Strings, Rings, and Bunches

(Spatial Patterns)

Background

- The human brain is a pattern-seeking system it constantly tries to find some kind of order in the enormous quantity of information that comes streaming in though eyes, ears, and other senses. That search for order becomes more efficient when we learn words that help us put sensory impressions into "generally recognized" categories colors, shapes, spatial patterns, etc.
- Students who learn to recognize and name spatial patterns have an advantage they can remember maps and graphs more efficiently, because they can devote more brain resources to analyzing rather than simply remembering the arrangements of things. Also, they know when to look for causes, and when to conclude that features are random, not influenced by some force.

Materials

- (from previous lessons) a classroom model or map on a table or desk near the middle of the room
- blocks, dolls, and other small models; table settings; bathroom materials; photos of landscape features in the neighborhood, community, and state.
- symbols for various features that can be placed in different relationships.
- drawings of classroom features, such as a clock, globe, easel, etc.; small dolls, boxes, etc.

Vocabulary

Review: model, stand for, shrinking machine, location, position, line up

Concentrate on: balanced, unbalanced, pattern, string, ring, bunch, wave, group, even, spread out

Introduce: box, triangle, star, target, neighbor(ing)

Procedures

- put two sets of about six coins or blocks on a table one set in a line, the other in just a bunch.
 (Optional: make a math link by asking how many blocks are in each group.) Ask students to describe how the groups are the same (same number). Ask how they are different (different arrangement). Try to elicit the idea that one group is in a line.
- put half a dozen blocks or coins on one side of a desk, and scatter the same number evenly across another desk. Then ask if there are any differences in the groups. Try to elicit the idea that one group is all on one side, the other is not (one is balanced, the other is not).
- ask questions and listen
- VARIATION: arrange four blocks in a line and ask a student to add a block "in the same pattern"
- VARIATION: hold up photo of clearly aligned features (e.g. newspaper boxes near a subway entrance) or unaligned features (trees in a park) and have students arrange blocks to represent the features. The first examples should be extremely obvious one cannot expect people to make subtle discriminations until the basic categories are clearly understood.
- VARIATION: hold up pictures of memorable animals (penguins, bears, giraffes, ants, camels) that are in bunches or lines, and have students describe the patterns.

Learner outcomes

- awareness that many features in the world tend to occur in distinctive patterns sometimes evenly spread throughout an area, sometimes biased toward one side of an area, sometimes arranged in bunches, strings, rings, waves, target shapes, etc.
- enhanced ability to describe spatial patterns, and to give and interpret directions

Issues to be resolved

- A BIG ISSUE. The concept of "random" is the key to understanding pattern, but it is surprisingly difficult for students to grasp, even in college (maybe because they did not learn spatial patterns in primary school, when they were learning other visual category words such as colors and shapes?!!).

Strings, Rings and Bunches - Developmental Sequence

Background: Like any statement of developmental sequence, this list indicates what *might* happen with a typical child. It is not a prescription of what *must* happen in precisely this order in a classroom.

Stage 1: Students examine simple patterns and decide if they are "balanced" or "mostly on one side"

Teacher points to a desk with some blocks on it and asks if the blocks are scattered all across the desk or bunched mostly on one side (at first, make the distinction extremely obvious)

Use other simple examples until the concepts of *balanced* and *unbalanced* (*biased*) are clear. Use different kinds of imbalance – left/right, top/bottom, corner/middle etc.

Stage 2: Students select symbols to show relative positions of objects on a classroom map/model.

Teacher asks students to place squares or blocks to represent desks on the classroom map or model; in most primary classrooms, the tables or desks are mostly on one side of the room. Try with other objects on a rug, and repeat until they can reliably represent balanced and unbalanced patterns.

VARIATION: Teacher places objects on the map/model, and asks students if those objects accurately represent the pattern of named features in the room (or on the rug, etc.). Like many other aspects that seem "intuitively obvious" to adults, the distinction between balanced and unbalanced has to be learned and may take some time and/or repetition.

Stage 3: Students describe features that tend to occur in specific patterns – clusters, strings, etc.

Teacher arranges blocks in definite patterns (lines, strings, rings, tight clusters (bunches), or, later, stars, targets, checkerboard arrangements, waves. Describe the patterns at first, then ask students to name the patterns, then occasionally misname a pattern and have students correct the "mistake".

Teacher shows photos of features and has students decide if they tend to occur "in bunches," "all in a line," or "in a way that doesn't look like any kind of pattern."

VARIATION: repeat with other features – signs and specific kinds of business (this is a good place to add common street sign words like restaurant, grocery, and bank to their vocabularies). Perhaps note that we are learning words that might help us when we go on a field trip.

Stage 4: Students arrange blocks or coins in specified patterns.

Teacher mentions a pattern and asks students to arrange blocks in that pattern. (This can be a kind of "Simon says" game, like "Simon says put your blocks in a string from east to west" – it can also be a playground game where groups of students become the blocks – "Simon says for the bluebird team to arrange itself into a ring around the red pail."

VARIATION: Teacher holds up pictures of memorable animals (penguins, bears, giraffes, ants, camels) that are in bunches or lines, and asks students to describe the patterns and/or to arrange blocks or coins or small dolls "in the same pattern."

Stage 5: Students describe patterns on maps or remotely sensed images of the world.

Teacher holds up photos of neighborhoods as seen from an airplane and asks students to describe the pattern of houses or trees. Pick photos that start with familiar features and gradually stretch – people can continue to learn about spatial patterns well into graduate school!!!

VARIATION: Use photos of buildings and describe patterns within the scene – e.g., of windows, lighted windows at night, objects in a store window, anything that has a distinctive pattern.

Stage 6: Students place models of features on a neighborhood map.

Assessment game: Put towels on several tables in the room, hide a flat object (e.g., a photo, card, certificate) under one towel, place blocks or coins in a pattern on the towel, and make a "treasure map" that says to look under the towel that has coins arranged in a string, ring, star, or other distinctive shape. Reverse the process: students hide a treasure and show its location on a map for others to read.

Forward: repeat the process for larger areas – city, state, country, continent, world – as appropriate.













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