

Minneapolis Public Schools

Physical Science – Grade 11-12

PACING SCHEDULE

STANDARDS ADDRESSED	QUARTER 1 OR 3: THE HISTORY AND NATURE OF SCIENCE; FORCES AND MOTION; ASTRONOMY (Adjust Time Lines As Needed within the Quarter)	APPROXIMATE TIME REQUIRED
I.A.B.C.D.All I.A.B.C.D.All	UNIT I - Overview of Content, Skills and Processes of Science, and Introduction to Physical Science ✎ Investigation A - The nature of science ✎ Investigation B - Review of skills and safety	1-2 weeks
II II	UNIT II - Motion ✎ Investigation A - Speed ✎ Investigation B - Velocity ✎ Investigation C - Acceleration	2-3 weeks
II II	UNIT III – Non-linear Motion and Forces ✎ Investigation A – Balanced and unbalanced forces ✎ Investigation B – Friction <ul style="list-style-type: none"> • sources and effects • static and kinetic • resistance 	2 weeks
	UNIT IV – The Universe ✎ Investigation A – The solar system <ul style="list-style-type: none"> • two models for formation • characteristics of planets and natural satellites • other components • orbital movement ✎ Investigation B – Stars and galaxies <ul style="list-style-type: none"> • types • how they change over time • life cycles ✎ Investigation C – Origin of the Universe <ul style="list-style-type: none"> • evidence for • current investigative technologies ✎ Investigation D – Evolution of the Universe <ul style="list-style-type: none"> • Doppler evidence • the future of the Universe 	2 weeks

STANDARDS ADDRESSED	QUARTER 2 OR 4: NEWTONIAN MECHANICS AND ENERGY	APPROXIMATE TIME REQUIRED
II II	UNIT I – Newton’s Laws ➤ Investigation A – Newton’s First Law <ul style="list-style-type: none"> • net force • effects of force on motion • inertia ➤ Investigation B – Newton’s Second Law <ul style="list-style-type: none"> • $f=ma$ • the Newton measurement unit • gravitational effects on an object at rest and in motion • mass versus weight ➤ Investigation C – Newton’s Third Law <ul style="list-style-type: none"> • impulse momentum • forces during collision • action and reaction 	4-5 weeks
II II	UNIT II – Work, Power, and Energy ➤ Investigation A – Simple machines and mechanical advantage, including conceptual and quantitative understanding ➤ Investigation B – Kinetic and potential energy <ul style="list-style-type: none"> • definitions, differentiation, and association • conversions • Law of Energy Conservation ➤ Investigation C – Electrical energy <ul style="list-style-type: none"> • properties of electrical force: charge, conduction, induction, field, force over distance, electrical potential, the volt as unit of measurement, current, conductors, circuits • AC and DC current • production, storage, and transmission of electricity ➤ Investigation D – Waves <ul style="list-style-type: none"> • electromagnetic including light • sound 	3-5 weeks

STANDARDS ADDRESSED	QUARTER 3 OR 1: INTRODUCTION TO CHEMISTRY	APPROXIMATE TIME REQUIRED
II II II II	UNIT I – Atoms and Elements Investigation A – Components of the atom <ul style="list-style-type: none"> • the Bohr model • parts of the atom • mass and charge Investigation B – The periodic table <ul style="list-style-type: none"> • positioning the elements • number and mass • regions and families • periodicity • valence electrons • deriving bond type from table position Investigation C – Properties of elements; isotopes Investigation D – How neutral elements become ions	3.5 weeks
II II	UNIT II – States of Matter Investigation A – Kinetic Theory <ul style="list-style-type: none"> • comparison of elements, compounds, atoms, and molecules • chemical vs. physical change • properties of atoms • valence electrons Investigation B – Bonding <ul style="list-style-type: none"> • names and formulas from the oxidation number • ionic and covalent bonds • interpreting chemical formulas Investigation C – Mixtures and solutions <ul style="list-style-type: none"> • solubility • acids, bases, and the pH scale 	3.5 weeks

STANDARDS ADDRESSED	QUARTER 4 OR 2: CHEMICAL REACTIONS AND ENERGY TRANSFORMATIONS	APPROXIMATE TIME REQUIRED
II II	UNIT I – Chemical Reactions ✎ Investigation A – Word and symbol equations ✎ Investigation B – Chemical reactions <ul style="list-style-type: none"> • conservation of mass • balanced equations • neutral solutions from acids and bases • six types of chemical reactions • energy of chemical reactions • effects of temperature • catalysts 	2 weeks
II II II	UNIT II – Energy Transformations ✎ Investigation A – Conservation of Energy and Mass <ul style="list-style-type: none"> • nuclear reactions • physical and chemical changes ✎ Investigation B – Nuclear Reactions <ul style="list-style-type: none"> • fusion and fission • energy and elements • products released • amount of energy released • weak and strong nuclear forces • comparison and contrast in chemical and nuclear energy ✎ Investigation C – Fossil Fuels <ul style="list-style-type: none"> • risks and benefits • renewable resources • nuclear power ✎ Investigation D – Wavelength in the Electromagnetic Spectrum ✎ Investigation E – Thermodynamics <ul style="list-style-type: none"> • cycling of materials in Earth systems • transfer of energy in Earth systems 	6 weeks
I.B.1	UNIT III – Designing and Conducting an Original Experiment	2 weeks