys a CD that costs \$14.49. He gives the sales clerk a \$20 bill. How much change will he receive? Name the least number of coins and bills he can receive. Show your work.

Implementation Suggestions

- This assessment adds to what students did in fourth grade. Making change for \$20 is not a new task, however showing the exact change with fewest coins is new to fifth graders.
 - Read the problem and distribute coins and bills to students who need to use manipulatives. Suggest that drawing pictures, making a table, and writing a number sentence are all acceptable strategies.
 - There will be fifth graders who use counting on to solve for \$5.51. Others may use subtraction with regrouping. To show the fewest coins, using a 50-cent piece is acceptable but not necessary.
-

Interventions

- Students who do not have a strategy to accurately solve for change from \$20 should practice change for \$10 and change for \$100 to the nearest dollar. Then, return to solving problems with finding change for \$1. Make connections to the strategy of counting on to the nearest dollar first, and then count the whole dollars that add on to make the total amount.
 - Use Unit 1 – DPP G, as another DPP that allows for practice. Teachers can use this as a model to write other practice problems.
-

Follow-Up DPP

Write a number that has:
Show your work.

A. 6 tens and 3 ones

B. 91 hundreds and 6 tens

C. 73 tens

D. 8 hundreds and 14 ones

E. 50 tens and 8 ones

Implementation Suggestions

- Make it very clear that students can write the answer alone but then must return to the problem to explain or show why 6 tens and 3 ones is 63. One suggestion for an explanation might be to write $60 + 3 = 63$. Students who just write the numbers from the problem could guess and get A, D, and E correct. So asking for a number sentence is necessary.
 - Students using expanded notation with understanding will write for B, 91 hundreds is 91×100 or 9100 and 6 tens is 6×10 or 60. Summing $9100 + 60$ gives 9160.
-

Interventions

- Return to lessons about expanded notation and give students practice in writing correct responses to 75 hundreds, 75 tens, 75 ones.
 - Pull out base ten pieces and practice building numbers like 23 tens, 23 hundreds.
 - Unit 2 – DPPs S and U give more practice in thinking in place value.
-

Follow-Up DPP

Two shipments of fruit were delivered to the school cafeteria. One shipment delivered 8 sacks of oranges, 50 pounds to a sack. In the other shipment, there were 7 sacks, also 50 pounds to a sack. How many pounds of fruit were delivered to the cafeteria in all? Show your work.

Implementation Suggestions

- This assessment gives the teacher information about how students solve word problems. There are at least three ways to solve this problem:
 - $(8 + 7) \times 50 = 750$
 - $(8 \times 50) + (7 \times 50) = 400 + 350$ or 750
 - $50 + 50 + 50 + 50 \dots\dots = 750$
 - Students can be reminded to use number sentences as well as pictures. Students who are still using repeated addition need an intervention. Students who cannot solve this problem with ease need interventions.
-


Interventions

- Sometimes asking students who use repeated addition to write the number sentence a different way will be enough intervention to get students to self-correct. Asking students to use a multiplication number sentence might also be enough to see self-correction. This sort of feedback can be written on the student's paper and given back as a rewrite.
 - Students who cannot start this problem successfully need to stop, reread the problem, and retell the problem to the teacher. Perhaps hearing the problem again and rephrasing it themselves might be all the intervention necessary.
 - Students who made errors in multiplication may need to review multiplication facts.
-

Follow-Up DPP


- Unit 3 – DPP C, checks on multiplication by 10s and 100s. Notice if students have given up additive thinking.


Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.


A.
$$\begin{array}{r} 46 \\ \times 7 \\ \hline \end{array}$$
 

B.
$$\begin{array}{r} 77 \\ \times 16 \\ \hline \end{array}$$
 

C.
$$\begin{array}{r} 54 \\ \times 35 \\ \hline \end{array}$$
 

D.
$$\begin{array}{r} 38 \\ \times 30 \\ \hline \end{array}$$
 

E.
$$\begin{array}{r} 62 \\ \times 40 \\ \hline \end{array}$$
 

F.
$$\begin{array}{r} 7134 \\ \times 5 \\ \hline \end{array}$$
 

Implementation Suggestions

- This assessment gives teachers insight into what degree students are proficient in estimation and calculations. Teachers have given only the estimate part of the assignment to their students, collected them, evaluated for proficiency, and then asked students to find the actual products. A discussion can follow about looking at the estimate and deciding if the actual makes sense. Cloud answers might include:
A. $50 \times 7 = 350$ B. $80 \times 15 = 1,200$
C. $50 \times 40 = 2,000$ D. $40 \times 30 = 1,200$
E. $60 \times 40 = 2,400$ F. $7,000 \times 5 = 35,000$

Interventions

- Students may need to review how to find friendly numbers or front-end estimation to make good choices. There might be discussions with many students about increasing one factor and decreasing the other to keep the product closer to the actual answer. For C, decreasing 54 to 50 and increasing 35 to 40 gives an estimate of 2,000.
- There may be a need for an intervention group for students who cannot multiply accurately. This may be based on missing some multiplication facts or not understanding partial products.
- Provide a multiplication table for the desktop. As student masters the 2s, 5s, etc., blacken those rows and columns. Soon there will only be a few facts NOT blackened, and the student will only use the chart for a very few unknown facts. This builds confidence.
- By asking students to make estimates, students are practicing the first step in partial products, finding the product of multiples of 10s or 100s.
- Some students may need to return to using base ten or arrays to produce a model that shows the decomposing of the multiplication.

For example: 46×7 can be shown as:

	40	6
7	$40 \times 7 = 280$	$6 \times 7 = 42$
	$280 + 42 = 322$	

Follow-Up DPP

- Look ahead to Unit 3 – DPP G and Unit 5 – DPP N to see next opportunities to check for understanding.

Solve.

A. $30 \times 20 =$

B. $80 \times 30 =$

C. $200 \times 60 =$

D. $50 \times 300 =$

E. $1000 \times 30 =$

F. $900 \times 200 =$

G. $6000 \times 300 =$

H. $20 \times 200 =$

I. $7000 \times 3 =$

Write a rule for multiplying with zeros.

Implementation Suggestions

- This assessment asks a student to multiply with multiples of 10, 100, and 1,000. Students practiced this skill repeatedly in fourth grade. Students were taught to think about rewriting each equation to show the magnitude of the number. 30×20 became $3 \times 10 \times 2 \times 10$ or 6×100 or 600. Counting the zeros is a shortcut that students may see and use but should not be the only strategy. For problems like $7,000 \times 3$, students have been taught to think 7 thousand \times 3 or 21 thousand or 21,000. Hopefully, many students have invented the zero rule with understanding.
-





Interventions

- For students who cannot solve these problems accurately should return to writing expanded notation to solve for the products.
-

Follow-Up DPP

- Look ahead for Unit 4 – DPP S and Unit 5 – DPP E for additional times to assess this skill.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper or mental math to find the answers.

A.
$$\begin{array}{r} 54 \\ \times 8 \\ \hline \end{array}$$
  B.
$$\begin{array}{r} 534 \\ + 963 \\ \hline \end{array}$$
  C.
$$\begin{array}{r} 730 \\ \times 6 \\ \hline \end{array}$$
  D.
$$\begin{array}{r} 5001 \\ - 3989 \\ \hline \end{array}$$
 

Implementation Suggestions

- This is a short assessment to keep tabs on students' abilities to do arithmetic accurately and to connect estimating to computing and knowing that together stronger computation occurs and self-correction is possible.

Interventions

- Return to base ten shorthand or other appropriate strategies.

Follow-Up DPP

- Unit 5 – DPP N is the next chance to check on student's growth.

1. Write an improper fraction for each mixed number.

A. $\frac{15}{4}$

B. $\frac{24}{8}$

C. $\frac{29}{3}$

2. Write a whole number or a mixed number for each improper fraction.

A. $6\frac{2}{3}$

B. $9\frac{1}{2}$

C. $5\frac{1}{3}$

Implementation Suggestions

- Students at this point may not have committed to the algorithm to solve either changing improper fractions to mixed numbers or vice versa. Remind students to draw pictures or use pattern pieces to solve both processes.
- The procedure should follow understanding of the concept. 1A can be modeled by recomposing $15/4$ into groups of $4/4$. Unit 2 – DPP A, can be modeled as decomposing 6 into $18/3$ and then adding $2/3$.

Interventions

- Choose any new set of improper fractions and mixed numbers to model with pictures. Return to fractions that can be modeled with pattern blocks ($1/2$ s, $1/3$ s, $1/4$ s, $1/6$ s) and then plan a lesson to teach the students how to quickly draw simple pictures to show the same trading. Some students need to practice using rectangles for fraction pictures or circles for fraction pictures to be able to model any fraction.

Follow-Up DPP

- Look ahead to Unit 14 – DPP T for the next assessment on improper fractions.

Complete the number sentences with the correct value for n.

A. $\frac{4}{8} = \frac{n}{2}$

B. $\frac{2}{3} = \frac{6}{n}$

C. $\frac{12}{9} = \frac{n}{3}$

D. $\frac{5}{12} = \frac{10}{n}$

E. $\frac{20}{16} = \frac{5}{n}$

Implementation Suggestions

- At this point in fifth grade, students have been taught to use an algorithm to solve equivalent fractions. The students notice a relationship between denominators (multiply by n or divide by n) and then use the same procedure on the numerator (or vice versa).
- Students may also use the Fractohoppers page from the Discovery Assignment Book (DAB) as a resource.
- Students may or may not have also learned the concept that these two fractions mean exactly the same part of a whole. Have a discussion before the students start this assessment to find out what your students think “equivalent” means. Allow time for students to talk together, refer to the word wall, and then capture all of the ideas.
- Notice examples A, C, and E. These three ask a student to use division to give the fraction a new name. Some students will be more successful in changing the names of the fractions if they are building the numbers up and using multiplication to change the fractions. Some teachers teach the students to rewrite a fraction: $\frac{4}{8} = \frac{n}{2}$ as $\frac{n}{2} = \frac{4}{8}$. Then, the student can work from left to right and use multiplication. If you notice that students can solve B and D successfully, try this approach in your teaching.

Interventions

- Return to the lesson in Unit 3 and re-teach the procedure for equivalent fractions.
- Use ratio tables to show equivalent fractions (Unit 3, Lesson 5, questions 10-14). By building a table of values, the student will see many fractions that are all equivalent.

#cookies	2	4	6	8	10
cost	\$0.25	\$0.50	\$0.75	\$1.00	\$1.25

- Use a multiplication fact table as resource to build equivalent fractions. Cut the table into strips. For example, use the 3 table as the numerator and the 6 table as the denominator. Notice that this set of fractions are all equivalent to $\frac{3}{6}$.

3	6	9	12	15	18	21
6	12	18	24	30	36	42

Follow-Up DPP

- Unit 7 – DPP E can be used to check students understanding of equivalent fractions.

1. Name at least two fractions between $\frac{1}{2}$ and 1.
2. Name at least two fractions between $\frac{1}{4}$ and $\frac{3}{4}$.
3. Name at least two fractions between 0 and $\frac{1}{2}$ with a denominator of 10.
4. Name at least two fractions between $\frac{7}{8}$ and 1.
5. Name at least two fractions between 0 and $\frac{1}{2}$ with a numerator that is not 1.

Implementation Suggestions

- Teachers will get insight into students' understanding of ordering fractions as they write fractions that are between two points on a number line. A student needs to understand greater than and less than to complete this task.
- Read the directions with the class and provide Fractohopper DAB page for students who want to use this model. Teacher can keep track of which students could accomplish this task with and without the model.
- Notice that these directions now ask students to find two fractions instead of just one. It will probably be necessary to monitor students so that the two fractions they choose are NOT equivalent. Include this in your directions but also monitor.
- Example: for question 2, the normal answer is $\frac{2}{4}$, but a student may write $\frac{1}{2}$ as his second fraction. Disallow that equivalent fraction.
- For questions 4 and 5, the difficulty level increases. In question 4, the student needs to find fractions with a denominator other than 8ths. Students who solve this with ease have a good understanding of how far away from a whole fractions are. Good examples for answers are $\frac{8}{9}$, $\frac{9}{10}$, $\frac{10}{11}$, etc. In question 5, students are asked NOT to use unit fractions but still find fractions less than $\frac{1}{2}$. Good examples include $\frac{2}{10}$, $\frac{2}{9}$, $\frac{2}{8}$, $\frac{2}{7}$, $\frac{2}{6}$, $\frac{2}{5}$, etc.
- These two questions (4 and 5) should be a topic of conversation when the assessment is over. Perhaps students in the class could be given the task to look for a pattern and start making a list of MANY examples that work.

Interventions

- All students should be proficient (with the help of a Fractohopper sheet) for questions 1 to 3.
- Those who struggle need to build number lines and solve similar problems like the ones in Unit 3, Home Practice Part 3.

Follow-Up DPP

- Look ahead to Unit 5 – DPP T and Unit 6 – DPP H as places to check for understanding.

A. $800 \times 80 =$

B. $25,000 \div 50 =$

C. $4900 \div 7 =$

D. $10,000 \div 10 =$

E. $40 \times 400 =$

F. $8100 \div 90 =$

Implementation Suggestions

- This assessment tests the skills necessary to become proficient in the “Forgiving Method” of long division. Using the forgiving method and ONLY using 1000 or 100 or 10 as the choices will lead to a long list of “chunking” for long division. The goal is to have students use appropriate chunks, large chunks, to quickly solve long division. Two errors occur. The student chunks in 10s when 100s is more appropriate (magnitude of the number), or the student plays it safe and chunks in the correct magnitude but only uses 100 instead of a multiple of 100. This assessment will push students to think in large chunks and be able to multiply these chunks successfully.
- During this DPP, notice if the student is using good understanding of non-zero facts. Does the student know when solving 800×80 that (8×8) is 64? Does the student know that when solving 800×80 the product is $(8 \times 100 \times 8 \times 10)$ or $(64 \times 100 \times 10)$ or (64×1000) ? Diagnose if one or both of these errors occurs.

Interventions

- Provide a multiplication chart.
- Re-teach the rules for multiplying with zeros.

Follow-Up DPP

- Look ahead to Unit 5 – DPP E and Unit 6 – DPP O to see other assessments that will help determine if this skill is proficient.

DPP E – Multiplying by 10s**Unit 5**

A. $30 \times 90 =$

B. $80 \times 90 =$

C. $900 \times 60 =$

D. $50 \times 900 =$

E. $1000 \times 90 =$

F. $900 \times 200 =$

G. $4000 \times 900 =$

H. $70 \times 900 =$

I. $9000 \times 9 =$

Implementation Suggestions

- This assessment tests the skills necessary to become proficient in the “Forgiving Method” of long division. Using the forgiving method and ONLY using 1000 or 100 or 10 as the choices will lead to a long list of “chunking” for long division. The goal is to have students use appropriate chunks, large chunks, to quickly solve long division. Two errors occur. The student chunks in 10s when 100s is more appropriate (magnitude of the number), or the student plays it safe and chunks in the correct magnitude but only uses 100 instead of a multiple of 100. This assessment will push students to think in large chunks and be able to multiply these chunks successfully.
- During this DPP, notice if the student is using good understanding of non-zero facts. Does the student know when solving 900×6 that (9×6) is 54? Does the student know that when solving 900×6 the product is $(9 \times 100 \times 6 \times 10)$ or $(54 \times 100 \times 10)$ or (54×1000) ? Diagnose if one or both of these errors occurs.


Interventions


- Provide a multiplication chart.
- Re-teach the rules for multiplying with zeros.


Follow-Up DPP


- Look ahead to Unit 6 – DPP O to see other assessments that will help determine if this skill is proficient.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.


A.
$$\begin{array}{r} 18 \\ \times 63 \\ \hline \end{array}$$
 

B.
$$\begin{array}{r} 565 \\ + 739 \\ \hline \end{array}$$
 

C.
$$\begin{array}{r} 2,706 \\ - 1,187 \\ \hline \end{array}$$
 

D.
$$\begin{array}{r} 37 \\ \times 29 \\ \hline \end{array}$$
 

E. $5,170 \div 5 =$ 

F. $17,235 \div 9 =$ 

Implementation Suggestions

- The ability to use accurate computation and estimation is a goal for all fifth graders. This assessment is a way to evaluate students' growth over time

Interventions

- Pinpoint the errors and form individual or small group work for estimating strategies and/or computation proficiency.

Follow-Up DPP

- Unit 6 – DPP I is the next assessment that will check on understanding of multiplication and division.

DPP T – Comparing Fractions

Unit 5

Write a number sentence to compare the following fractions. Use $<$, $>$, or $=$ in your sentence.

A. $\frac{1}{10}$ $<$ $\frac{7}{8}$

B. $\frac{4}{8}$, $\frac{5}{10}$

C. $\frac{4}{5}$, $\frac{1}{2}$

D. $\frac{2}{3}$ $<$ $\frac{7}{12}$

E. $\frac{3}{10}$, $\frac{3}{8}$

F. $\frac{11}{12}$, $\frac{5}{12}$

Explain your thinking for Questions A and B.

Implementation Suggestions

- These 6 problems ask a student to show understanding of ordering fractions. Some teachers have made a template for students to use like the one shown here.

Close to 0	Close to 1/2	Close to one whole	Larger than one whole
1/10		7/8	

- A strategy that works quite well with fifth graders is to classify fractions by size. Problem A is shown on the chart. Questions A, B, and C can all be solved with this ordering system. Question E follows the rule “like numerators,” and question F orders by “like denominators.” Question D is the only one that students may need to change the fractions to like denominators to solve for greater than or less than. It can be solved with geoboard fractions.

Interventions

- Make templates like the one shown, laminate, and attach to the student’s desk. Each time he/she is reminded to start with thinking about the magnitude of the fraction.
- Make a chart of all of the strategies and post on the word wall or add to student notebooks for reference. Define “like numerators” as, “If I have 3 pieces of 10ths and 3 pieces of 8ths, the 3 pieces of 8ths have to be bigger because the unit fraction 1/8 is bigger than 1/10.”
- Students who still cannot determine that equivalent fractions are ratios are probably looking at the numerator and denominator as two numbers instead of numbers in a relationship. Many students may still think that for question B, 5 and 10 are bigger than 4 and 8, so 5/10 is larger than 4/8. Return to lessons on ratios.

Follow-Up DPP

- The next DPP that assesses this skill is Unit 6 – DPP H.

Circle the number closest to the actual sum or difference. Show how you estimated your answer.

1. $7/8 + 12/13$ is closest to:

- A. $1/2$
- B. 1
- C. $1\ 1/2$
- D. 2

2. $4/9 + 5/8$ is closest to:

- A. $1/2$
- B. $3/4$
- C. 1
- D. 2

3. $8/9 - 1/12$ is closest to:

- A. 0
- B. $1/2$
- C. 1

4. $1/2 - 4/9$ is closest to:

- A. 0
- B. $1/4$
- C. $1/2$

Implementation Suggestions

- This assessment asks students to only estimate the sum of fractions. The students who can think about the magnitude of individual fractions will be able to sum two estimates and explain their thinking.
- A might be estimated as $1 + 1 = 2$.
- B could be solved as $1/2 + 1/2 = 1$
- C is $1 - 0 = 1$
- D is $1/2 - 1/2 = 0$
- Because there are choices, one of the choices is closest. Students need to be reminded to only find the estimated sum or difference. Students who use the wrong operation can be redirected to read the + and – symbols carefully.

Interventions



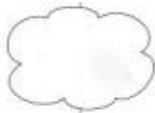
- Continue to allow students to classify these fractions using the chart.

Close to 0	Close to $1/2$	Close to one whole	Larger than one whole
		$7/8$ $12/13$	

Follow-Up DPP

- The next assessment that deals with this concept is Unit 7 – DPP Y.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper to find the answers.

A. $870 \div 6 =$  B. $7045 \div 8 =$  C. $34 \times 56 =$ 

Implementation Suggestions

- This assessment allows students to show growth over time. The “clouds” will show to what degree students are estimating both division and multiplication.
- Question A might be estimated simply as 100, because that is the correct first chunking. Some students might think that $900/6$ would be close to 150.
- Question B could be estimated as a little less than 1000 or less than 900. The number sentence might show $8 \times 900 = 7,200$.
- Question C could be estimated as $30 \times 60 = 1800$.

Interventions

- Look carefully at the papers of students who are not successful. Diagnose into many categories.
 - This student does not know the facts and miscomputes.
 - This student does not have the partial products strategy done systematically.
 - This student has errors in the forgiving method but not in facts.
 - This student can do all of the algorithms but fails to estimate within reason.
- There may be students who fall into more than one category, but sometimes we can pinpoint the reason for the missed work and then return to that kind of lesson.

Follow-Up DPP

- Unit 9 – DPP A is the next DPP to assess division.

DPP O – Multiplying and Dividing with Zeros**Unit 6**

A. $80 \times 400 =$

B. $2800 \div 70 =$

C. $7 \times 80,000 =$

D. $700 \times 6000 =$

E. $4800 \div 600 =$

F. $240 \div 4 =$

Write a rule for dividing with zeros.

Implementation Suggestions

- At this point in fifth grade, this DPP should have many successful outcomes. Most students have invented a strategy for multiplying with zeros. Dividing with zeros requires a different strategy. Students may write something like this, “When I divide 2,800 by 70, I think that this is the same problem as $280/7$ because I divided BOTH numbers by 10 first.”
-

Interventions

- This is the last DPP that assesses this skill. Spend time practicing the strategies for multiplying and dividing by multiples of 10 and 100.
 - Another strategy that might help students with dividing by multiples of 10 and 100 is to think of these divisions as finding equivalent fractions. Some students might also think of this as reducing fractions.
 - $2800/70 = 280/7$ (divide by $10/10$) and also $40/1$ (divide by $7/7$)
 - $4800/60 = 480/6$ (divide by $10/10$) and also $80/1$ (divide by $6/6$)
 - $240/4 = 60/1$ (divide by $4/4$)
-

Follow-Up DPP

Professor Peabody forgot to put decimal points in the numbers below. He does know that the "6" in each number stands for six-tenths.

Rewrite each number and put a decimal point in each number so that the 6 stands for six-tenths.

- A. 1360 B. 1206 C. 603
D. 126 E. 367 D. 1634

Estimate the sum of the six numbers your wrote.



What is the actual sum? _____

Implementation Suggestions

- Read the directions so students understand that the first step to make every 6 stand for six tenths. As students are doing the task, ask students one-on-one to read the numbers aloud after they place the decimal point. Many students will successfully place decimal points because they see a pattern. Reading the decimals is also necessary. Note which students are not reading 3.67 as three and sixty-seven hundredths. Disallow three point sixty seven.
- The question about estimating the sum requires the students to know what part of the decimal numbers are whole numbers. Students who write answers like the ones below to estimate are accurate in their understanding of whole numbers. Students may only write a sum in the cloud. If that estimated sum is reasonable then ask the student to show his/her work.
- Because one of the whole numbers is 120, the estimate should show at least $120 + 10 + 10$ or 140.
- $13 \frac{1}{2} + 120 \frac{1}{2} + 12 \frac{1}{2} + 3 \frac{1}{2} + 1 \frac{1}{2} = 151 \frac{1}{2}$
- $13 + 120 + 12 + 3 + 1 = 149$ **152.707 is the actual sum.**

Interventions

- Play a game called, "Make the Decimal." Give students a decimal mat. Students turn over one playing card (or numeral card) at a time and place them in the decimal mat. Each student can place his cards in any order one at a time. Each student also turns over his/her own cards. After everyone is finished placing 6 cards, the teacher says, "Make the 5 mean 5 hundredths." Then, the student places the decimal point in the correct place, and whichever person has the largest number wins. Each student has to read his new number.

- A

3	2	.6	5	4	7
---	---	----	---	---	---

- B

7	3	1	8	.2	5
---	---	---	---	----	---

- C

1	.6	5	9	0	2
---	----	---	---	---	---

- Although these three students all played the game correctly, B has the largest number.
- One teacher tried this game and decided that the students could get points for correctly writing the 5 hundredths and reading the number correctly, and the winner just got an extra point. There were times that a student did not have 5 turned over. Then, his number was a whole number. A student who happened to turn over more than one five could choose which 5 became 5 hundredths. During each turn, the students not only get to read and make their decimal, they also check the decimals made by the rest of the team.

Follow-Up DPP

- Unit 8 – DPP G is the next DPP that assesses this concept.

Solve the following problems. First, circle a number to estimate the answer to each problem. Then, solve each problem using pencil and paper to find the answers.

A. $\frac{3}{5} + \frac{3}{10} =$

Answer is close to:

- A. 0
- B. 1/2
- C. 1

B. $\frac{7}{8} - \frac{1}{2} =$

Answer is close to:

- A. 0
- B. 1/2
- C. 1

C. $\frac{1}{6} + \frac{1}{3} =$

Answer is close to:

- A. 0
- B. 1/2
- C. 1

D. $\frac{1}{2} - \frac{1}{3} =$

Answer is close to:

- A. 0
- B. 1/2
- C. 1

Implementation Suggestions

- This assessment addresses how a student first estimates the sum or the difference of fractions with unlike denominators. There are choices for the estimates so that all can agree on the best estimate. Students can use multiple strategies to find the sum or difference of fractions.

Interventions

- Ask students to show adding or subtracting of fractions with a model. Some students might use geoboards, dot paper rectangles, or just picture models.
- Do not intervene if a student finds a common denominator that is not the Least Common Denominator.
- Do not intervene if a student adds or subtracts correctly and fails to reduce the fraction answer.

Follow-Up DPP

- Unit 10 – DPP L is the next DPP that assesses this concept.

Change the following fractions to decimals and then to percents. Show your work.

A. $\frac{23}{100}$	B. $\frac{3}{4}$	C. $\frac{30}{50}$	D. $\frac{68}{100}$
E. $\frac{5}{10}$	F. $\frac{2}{8}$	G. $\frac{9}{100}$	H. $\frac{2}{40}$

Implementation Suggestions

- This is the first formative assessment to discover to what degree students can move from fraction representation to decimals and then percents. The algorithm that was taught included making the fraction a part of a hundred and then writing that (n/100) fraction as a decimal and percent. All three representations translate into parts of 100.
- Notice that A and D are the two easiest problems because those fractions are already part of 100. G is somewhat harder because it asks a student to pay attention to place value and value of the number. 9/100 is 9 hundredths and requires the 9 in the hundredths place with a zero place holder. The other examples require the student to change the fraction into a fraction with a denominator of 100 (B C E). And, finally, the last two (F and H) require a student to reduce the fraction and then change it into a fraction with a denominator of 100. F (2/8) and H(2/40) are both fractions that can easily be reduced and then recomposed into hundredths.

Interventions

- There could be students who can make the fractions (n/100) and change easily to a percent but have difficulty with decimals.
- There may be students who can write the decimals but forget to write the percents. Carefully guide these students to writing both.
- When students do write a fraction in the n/100 form, the teacher may ask the student to write the name of the fraction (n hundredths), and then by hearing and writing the name, the student may self-correct and write the decimal. Using the decimal place value chart might be necessary for students to place the numbers correctly.

Money	Ones	Tenths	Hundredths
	0	.2	3
3 quarters	0	.7	5
	0	.6	0
	0	.6	8
2 quarters	0	.5	
1 quarter	0	.2	5
	0	.0	9
1 nickel	0	.0	5

- Some students will benefit from using the centiwheel to see the size of the fraction and


decimal and percent.


- Others will see a connection between decimals and fractions and money.
-


Follow-Up DPP


- Unit 13 – DPP F is the next DPP that assesses this concept.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem using pencil and paper or mental math to find the answers.

A. $678 \div 4 =$ 

B. $200 \div 5 =$ 

C. $56 \div 5 =$ 

D. $1264 \div 8 =$ 

Implementation Suggestions

- This assessment might be preceded by some estimation practice. Give an example like 729 divided by 4. Some students might want to write 100 in the cloud because that is the estimate that is used when starting the forgiving method. Other students might suggest 700 divided by 4 is less than 200 because 800 divided by 4 is 200. Still others might suggest that 700 divided by 5 is 120. All three estimates are good ways to think about division:
 - What is the first large chunk?
 - What is the quotient smaller than?
 - Can I find another divisor to make it easier?
- The teacher may only choose to do this reminder with the group who had difficulty the last time we practiced this skill in Unit 6 – DPP I.
- Then, allow sufficient time to estimate and then solve for actual exact quotients.

Interventions

- Look at the student work to determine which students are making computation errors vs. procedure errors.
- Return to base ten manipulatives and/or shorthand to solve these problems.

Follow-Up DPP

- The very next checkpoint, Unit 9 – DPP E requires a student to estimate a quotient and NOT find the actual.

See if you can figure out these problems in your head. Then, write down your reasoning for each answer.

- A. About how many 12s are in 140?
 - B. About how many 25s are in 370?
 - C. About how many 20s are in 345?
-

Implementation Suggestions

- This assessment shows the teacher the thinking students have while grouping and sharing and estimating in division. In real life, adults are asked to solve these types of problems. For that reason, do not be hesitant to start this assessment with a real life example.
 - “I want to use ribbons that were 50-inches long for a table decoration. How many of these ribbons can I cut from a roll of ribbon that is 350-inches long?”
 - Then with no paper and pencil, allow students to think about this problem, talk about it in small groups, and then show how to solve it by using a number sentence or a picture or both.
 - Then distribute the DPP and let students work alone showing their work.
-

Interventions

- Put students back together to talk about the three problems. Allow students to share their thinking and then add to their own papers to improve the explanations and the answers. Having students self-correct and fix a rough draft may be a very successful way to intervene.
-

Follow-Up DPP

- Unit 14 – DPP T is the next DPP that assesses this concept.

Compare each pair of division problems. Fill in the box with $<$, $>$, or $=$.

A. $16 \div 2$ $16 \div 3$

B. $18 \div 4$ $18 \div 3$

C. $48 \div 4$ $48 \div 3$

D. $471 \div 4$ $471 \div 3$

E. $471 \div 4$ $471 \div 7$

F. $1000 \div 8$ $1000 \div 12$

G. $1052 \div 8$ $1176 \div 8$

H. $1057 \div 432$ $100 \div 89$

Write an explanation for Questions F and G.

Implementation Suggestions

- This assessment connects what students know about division and fractions.
 - A fraction is a division problem—16 divided by 2 is $16/2$.
 - This assessment also connects students' understanding of division with the magnitude of the quotient. In other words, students should be able to know which division problem is larger by just looking at the dividends and the divisors.
 - With those two strategies students might think:
 - "16/2 is larger than 16/3 because halves are larger than thirds and having 16 larger things is better than 16 smaller things" (like numerators)
 - 16 divided by 2 has to be larger than 16 divided by 3 because fewer people are sharing the same 16 things
 - Questions A–F have equal dividends but different divisors.
 - Question G has equal divisors but different dividends.
 - Question H is a question where the student uses his own estimation strategy.
 - Discourage students from doing the division to solve the problems. When a student solves A, 8 is less than 5r1, then he/she shows knowledge of division but is not using estimation.
-







Interventions

- For students who ONLY can do the algorithm, start a discussion about other strategies that will help students estimate.
-

Follow-Up DPP

- Unit 11 – DPP O is the next DPP that assesses this concept.

Solve the following problems. First, estimate and put your estimate in the cloud next to the problem. Then, solve each problem by adding or subtracting the fractions.

A. $\frac{3}{8} + \frac{1}{4} =$  B. $\frac{4}{5} + \frac{2}{3} =$  C. $\frac{11}{12} - \frac{1}{3} =$ 
D. $\frac{8}{9} - \frac{1}{3} =$  E. $\frac{11}{12} + \frac{1}{6} =$  F. $\frac{7}{10} - \frac{2}{5} =$ 

Explain your estimation strategy for Question E.

Implementation Suggestions

- This is the first fraction estimation that requires the student to write an answer without choices.
- These are examples of acceptable cloud answers:
 - A: $1/2 + 1/4 = 3/4$
 - B: $1 + 2/3 = 1 \ 2/3$
 - C: $1 - 1/3 = 2/3$
 - D: $1 - 1/3 = 2/3$
 - E: $1 + 1/6 = 1 \ 1/6$
 - F: $2/3 - 1/3 = 1/3$
- The addition and subtraction of these fractions can be solved with common denominators, dot-paper rectangles, or another strategy. No intervention is necessary if a student fails to find the Least Common Denominator or reduce the answer to lowest terms.

Interventions

- Some students who cannot add or subtract fractions with unlike denominators may have many different errors. Determine if the error is computational or procedural or estimating. Pull small groups based on the errors.
- Help students draw the pictures or dot-paper rectangles. Use the Fractohopper chart to determine good estimates.

Follow-Up DPP

Put a mark in the box next to the number to show that a number is divisible by 2, by 3, by 6. Look at the example.

Remember, a number is divisible by 3 if the sum of its digits are divisible by 3.

	Divisible by 2	Divisible by 3	Divisible by 6
Example 12	X	X	X
26			
258			
368			
939			
1032			

Write the divisibility rule for 6.

Implementation Suggestions

- Talk about the example for 12. Take time for table groups to talk about why 12 is divisible by 2, 3, and 6.
- Then give students time to complete the chart.
- Make sure that students attempt to write a rule for divisibility by 6.
- You might also ask students to write a few new examples of numbers in the thousands or hundreds that are divisible by 6 to add to their explanation.

Interventions

- Play a game of “Yes It Is!” Write a numeral on the board. Then, have everybody stand up. If it is divisible by 6, the student stays up, if it is not, the student sits down. This gives the teacher quick knowledge about who can think about even numbers whose digits sum to a multiple of 3.
- After each number the group repeats why the number is divisible by 6 or not.
 - 345 – “It is odd so it cannot be a multiple of 6.”
 - 346 – “When I sum the digits I get 13. 13 is NOT divisible by 3.”
 - 348 – YES, “When I sum the digits I get 15, and it is an even number because it ends in 8!”

Follow-Up DPP

- Unit 11 – DPP ? and Unit 13 – DPP C are the next DPPs that assess this concept.

Find at least one number for n that makes each sentence true. If there is more than one correct answer, explain.

Example:

- $\frac{n}{4} > \frac{3}{8}$.
- n can be 2 because $\frac{2}{4} > \frac{3}{8}$.
- n can also be 3 because $\frac{3}{4} > \frac{3}{8}$.

A. $\frac{1}{5} = \frac{n}{25}$

B. $\frac{6}{21} = \frac{2}{n}$

C. $\frac{n}{12} < \frac{3}{4}$

D. $\frac{7}{8} < \frac{n}{16}$

Implementation Suggestions

- For problems that are equivalent, there is only one correct number that will replace the n . For problems that are NOT equivalent, then there are multiple correct answers. Students may be able to explain that the n can be replaced with any number greater than 2 (in the example on the page).
- A: $n = 5$
- B: $n = 7$
- C: n can be any number less than 9.
- D: n can be any number greater than 15
- Finding more than one correct response to n is the task. If a student only finds one correct response to n , return the paper and ask the student to complete the assignment.
- For C and D, students might start by finding the n that solves for equivalent fractions and then change the number to solve for greater than or less than.

Interventions

- Return to solving for missing numbers with equivalent fractions. When students have mastered solving problems like A and B, they can then continue with nonequivalent fractions.

Follow-Up DPP

1. Find all the factor pairs for the following numbers. Tell which numbers are prime.

A. 23

B. 258

C. 39

D. 73

E. 1278

2. Draw a factor tree for each composite number above. Then, write its prime factorization. Use exponents when possible.

Implementation Suggestions

- Students are asked to find factor pairs and also to ascertain that numbers with only one pair of factor pairs are prime.
- These words and examples should be on the word wall: factor pairs, prime numbers, and prime factors.
- This assessment should be a review of knowledge from fourth grade. Using a calculator does not interfere with checking for understanding.
- Remind students to use a T-chart to make a systematic list of factor pairs.

1	258
2	129
3	86
6	43

Interventions

- Students who show that 23 and 73 are prime and the rest are composite are in good shape. It is not necessary that students find ALL factor pairs for the composites, just find at least two different pairs of factors.
- As students show the prime factors of a composite, the lesson that follows might be a discussion about how to recompose prime factors to make all of the factors.
- The prime factors of 258 are $2 \times 3 \times 43$.
- By taking these three factors and recomposing them, a student can build all of the factor pairs.
- $(2 \times 3) \times 43$ becomes 6×43
- $2 \times (3 \times 43)$ becomes 2×129
- $(2 \times 43) \times 3$ becomes 3×86

Follow-Up DPP

A. $\frac{1}{2} \times 100 =$ B. $\frac{1}{2} \times 60 =$ C. $\frac{1}{2} \times 80 =$ D. $\frac{1}{2} \times 82 =$

E. $\frac{1}{4} \times 200 =$ F. $\frac{1}{4} \times 80 =$ G. $\frac{1}{6} \times 60 =$ H. $\frac{1}{6} \times 54 =$

Explain your strategy for finding $\frac{1}{6}$ of a number.

Implementation Suggestions

- Use mental math to solve for fractional parts of a whole. These numbers are easily divisible and can be halved, quartered, or divided by 6.
 - The strategy for finding $\frac{1}{6}$ of a number needs to be explained by each student in the space provided. Redirect students who forget to answer the final question.
-

Interventions

- Return to the array model to draw a whole and divide it into $\frac{1}{2}$ s, $\frac{1}{4}$ s, and $\frac{1}{6}$ s. By dividing the array, students will be soon able to move to numbers instead of models.
-

Follow-Up DPP

- Unit 14 – DPP R is the next time to assess this concept.

Remember that fractions, decimals, and percents are all ways of speaking about parts of a whole. Fill in the chart with equivalent names for the given numbers. Reduce all fractions to lowest terms

	Fraction	Decimal	Percent
A.		0.10	
B.	$\frac{1}{2}$		
C.			15%
D.		0.4	
E.	$\frac{3}{100}$		
F.			30%
G.	$\frac{3}{4}$		
H.		0.01	

Implementation Suggestions

- Read the directions together. This is the first formative assessment that asks students to reduce the fractions. Remind students to say the name of the fraction, decimal, or percent aloud. Sometimes whispering these numbers and hearing their names will help students reproduce the decimal as a fraction or vice versa. This assessment is very thorough. There are benchmark fractions ($\frac{1}{2}$ and $\frac{3}{4}$), decimals given as tenths and hundredths (0.4 and 0.10), and four fractions that need to be reduced. Students with incomplete knowledge will find this very difficult.

Interventions

- There are some basic concepts that need to be internalized:
- 0.40 is the same as 0.4. The extra 0 in decimals does not make the number larger.
- Fractions, decimals, and percents all need to be based on 100.
- When thinking about decimals and coins, connect that a quarter ($\frac{1}{4}$) is \$0.25, a dime ($\frac{1}{10}$) is \$0.10 or 0.1, and a penny ($\frac{1}{100}$) is \$0.01.
- Perhaps the intervention might include matching equal decimals.

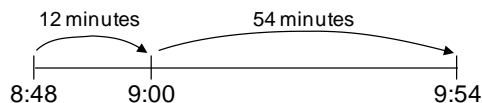
Follow-Up DPP

Ms. Internet schedules the following times for each of three activities she wants her students to complete at the computer. How many minutes are assigned for each activity? Show your work.

- A. Word processing: 8:48 to 9:54 A.M.
- B. Graphing data from an experiment: 9:55 to 10:17 A.M.
- C. Geography game: 10:20 to 10:43 A.M.

Implementation Suggestions

- Students may need access to a clock in order to add on and find elapsed time.
- The second strategy may be to make a number line and “hop” from 8:48 to 9:54 remembering that there are 60 minutes in an hour.



- So, $12 + 54 = 66$ minutes
- The third strategy may be to add on with numbers. “From 8:48 to 9:48 is one hour, and from 9:48 to 9:54 is 6 minutes.”
- Students may also use subtraction with regrouping (with 60 minutes as the trade for one hour when necessary) $9:54 - 8:48 = 1$ hour and 6 minutes.

Interventions

- Students who still have difficulty finding elapsed time should be paired with a partner and together talk about many strategies until each student finds the best way for recording the information. It may be likely that students who have this misunderstanding cannot tell time. Keeping the notion that the numbers on the clock mean BOTH the hour and a multiple of 5 minutes is like using two variables at the same time. Return to lessons on naming clock times to the hour, the half hour, the quarter hour, and finally to the five minute and minute.

Follow-Up DPP

A closet has 20 shirts.

1. $\frac{1}{5}$ of the shirts are dress shirts. How many dress shirts are in the closet?

Show your work.

2. $\frac{1}{2}$ of the shirts are work shirts. How many work shirts are in the closet?

Show your work.

3. The rest of the shirts are t-shirts. What fraction of the shirts are t-shirts?

Show your work.

Implementation Suggestions

- Questions 1 and 2 ask the student to find a fraction of a whole.
- Question 3 asks the student to first find the remaining shirts and then build a fraction showing the remaining shirts based on the whole.
- This can be solved in two ways:
 - Use the answers 4 and 10 from questions 1 and 2 and then solve that there are 6 more shirts and the fraction is $\frac{6}{20}$ or $\frac{3}{10}$ OR
 - Understand that $\frac{1}{5} + \frac{1}{2} + n = 1$. Solve for the missing fraction of the whole, $\frac{2}{10} + \frac{5}{10} + \frac{3}{10} = 1$

Interventions

- Only intervene with students who cannot find answers for Questions 1 and 2.

Follow-Up DPP

Rewrite each of the following as mixed numbers with no improper fractions. All fractions should be in lowest terms.

A. $8 \frac{10}{6}$

B. $\frac{27}{6}$

C. $3 \frac{9}{4}$

D. $\frac{88}{12}$

Create an example of a mixed number with an improper fraction.
Solve your example.

Implementation Suggestions

- This assessment makes finding mixed numbers quite interesting. The fraction part of the mixed numbers in A and C are written as improper fractions. The student has to change the improper fraction to a mixed number and remember to add it to the whole number that was attached to the problem.
- Start this assessment with an example.
- $1 \frac{3}{2}$ needs to be written with a fraction in lowest terms. Model a yellow hexagon and 3 red trapezoids so the number matches exactly what is written. Exchange the $\frac{2}{2}$ for a yellow hexagon and write the new number as $2 \frac{1}{2}$.
- Then, allow students to draw pictures or use number sentences to show their work. Remind students to create a problem like this and solve it.

Interventions

- Allow students to use pattern pieces or drawings to show how to make the wholes. Suggest that these problems can be solved with subtraction of one. In problems like B, a student could keep subtracting groups of $\frac{6}{6}$ to find the wholes and the leftovers.
- $(\frac{27}{6} - \frac{6}{6} - \frac{6}{6} - \frac{6}{6} - \frac{6}{6} = \frac{3}{6} \text{ left over} + 1 \text{ grouped } 4 \text{ wholes})$

Follow-Up DPP

Solve the following. Explain your solutions.

1. If a hotel charges \$270 for a 6-night stay, how much is a 2-night stay?
Show your work.
2. If I walk half a mile in ten minutes, how far can I walk in one hour?
Show your work.
3. For every eight children on a field trip there needs to be one adult chaperone.
If there are 136 students going on the trip, how many chaperones are needed?
Show your work.
4. For every \$20 the students collect in the school fundraiser, \$5 goes toward
decorating the cafeteria. If \$1315 went toward the decoration project, how
much money was collected in all? Show your work.

Implementation Suggestions

- This last formative assessment allows students to solve problems with many different strategies. Although using a ratio seems most efficient, division or multiplication are both acceptable.
 1. \$270: 6 nights :: \$n:2 nights OR since we are only staying 1/3 as long I can find 1/3 of 270 or divide 270 by 3.
 2. 1/2 mile : 10 minutes :: n: 60 minutes OR since I am walking 6 times as long I can multiply 1/2 x 6.
 3. 8 children: 1 adult :: 136 children : n adults OR divide 8 into 136.
 4. \$20 collected: \$5 fund :: \$n : \$1315 fund OR since we had to collect 4 times as much than we got for the fund, I will multiply 4 x 1315.
- Students who do well on questions 1–3 need no intervention.

Interventions

- Some students will need to reread the problems aloud and talk about what they know and what they want to find out. After visualizing the problem, some students will be able to self-correct.
- Some students have difficulty with understanding the size of the answer. When they read Question 1, they multiply x 3 instead of dividing by 3.
- Some students are not thinking multiplicatively. They find the difference between 6 and 2 nights and subtract 4 instead of dividing by 3.

Follow-Up DPP