**Complex Instruction Task Information Sheet**

**Submarine Sandwiches**

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| Task Title: | Sharing Submarine Sandwiches |
| Task Authors: | Adapted from  Fosnot, C. T., & Dolk, M. L. A. M. (2002). *Young mathematicians at work: Constructing fractions, decimals, and percents*. Portsmouth, NH: Heinemann.  Adapted by Teach Math Group (Amy Roth McDuffie, Corey Drake, Erin Turner, Mary Foote, Tonya Bartell) |
| Tags:  math or pedagogical content | Math |
| **Learning Goals** |  |
| Objectives (mathematical and/or pedagogical): | Fractional fair sharing  Comparing fraction quantities |
| Common Core Content Standards Addressed: | Developing Understanding of Fractions   * 3.NF.1 * 3.NF.3d   Extend Understanding of Fraction Equivalence and Ordering   * 4.NF.1 * 4.NF.2 * 4.NF.3 |
| Common Core Standards for Mathematical Practice Addressed: | Mathematical Practices: 1, 2, 3, 4 |
| **Set up Information** |  |
| Specific Norms | * Everyone contributes and no one takes over * Everyone records * Everyone explains all of the work |
| Specific Roles |  |
| Multiple ability orientation (See the Smarter Together! book for more information.) | In order to be successful at this task, your group is going to need to:   * make equal parts * partition shapes * communicate ideas * compare fractional quantities * connect mathematics problem to experiences sharing things outside of school * use multiple representations * listen to the reasoning of others * craft mathematical arguments * model real world contexts with mathematics * persevere in problem solving   No one of us is good at all of these things, but we are each good at some of them. Together your group has the abilities you need to be successful. |
| M*aterials* to prepare | * Sheets of plain green paper * Markers * pencils   Make copies:   * Submarine sandwich templates (several for each group) * Task card (2 per group) (copy Part 1 on a separate page from Parts 2-5) * Problems for pairs (copy page one per group and cut in half) |
| **Task Enactment** |  |
| Launch | Whole class discussion of experiences when students have shared something with others. The purpose of this discussion is to draw out potential mathematical funds of knowledge, or practices that students in engage in at home or in their communities related to sharing things equally. In addition to sharing food, such as pizza, brownies, and sandwiches, you could also touch on other kinds of sharing but ultimately funnel the discussion toward sharing food item that can be cut into pieces. |
| Closure | As a group choose two solutions to any one problem and be ready to explain (to the whole class) how you know which shows the greater amount of submarine sandwich per person.  What are our concerns when we share fairly?   * minimum number of cuts? * each person gets equal cut |
| Any specific directions? | * Hand out part 1 to groups of 4 students. As groups finish and can explain their solutions, hand out directions to parts 2-6 along with envelopes with additional problems. * When recording on sheet, students must draw their own representations, not allow partners to draw on their paper. * During check in with teacher after Part 4, the teacher should ascertain whether students are making sufficient sense of the task to continue to Part 5. |
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| Possible variations – how might this task be adjusted for different content or grade level? | Easier number combinations or fewer problems.  If you are doing this with PSTs, after the problem solving session, show the video from Fosnot & Dolk, *Young Mathematicians at Work.* |
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| More information about task design  (Just in case you haven’t already had enough details) | Why specify that students should write on green paper?  For two reasons: First, if the teacher is walking around checking to see where groups are, and she sees students working with the green paper representation, she knows immediately where they are in the task. Second, since poster paper is white, if the representation that they use is a on a different colored paper, it will stand out more. (This is particularly true if they decide to cut things out of the green paper and glue them on the poster paper – white on white doesn’t work well.) This is not a big deal of course, but there is some reasoning behind it. Of course blue, orange, red, purple or any other color would work just as well. So the green part was just random.  Why provide sandwich cut outs?  The reason for providing the sandwich cut outs was two-fold. One, it is a **visual referent** (that looks realistic enough to trigger some understanding) for children who may not know right away what submarine sandwiches are. If children think just of an individual sandwich, and not that sandwiches can be these longish things that can be partitioned into more than 2 or 3 pieces, that can be problematic in these tasks. So for children who may not have the cultural knowledge of what a sub sandwich is, we thought a realistic looking visual would be useful. They might see the picture and recognize subs as something they have in fact seen before, or at least have an image in mind of what they are. Second, the cut outs support **paper folding strategies**, something that is harder with other tools like linking cubes, drawings, etc. So having cutouts available in additional to other tools just opens the space for possible strategies. The idea was not to push children to use the cut outs, just to offer it as a possible tool.  The sandwich cut outs are oval, making it hard for students to create truly equal shares. Is that a problem?  What matters in partitioning is what the child is trying to do — when children try to split things into 3 equal parts to make thirds, the pieces are rarely equal even if they start with a rectangle model (even folding exact thirds is kind of impossible), and the intention is what matters. As long as children know what they mean to do and know what the pieces represent, that is all that matters. The fact that the thirds are exactly equal in terms of area because one has rounded edges is not the issue. Children can recognize that but still keep track of the fact that they are partitioning something into 3rds and 3rds are equal parts. This same issue comes up with children’s drawings. With cut outs that start out to be the same size, and when classes of kids have repeated experiences with equal sharing tasks, this comes up as a topic of group discussion pretty quickly. Children move past it fairly easily. If they are relying only on visual comparison methods to compare fractions, it can create problems because 4th can look different than 3rds for example, etc. So that has to be addressed, but we want children using other kinds of reasoning to compare fractions, beyond just which one looks bigger. |

**Suggested Roles (Adapted from Amy McDonald)**

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| **Facilitator**  Gets the team off to quick start  Makes sure everyone understands the information on the task card.  Organizes the team so they can complete the task  Keeps track of time  Substitutes for absent roles  “Who knows how to start?”  “I can’t get it yet… can someone help?”  “We need to keep moving so we can…”  “Let’s find a way to work this out.” | **Resource Manager**  Makes sure the team is using all resources well, especially people.  Calls the teacher over for a team question  Collects supplies for the team  Cares for and returns supplies  Organizes clean up  “I think we need more information here.”  “I’ll call the teacher over”  “We need to clean up. Can you… while I…?”  “Do we all have the same question?” |
| **Recorder / Reporter**  Gives update statements on team’s progress  Makes sure each member of the team records the data  Organizes and introduces report  “We need to keep moving so we can…”  “I’ll introduce the report, then…”  “Did everyone get that in your notes?” | **Reflection Leader**  Helps the group reflect on their work during the task and at the end.  Asks questions about the group’s activity:  “What strategies have we used?”  “What worked?”  “What isn’t working/didn’t work?” |

**Submarine Sandwich Task Card**

**Materials:**

Green paper

Submarine sandwich templates

Markers, pencils

**NORMS:**

* Everyone contributes and no one takes over
* Everyone records
* Everyone explains all of the work

**Directions:**

**Part 1)** As a group, solve the following problem.

6 people share 4 submarine sandwiches so that each person gets the same amount. How much of one sandwich does each person get?

* On a green sheet of paper, represent two different ways to share the sandwiches.
  + Show how you split the sandwiches
  + Show how much sandwich one person gets
  + Use words, pictures, and numbers
* Each person should share one experience in which they shared food with others.
* When you are done, each person raises a hand to signal the teacher.

**Part 2)** Each pair should solve their two problems. Think about the strategies you just used.

**Part 3)** On a green sheet of paper, each person should represent a solution for one of the problems

* + Show how you split the sandwiches
  + Show how much sandwich one person gets
  + Use words, pictures, and numbers

**Part 4)** As a group of four, take turns presenting your solutions to the group. (Each person must share one solution.) As a group, determine if each solution makes sense. Ask questions to clarify ideas. Help the presenter make changes if necessary.

When the group agrees that all solutions make sense, CHECK WITH THE TEACHER.

**Part 5)** As a group, arrange the five solutions (on the green sheets of paper) so that the amount of submarine sandwich that each person gets is ordered from least to greatest.

**Part 6)** Select solutions for two different problems and be ready to explain how you know which shows the greater amount of submarine sandwich per person.

**Problems for**

**Pair #1**

5 people share 3 submarine sandwiches so that they each get the same amount. How much of a submarine sandwich does one person get?

4 people share 3 submarine sandwiches so that they each get the same amount. How much of a submarine sandwich does one person get?

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**Problems for**

**Pair #2**

5 people share 4 submarine sandwiches so that they each get the same amount. How much of a submarine sandwich does one person get?

8 people share 7 submarine sandwiches so that they each get the same amount. How much of a submarine sandwich does one person get?

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