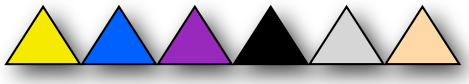
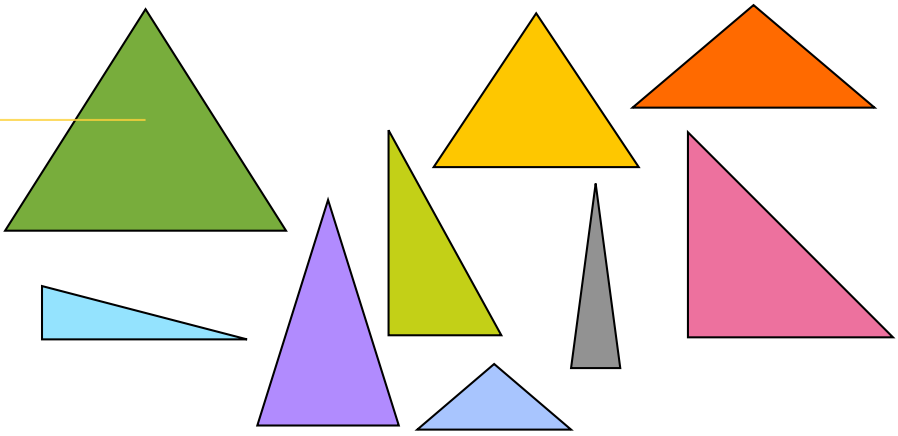
(Craig Dwyer)



Sorting and Matching Triangles

Intended outcomes:
Exploring aspects of triangle and unpacking the language and interpretations of how to talk about angles in a mathematical environment.

Lesson Sequence:
1) Each group receives an opaque bag with shapes inside
2) Groups describe the shapes as they pull them out and pool them all together
3) Each group sorts their shapes into three chosen criteria (unrelated to color, focusing on appearance); make a note of the criteria used (student language is acceptable). Encourage students to use metaphor and visualization.
4) Subduct the groups and describe the differences in shape and record those differences (using iPads to take photos of each step and record differences)
5) Students sit silently and look at the different sorting and describing techniques (on the TV). Students make a master list of all the strategies and descriptions on a piece of chart paper, match and compare similar strategies, and redefine terms
6) Teacher hands out a series of sorting criteria (orienting attention from triangle-ness to angle) and engages in classroom discussion and conjecture as to their meanings and pairings, and students investigate whether or not they used, or can find, that strategy in their own work
7) Students then restart the sorting process and try and sort the shapes using the terms that the teacher gave, and adding terms together (again making a slideshow of the process on the iPad)
8) Compare the two sorting presentations and create a Venn diagram to compare similarities and differences
9) Email the files out to everybody and host them on the wiki
10) At home that evening, the students are expected to explain the lesson to their parents and ask them how they would have sorted the shapes



Teacher sorting Categories	Acute Angle	Obtuse Angle	Right Angle

Connection between language, concept and understanding is problematic for my grade 5.6

Dimensions of Variance, focus on angles (Mason and Watson, 2006)

Occasioning Diversity by making it a group assignment

Each triangle is meant to be a didactic object (Thompson, 2002)

Mathematical language and build a joint vocabulary

Creating a redundancy around language; supports my ESL students

Classifying mathematical objects (Swan, 2008), using their own classification system

Anne's idea. I interpreted it as a way to orient attention to the physical properties of the shapes, not the embodied meanings

Similar to the notion of mini-whiteboards (Swan, 2008)

Students should be describers (Cuoco, Goldenberg, Mark, 1997)

Orientating attention to variation within the space of triangles (Mason and Watson, 2006)

Will lead to conjectures and lively debate, collaborative discussion (Swan, 2008)

Merger of property recording and image saying; don't need boundaries (Pirie and Kieren, 1994). This is still foggy in my head, but I see a connection that I am unable to explain.

Orientating attention from variation to generalization with angles in triangles (Mason and Watson, 2006)

Expanding the shapes as didactic objects into didactic models (Thompson, 2002)

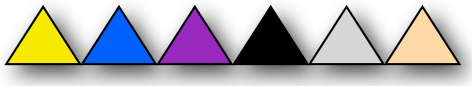
Transferring their language, to the language of math

Students should be pattern sniffers, self-reflective (Cuoco, Goldenberg, Mark, 1997)

The triangles all contain a mixture of angles that they can adequately describe. I see them interpreting different meanings and creating varying conjectures.

I am assuming that they understand the essence of triangle-ness, but are unaware of how to classify the angles formally. We based the sorting on the visual of triangle-ness, but now we are grounding that visual in a sense of 90 degrees-ness.

(Craig Dwyer)



Explicit Mathematical Orientations

- **Triangles are comprised of three angles**
- **90 degrees is two perpendicular lines meeting at an point**
- **A right angle is 90 degrees**
- **An acute angle is one that is less than 90 degrees**
- **An obtuse angle is one that is more than 90 degrees**

In terms of the mathematics of this lesson, designing this task highlighting the importance of understanding the difference between a triangle and a angle. There is a sense of a thing we understand as a triangle, and often we forget that the angle is a part of that triangle, and the construction of those three angles constitute the whole. While this may seem obvious at first glance, it is these obvious misconceptions and assumptions that may lead to the shutting down of possible conjectures that may lead to fruitful discussion and reflection. By explicitly orienting attention to the difference between these two terms, and having two sorting activities that are similar, but different in nature of their relationship to triangle-ness and angle-ness, I see some interesting ideas emerging from a lively discussion. At the same time, the lego-fanatic and painter in me will not be completely satisfied until I actually *do* this lesson with my students and see what happens. At the moment, it is an interesting idea that seems to be floating in space, and I am unable to pin it down with my hands. Though this is very different from the way I normally approach a math-task, I am excited at the prospect of some delicious cognitive dissonance when I finally get around to *doing* it.

And I will do it.

My anticipation of cognitive dissonance is grounded in the metaphors that I normally view a learning environment. This approach feels like an opposite path to the way I approach classroom planning. I try to create an environment in my classroom where the students know that the important space to occupy in the task is the present moment and that there is no preordained trajectory, only an emergent path from this engagement with the present. This approach allows us to engage with the concept and focus on the direction of our understanding. It occasions an environment of risk-taking, conjecture creating, and ownership. For me, it allows me to attend to the emerging misconceptions and understandings, and to orient attention into paths that will benefit our collective mind-set. This seems to be more structured and formalized, while my approach is more of an adapting and responding to the ebb and flow of the collective, and the individuals within it.

Yet, I feel a harmony between these two that I cannot yet verbalize. I look forward to digging deeper and challenging my ways of being and knowing in the classroom.

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