8th Grade Science Curriculum Outcomes

**Scientific Method**
* Generate scientific questions about the world, based on observation*
* Design and conduct simple investigations*
* Parts of the method: purpose/question, hypothesis, materials, procedure, data & results, conclusions*
* Terms of the method: fair test, variables (independent and dependent), controlled variables, accuracy, and population*
* Forms of recording and reporting data: tables, graphs, and journals*
* Use sources of information to help solve problems*
* Write and follow procedures in the form of step-by-step instructions, recipes, formulas, flow diagrams, and sketches*
* Terms: purpose, procedure, observation, conclusion*
* Evaluate the strengths and weaknesses of claims, arguments, or data*
* Aspects of an argument: data, evidence, sampling, alternative explanation, conclusion*
* Describe the benefits and risks of new technologies or patterns of human activity*
* Risk, benefit, side effects, advantage, disadvantage=*
* Recognize the contributions made in science by cultures and individuals of diverse backgrounds*

**Basic Measurement**
* Use measurement devices to provide consistency in an investigation*
* Celsius, meters, liters, grams, teaspoon, cup*
* Balances, meter stick, graduated cylinder*
* Measure physical properties of objects or substances (mass, weight, temperature, area volume)*
* Describe when length, mass, weight, area or volume are appropriate to describe the size of an object and amount of a substance*
* Recognize lab equipment and be able to demonstrate correct usage*

<table>
<thead>
<tr>
<th>* Triple Beam Balances</th>
<th>* Flask</th>
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<tbody>
<tr>
<td>* Ruler</td>
<td>* Test Tube</td>
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<tr>
<td>* Watch glass</td>
<td>* Thermometer</td>
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<tr>
<td>* Beaker</td>
<td>* Hot plate</td>
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<tr>
<td>* Ring Stand Set up</td>
<td>* Bunsen Burner</td>
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<td>* Graduated Cylinder</td>
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**Matter**
* Describe common physical changes in matter
* Changes in states of matter: condensation, evaporation, melting, freezing, thermal expansion and contraction
* Describe common properties in matter
* Physical (size, color, shape, etc) and chemical; density
* Describe common chemical changes in terms of properties of reactants and products
* Examples: burning paper, rusting iron, photosynthesis, and digestion
* Distinguish between physical and chemical changes in natural and technological systems
* Examples: water cycle, chewing erosions, corrosion
* Explain physical changes in terms of the arrangement and motion of atoms and molecules
* Moving faster and gaining energy, moving slower and losing energy, vibrating, rotated, and conservation of matter
* Classify substances as elements, compounds, or mixtures
* Describe atoms of extremely small particles (atoms) that bond together to form molecules
* Molecule, particle, matter, bond, atom
* Describe the motion and arrangement of molecules in solids, liquids, and gases
* Describe the properties of acids and bases and their relationship to pH

**Hydrosphere**
* Use maps of the earth to locate water in its various forms and describe common conditions under which they exist
* Lakes, rivers, oceans, springs, glacier, water vapor
* Describe how rainwater in Michigan reaches the ocean
* Water path — run-off, creeks, wetlands, rain fall, snow melt
* Identify and describe regional watersheds
* Drainage, basins, divides, reservoirs, tributaries
* Explain how water exists below the earth’s surface and how it is replenished
* Water table, spring, porous, filtration
* Describe the origin of pollution in the hydrosphere
* Sewage, household dumping, industrial wastes, agricultural run-off
* Describe how human activities affect the quality of water in the hydrosphere
* Human activities, quantity of water, oceans, freshwater pollution, groundwater, water treatment

**Atmosphere and Weather**
* Describe the composition and characteristics of the atmosphere
* Air, molecules, gas, water vapor, humidity, dust particles, air pressure, temperature changes with altitude
* Describe patterns of changing weather and how they are measured
* Cold fronts, warm fronts, air mass, thermometer, rain gauge, wind direction indicator, weather maps, satellite weather images
* Explain the water cycle and its relationship to weather patterns
* Evaporation, condensation, cooling, clouds, run-off, rain, snow, hail, fog, humidity, droughts
* Describe the health effects of polluted air

**Space Science**
* Compare our sun to other stars
* Temperature, colors, sizes, apparent and absolute brightness, double stars
* Describe compare and explain the motion of the earth and moon
* Rotation, revolution, axis, equinox, solstice, tides, phases of the moon
* Describe the position and motion of our solar system in our galaxy and the overall scale, age, and structure of the universe
* Stars, galaxies, Milky Way, spiral structure, speed of light, light year, travel times, big bang, red shift
* Explain how stars and planetary systems form and how stars produce energy
* Coalescence from clouds and dust by gravity, explosion of stars producing heavy elements, heavy and light elements, age of the solar system