**Key notes for Second Sixweeks Test**

**Scientific Method**

1. **Scientific Methods – are ways scientists follow steps to answer a question or solve a problem**
2. **Hypothesis – a possible explanation or guess to the question or problem**
3. **Controlled experiment – Tests on ONE factor at time – with a control (Does not get the change) to compare to**
4. **Scientific Method:**
   1. **Make an observation to ask a Question**
   2. **Make an Hypothesis**
   3. **Do an experiment**
   4. **Record and Analyze the Data**
   5. **Make a Conclusion**
   6. **Share your results**

Engineering Design Process

1. **My RESULTS DEPENDS on What I CHANGE (independent variable)**
2. **Variable – any factor or part that can affect an experiment ( examples: cup, fish, amount of water, ice)**
3. **Independent Variable – What “I” change in an experiment**
4. **Dependent Variable – The RESULT of what I change**
5. **Experimental Group – The Group That gets the CHANGE**
6. **Control – The group or part that DOES NOT get the change and used to compare to**
7. **Trial – Repeating the experiment, each time the experiment is done is called a trial**
8. **Engineering Design Process Steps**
   1. **Ask (what is the problem or question)**
   2. **Imagine (the answer to the problems or question)**
   3. **Plan and create (draw a blueprint or design – the build the prototype)**
   4. **Improve – What changes can you make**

**Technology**

1. **Assistive Technology – HELPS the organism (Glasses, canes, inhalers, walkers)**
2. **Adaptive Technology – CHANGES the organism Permanently or lifestyle change Permanently (laser eye surgery , insulin pumps, knee replacement, doorbell light for the deaf)**

**Conclusions**

1. **Must support or NOT Support the Hypothesis**
2. **A Valid conclusion is one that can be trusted**
   1. **Experiment should be repeated many times with same results**
   2. **The experiment should be repeated by others**

**Bias and Error**

1. **Error can happen when:**
   1. **Wrong measurements**
   2. **Using the wrong scientific tools**
   3. **Changing the conditions (like the temperature in the room of the experiment)**
2. **Bias is an expectation that leads to a particular conclusion**
   1. **May be something in the unconscious (back of mind)**
   2. **Person may not want to be wrong**
   3. **Misrepresentation of Data**
   4. **Opinion**
   5. **Past experiences**

**Scientific Tools**

1. **Metric System**
   1. **Kilo, Hecto, Deka { BASE UNIT (meter, liter, gram)}, Deci, Centi, Milli**
   2. **King Henry Doesn’t Usually Drink Chocolate Milk**
   3. **Celsius Temperatures:** 
      1. **Thirty is hot**

**Twenty is nice**

**Ten is cool**

**Zero is ICE!**

1. **Tools**
   1. **Beaker – to measure or mix liquids or pourable solids**
   2. **Gradated cylinders – to measure liquids**
   3. **Balance scale – to compare two measures or compare one item to a given weight**
   4. **Meter stick – to measure length**
   5. **Thermometer – to measure temperature**
   6. **Microscope – to view TINY objects**
   7. **Telescope – to view objects FAR AWAY**

**Interactions of Living Things**

1. **Biotic – LIVING Things**
2. **Abiotic – NON – LIVING Things**
3. **Limiting Factors** – **resource that is SO SCARCE that it limits the size of the Population**
   1. **(Examples:** food, water, living space…)
4. **Carry Capacity – the largest population that an environment can support**
5. **Producers – PLANTS – make their own food through PHOTOSYNTHESIS**
6. **Consumers – EAT plants or other consumers**
   1. **Primary Consumers – Eat PLANTS**
   2. **Secondary Consumers – Eat animals that EAT Plants**
   3. **Third Consumers – Usually top of the food chain**
   4. **Fourth Consumers – Usually decomposers**

**Energy Flow**

1. **The ARROWS point to the one doing the EATING!**
2. **FOOD CHAIN - ONE line only**
3. **FOOD WEB – many food chains together – looks like a web**
4. **Energy Pyramid – a model for how the energy spreads through an ecosystem**

**Fourth level**-Decomposers and Scavengers

**Third level Consumers**- Omnivores

**Second Level Consumers** – Carnivores

**First Level Consumers** – Herbivores

**Producers** - Plants

**Levels of the Environment**

1. **Organism – only ONE**
2. **Population – Two or more of the same animal/plant**
3. **Community – many populations in a given area**
4. **Ecosystem – a community and its NON-LIVING (Abiotic) parts**
5. **Biosphere – All the ecosystems of the earth**

**Adaptations**

1. **Camouflage**
2. **Warning Coloration**
3. **Teeth adaptations**
4. **Feet adaptations**
5. **Beak adaptations**
6. **Behavioral adaptations**

**KNOW EXAMPLES OF THESE!!!!**

**Symbiosis**

1. **Mutualism – BOTH Benefit/HELPED**
2. **Commensalism – ONE Benefits – other is UNAFFECTED**
3. **Parasitism – ONE Benefits – other is HURT**
4. **Predator – Hunts and Eats**
5. **Prey – Being Hunted and is Eaten**

**Cycles**

1. **Water Cycle**
   1. **Evaporation – Turn liquid water to a GAS**
   2. **Condensation – Turns Gas back into a LIQUID – Makes CLOUDS**
   3. **Precipitation – Clouds can NOT hold any more water – it falls as rain , snow, sleet, or hail**
   4. **Transpiration – The waste of Plants that releases WATER into the Air**
2. **Carbon Cycle (ALL living things contain carbon and need carbon – some nonliving things also are made of carbon)**
   1. **Carbon is released for plants to use by:**
      1. **Respiration – the breathing in of oxygen by animals and used to break down sugar and exhaling – CARBON DIOXIDE**
      2. **Combustion – the burning of things that releases CARBON**
      3. **Decomposition – Decomposers breaking down dead plants and animals and releasing CARBON in the soil**
   2. **Animals and HUMANS get the carbon they need by EATING PLANTS or animals that have eaten plants**
3. **Nitrogen Cycle – ALL living things need nitrogen but can NOT use Nitrogen GAS**
   1. **PLANTS need nitrogen FIXED (3 ways to do)**
      1. **Lightning will FIX Nitrogen**
      2. **Bacteria will FIX Nitrogen**
      3. **Decomposition will FIX Nitrogen**
   2. **Animals and HUMANS get the Nitrogen they need by EATING PLANTS or animals that have eaten plants**

**Biomes**

1. **Tundra – COLD Desert – at the poles or tops of mountains**
2. **Taiga – Coniferous Forest – Evergreen Trees – Right below the Tundra at the poles**
3. **Temperate Deciduous Forest – SEASONS – Leaves fall in the FALL- makes very RICH Soil**
4. **Rainforest – At the EQUATOR – NO Seasons – always summer – POOR Soil due to no leaves falling in fall**
5. **Desert – Less than 25 cm or 10 inches of rain- Extreme temperatures , hot = day, cold = night, poor soil, animals adapt to live there**
6. **Grasslands – Grasses very few trees, found in all over the earth, RICH SOIL**
   1. **Prairie – North America**
   2. **Steepe – Asia**
   3. **Savannas – Africa**
   4. **Pampas – South America**
7. **Freshwater Biomes – little or no salt content, includes flowing and standing water**
   1. **Flowing freshwater – rivers or streams**
   2. **Standing freshwater – ponds or lakes**
      1. **Wetlands - home to many plants and animals (also called a swamp)**
8. **Saltwater Biomes**
   1. **Coral Reefs – formed from dead skeletons of coral over a long period of time**
      1. **Home of a large DIVERSE of plants and animals (Nemo!)**
   2. **Ocean – 4 zones**
      1. **Intertidal – contains the shoreline / coast (high and low tides)**
      2. **Neritic Zone – still receives sunlight, water still warm, plants and marine animals**
      3. **Oceanic Zone – Sea floor drops sharply, plankton near surface**
      4. **Benthic Zone- Deepest part of the ocean – no sunlight at the ocean floor, some animals get energy from thermal vents**
   3. **Estuaries- Where FRESHWATER and SALT WATER Meet! - Contains most of OUR SEAFOOD, very rich in nutrients**