Kindergarten Homework:

- **Watch this video** with your grade level teammates- http://www.learner.org/vod/vod_window.html?pid=876 (yes, it is old, yet provides a good look at a problem-based setting)
  Once the video has begun, you can hover the cursor over the screen and right click- you now have a zoom option for full screen so it is easier to view as a group.
- **Answer the questions** at the end of the video with your colleagues.
- The task began with exploration of the materials. What routines and rituals had to be understood, modeled, and practiced prior to attempting this type of task? Can you find similar routines and rituals described in the GPS frameworks?
- There were many mathematical opportunities in this task. How could you build on what students learned in this session? What could come next?
- How can you use what you noticed in this video to help students become proficient at the mathematical practice standards ?
- **Try the task** used by this teacher with your students. This could be done as a small group activity with a parapro, coteacher, or parent guiding one group while the teacher guides the other.

  Here's a quick overview. Remember, the teacher used questions and observations to guide the process, and did not do the work for the students. They decided how they would sort within their teams, and they decided how long to build their trains. They also had to figure out how many trains they needed to match their age.

  Start with exploration.
  Move to sorting the materials.
  Have students build trains that are the same length. They may choose the length they wish to use for their trains.
  Have each child create enough trains so that there is one train per year of their age, and put them together to create one long train that represents their age.
  Finally, have students determine how to line the trains up in order of length.
  The teacher built in the concept of the baseline to assist the students in measuring fairly, and to prepare them for graphing.

  You do not have to use unifix cubes to do the task. Students can create groups of like sized objects such as tiles, stickers on adding machine tape, bingo marker dots on adding machine tape, etc.

  Compare notes with your colleagues. How did it go? What did you notice about your students? How could students record and explain their work? How could the teacher extend this lesson? How can you create problematic situations for your students?

Standards for Mathematical Practice – Kindergarten Specific

Mathematical Practices are listed with each grade's mathematical content standards to reflect the need to connect the mathematical practices to mathematical content in instruction.

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

Students are expected to:

1. Make sense of problems and persevere in solving them.
In Kindergarten, students begin to build the understanding that doing mathematics involves solving problems and discussing how they solved them. Students explain to themselves the meaning of a problem and look for ways to solve it. Younger students may use concrete objects or pictures to help them conceptualize and solve problems. They may check their thinking by asking themselves, "Does this make sense?" or they may try another strategy.

2. Reason abstractly and quantitatively.
Younger students begin to recognize that a number represents a specific quantity. Then, they connect the quantity to written symbols. Quantitative reasoning entails creating a representation of a problem while attending to the meanings of the quantities.

3. Construct viable arguments and critique the reasoning of others.
Younger students construct arguments using concrete referents, such as objects, pictures, drawings, and actions. They also begin to develop their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.

4. Model with mathematics.
In early grades, students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, acting out, making a chart or list, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed.

5. Use appropriate tools strategically.
Younger students begin to consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, kindergarteners may decide that it might be advantageous to use linking cubes to represent two quantities and then compare the two representations side-by-side.

6. Attend to precision.
As kindergarteners begin to develop their mathematical communication skills, they try to use clear and precise language in their discussions with others and in their own reasoning.

7. Look for and make use of structure.
Younger students begin to discern a pattern or structure. For instance, students recognize the pattern that exists in the teen numbers; every teen number is written with a 1 (representing one ten) and ends with the digit that is first stated. They also recognize that 3 + 2 = 5 and 2 + 3 = 5.

8. Look for and express regularity in repeated reasoning.
In the early grades, students notice repetitive actions in counting and computation, etc. For example, they may notice that the next number in a counting sequence is one more. When counting by tens, the next number in the sequence is "ten more" (or one more group of ten). In addition, students continually check their work by asking themselves, "Does this make sense?"