

Exam 1 – 2012

Learning Goals

- To explain what it is to “do science” and how the idealized steps of the “scientific method” do not do an adequate job of explaining what it is to do science.
- To describe what a generalization is and what it takes to prove and to disprove a generalization or scientific theory.
- To describe the necessity for observations and characterization of patterns to understand the invisible
- To describe differences in the process of scientific discovery as described in Derry
- To describe the value of a model regardless of whether it models the phenomena exactly.
- To describe how a person becomes an expert.

Genetics

- to explain the difference between mitosis and meiosis.
- to describe why meiosis is necessary to create gametes (eggs and sperm)
- to describe simple inheritance and calculate the probability of particular traits showing up in offspring.
- to explain how certain diseases and genetic defects can occur in newborns.
- to explain what stem cells are, their purpose and where they exist.
- To describe the basic process of invitro fertilization (IFV) and genetic testing
- To describe how the two different types of twin babies can come about – fraternal and identical.

Earthquakes

- to describe where earthquakes can be located and how it takes two pieces of information, the epicenter and the depth, to fully describe the location of the quake.
- To explain how and why earthquakes are not predictable
- To describe different types of deformation that rocks can experience due to stress and strain

Science of Sound

- Vibrations make sound
 - Our throat vibrates to make voice
 - Straw tip vibrates to make sound
 - Plucked string vibrates to make sound
- Sound travels as sound waves (not particles)
- Sound is energy
- High pitch is a high sound (treble notes)
- Lower frequencies (lower sounds- bass notes) have longer wavelengths
- Resonant frequency: The frequency an object “likes” to vibrate at
 - Different lengths of straw “like” different frequencies
 - How waves add to create resonance
- All instruments need source of vibration, way to change the pitch and a resonance chamber or sympathetic vibration to make it loud.

Function of the ear

- The ear flap is called the pinna and is used for funneling sound into the ear.
- To describe how sound waves travel into the ear and through through the inner ear into the cochlea

- The cochlea is filled with thousands of tiny sensors called hair cells
- These hair cells turn vibrations into electrical signals that are sent to the brain and the brain interprets the source of the sound (piano vs. a guitar).
- Different parts of the cochlea resonate with certain frequencies....
Some like high pitches and some like low pitches...
- Listening to loud sounds for too long can damage the hair cells
- Damaged hair cells can't be fixed.