

TSIA Module 1 Misconceptions

Practices of Scientists

- Science is a static body of knowledge that does not change
- Scientists are mostly old men in white coats with crazy hair.
- Scientists all work in the same way because there is only one way to do science.
- The scientific process is linear and uni-directional.
- Hypotheses cannot change.
- Only (professional) scientists can do science.
- If your hypothesis is not supported, your investigation has failed.
- Science is only done in a laboratory.
- Accepted scientific explanations do not change over time.
- If scientists disagree, or the results of experiments show conflicting results, then the scientific findings are not useful.
- TV shows and movies accurately show how science is done (e.g. CSI, The Big Bang).

Density

General Misconceptions

- Big things are more dense, small things are less dense.
- Big/heavy things sink, whereas small/light things float.
- Objects with air inside will always float.

Aquatic Misconceptions

- Substances (e.g. salt/sugar) dissolved in water do not affect the overall weight.
- Objects float because the body of water is large (e.g. the ocean or the experimental container).
- Density does not cause currents; only waves cause currents.
- Water is water. Water in the ocean has the same properties everywhere.
- Confusion between density, buoyancy, and gravity.

Moon

- The phases of the moon are caused by shadows of the earth, sun, or clouds.
- There is a side of the moon that is always dark.
- The moon is only visible at night.
- The moon emits its own light, or the moon is very reflective.
- The moon does not have gravity.
- If the earth had no moon, there would be no tides.
- The moon does not rotate.
- Confusion between eclipses and moon phases

Other Physical Aquatic Science Misconceptions

- There are many disconnected oceans.
- Water in the ocean “stays in one place”.
- Water in the ocean moves up and down with waves and tides, but it doesn’t move long distances across oceans.
- Waves cause currents.
- Understanding physics and chemistry are not important to ocean biology.
- The coast and coastlines are static and do not change over time.
- The ocean is same depth everywhere.
- Islands float.
- Sand is made of salt.