Riding the RAFT
Melissa D. Gunter

Writing about mathematics holds a wealth of benefits for students. When students are given opportunities to write in math class, it helps develop mathematical thinking and language (Carter 2009; McCarthy 2008; Yang 2005), encourages self-reflection (Carter 2009; Danielson 2010; O’Kelley 2013), and provides a better way to organize ideas (Linhart 2014; Rogers 2014). Many teachers incorporate journaling and other types of reflective writing into their instruction already (Sjoberg, Slavit, and Coon 2004; Sanders 2009), but what about other forms of writing? NCTM states the importance of writing, in that students in the middle grades should be “more explicit about basing their writing on a sense of audience and purpose” (NCTM 2000, p. 62). How can we help students develop this important skill in math class?

Looking for guidance in writing, I turned to the National Council of Teachers of English. I found an instructional strategy called RAFT (Simon 2012). RAFT, an acronym for Role of the Writer, Audience, Format, and Topic, allows students to practice using different voices and topics as they write. At first, I was not convinced that it would be useful in the math classroom, but I saw its incredible appeal in other subject areas. For example, imagine a student writing as though he or she were President Franklin Roosevelt, penning a letter to wife Eleanor, describing his thoughts about Executive Order 9906 and Japanese internment camps during World War Two. Another view of this writing assignment could be asking this same student to write a letter to President Roosevelt as though he or she were a Japanese prisoner. What an incredible way to assess student understanding of political conflicts during World War Two! In an English class, many possibilities exist in which students create writings from one character in a novel to another; the ideas are endless.

But what about in math? After some careful thought, I began to come up with ideas. What if exponents were made to argue for their “laws” in front of a jury? How could linear inequalities convince algebra students that they are very nearly related to linear functions? I continued to think of ways that this writing could be incorporated in many levels of mathematics. A quadratic curve could write a pining love letter to its directrix, mourning the distance that
would always remain between them. A set of data could issue a news bulletin about different ways it could be displayed. Negative integers could create an owner’s manual describing their operations. The list goes on (see Table 1).

I gave careful thought to how I would use RAFT in my own classroom, although there are many ways to implement it. I felt it would be necessary to provide a sample writing before I expected my students to create one of their own, probably involving the topic previous to the one I hoped to assess with RAFT. Then, a few choices remained: Do students complete the task alone? Do they work in small groups? Is the same RAFT assigned to everyone, or are options provided to choose from?

I decided that my students would complete the assignment in pairs to ease them into the writing experience. I did not provide an example to read, but discussed a couple of examples of past RAFTs that had been created. Since the topic of ratio and proportion was recently studied, I used that subject area to frame our RAFTs and then created three options for students to choose from (see Table 2). I purposefully chose different tones for the assignments, with one being a more serious kind of format than the others (the owner’s manual), one more accessible (a pen pal letter), and then a more creative one (the dating profile).

After students paired off, each pair chose one RAFT to complete. Carter and Mark (all names are pseudonyms) particularly lamented their “lack of creativity” and chose the owner’s manual assignment almost immediately. Candace and Uma were amused with the online dating profile and snapped that one up (see Fig. 1). Mandy and Kate had expressed indifference to their assignment and were happy to complete the pen pal letter. I had hoped that the choice in formats would allow students to step out of their comfort zone, but not quite so far as to be frustrating.

As the students worked, I facilitated the discussions in each group. Carter and Mark (see Fig. 2) were visibly frustrated from the beginning while trying to complete the owner’s manual option, so I questioned them about the information one might find in such a document. When they replied that one would find instructions for using the item, I encouraged them to think about what kind of instructions you might need for ratios and proportions. This clue set them to work. The other two groups asked me to look over their work, which I did; I also asked guiding questions about anything they may have neglected to address. I gave the students only about twenty minutes, which was enough time to start a reasonable rough draft but definitely not enough time for revisions. It was difficult, especially at first, for

<table>
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<th>Table 1</th>
<th>These RAFT examples are just a few of the potential ideas that can occur in a math class.</th>
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<td>Role</td>
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<td>Data</td>
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<th>Table 2</th>
<th>Students were presented with options for a ratio and proportion RAFT assignment.</th>
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<tr>
<td>Role</td>
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<td>Ratio</td>
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<td>Ratio and proportion</td>
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<td>Proportion</td>
<td>Similar figures</td>
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students to translate what they knew about ratios and proportions in a meaningful way to the requested format, but with careful questioning, their work continued to improve.

After the short time was up, each group presented what it had created and gave feedback. For example, Mandy and Kate wrote their pen pal letter from Ratio (Rachel) to Proportion (Portia) (see fig. 3); it was suggested that if they had been given a chance for revisions they could have written Portia’s response and expanded on their understanding of the concept. This feedback proved very helpful as students worked to refine their product.

I think it is clear, even from these first drafts, that this activity can be a meaningful tool for eliciting evidence of student thinking, as emphasized in Principles to Actions: Ensuring Mathematical Success for All (NCTM 2014). By the end of class, it was easy to see that writing did, in fact, have a home in the mathematics classroom as a tool to understand what our students know and how well they can convey it. I have already been asked when we will do the next RAFT. I am looking forward to seeing what else my students can generate when they are given some creative license to explain their understanding.

REFERENCES
Linhart, Jean Marie. 2014. “Teaching Writing and Communication in a Mathematical Modeling Course.”
Fig. 3 Ratio (Rachel) and proportion (Portia) were pen pals in Mandy and Kate’s RAFT assignment.

Hey Portia,

I’m so glad we have been pen pals for awhile. We each can talk about how we got along so far. We tell each other about everything. You just are great to confide to all of them rather than just a select group like me. I have yet to ask you about how many pets you have. I have three cats. It is 2 of them being male. It is required, of course. How many male pets do you have? I wish I could have birds, but my cats would eat them.

Talk to you in the next letter!

-Rachel


I ♥ spherical analogs of truncated icosahedrons.

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