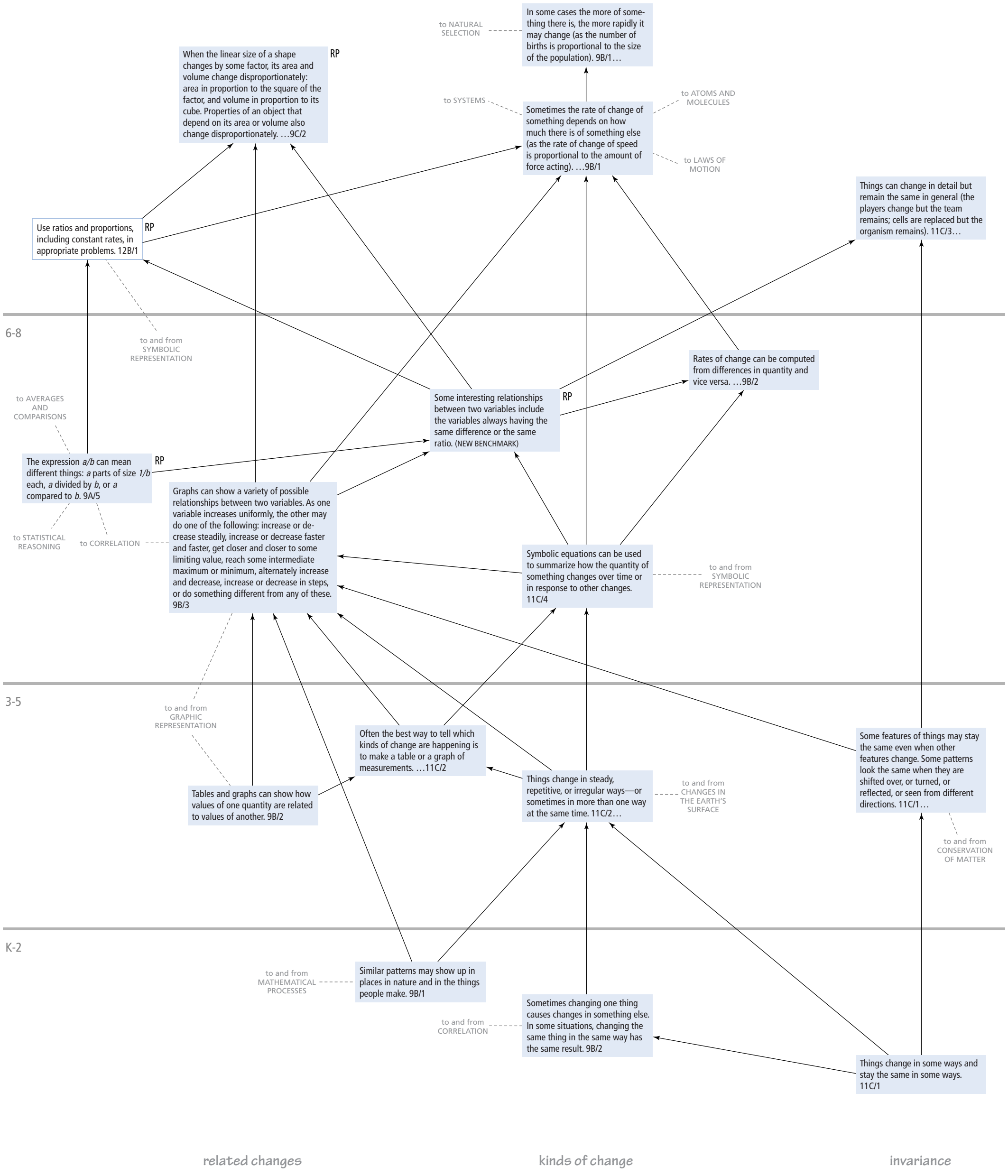
9-12
6-8
3-5
K-2
RP
RP
RP
RP
to NATURAL SELECTION
In some cases the more of something there is, the more rapidly it may change (as the number of births is proportional to the size of the population). 9B/1…
When the linear size of a shape changes by some factor, its area and volume change disproportionately: area in proportion to the square of the factor, and volume in proportion to its cube. Properties of an object that depend on its area or volume also change disproportionately. …9C/2
to SYSTEMS
Sometimes the rate of change of something depends on how much there is of something else (as the rate of change of speed is proportional to the amount of force acting). …9B/1
to ATOMS AND MOLECULES
to LAWS OF MOTION
Things can change in detail but remain the same in general (the players change but the team remains; cells are replaced but the organism remains). 11C/3…
Use ratios and proportions, including constant rates, in appropriate problems. 12B/1
to and from SYMBOLIC REPRESENTATION
Rates of change can be computed from differences in quantity and vice versa. …9B/2
to AVERAGES AND COMPARISONS
Some interesting relationships between two variables include the variables always having the same difference or the same ratio. (NEW BENCHMARK)
The expression a/b can mean different things: a parts of size 1/b each, a divided by b, or a compared to b. 9A/5
to STATISTICAL REASONING
to CORRELATION
Graphs can show a variety of possible relationships between two variables. As one variable increases uniformly, the other may do one of the following: increase or decrease steadily, increase or decrease faster and faster, get closer and closer to some limiting value, reach some intermediate maximum or minimum, alternately increase and decrease, increase or decrease in steps, or do something different from any of these. 9B/3
Symbolic equations can be used to summarize how the quantity of something changes over time or in response to other changes. 11C/4
to and from SYMBOLIC REPRESENTATION
to and from GRAPHIC REPRESENTATION
Often the best way to tell which kinds of change are happening is to make a table or a graph of measurements. …11C/2
Some features of things may stay the same even when other features change. Some patterns look the same when they are shifted over, or turned, or reflected, or seen from different directions. 11C/1…
Tables and graphs can show how values of one quantity are related to values of another. 9B/2
Things change in steady, repetitive, or irregular ways—or sometimes in more than one way at the same time. 11C/2…
to and from CHANGES IN THE EARTH'S SURFACE
to and from CONSERVATION OF MATTER
to and from MATHEMATICAL PROCESSES
Similar patterns may show up in places in nature and in the things people make. 9B/1
Sometimes changing one thing causes changes in something else. In some situations, changing the same thing in the same way has the same result. 9B/2
to and from CORRELATION
Things change in some ways and stay the same in some ways. 11C/1
related changes
kinds of change
invariance