

Reflecting on Practice: Worthwhile Tasks



Unit 3 Session 3

I know, it's not a math cartoon but Paul Erdős reading his first proof would not have been as funny.



Golden Apples

A prince picked a basketful of golden apples in the enchanted orchard. On his way home, he encountered some problems and ended up with only two golden apples. First, a troll guarding the orchard stopped him and demanded payment of one-half of the apples plus two more. The prince gave him the apples and set off again. A little further on, a second troll guard stopped him. This troll demanded payment of one-half of the apples the prince now had plus two more. The prince paid him and set off again. Just before leaving the enchanted orchard, a third troll stopped him and demanded one-half of his remaining apples plus two more. The prince paid him and continued home. Now he had only two golden apples left. How many apples had he picked? (Adapted from Driscoll, 1999)

Questions for Teachers

(Horn, 2013, p.
64)

Part 1: Selecting and Setting Up a Mathematical Task

What are your mathematical goals for the lesson (i.e., what do you want students to know and understand about mathematics as a result of this lesson)?

In what ways does the task build on students' previous knowledge, life experiences, and culture? What definitions, concepts, or ideas do students need to know to begin to work on the task? What questions will you ask to help students access their prior knowledge and relevant life and cultural experiences?

What are all the ways the task can be solved?

- Which of these methods do you think your students will use?
- What misconceptions might students have?
- What errors might students make?

What particular challenges might the task present to struggling students or students who are English language learners? How will you address these challenges?

What are your expectations for students as they work on and complete this task?

- What resources or tools will students have to use in their work that will give them entry into, and help them reason through, the task?
- How will the students work—independently, in small groups, or in pairs—to explore this task? How long will they work individually or in small groups or pairs? Will students be partnered in a specific way? If so, in what way?
- How will students record and report their work?

How will you introduce students to the activity so as to provide access to all students while maintaining the cognitive demands of the task? How will you ensure that students understand the context of the problem? What will you hear that lets you know students understand what the task is asking them to do?



Planning for implementation

- launch/set up
- prior knowledge,
- anticipating (misconceptions, solutions, methods, errors, etc.),
- how students will work,
- how work will be recorded and reported



Golden Apples

In groups of 2-3 plan the implementation of this task using the considerations we have discussed. Decide exactly what mathematical goal would be served by this task, what prior knowledge, anticipating (misconceptions, solutions, methods, errors, etc.), how to set the task up, how kids will work, how their work will be recorded and reported. Be prepared to share a rationale for the decisions you make with the larger group.



Setting up a task (Horn, 2012)

Part 2: Supporting Students' Exploration of the Task

As students work independently or in small groups, what questions will you ask to

- help a group get started or make progress on the task?
- focus students' thinking on the key mathematical ideas in the task?
- assess students' understanding of key mathematical ideas, problem-solving strategies, or the representations?
- advance students' understanding of the mathematical ideas?
- encourage *all* students to share their thinking with others or to assess their understanding of their peers' ideas?

How will you ensure that students remain engaged in the task?

- What assistance will you give or what questions will you ask a student (or group) who becomes quickly frustrated and requests more direction and guidance in solving the task?
- What will you do if a student (or group) finishes the task almost immediately? How will you extend the task so as to provide additional challenge?
- What will you do if a student (or group) focuses on nonmathematical aspects of the activity (e.g., spends most of his or her [or their] time making a poster of their work)?



Supporting students in their work

What can you do with this task for a student who is struggling to begin the task?



Supporting students in their work

What can you do with this task for a student who gets the answer right away?



Reminder

Using Lesson Study to Develop Effective Blackboard Practices (Yoshida, 2005)

As you read, think about the questions:

- Why is it important to have public records of classwork?
- How do you create and use public records of classwork in your own teaching?



References

- Driscoll, M. (1999). *Fostering algebraic thinking: A guide for teachers grades 6-10*. pp. 1-8. Heinemann
- Horn, I.S. (2012). Selecting and Setting Up a Task. In *Strength in Numbers: Collaborative Learning in Secondary Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

