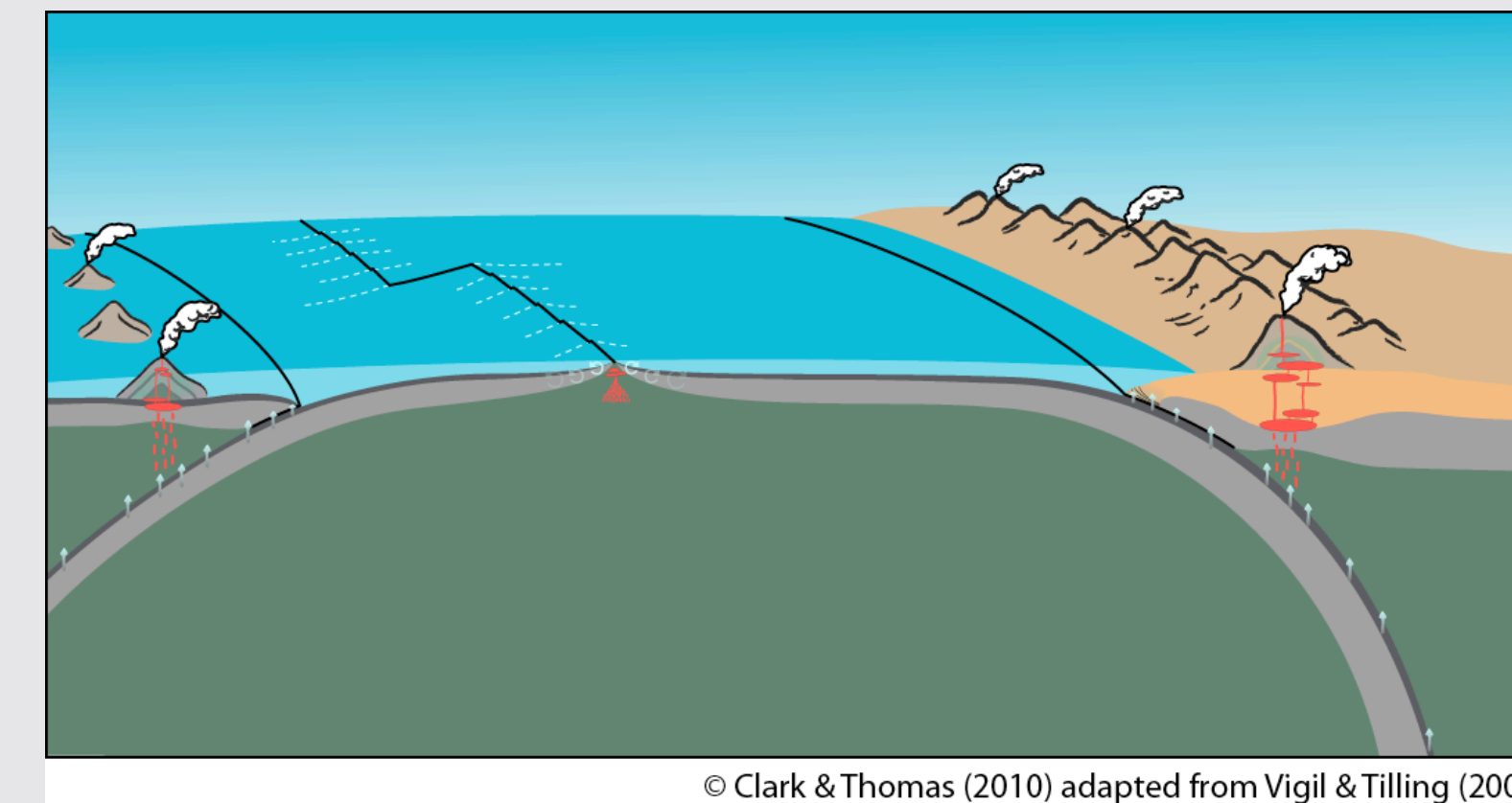


Plate Tectonics Hypothetical Construct Map

Upper Anchor

Volcanoes, earthquakes and mountains are the surface manifestations of large-scale movement of both solid and near-solid earth materials. Such movements can be explained as a natural consequence of the initial formation of the planet, its subsequent differentiation into chemically distinct units (crust, mantle, core), and the continual transfer of heat from the interior of the planet to the surface.



© Clark & Thomas (2010) adapted from Vigil & Tilling (2006)

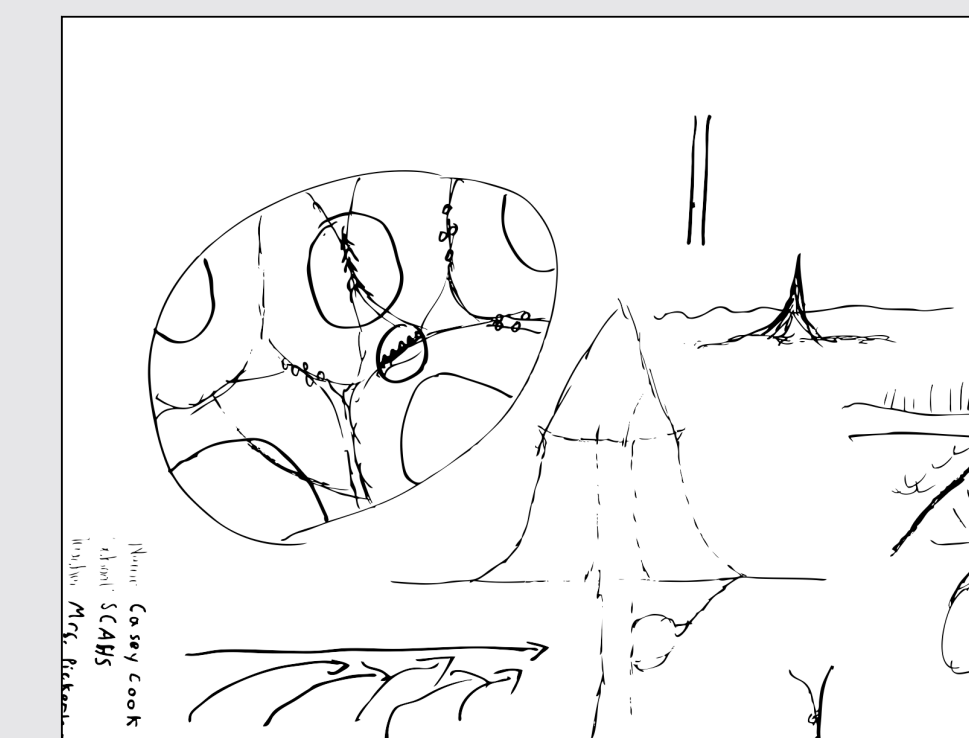
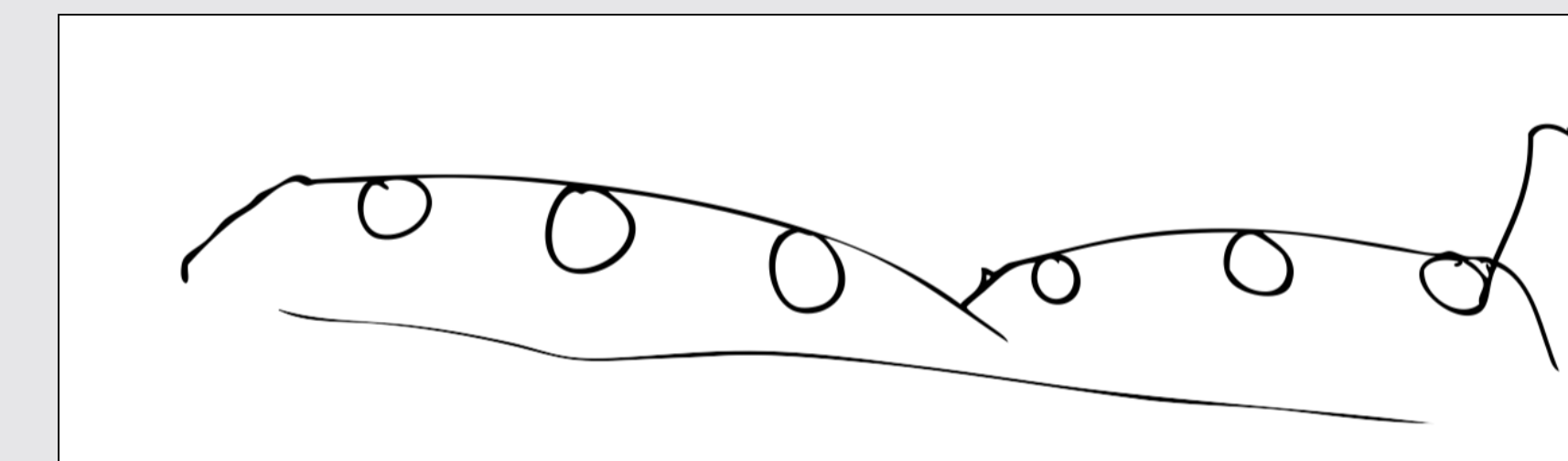
Conceptual Interviews

Total number of students interviewed = 89
 Middle Grades = 59
 High School = 27
 University = 3
 Students with the new protocol = 40
 Students with pre/post = 23 (46 interviews)

Plate Tectonics

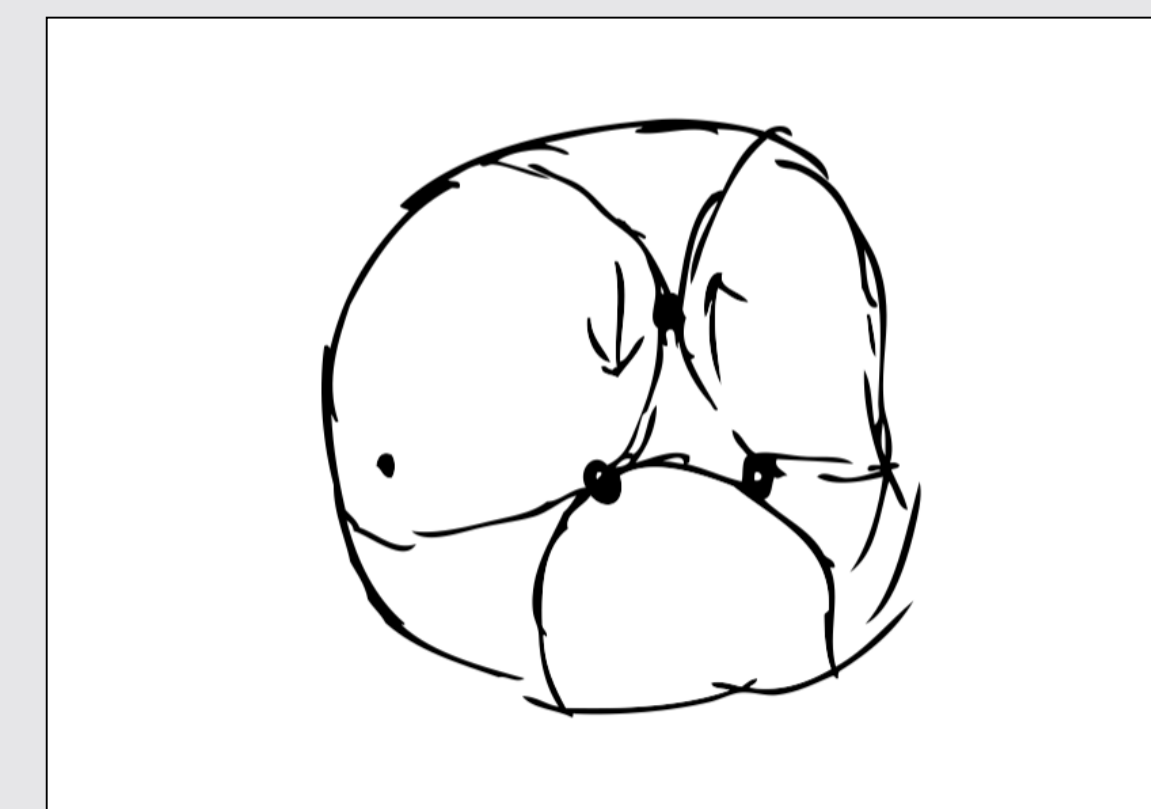
7	Students understand that “it must be the case” that all plate interactions are interdependent (e.g. if the North American Plate is getting bigger, then the Pacific Plate must be getting smaller)
6	Students understand that material is recycled and mass is conserved. Students indicate that boundaries and the phenomena that occur there are a RESULT of plate dynamics, not the cause.
5	Students describe the continuous process of movement of individual plates that leads to intermittent events at boundaries, driven by new material is being formed and old material being destroyed. Students indicate that plates are bounded on all their sides by other plates.
4	Students describe the continuous process of movement of a gapless system of individual plates that leads to intermittent events at boundaries.
3	Students include a description of a boundary where two plates diverge. Students see tectonic plates as acting independent of one another, indicating there may be ‘space’ between plates. They continue to use other terms without description or understanding of associated process.
2	Not simply boundary focused, but identify that there are plates. Students focus on subduction as a process at boundaries where one plate goes under another. Terms are mentioned, but there is no description or understanding of process; e.g. Pangea, Mid-Ocean Ridge, Asthenosphere
1	Geographic association of a phenomenon with plate boundaries (e.g. rubbing leads to earthquakes, volcanoes happen at plate boundaries)
0	Supernatural decision; random; associated with water; associated with regional climate

The plates keep getting renewed



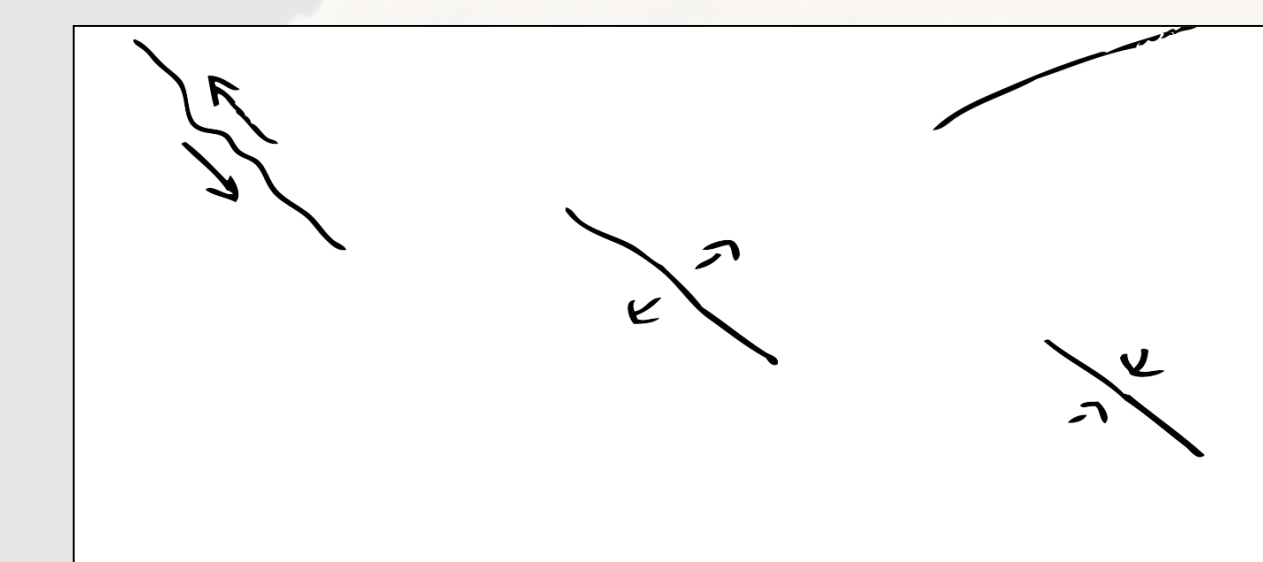
Some plates are sliding under others and some plates are coming back up. It’s always changing

Plates move towards the continents, which cause the oceanic crust to sink. The upwelling of magma around divergent boundaries makes the plates move, too



More activity occurs “in between plates” than “in the middle” of plates

Earthquakes cause plates to separate



Helen Gall, Meredith Hill Bembenic, Eliza Richardson, Scott McDonald, and Tanya Furman

