Representing Our World

(Spatial Reasoning and Communication)

Background

- Research clearly shows that human brains have several separate "networks" that organize spatial information in different ways. This research has three huge implications for teachers:
  1. Learning how to learn – spatial reasoning helps kids learn from maps, graphs, stories, etc.
  2. Choosing tools – different modes of reasoning support learning different kinds of information
  3. Individual differences – some kids are good at spatial sequencing, others associations, etc. Proficiency with one mode does not necessarily mean proficiency with another.

It's helpful to think of this as being like our arm muscles – we have a bunch of different muscles that help our arms do different things. They often work together, sometimes doing things in sequence and sometimes doing several things at the same time. We use different combinations of muscles to do different things, like throw a baseball, play a guitar, eat a bowl of soup, or smooth a clay sculpture.

Coaches who want to help their players strengthen their arm muscles do not tell them to do only pushups or bicep curls in the gym – on the contrary, they prescribe a number of different exercises. And they often prescribe specific exercise to bring weak muscles up to the level of the others.

This is exactly what we need to do.

Materials (in general, the larger the better for hands-on materials)

- a model or map of the classroom, on a table or desk near the middle of the room
- small objects to represent things in the room (e.g., marble for globe, block for desk).
- desktop outline maps of the classroom, with a few key features like the entry door, windows, and/or whiteboard for orientation
- maps of the schoolyard, local community, state, etc.

Procedures

- Do the key parts of every lesson. Every lesson.
  Do not (NOT) do just the ones that seem most intuitively useful to you. See implication #3 above. What works best for you may not be what works best for a student, or every map-reading task.
  (There's a word for picking just some of these as a primary focus – it's called discrimination.)
- The lessons are numbered in a proven sequence, BUT they do not have to be done in that order. Become familiar with them all, and feel free to do them in different orders until you find what works best for you and your students.
- You can combine ideas in various ways, or combine these lessons with readalouds, math lessons, field trips, playground games, many other parts of the curriculum.
- The images in these pdf files are for discussion, not necessarily for use in class. You can (and should) design your own props to fit the conditions in your school.
- Evaluate students frequently, often informally, and prescribe practice with the modes they find most difficult. Often, this can be done by simply asking appropriate questions, even in the context of another lesson or a daily activity like emptying a wastebasket or lining up for lunch.

Representing Our World

(Modes of Spatial Reasoning and Communication)

1. Models and Maps – spatial representations.
- Put a whole room in a shrinking machine, so it fits on a desk. This marble represents the globe.

2. Similar or Different – spatial comparisons.
- Compare places qualitatively (similar or different) or quantitatively (more or less).

3. Near or Far – the idea of distance, and of spatial aura (zone of influence close to something).
- Tobler's First Rule of Geography: "every place has an effect on every other place in the world – nearer places have more effect than faraway places."

4. Toward and Away – the idea of direction, and of movement toward a specific landmark.
- Go toward a named landmark, or in a given direction. "Line up along the north wall."
  "That wall is not north – north keeps going beyond the wall. What would we see if we go north?"

5. This Group or That One – spatial group, region.
- A geographical region is like a historical era – it is a way of putting similar things together, dividing the world into smaller and more homogeneous parts that are easier to remember.

6. Sooner or Later – spatial sequences, and the transitions between places in a sequence.
- Someplace halfway between two places is likely to have conditions that are halfway between them.

7. Inside or Outside – spatial hierarchies
- Houses inside communities, towns inside states, states inside countries, countries inside continents.

8. In the Same Position – spatial analogies, places in similar geographic positions
- Identify places in similar positions on other tables, rooms, towns, watersheds, states, continents. Places in similar geographic positions often have similar conditions.

9. Strings, Rings, and Bunches – spatial patterns, non-random arrangements of things
- Distinctive spatial arrangements usually imply some force acting on objects to "line them up."

10. Together or Separate – spatial associations, things that occur in the same places
- Things that occur together are often linked in some other way, perhaps cause and effect.

11. Observers and Objects – frames of reference
- Human brains maintain multiple independent "maps" of things around them. Egocentric maps are centered on the person; allocentric maps are aligned with local or global frames of reference.

12. Continents, Oceans, and the Equator – a basic global map
- A globe is the only truly accurate representation of the ball-shaped Earth. Flat maps can show the spatial relationships that are important to answer specific geographic questions.

Exceptions: The world is big and complicated. One reason we need to look at it in different ways is that a given way of organizing our knowledge doesn't work for every kind of knowledge.