

Density and the Rock Cycle Unit Schedule

Introduction

The topic for this unit is density, specifically understanding what density is and how it is determined, and applying that knowledge to understanding the rock cycle.

My audience for this unit is either a High School senior or community college Earth science class.

This unit is integral to my Earth science course because many Earth science processes are driven by density differences. A student can learn about an Earth science process in terms of what it represents, but without a solid understanding of the mechanisms by which the process exists, the student may only leave the course with a superficial or incomplete understanding of that phenomenon and why it occurs. The rock cycle is a prime example of a density-related Earth science process, because density differences are the fundamental underlying factors for many of the steps within that cycle. For example, subduction and creation of new igneous rock runs hand-in-hand with mantle convection, which is a result of density variations within the mantle. Other portions of the rock cycle, including constraints on sediment transport, accretion of terranes, or accretionary wedges, all are controlled by density differences.

Topic prior to this unit

Igneous, metamorphic, and sedimentary rocks and rock-forming minerals will have been covered just before this unit. Students will be able to identify rocks/minerals and will have a general idea of the environment of formation for samples in each rock group. The rock cycle was covered in that unit, in the sense that each rock has a protolith, or parent material, from some other portion in that cycle. That unit will hopefully set the stage for looking more in-depth at each component of the rock cycle and the way in which density differences play a role.

Topic after this unit

Climate and climate change, and density will be worked in here as well, to keep the concept alive in the course and in students' minds.

Essential questions

These were developed after the list of objectives were identified and prioritized, but I'm stating them here for clarity.

1. What role does density play in the formation of igneous, sedimentary, and metamorphic rocks?
 - a. What is density? Why is density important?
 - b. What factors control the density of an object/substance?
 - c. Are there density differences within the Earth? If so, where, and what role do they play?
2. Is Earth growing bigger over time (i.e. is Earth's circumference increasing)?