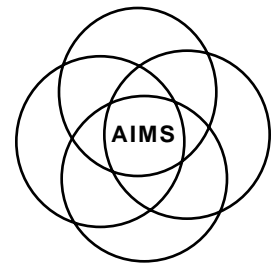


Michigan's  
**SCIENCE**  
Standards and Benchmarks  
and  
Suggested *AIMS* Activities



Primary Level  
Grades K-2



Compiled by  
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## Michigan Science Content Standards and Working Draft Benchmarks and Correlated AIMS Activities

### Key to abbreviations and typeface:

*Italics* indicate the source of the activity. 5.02 means volume 5, number 2 of the AIMS Magazine or Newsletter.

### I. Construct New Scientific and Personal Knowledge Elem K-2

#### Content Standard 1:

All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology and reconstruct previous learned knowledge.

How do scientists ask questions that help them learn about the world.

#### I.1.E.1

C1	Generate reasonable questions about the world, based on observation.
	Observe a Leaf ..... <i>Primarily Plants</i>
	Observe a Tree ..... <i>Primarily Plants</i>
	Fishful Thinking ..... <i>Critters</i>
	The Two Liter Aquarium..... <i>Series 2 Primary Binder</i>
	Mealworms Under Glass .....7.04
	Water Watchers .....5.06
	Drying on the Line ..... 9.07
	The Mini Water Cycle ..... <i>Water Precious Water</i>
	Melt a Cube, Keep a Cube ..... <i>Primarily Physics</i>
	Grapes to Raisins ..... <i>Fall into Math and Science</i>
	Sound is Vibration ..... <i>Primarily Physics</i>
	Sensational Observations.....11.08
	Schoolyard Safari .....13.03
	A Snap of Time ..... <i>Cycles of Knowing and Growing</i>
	Clownin' Around.....12.01

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How do scientists figure out answers to their questions by investigating the world?

I.1.E.2

C2 Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.

Melt a Cube, Keep a Cube .....	<i>Primarily Physics</i>
A Pumpkin Cover Up .....	8.03
Magniviewer .....	9.10
A World of Discovery (Song) .....	9.10
What's the Skinny? .....	10.09
Touch Tells Much .....	11.08
Holiday Sense.....	11.05
A Safe Landing .....	<i>Under Construction</i>
What a Corny Life .....	<i>Cycles of Knowing and Growing</i>
Observing Bulbs .....	<i>Cycles of Knowing and Growing</i>

I.1.E.3

C3 Manipulate simple mechanical devices and explain how they work.

Construct Musical Instruments .....	<i>Primarily Physics</i>
My Styrophone .....	<i>Primarily Physics</i>
You are My Sunshine .....	<i>Spring into Math and Science</i>
Time for Tools .....	<i>Under Construction</i>
Tools of the Trade .....	<i>Under Construction</i>
Can It Open .....	<i>Under Construction</i>
Tall Walls .....	<i>Under Construction</i>

I.1.E.4

C4 Use simple measurement devices to make metric measurement.

Let me Count the Ways .....	1.04 & <i>Primarily Bears</i>
All Around the Apple .....	5.02
Water in Apples .....	<i>Jaw Breakers and Heart Thumpers</i>
Bear Facts .....	1.02
Rock Hounds and Bears .....	4.04
Look at Me Now .....	9.02

How do scientists learn about the world from books and other sources of information

I.1.E.5

C5 Develop strategies and skills for information gathering and problem solving.

Sound Energy .....	<i>Primarily Physics</i>
Energy .....	<i>Primarily Physics</i>
Heat Energy .....	<i>Primarily Physics</i>
Energy Concept Map .....	<i>Primarily Physics</i>

How do scientists communicate their findings to other scientists and the rest of society?

I.1.E.6

C6 Construct charts and graphs and prepare summaries of observations.

Because most AIMS activities include opportunities for students to construct charts and graphs and prepare summaries of observations, individual activities are not listed here.

## II. Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge - Elem K-2

### Content Standard 1:

All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.

How do scientists decide what to believe?

#### II.1.E.1

R1 Develop and awareness of the need for evidence in making decisions scientifically.

Can it Matter ..... 10.02  
Teddy Bears and Oranges ..... *Primarily Bears*  
The Orange and Water ..... *Off the Wall*

How is science related to other ways of knowing?

#### II.1.E.2

R2 Describe the relationship of science to other forms of creative expression such as language arts and fine arts.

Gingerbread Kids ..... 6.05  
Leaf Printing ..... *Primarily Plants*  
The Mitten ..... 5.06  
Made by Nature Made by Me ..... 11.01

How do science and technology affect our society?

#### II.1.E.3

R3 Describe ways in which technology is used in everyday life.

When I was 10 ..... *Electrical Connections*  
Time for Tools ..... *Under Construction*  
Tools of the Trade ..... *Under Construction*  
Tool Tales ..... *Under Construction*  
Why Wheels? ..... 13.02

#### II.1.E.4

R4 Develop an awareness of the impact of human activity on the environment

Missing Moths ..... *Critters*  
Little Sprouts ..... *Water Precious Water*  
After Lunch ..... *Cycles of Knowing and Growing*

How have people of diverse cultures contributed to and influenced developments in science?

#### II.1.E.5

R5 Develop an awareness of contributions made to science by people of diverse backgrounds.

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### III. Use Scientific Knowledge from the Life Sciences in Real-World Contexts - Elementary K-2

#### CELLS

##### Content Standard 1:

All students will apply an understanding of cells to the functions of multicellular organisms; and explain how cells grow, develop and reproduce.

What are cells?

##### III.1.E.1

LC1 Describe cells as living systems.

Eggstra Explorations ..... *Spring into Math & Science*

#### ORGANIZATION OF LIVING THINGS

##### Content Standard 2:

All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.

How are groups of living things classified?

##### III.2.E.1

LO1 Compare and classify familiar organisms on the basis of observable physical characteristics.

Leaf Facts .....	<i>Primarily Plants</i>
Leaf Safari .....	<i>Primarily Plants</i>
Sorting Leaves .....	<i>Primarily Plants</i>
Evergreen .....	7.05
Observe a Leaf.....	<i>Primarily Plants</i>
Observe a Tree .....	<i>Primarily Plants</i>
Wings and Webs .....	<i>Critters</i>
Spiders and Insects .....	<i>Critters</i>
Mealworms under Glass .....	7.04
Move Along Mealworm .....	9.01
Mealworm Hop (Song) .....	9.01
Beetle Mania .....	11.02
Pets are Part of the Picture .....	5.10
Seed Sort .....	<i>Primarily Plants</i>
Observing Seeds .....	<i>Primarily Plants</i>
Seeds, Spores and More.....	<i>Primarily Plants</i>
Seeds Travel.....	<i>Primarily Plants</i>
Helicopters and Parachutes .....	<i>Primarily Plants</i>
Apples A Peel to Me .....	<i>Fall into Math and Science</i>
Sherlock Combs the Yard .....	1.10
Lenses and Ladybugs .....	9.08

III.2.E.2

- LO2 Describe vertebrates in terms of observable body parts and characteristics.
- Undercover ..... *Critters*
  - Fishful Thinking ..... *Critters*
  - Fish Puzzle ..... *Primary series 2 binder*
  - Mealworm Hop (Song) ..... 9.01
  - Mammals on My Mind ..... *Bats Incredible*
  - Megabat & Microbat ..... *Bats Incredible*
  - Classroom Safari ..... *Critters*
  - Eyeful of Color ..... *Fall into Math and Science*
  - Fingerprinting ..... *Jawbreakers & Heart Thumpers*
  - I am Growing ..... 9.02
  - Dichotomous Key for Creature Features ..... 5.05

How do life cycles of living things differ?

III.2.E.3

- LO3 Describe life cycles of familiar organisms.
- Mealworms under Glass ..... 7.04
  - Move Along Mealworm ..... 9.01
  - A Time of Their Own ..... *Cycles of Knowing and Growing* and 9.03
  - Silkworms ..... *Cycles of Knowing and Growing*
  - Just a Little Sprout ..... *Cycles of Knowing and Growing*
  - Golden House ..... *Cycles of Knowing and Growing*
  - Fallen Leaf ..... *Cycles of Knowing and Growing*

How do living things obtain and use energy?

III.2.E.4

- LO4 "Compare and contrast food, energy, and environmental needs of similar organisms."
- Food Chains & Webs ..... *Critters and 9.09*
  - Home on the Range ..... *Critters*
  - Caring Cubes ..... 13.02

How are the parts of living things adapted to carry out specific functions?

III.2.E.5

- LO5 Describe functions of selected seed plant parts.
- Noses for Nectar ..... *Bats Incredible*
  - Inside a Seed ..... *Primarily Plants*
  - Plant Parts Song ..... 7.05

## HEREDITY

### Content Standard 3:

All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.

How are characteristics of living things passed on through generations?

III.3.E.1

LH1 Give evidence that characteristics are passed from parents to young.  
 Eyeful of Color ..... *Fall Into Math and Science*

## EVOLUTION

### Content Standard 4:

All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.

How do scientists trace the origin and development of species?

III.4.E.1

LE1 Explain how fossils provide evidence about the nature of ancient life.

In what ways are living things adapted (suited) to survive in their environments?

III.4.E.2

LE2 Explain how physical and/or behavioral characteristics of organisms help them to survive in their environments.

Gone Fishing ..... *Critters*  
 Seeds Spores and More ..... *Primarily Plants*  
 Seeds Travel ..... *Primarily Plants*  
 Hide and Seek ..... *Critters*  
 Noses for Nectar ..... *Bats Incredible*  
 Missing Moths ..... *Critters*  
 Web Threads ..... *12.03*  
 I'm Stuck on You ..... *9.05*

## ECOSYSTEMS

## Content Standard 5:

All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment and analyze how humans and the environment interact.

How are parts of an ecosystem related and how do they interact?

## III.5.E.1

LEC1 Identify familiar organisms as part of a food chain or food web & describe their feeding relationships within.

Food Chains & Webs .....9.09

Food Chain of the Pond Song .....8.05

## III.5.E.2

LEC2 Explain common patterns of interdependence and interrelationships of living things.

People Need Plants ..... *Primarily Plants*

Two Liter Aquarium..... *Primary Series 2 workshop binder*

How is energy distributed to living things in an ecosystem?

## III.5.E.3

LEC3 Describe the basic requirements for all living things to maintain their existence.

The Earthworm ..... *Critters*

Make a Terrarium .....2.08

A Seed Grows ..... *Primarily Plants*

A Fallen Leaf ..... 11.07

How do communities of living things change over time?

## III.5.E.4

LEC4 Design systems that encourage growing of particular plants or animals.

Home on the Range ..... *Critters*

The Two Liter Aquarium..... *Primary Series 2 binder*

What a Corny Life ..... *Cycles of Knowing and Growing*

How do humans and the environment interact?

## III.5.E.5

LEC5 Describe positive and negative effects of humans on the environment.

Pollution Solution ..... *Overhead and Underfoot*

Paper - A Pressing Issue .....9.06

Bitter Litter ..... *Overhead & Underfoot*

Air Catchers ..... 12.04

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## IV. Use Scientific Knowledge From the Physical Sciences in Real-World Contexts - Elem K-2

### MATTER AND ENERGY

#### Content Standard 1:

All students will measure and describe the things around us; explain what the world around us is made of ; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.

How do we describe the things around us?

#### IV.1.E.1

**PME1** Classify common objects and substances according to observable attributes: color, size, shape, smell, hardness, texture, flexibility, length, weight, buoyancy, states of matter, magnetic properties.

Webs and Wings .....	<i>Critters</i>
Sorting Leaves .....	<i>Primarily Plants</i>
Popped or Not .....	7.10
Touch & Tell .....	<i>Sensible Science</i>
Making Sense from Scratch .....	<i>Sensible Science</i>
Crazy Over Cranberries .....	9.04
Cranberry Chorus .....	9.04
Joys of Jelly Beans .....	<i>Primarily Bears</i>
Gummy Bears .....	<i>Primarily Bears</i>
Sorting Seeds .....	<i>Primarily Plants</i>
What Do You Think Will Float? .....	<i>Spring into Math &amp; Science</i>
Floating Fruit .....	<i>Spring into Math &amp; Science</i>
Rock Groups .....	<i>Primarily Earth</i>
Rocks and More Rocks .....	<i>Primarily Earth</i>
Sherlock Combs the Yard .....	<i>Overhead and Underfoot</i>
You Drive Me Crackers .....	<i>Fall into Math &amp; Science</i>
Lucky Shamrocks .....	<i>Spring into Math &amp; Science</i>
Canned Scents .....	<i>Sensible Science</i>
Pick Pockets .....	10.04
Pouring Over Matter .....	11.09
Changes in Matter .....	12.02

How do we describe the things around us?

#### IV.1.E.2

**PME2** Measure weight, dimensions, and temperature of appropriate objects and materials.

What's Hot & What's Not .....	9.09
A Bear Eggs-pedition .....	7.09
Think Hot, Think Cold .....	<i>Primary Series 2 Binder</i>
Leaf Safari .....	<i>Primarily Plants</i>
Crazy Over Cranberries .....	9.04
A Little Cup Will Do It .....	<i>Water Precious Water</i>
Make a Paper Thermometer .....	<i>Primarily Physics</i>

Let Count the Ways .....	<i>Primarily Bears</i>
Bear Facts .....	<i>Primarily Bears</i>
Teddy Bear Math .....	<i>Primarily Bears</i>
My Shoe .....	4.06
My Rock .....	4.02 and <i>Primarily Earth</i>
Rock Hounds and Bears .....	4.04
Water in Apples .....	<i>Jaw Breakers and Heart Thumpers</i>
Washers & Dryers .....	8.02
Eggstra Explorations .....	<i>Spring into Math &amp; Science</i>
What's Hot and What's Not .....	9.09
Size-Wise .....	10.07

What is the world around us made of?

IV.1.E.3

PME3 Identify properties of materials which make them useful.

Melt a Cube, Keep a Cube .....	<i>Primarily Physics</i>
What will a Magnet Attract? .....	<i>Mostly Magnets</i>
Stick to it .....	<i>Mostly Magnets</i>
What Do You Think Will Float? .....	<i>Spring into Math &amp; Science</i>

IV.1.E.4

PME4 Identify forms of energy associated with common phenomena.

Energy Concepts .....	<i>Primarily Physics</i>
Heat Energy .....	<i>Primarily Physics</i>
You Are My Sunshine .....	<i>Spring into Math &amp; Science</i>
Sizing Up Sails .....	10.03
The Beat of the Drum .....	11.04

How do electricity and magnetism interact with matter?

IV.1.E.5

PME5 Describe the interaction of magnetic materials with other magnetic materials and non-magnetic materials.

What will a Magnet Attract? .....	<i>Mostly Magnets</i>
Stick To It .....	<i>Mostly Magnets</i>
Fish & Clips.....	<i>Mostly Magnets</i>
Hungry Hounds .....	<i>Mostly Magnets</i>

IV.1.E.6

PME6 Describe the interaction of charged materials with other charged or uncharged materials.

Electric Breakfast .....	<i>Glide into Winter</i>
Static Strokes .....	<i>Electrical Connections</i>
All Charged .....	7.02

IV.1.E.7

PME7 Describe possible electrical hazards to be avoided at home and at school.

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## CHANGES IN MATTER

Content Standard 2: All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

How does matter change?

IV.2.E.1

PCM1 Describe common physical changes in matter (size, shape, melting, freezing, dissolving) and the heat energy that accompanies some changes.

The Mini Water Cycle.....	<i>Water, Precious Water</i>
Drying on the Line .....	9.07
Melt a Cube, Keep a Cube .....	<i>Primarily Physics</i>
Grapes to Raisins .....	<i>Fall into Math and Science</i>
Raisin Bread .....	6.03
Let's make Ice Cream .....	6.06
Can It Matter? .....	10.02
What Can This Matter Be? (Song) .....	10.02
What Makes Rain? .....	<i>Primarily Earth</i>
A Disappearing Act .....	<i>Primarily Earth</i>
Water to Ice to Water.....	<i>Primarily Earth</i>
Frosty Forms .....	12.06

IV.2.E.2

PCM2 Prepare mixtures and separate them into their component parts.

Sandy Magnet .....	<i>Off the Wall Science</i>
Fish & Clips .....	<i>Mostly Magnets</i>
Seed Sort .....	<i>Primarily Plants</i>
Soil Samplers .....	6.09
That Sorted Soil .....	6.10

How do living things (and human technology) change matter and transform energy?

IV.2.E.3

PCM3 Construct simple objects that fulfill a technological purpose.

You are my Sunshine .....	<i>Spring into Math &amp; Science</i>
Make a Musical Instrument .....	<i>Primarily Physics</i>
My Styrophone .....	<i>Primarily Physics</i>
Sounding off like a Lion .....	<i>Primarily Physics</i>
One Straw Kite .....	3.08
Make a Thermometer .....	<i>Primarily Physics</i>
Magnaviewer.....	9.10
Magnify.....	<i>Primarily Physics</i>

## MOTIONS OF OBJECTS

### Content Standard 3:

All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.

#### How do things move around us?

##### IV.3.E.1

PMO1 Describe or compare motions of common objects in terms of speed and direction.

Spinning Ghosts .....	<i>Fall into Math and Science</i>
Rotor Promotor .....	<i>The Sky's the Limit</i>
Sizing Up Sails .....	10.03

#### Why do things move as they do?

##### IV.3.E.2

PMO2 Describe that forces (pushes or pulls) are needed to speed up, slow down, stop, or change the direction of a moving object.

Hungry Hounds .....	<i>Mostly Magnets</i>
Huff and Puff .....	<i>Spring into Math and Science</i>
A Tall Fall .....	10.01
Why Wheels? .....	13.03
Shapes on the Move .....	12.03
Feather Relays .....	13.04

#### How can we control the motions of objects?

##### IV.3.E.3

PMO3 Use simple machines to make work easier.

Take it Easy .....	<i>Popping with Power</i>
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## WAVES AND VIBRATIONS

### Content Standard 4:

All students will describe sounds and sound waves; explain shadows, colors, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.

#### How can we describe sound?

##### IV.4.E.1

PWV1 Describe sounds in terms of their properties (pitch, loudness)

Sound Energy .....	<i>Primarily Physics</i>
Sound is Vibration .....	<i>Primarily Physics</i>
Voice Box .....	<i>Primarily Physics</i>
The Sounds of Music .....	<i>Primarily Physics</i>
How to Construct Musical Instruments.....	<i>Primarily Physics</i>

##### IV.4.E.2

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- PWV2 Explain how sounds are made.
- Sound Energy ..... *Primarily Physics*
  - Sound is Vibration ..... *Primarily Physics*
  - Slinky Sound ..... *Primarily Physics*
  - Sounding off like a Lion..... *Primarily Physics*

How can we describe light?

IV.4.E.3

- PWV3 Describe light from a light source in terms of its properties.
- Light Sources ..... *Primarily Physics*
  - Just Passing Through ..... *Primarily Physics*
  - Mirrors Reflect ..... *Primarily Physics*
  - Prism Power ..... *Primarily Physics*

IV.4.E.4

- PWV4 Explain how light illuminates objects.

IV.4.E.5

- PWV5 Explain how shadows are made.
- Me and My Shadow ..... *Pieces & Patterns*
  - Mr. Groundhog, Mr. Groundhog... *Cycles of Knowing and Growing*

## **V. Use Scientific Knowledge from the Earth and Space Sciences in Real World Contexts - Elementary K-2**

### **GEOSPHERE**

Content Strand 1:

All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.

What is the earth's surface like?

V.1.E.1

- EG1 Describe major features of the earth's surface.
- Were you aware? ..... *Water Precious Water*
  - Surf and Sand Toss ..... *Finding your Bearings*
  - The Earth's Features ..... *Primarily Earth*

V.1.E.2

EG2 Recognize and describe different types of earth materials.

Soil Samplers .....	6.09
That Sorted Soil .....	6.10
My Rock .....	4.02 and <i>Primarily Earth</i>
What Makes Soil? .....	<i>Revised Overhead and Underfoot</i>
Rock Groups .....	<i>Primarily Earth</i>
Rocks and More Rocks .....	<i>Primarily Earth</i>
Soil Study .....	<i>Primarily Earth</i>
Sandpile .....	<i>Primarily Earth</i>
Dirt Baggers .....	<i>Cycles of Knowing and Growing</i>

How do the earth's features change over time?

V.1.E.3

EG3 Explain how rocks and fossils are used to understand the history of the earth.

V.1.E.4

EG4 Describe natural changes in the earth's surface.

Sand Pile .....	7.09
Erosion Song .....	9.05
Rain Away .....	<i>Water, Precious Water</i>
Ice Breakers .....	<i>Primarily Earth</i>
Agent Erosion .....	<i>Primarily Earth</i>
Quaking Earth .....	<i>Primarily Earth</i>
Volcanoes .....	<i>Primarily Earth</i>

What effect has technology had on the earth's surface and resources?

V.1.E.5

EG5 Describe uses of materials taken from the earth.

The Earth Has What We Need! .....	<i>Primarily Earth</i>
We Use Rocks and Minerals .....	<i>Primarily Earth</i>

V.1.E.6

EG6 Demonstrate means to recycle manufactured materials and a disposition toward recycling.

Paper-A Pressing Issue..	<i>Cycles of Knowing and Growing</i> and 9.06
Let's Recycle .....	5.02
We Use Rocks and Minerals.....	<i>Primarily Earth</i>
Plastics by the Number .....	11.09
A New Look for an Old Bag .....	<i>Cycles of Knowing and Growing</i>

## HYDROSPHERE

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## Content Standard 2:

All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; analyze the interaction of human activities with the hydrosphere.

Where is water found on the earth and what are its characteristics?

V.2.E.1

EH1 Describe how water exists on earth in three states.

Were You Aware? ..... *Water Precious Water*

Mini Water Cycle ..... *Water Precious Water*

How much of Our World is Water?..... *Water Precious Water*

Where is Water? ..... *Primarily Earth*

How does water move?

V.2.E.2

EH2 Trace the path that rain water follows after it falls.

Moving Raindrops ..... *Water Precious Water*

Water Cycle Song ..... *9.07*

Drying on the Line ..... *9.07*

Water Watchers..... *5.06*

Washers and Dryers ..... *8.02*

Water in Apples ..... *Jaw Breakers and Heart Thumpers*

What Makes Rain? ..... *Primarily Earth*

A Disappearing Act ..... *Primarily Earth*

Water to Ice to Water..... *Primarily Earth*

How do human activities interact with the hydrosphere?

V.2.E.3

EH3 Identify sources of drinking water.

A Little Cup Will Do It ..... *Water Precious Water*

V.2.E.4

EH4 Describe uses of water.

Drip Drop Flip Flop ..... *Water Precious Water*

Just a Little Drip ..... *9.09*

## ATMOSPHERE AND WEATHER

### Content Standard 3:

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

What makes up weather and how does it change from day to day, from season to season and over long periods of time?

#### V.3.E.1

EAW1 Describe the atmosphere.

Inverted Tumbler in the Aquarium ..... *Off the Wall Science*  
 A Close Look at Air ..... *Primarily Earth*  
 Air is There..... *Primarily Earth*  
 The Wind Blows ..... *10.08 and Primarily Earth*

#### V.3.E.2

EAW2 Describe weather conditions and climates.

Thermometer ..... *Primarily Physics*  
 The Wind Blows ..... *10.08 and Primarily Earth*  
 Which Way? ..... *Primarily Earth*  
 Cloudy Weather ..... *Primarily Earth*  
 Watching the Weather ..... *Primarily Earth*  
 Air Temperature ..... *Primarily Earth*  
 Temperature Cold - Hot and Cold ..... *11.07*  
 Watching the Weather ..... *Primarily Earth*

#### V.3.E.3

EAW3 Describe seasonal changes in weather.

The Mitten: An Integrated Unit ..... *5.06*  
 Mighty Mittens ..... *Glide into Winter*  
 Teddy Bears Dress for Summer ..... *Primarily Bears*  
 Apple Art ..... *Fall into Math & Science*  
 Season-O ..... *Cycles of Knowing and Growing*

What are the relationships between human activity and the atmosphere?

#### V.3.E.4

EAW4 Explain appropriate safety precautions during severe weather.

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SOLAR SYSTEM, GALAXY AND UNIVERSE

Content Standard 4:

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

How does our planet and sun compare to other planets and star systems?

V.4.E.1

ES1 Describe the sun, moon, and earth.

How do objects in the solar system move?

V.4.E.2

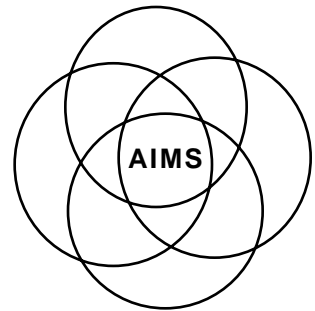
ES2 Describe the motions of the earth and moon around the sun.

Me and My Shadow .....*Pieces & Pattern*  
Sky Watchers ..... *Cycles of Knowing and Growing*  
Mr. Groundhog, Mr. Groundhog... *Cycles of Knowing and Growing*  
Look at the Moon ..... *Cycles of Knowing and Growing*  
Shadow Shows .....*12.01*

Michigan's  
**Science**  
Standards and Benchmarks  
and  
Suggested *AIMS* Activities



Grades 3-5



Compiled by  
Michigan AIMS Facilitators

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## Michigan Science Content Standards and Working Draft Benchmarks and Correlated AIMS Activities

**Key to abbreviations and typeface:**

*Italics* indicate the source of the activity. 5.02 means volume 5, number 2 of the AIMS Magazine or Newsletter.

### I. Construct New Scientific and Personal Knowledge - Elem 3-4

Content Standard 1:

All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology and reconstruct previous learned knowledge.

How do scientists ask questions that help them learn about the world?

I.1.E.1

- C1 Generate reasonable questions about the world, based on observation.
- Warming up to Worms .....6.06
  - Path Finders .....*Electrical Connections*
  - Topping Off Mount Saint Helen .....8.08
  - High Flying Flags.....13.01
  - What's My Line.....10.05
  - Floor Samples.....*Field Detectives*

How do scientists figure out answers to their questions by investigating the world?

I.1.E.2

- C2 Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.
- Defying Gravity .....*Mostly Magnets*
  - Hands on the Giant .....6.07
  - Mealworms Under Glass.....*Magnificent Microworld Adventures*
  - Night Crawlers .....*Magnificent Microworld Adventures*
  - Jumping Jacks .....*Magnificent Microworld Adventures*
  - Sea Stars .....*Magnificent Microworld Adventures*
  - Focus on Scopes .....*Magnificent Microworld Adventures*
  - The Enormous E .....*Magnificent Microworld Adventures*
  - A World of Discovery (song).....9.10
  - Lenses & Lady Bugs.....9.08
  - Charting the Ocean Depths.....9.02
  - Great Cookie Mix Up.....13.01
  - All Wrapped Up.....11.07

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## I.1.E.3

C3

Manipulate simple mechanical devices and explain how they work.

Make a Switch .....	<i>Electrical Connections</i>
Circuit Quiz Board .....	<i>Electrical Connections</i>
Hot Air Balloons .....	2.07
Magic String .....	10.06
Water Wheels .....	10.06
Magniviewer .....	9.10
Bridging the Gap.....	10.09
Push 'n Pull Puppets.....	<i>Under Construction</i>
Pull it Eggs.....	<i>Under Construction</i>
A First -Class Lever .....	<i>Popping with Power(1996)</i>

## I.1.E.4

C4

Use simple measurement devices to make metric measurement.

Metric Scavenger Hunt .....	<i>Math + Science: A Solution</i>
Make your own Measuring Cup .....	<i>Water Precious Water</i>
All Bottled up .....	<i>Water Precious Water</i>
Oranges for the Most Part .....	9.10
By Golly, By Gum .....	5.10
By Golly, By Gum, By Time .....	5.10
Big Banana Peel .....	<i>Math+Science: a Solution</i>
Weight Watchers.....	<i>Math+Science: a Solution</i>
Are You a Square? .....	<i>Hardhatting in a Geo World</i>
Can You Believe It? .....	2.08
Volumes of Fun .....	<i>Hardhatting in a Geo World &amp; 6.05</i>
Looking for a Liter .....	10.09
Tints and Temps.....	<i>Popping With Power(1996)</i>
Why Be a Hot Head.....	<i>Popping With Power(1996)</i>
Hot Stuff .....	<i>Math+Science: a Solution</i>
White Rain.....	<i>Our Wonderful World World</i>
How High? How Far?.....	13.02
Hot Pockets.....	13.02
All wrapped Up .....	11.07

How do scientists learn about the world from books and other sources of information?

## I.1.E.5

C5

Develop strategies and skills for information gathering and problem solving.

Leaf Facts .....	<i>Primarily Plants</i>
Worm Fact Sheets.....	<i>Middle Series 2 Binder</i>
Static Electricity .....	<i>Electrical Connections</i>
History of a Tree .....	<i>Budding Botanist</i>
Tree Cookies .....	<i>Our Wonderful World</i>
Food Chain information page .....	<i>Critters</i>
Animal Antics .....	<i>Critters</i>
How High? How Far?.....	13.02
Collecting Data.....	12.09
Sweet Retreat.....	11.07

How do scientists communicate their findings to other scientists and the rest of society?

I.1.E.6

C6 Construct charts and graphs and prepare summaries of observations.

Most activities.....	All Books & Magazines
What's My Line .....	10.05
Water in Apples.....	4.01
CAT Scan .....	7.07
How High? How Far?.....	13.02
Hurricane!.....	13.02
All Wrapped Up.....	11.07

## II. Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge - Elem 3-4

Content Standard 1:

All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.

How do scientists decided what to believe?

II.1.E.1

R1 Develop an awareness of the need for evidence in making decisions scientifically.

Mapping the Ocean Floor .....	<i>Down to Earth</i>
Super Sleuth .....	<i>Math+Science: a Solution</i>
How High? How Far?.....	13.02
Good Looking.....	<i>Field Detectives</i>
Telltale Clues.....	<i>Field Detectives</i>

How is science related to other ways of knowing?

II.1.E.2

R2 Describe the relationship of science to other forms of creative expression such as language arts and fine arts.

My Tree is a Friend.....	<i>Primarily Plants</i>
Leaf Printing .....	<i>Budding Botanist</i>
Paper a Pressing Issue .....	9.06
Singing Songs of Science .....	<i>Tape/CD</i>

How do science and technology affect our society?

II.1.E.3

R3 Describe ways in which technology is used in everyday life.

When I was Ten .....	<i>Electrical Connections</i>
A Little Cup Will Do It .....	<i>Water Precious Water</i>
Lighten Up .....	<i>Popping With Power</i>

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## II.1.E.4

R4 Develop an awareness of the impact of human activity on the environment.

Help Save the Birds .....	<i>Water Precious Water</i>
Missing Moths .....	<i>Critters</i>
Teddy Bears Fight Pollution .....	<i>2.03</i>
What's in the Air .....	<i>Our Wonderful World</i>
Bitter Litter .....	<i>Overhead &amp; Underfoot</i>
Compacted Playground.....	<i>Field Detectives</i>

How have people of diverse cultures contributed to and influenced developments in science?

## II.1.E.5

R5 Develop an awareness of contributions made to science by people of diverse backgrounds.

Antony van Leewenhoek.....	<i>Magnificent Microworld Adventures</i>
Robert Hooke .....	<i>Magnificent Microworld Adventures</i>
Benjamin Banneker .....	<i>Historical Connections II</i>

### III. Use Scientific Knowledge from the Life Sciences in Real - World Contexts - Elementary 3-4

#### CELLS

Content Standard 1:

All students will apply an understanding of cells to the functions of multicellular organisms; and explain how cells grow, develop and reproduce.

What are cells?

III.1.E.1

LC1 Describe cells as living systems.

Life in Glass Houses .....	9.10
Onion Rings.....	<i>Magnificent Microworld Adventures</i>
Model of a Cell .....	<i>Budding Botanist</i>
Cheek to Cheek.....	<i>Magnificent Microworld Adventures</i>
The Green Machine.....	<i>Magnificent Microworld Adventures</i>

#### ORGANIZATION OF LIVING THINGS

Content Standard 2:

All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.

How are groups of living things classified?

III.2.E.1

LO1 Compare and classify familiar organisms on the basis of observable physical characteristics.

Leaf Facts, Leaves .....	<i>Budding Botanist</i>
Animal Antics .....	<i>Critters</i>
Wings & Webs .....	<i>Critters</i>
Picturing a Dichotomy .....	9.08
Animals of a Sort .....	10.07
Back Talk .....	10.09
Beetle Mania.....	11.02

III.2.E.2

LO2 Describe vertebrates in terms of observable body parts and characteristics.

Microbat or Mega Bat? .....	<i>Bats Incredible</i>
Animal Antics .....	<i>Critters</i>
Unique U .....	<i>Math +Science: A Solution</i>
Picturing a Dichotomy .....	9.08
Fingerprinting .....	<i>Jawbreakers and Heart Thumpers</i>
Animals of a Sort .....	10.07
Back Talk .....	10.09

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How do life cycles of living things differ?

III.2.E.3

LO3 Describe life cycles of familiar organisms.

Warming up to Worms .....	6.06
My Mealworm .....	<i>Critters</i>
Mealworms on stage .....	<i>Critters</i>
A Time of Their Own .....	9.03
Butterfly Cycle (Song) .....	9.03
Flip Book of Life Cycle	
Dirt Dwellers .....	10.09
Meal Worms Under Glass .....	<i>Magnificent Microworld Adventures</i>
Its in the Bag.....	<i>Primarily Plants</i>
Just a Little Sprout.....	6.08

How do living things obtain and use energy?

III.2.E.4

LO4 Compare and contrast food, energy, and environmental needs of similar organisms.

Which Soil Works Best? .....	<i>Primarily Plants</i>
Plants and Water .....	<i>Primarily Plants</i>
What Do Plants Need to Grow? .....	<i>Primarily Plants</i>
What Temperature is Best? .....	<i>Primarily Plants</i>
Plants and Sunlight .....	<i>Primarily Plants</i>
The Pickle Jar Aquarium.....	<i>Magnificent Microworld Adventures</i>
Fishing for Clues.....	<i>Field Detectives</i>
Pyramid Pile Up.....	<i>Field Detectives</i>
Running on Empty.....	<i>Field Detectives</i>
Compacted Playground.....	<i>Field Detectives</i>
It's Bean a Great Place to Live.....	<i>Field Detectives</i>

How are the parts of living things adapted to carry out specific functions?

III.2.E.5

LO5 Describe functions of selected seed plant parts.

Tree Cookies .....	<i>Our Wonderful World</i>
Stem study .....	<i>Primarily Plants</i>
Root study .....	<i>Primarily Plants</i>
Twig Story .....	<i>Budding Botanist</i>
Seed Within .....	<i>Primarily Plants</i>
Down Under .....	<i>Budding Botanist</i>
Observing Bulbs .....	<i>Primarily Plants</i>
Herb & Woody .....	<i>Budding Botanist</i>
Plant Food .....	10.07
Plant Parts Food Rap .....	10.07

## HEREDITY

### Content Standard 3:

All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.

How are characteristics of living things passed on through generations?

III.3.E.1

LH1

Give evidence that characteristics are passed from parents to young.

Extension of *Traits Combo* .....6.10

Identify personal traits, check for same traits in parents & grandparents.

Picturing a Dichotomy .....9.08

Leaves. .... *Budding Botanist*

## EVOLUTION

### Content Standard 4:

All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.

How do scientists trace the origin and development of species?

III.4.E.1

LE1

Explain how fossils provide evidence about the nature of ancient life.

In what ways are living things adapted (suited) to survive in their environments?

III.4.E.2

LE2

Explain how physical and/or behavioral characteristics of organisms help them to survive in their environments.

Hide and Seek ..... *Critters*

Missing Moths ..... *Critters*

Cactus ..... *Budding Botanist*

A New Plant Discovery ..... *Budding Botanist*

Table Manners ..... *Critters*

Bear Feet ..... 11.05

Calico Fields ..... 12.01

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## ECOSYSTEMS

### Content Standard 5:

All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment and analyze how humans and the environment interact.

How are parts of an ecosystem related and how do they interact?

#### III.5.E.1

LEC1 Identify familiar organisms as part of a food chain or food web & describe their feeding relationships within.

Predator & Prey .....	<i>Our Wonderful World</i>
Food Chain of the Pond (song).....	8.05
Food Chains & Webs .....	9.09
Catch Me If You Can .....	<i>Critters</i>
What's the Net Worth? .....	10.03
Nocturnal Hunter .....	4.05
Pizza Parts and Web Wheels .....	<i>Field Detectives</i>
Producing a Producer .....	<i>Field Detectives</i>
Pyramid Pile Up .....	<i>Field Detectives</i>
Life in the Food Chain .....	<i>Field Detectives</i>

#### III.5.E.2

LEC2 Explain common patterns of interdependence and interrelationships of living things.

Noses for Nectar .....	<i>Bats Incredible</i>
Life in the Food Chain.....	<i>Field Detectives</i>
Buffet Lunch .....	<i>Field Detectives</i>
From Leaf to Soil .....	<i>Field Detectives</i>
Tree House .....	<i>Field Detectives</i>
Fallen Leaf.....	11.03

How is energy distributed to living things in an ecosystem?

#### III.5.E.3

LEC3 Describe the basic requirements for all living things to maintain their existence.

Help Save the Birds .....	<i>Water Precious Water</i>
A Special Plot .....	10.01
Homing in on Habitats (song).....	10.01
Dirt Dwellers .....	<i>Field Detectives</i>

How do communities of living things change over time?

III.5.E.4

- LEC4 Design systems that encourage growing of particular plants or animals.
- The Earthworm ..... *Critters*
  - Make a Terrarium .....2.08
  - Two Liter Aquarium..... *Primary Series 2 Binder*
  - Home Away From Home ..... *Field Detectives*
  - Design Your Own Shelter..... *Field Detectives*

How do humans and the environment interact?

III.5.E.5

- LEC5 Describe positive and negative effects of humans on the environment.
- Help Save the Birds ..... *Water Precious Water*
  - Paper - A Pressing Issue .....9.06
  - Little Sprouts ..... *Water Precious Water*
  - Cape of Good Hope .....9.07
  - What's the Net Worth? .....10.03
  - Mini Water Treatment Simulation..... *Water Precious Water*

## IV. Use Scientific Knowledge From the Physical Sciences in Real-World Contexts - Elem 3-4

### MATTER AND ENERGY

Content Standard 1:

All students will measure and describe the things around us; explain what the world around us is made of ; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.

How do we describe the things around us?

IV.1.E.1

- PME1 Classify common objects and substances according to observable attributes: color, size, shape, smell, hardness, texture, flexibility, length, weight, buoyancy, states of matter, magnetic properties.
- Sea-Shells are Special .....5.08
  - Button Button .....*Pieces and Patterns*
  - Are you a Square? ..... *Hardhatting in a Geo World*
  - Picturing a Dichotomy .....9.08
  - Jelly Bellys .....*Pieces and Patterns*
  - Sherlock Combs the Yard .....*Overhead & Underfoot*
  - M & M Math .....*Primarily Bears*
  - (M & M) What's in the Bag? .....*Math+Science: A Solution*
  - It Floats, It Sinks ..... *Floater & Sinkers*
  - Stick To It.....*Mostly Magnets*
  - Pet Rock.....*Overhead and Underfoot*

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How do we describe the things around us?

IV.1.E.2

PME2 Measure weight, dimensions, and temperature of appropriate objects and materials.

Metric Scavenger Hunt.....	<i>Math+Science: A Solution</i>
Now That's Using Your Head .....	2.03
By Golly, By Gum .....	5.10
By Golly, By Gum, By Time .....	5.10
What Temperature is Best? .....	<i>Primarily Plants</i>
Heat and Color .....	<i>Primarily Physics</i>
Big Banana Peel.....	<i>Math+Science: A Solution</i>
Weight Watchers .....	<i>Math+Science: A Solution</i>
Are you a Square? .....	<i>Hardhatting in a Geo World</i>
Can You Believe It? .....	2.08
Volumes of Fun .....	<i>Hardhatting in a Geo World &amp; 6.05</i>
Massing Around with Bats .....	10.03
How High? How Far?.....	13.02
All Wrapped Up.....	11.07

What is the world around us made of?

IV.1.E.3

PME3 Identify properties of materials which make them useful.

What will a Magnet Attract? .....	<i>Mostly Magnets</i>
Conductor or Insulator? .....	<i>Electrical Connections</i>
Sorting Challenge .....	<i>Mostly Magnets</i>
Water Activities .....	<i>Pieces and Patterns</i>
Why Be a Hot Head.....	<i>Popping With Power(1996)</i>
All wrapped Up .....	11.07

What is energy?

IV.1.E.4

PME4 Identify forms of energy associated with common phenomena.

What is Energy? .....	<i>Primarily Physics</i>
You Are My Sunshine .....	<i>Spring into Math &amp; Science</i>
All Wrapped Up.....	11.07

How do electricity and magnetism interact with matter?

IV.1.E.5

PME5 Describe the interaction of magnetic materials with other magnetic materials and non-magnetic materials.

What will a Magnet Attract? .....	<i>Mostly Magnets</i>
Fish & Clips .....	<i>Mostly Magnets</i>
Holding Power .....	<i>Mostly Magnets</i>
Defying Gravity .....	<i>Mostly Magnets</i>
Magnetic Tug of War .....	<i>Mostly Magnets</i>
Make a Compass.....	<i>Mostly Magnets</i>
Come About.....	11.04

IV.1.E.6

PME6 Describe the interaction of charged materials with other charged or uncharged materials.

Static Electricity .....	<i>Electrical Connections</i>
Static Strokes .....	<i>Electrical Connections</i>
Different Strokes .....	<i>Electrical Connections</i>
Circuit Quiz Boards.....	<i>Electrical Connections</i>
All Charged Up.....	12.02

IV.1.E.7

PME7 Describe possible electrical hazards to be avoided at home and at school.  
Balance Your Charges.....6.03

CHANGES IN MATTER

Content Standard 2:

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

How does matter change?

IV.2.E.1

PCM1 Describe common physical changes in matter (size, shape, melting, freezing, dissolving) and the heat energy that accompanies some changes.

Crazy Colloid .....	6.01
Let's make Ice Cream .....	6.06
Melt a Cube, Keep a Cube .....	<i>Primarily Physics</i>
Snow Job .....	10.04
What Makes Rain? .....	<i>Primarily Earth</i>
A Disappearing Act .....	<i>Primarily Earth</i>
Water to Ice to Water .....	<i>Primarily Earth</i>
Don't Flip Your Lid.....	13.01
Icy Conditions .....	12.08
Archimedes .....	5.09
Frosty Forms.....	12.06

IV.2.E.2

PCM2 Prepare mixtures and separate them into their component parts.

Sandy Magnet.....	Off the Wall Science
Help Save the Birds .....	Water Precious Water
That Sorted Soil .....	6.10
Soil Samplers .....	6.09
Money Laundering.....	12.09
Flipping Over Ice Cream.....	12.09
Messing With Mixtures.....	12.07
Change Matters.....	11.08

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How do living things (and human technology) change matter and transform energy?

IV.2.E.3

PCM3 Construct simple objects that fulfill a technological purpose.

Defying Gravity .....	<i>Electrical Connections</i>
Make a Switch.....	<i>Electrical Connections</i>
Circuit Quiz Board .....	<i>Electrical Connections</i>
Make a Flashlight .....	<i>Off the Wall Science</i>
Butter & Margarine Candles.....	<i>Off the Wall Science</i>
Why Wheels .....	13.02
Catapults.....	11.09

## MOTIONS OF OBJECTS

Content Standard 3:

All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.

How do things move around us?

IV.3.E.1

PMO1 Describe or compare motions of common objects in terms of speed and direction.

Wind Rollers .....	<i>Popping with Power</i>
Be a Rotor Promotor .....	<i>The Sky's the Limit</i>
Unbelievable Flying Objects .....	<i>The Sky's the Limit</i>
It's the Last Straw .....	<i>The Sky's the Limit</i>
Hot Air Balloons .....	2.07
Rally Around the Room .....	<i>Pieces &amp; Patterns</i>
Science on the Slide .....	10.03
Sizing Up Sails .....	10.03
Inclined to Work .....	12.09
Time Trials .....	11.02

Why do things move as they do?

IV.3.E.2

PMO2 Describe that forces (pushes or pulls) are needed to speed up, slow down, stop, or change the direction of a moving object.

Wing on a String.....	<i>The Sky's the Limit</i>
One Straw Kite .....	3.08
Sledding Through the Air .....	2.08
Rally Round the Room .....	<i>Pieces &amp; Patterns</i>
Puff Mobiles .....	<i>Popping with Power</i>
Hungry Hounds .....	<i>Mostly Magnets</i>
Science on the Slide .....	10.03

Working Out the Wiggles .....	10.04
Slip, Sliding Away.....	13.03
Blow Up.....	13.01
Why Wheels.....	13.02
Whack the Stack.....	11.07
Tug Teams .....	11.07
Pushes and Pulls.....	11.07
The Beat of the Drum .....	11.04

How can we control the motions of objects?

IV.3.E.3

PMO3 Use simple machines to make work easier.

One Good Turn Deserves Another .....	<i>Machine Shop</i>
Gearing Up Gears .....	<i>Machine Shop</i>
Winding Wheels .....	8.06
All's Well that Works Well .....	9.08
Sizing Up Sails .....	10.03
Water Wheels .....	10.06
A First Class Job .....	10.08
Why Wheels.....	13.02
Inclined to Work.....	12.08
Give Me a Lift.....	12.04

## WAVES AND VIBRATIONS

How can we describe sound?

Content Standard 4:

All students will describe sounds and sound waves; explain shadows, colors, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.

IV.3.E.1

PWV1 Describe sounds in terms of their properties (pitch, loudness).

Sound Energy .....	<i>Primarily Physics</i>
Sound is Vibration .....	<i>Primarily Physics</i>
Voice Box .....	<i>Primarily Physics</i>
The Sounds of Music .....	<i>Primarily Physics</i>
How to Construct Musical Instruments.....	<i>Primarily Physics</i>

IV.3.E.2

PWV2 Explain how sounds are made.

Sound Energy .....	<i>Primarily Physics</i>
Sound is Vibration .....	<i>Primarily Physics</i>
Slinky Sound .....	<i>Primarily Physics</i>
Sounding off like a Lion.....	<i>Primarily Physics</i>
The Beat of the Drum.....	11.04

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How can we describe light?

IV.3.E.3

PWV3 Describe light from a light source in terms of its properties.

Light Sources .....	<i>Primarily Physics</i>
Just Passing Through .....	<i>Primarily Physics</i>
Mirrors Reflect .....	<i>Primarily Physics</i>
Prism Power .....	<i>Primarily Physics</i>
Light Energy .....	<i>Primarily Physics</i>
Slides of Refraction.....	13.03

IV.3.E.5

PWV5 Explain how shadows are made.

Just Passing Through .....	<i>Primarily Physics</i>
Me & My shadow .....	<i>Pieces and Patterns</i>
Sizing Up Shadows .....	<i>Through the Eyes of Explorers</i>
Smart Shadows .....	<i>Historical Connections</i>
Sun Made Shadows .....	5.07
Sunny Side Up .....	<i>Overhead and Underfoot</i>

## V. Use Scientific Knowledge from the Earth and Space Sciences in Real World Contexts - Elementary 3-4

### GEOSPHERE

Content Strand 1:

All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.

What is the earth's surface like?

V.1.E.1

EG1 Describe major features of the earth's surface.

Surf and Sand .....	<i>Finding Your Bearings</i>
The Earth's Features .....	<i>Primarily Earth</i>

V.1.E.2

EG2 Recognize and describe different types of earth materials.

What makes soil .....	<i>Overhead &amp; Underfoot</i>
Soil Samplers .....	6.09
That Sorted Soil .....	6.10
Rock and Rule .....	<i>Overhead &amp; Underfoot</i>
Rock Groups .....	9.07 and <i>Primarily Earth</i>
Rocks and More Rocks .....	<i>Primarily Earth</i>
Soil Study .....	<i>Primarily Earth</i>

Sandpile .....	<i>Primarily Earth</i>
Layers of the Earth.....	13.01
Solidifying Sand .....	13.04
Sand Scan.....	12.05
A Warrant for Water .....	<i>Field Detectives</i>

How do the earth's features change over time?

V.1.E.3

EG3	Explain how rocks and fossils are used to understand the history of the earth.
	Peanut Butter and Jelly Geology .....
	5.04

V.1.E.4

EG4	Describe natural changes in the earth's surface.
	Rain Away-Don't Rain Away .....
	<i>Water Precious Water</i>
	Trickle Down Theory .....
	9.03
	Sand Dunes and Snow Drifts .....
	9.05
	Erosion Song .....
	9.05
	Agent Erosion .....
	10.03
	Rock Groups .....
	<i>Primarily Earth</i>
	Rocks and More Rocks .....
	<i>Primarily Earth</i>
	Soil Study .....
	<i>Primarily Earth</i>
	Sandpile .....
	<i>Primarily Earth</i>

What effect has technology had on the earth's surface and resources?

V.1.E.5

EG5	Describe uses of materials taken from the earth.
	The Earth Has What We Need! .....
	<i>Primarily Earth</i>
	We Use Rocks and Minerals .....
	<i>Primarily Earth</i>

V.1.E.6

EG6	Demonstrate means to recycle manufactured materials and a disposition toward recycling.
	Let's Recycle .....
	5.02
	Recycling Song .....
	7.07
	We Use Rocks and Minerals .....
	<i>Primarily Earth</i>

## HYDROSPHERE

### Content Standard 2:

All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; analyze the interaction of human activities with the hydrosphere.

Where is water found on the earth and what are its characteristics?

#### V.2.E.1

EH1 Describe how water exists on earth in three states.

Were You Aware? .....	<i>Water, Precious Water</i>
Mini Water Cycle .....	<i>Water, Precious Water</i>
Surf and Sand Count .....	<i>Finding your Bearings</i>
Water in Apples .....	<i>Jaw Breakers &amp; Heart Thumpers</i>
Where is Water? .....	<i>Primarily Earth</i>
Layers of Our Atmosphere.....	<i>12.09</i>

How does water move?

#### V.2.E.2

EH2 Trace the path that rain water follows after it falls.

Moving Water .....	<i>Water, Precious Water</i>
Moving Raindrops .....	<i>Water, Precious Water</i>
Moving Molecules .....	<i>Water, Precious Water</i>
Dry Idea.....	<i>Middle Series 2 Binder</i>
Puddle Pushers .....	<i>9.06</i>
Water Cycle Song.....	<i>9.07</i>
What Makes Rain? .....	<i>Primarily Earth</i>
A Disappearing Act .....	<i>Primarily Earth</i>
Water to Ice to Water .....	<i>Primarily Earth</i>

How do human activities interact with the hydrosphere?

#### V.2.E.3

EH3 Identify sources of drinking water.

Taste Testers .....	<i>Water Precious Water</i>
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#### V.2.E.4

EH4 Describe uses of water.

Help Save the Birds.....	<i>Water Precious Water</i>
A Little Cup Will Do It .....	<i>Water Precious Water</i>

## ATMOSPHERE AND WEATHER

### Content Standard 3:

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

What makes up weather and how does it change from day to day, from season to season and over long periods of time?

#### V.3.E.1

EAW1 Describe the atmosphere.

Inverted Tumbler in an Aquarium .....	<i>Off the wall Science</i>
A Close Look at Air .....	<i>Primarily Earth</i>
Air is There .....	<i>Primarily Earth</i>
The Wind Blows .....	<i>10.08 and Primarily Earth</i>
Space for a Balloon.....	<i>13.02</i>
Tub Temps.....	<i>12.09</i>
Layers of Our Atmosphere.....	<i>12.08</i>

#### V.3.E.2

EAW2 Describe weather conditions and climates.

In a Fog .....	<i>8.06</i>
Nature's Sound & Light Show.....	<i>Electrical Connections</i>
April Showers Bring May Flowers .....	<i>3.10</i>
The Wind Blows .....	<i>10.08 and Primarily Earth</i>
Which Way? .....	<i>Primarily Earth</i>
Cloudy Weather .....	<i>Primarily Earth</i>
Watching the Weather .....	<i>Primarily Earth</i>
Air Temperature .....	<i>Primarily Earth</i>
Hurricane!.....	<i>13.02</i>
Worldwide Highs.....	<i>11.05</i>

#### V.3.E.3

EAW3 Describe seasonal changes in weather.

Pasta Parallels .....	<i>9.06</i>
Lots of Temperature Plots .....	<i>13.04</i>

What are the relationships between human activity and the atmosphere?

#### V.3.E.4

EAW4 Explain appropriate safety precautions during severe weather.

Hurricane.....	<i>13.02</i>
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## SOLAR SYSTEM, GALAXY AND UNIVERSE

### Content Standard 4:

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

How does our planet and sun compare to other planets and star systems?

#### V.4.E.1

ES1 Describe the sun, moon, and earth.

Can you Planet? .....	<i>Out of This World</i>
Planetary Facts .....	<i>Out of This World</i>
Size it up .....	<i>Out of This World</i>
<i>Apparent Sizes</i> .....	11.04

How do objects in the solar system move?

#### V.4.E.2

ES2 Describe the motions of the earth and moon around the sun.

Sun Watchers .....	<i>Pieces and Patterns</i>
A Handy Time Piece .....	9.04
Wrap Around the Clock .....	8.03
Me and My Shadow .....	<i>Pieces and Patterns</i>
Pasta Parallels .....	9.06
The Moon Shines Bright.....	<i>Out of This World</i>

Michigan's  
**Science**  
Standards and Benchmarks  
and  
Suggested *AIMS* Activities



Grades

6 - 8

Compiled by  
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## Michigan Science Content Standards and Working Draft Benchmarks and Correlated AIMS Activities

**Key to abbreviations and typeface:**

*Italics* indicate the source of the activity. 5.02 means volume 5, number 2 of the AIMS Magazine or Newsletter.

### I. Construct New Scientific and Personal Knowledge - Grades 5-7

Content Standard 1:

All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology and reconstruct previous learned knowledge.

How do scientists ask questions that help them learn about the world?

I.1.M.1

C7 Generate scientific questions about the world, based on observation.

Rubber Eggs .....	1.07
Mealworms Under Glass .....	<i>Magnificent Microworld Adventures</i>
Night Crawlers.....	<i>Magnificent Microworld Adventures</i>
Jumping Jacks .....	<i>Magnificent Microworld Adventures</i>
Sea Stars .....	<i>Magnificent Microworld Adventures</i>
Focus on Scopes .....	<i>Magnificent Microworld Adventures</i>
The Enormous E .....	<i>Magnificent Microworld Adventures</i>
Moving In on Protozoa .....	<i>Magnificent Microworld Adventures</i>
Spinning the Tale .....	<i>Magnificent Microworld Adventures</i>
Life in Glass Houses .....	<i>Magnificent Microworld Adventures</i>
A Pretty Rotten Time .....	<i>Magnificent Microworld Adventures</i>
Algae the Food Factory .....	<i>Magnificent Microworld Adventures</i>
Blood .....	<i>Magnificent Microworld Adventures</i>
A Fish Tale .....	<i>Magnificent Microworld Adventures</i>
Flow Fingers .....	11.08
Wick Watchers.....	11.03
Fishing Around.....	11.02
Seeing Is Not Observing.....	11.01
Sand Scan.....	12.05

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How do scientists investigate the world to figure out answers to their questions?

I.1.M.2

C8 Design and conduct simple investigations.

Dry Idea.....	<i>Middle Series 2 Binder</i>
Build a Better Magnet .....	<i>Electrical Connections</i>
Ah Chute .....	<i>The Sky's the Limit</i>
Pillars of Strength .....	9.07
What's in a BB? .....	9.07
Bear-Barrow and Challenge.....	<i>Brick Layers</i>
A Balance Beam .....	<i>Brick Layers</i>
Have a Ball.....	<i>Popping with Power 96</i>
On the Rebound .....	<i>Popping with Power 96</i>
From the Ground Up.....	<i>Popping with Power 96</i>
Wheeling Your Way to the Top .....	<i>Brick Layers</i>
The Big Boom Construction Contest .....	<i>Brick Layers</i>
Can -Sealed Circuits.....	9.03
All Wrapped up .....	11.07
The Mirror's Footprint.....	11.02
Droopy Drawers.....	12.06
Life's Up and Downs.....	<i>Floaters and Sinkers 95</i>
Clay Boats.....	<i>Floaters and Sinkers 95</i>

I.1.M.2

C9 Investigate toys/simple appliances and explain how they work, using instructions & appropriate safety precautions.

Circuit Quiz Boards .....	<i>Electrical Connections</i>
Kite Kaper.....	3.08
Sundial Watches .....	<i>Pieces and Patterns</i>
Make a Kaleidoscope .....	4.02
Tooth to Tooth.....	<i>Machine Shop</i>
Sparky's Light Kit .....	<i>Electrical Connections</i>
Tuning Your Crystal Radio.....	11.04
Wing on a Straw.....	11.01
Ship Wrapped.....	9.9
Deep Sea Diver Relays.....	<i>Floaters and Sinkers 95</i>

I.1.M.3

C10 Use measurement devices to provide consistency in an investigation.

Big Banana Peel.....	<i>Math + Science: A Solution</i>
Going Bananas .....	1.04
Dry Idea .....	<i>Middle Series 2 Binder</i>
Volumes of Fun .....	6.05 & <i>Hardhatting in a Geoworld 96</i>
Icebergs .....	10.04
Looking for a Liter .....	10.09
Force Ups .....	<i>Brick Layers</i>
Dealing with Density .....	11.06
Sugar Highs.....	12.10
Some Like It Salty .....	<i>Floaters and Sinkers 95</i>
A Salty Problem.....	<i>Floaters and Sinkers 95</i>

How do scientists learn about the world from books and other sources of information?

I.1.M.4

C11 Use sources of information to help solve problems.

Leaf Facts .....	<i>Primarily Plants</i>
The Truth about Bananas .....	<i>Math + Science: A Solution</i>
Fingerprinting .....	<i>Jawbreakers &amp; Heart Thumpers</i>
Tree Cookies .....	<i>Our Wonderful World</i>
Energy .....	<i>Primarily Physics</i>
Food Chain .....	<i>Critters</i>
Electromagnetism .....	<i>Electrical Connections</i>
Plant Facts .....	<i>Budding Botanist</i>
Static Electricity.....	<i>Electrical Connections</i>
Nature's Sound & Light Show.....	<i>Electrical Connections</i>
A Whale in a Drop of Water.....	11.03

How do scientists communicate their findings to other scientists and the rest of society?

I.1.M.5

C12 Write and follow procedures in the form of step-by-step instructions, recipes, formulas, flow diagrams and sketches.

Color Magic .....	2.01
Wing on a String .....	3.03
A Tunnel-Less Wind Tunnel .....	3.03
Easy Glider .....	3.02
Standard Dart .....	<i>The Sky's the Limit</i>
Roaming Ranger .....	<i>The Sky's the Limit</i>
Flying Wing .....	<i>The Sky's the Limit</i>
Kite Kapers .....	3.08
Bernoulli was a Bird Brain .....	<i>The Sky's the Limit</i>
Dry Idea .....	<i>Middle Level Series 2 Binder</i>
Make a Switch .....	<i>Electrical Connections</i>
Stars in the Milky Way .....	8.02
Hot Air Balloons .....	2.07
Hanging in the Balance .....	9.10
Layers of the Earth.....	13.01
The Great Cookie Mix-up.....	13.01

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## II. Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge Grades 5-7

### Content Standard 1:

All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.

How do scientists decided what to believe?

#### II.1.MS.1

R6 Evaluate the strengths and weaknesses of claims, arguments, or data.  
The Orange's Secret..... *Floaters and Sinkers 95*

#### II.1.M.2

R7 Describe limitations in personal knowledge.

How is science related to other ways of knowing?

#### II.1.M.3

R8 "Show how common themes of science, mathematics, and technology apply in selected real-world contents."  
Homemade Fire Extinguisher ..... *Off the Wall Science*  
Sparky's Light Kit ..... *Electrical Connections*  
Short Stretches ..... *Upper Series 2 Binder*  
Sparky's Light Kit ..... *Electrical Connections*  
Put Your Name in Lights ..... *Electrical Connections*  
How Much Cargo will It Hold?..... *Floaters and Sinkers 95*  
Ship Shape..... *Floaters and Sinkers 95*

How do science and technology affect our society?

#### II.1.MS.4

R9 Describe the benefits and risks of new technologies or patterns of human activity.

How have people of diverse cultures contributed to and influenced developments in science?

#### II.1.M.5

R10 Recognize the contributions made in scientific by cultures and individuals of diverse backgrounds.  
Antony van Leewenhoek ..... *Magnificent Microworld Adventures*  
Robert Hooke ..... *Magnificent Microworld Adventures*  
Benjamin Banneker..... *Historical Connections II*

### III. Use Scientific Knowledge from the Life Sciences in Real-World Contexts - Grades 5-7

#### CELLS

##### Content Standard 1:

All students will apply an understanding of cells to the functions of multicellular organisms; and explain how cells grow, develop and reproduce.

What are cells?

##### III.1.MS.1

LC2 Describe similarities/differences between single-celled and multicellular organisms.

Cell Facts ..... *Budding Botanist*  
 Model of a Cell ..... *Budding Botanist*  
 Focus on Cells ..... *Budding Botanist*  
 Protozoan a Goin' ..... *9.04*  
 Moving in on Protozoa ..... *Magnificent Microworld Adventures*  
 At the Heart of Daphnia ..... *Magnificent Microworld Adventures*  
 Dropping in on Protozoa *9.04 & Magnificent Microworld Adventures*

##### III.1.MS.2

LC3 Explain why specialized cells are needed by plants and animals.

Cell your Fruits and Vegetables ..... *Budding Botanist*  
 Important Things Come In Tiny Packages ..... *1.07*  
 Dead Centers ..... *Magnificent Microworld Adventures*  
 Cheek to Cheek ..... *Magnificent Microworld Adventures*  
 Onion Rings ..... *Magnificent Microworld Adventures*  
 Blood ..... *Magnificent Microworld Adventures*  
 A Fish Tale ..... *Magnificent Microworld Adventures*  
 A Complete Package ..... *Magnificent Microworld Adventures*

How are cells adapted to survive, grow, develop and reproduce?

##### III.1.MS.3

LC4 Explain how cells use food as a source of energy.

Photosynthesis ..... *Budding Botanist*  
 Green Machine 1 ..... *Magnificent Microworld Adventures*  
 Green Machine 2 ..... *Magnificent Microworld Adventures*  
 The Cell as a Factory ..... *Magnificent Microworld Adventures*  
 Moving in on Protozoa ..... *Magnificent Microworld Adventures*

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## ORGANIZATION OF LIVING THINGS

### Content Standard 2:

All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.

How are groups of living things classified?

#### III.2.MS.1

LO6 Compare and classify organisms into major groups on the basis of their structure.

Creature Features .....	5.05
Sorting Trees .....	1.09
Leafy Facts Scavenger Hunt .....	2.02
Unique U .....	<i>Math + Science: a Solution</i>
Sea Life Shuffle .....	6.10
Animals of a Sort .....	10.07
Back Talk .....	10.09
Seeing to Cetaceans.....	11.05

How do life cycles of living things differ?

#### III.2.MS.2

LO7 Describe the life cycle of a flowering plant.

Flower Study .....	<i>Budding Botanist</i>
Test a Seed .....	<i>Budding Botanist</i>
Dissect a Seed.....	<i>Budding Botanist</i>
Seed from Fruits .....	<i>Budding Botanist</i>

How do living things obtain and use energy?

#### III.2.MS.3

LO8 Describe evidence that plants make and store food.

Photosynthesis .....	<i>Budding Botanist</i>
Transpiration .....	<i>Budding Botanist</i>

How are the parts of living things adapted to carry out specific functions?

#### III.2.MS.4

LO9 Explain how selected systems and processes work together in plants and animals.

Leaf Facts .....	<i>Primarily Plants</i>
Leaves .....	<i>Budding Botanist</i>
Herb and Woody .....	<i>Budding Botanist</i>
Twig's Story .....	<i>Budding Botanist</i>
History of a Tree .....	<i>Budding Botanist</i>
The Food Tube.....	11.10
Casing the System .....	11.01
Before and After Assessment – Bats .....	13.03

## HEREDITY

### Content Standard 3:

All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.

How are characteristics of living things passed on through generations?

#### III.3.MS.1

LH2 Describe how the characteristics of living things are passed through generations.

Teddy Bears come in Pairs .....	2.05
Traits Combo Extension .....	6.10
Are you a Square? Extension .....	<i>Hardhatting in a Geo-world</i> 96
Traits Combo .....	6.10
Picturing a Dichotomy .....	9.08

Why are organisms within a species different from one another?

#### III.3.MS.2

LH3 Describe how heredity and environment may influence/determine characteristics of an organism.

Missing Moths .....	<i>Critters</i>
A New Plant Discovery .....	<i>Budding Botanist</i>
Cactus .....	<i>Budding Botanist</i>

## EVOLUTION

### Content Standard 4:

All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.

How do scientists trace the origin and development of species?

LE3 Describe how biologists might trace possible evolutionary relationships among present and past life forms.

## ECOSYSTEMS

### Content Standard 5:

All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment and analyze how humans and the environment interact.

How are parts of an ecosystem related and how do they interact?

#### III.5.MS.1

LEC6 Describe common patterns of relationships among populations.

#### III.5.MS.2

LEC7 Predict the effects of changes in one population in a food web on other populations.

Catch Me if You Can ..... *Critters*  
 Nocturnal Hunter ..... *4.05*  
 What's the Net Worth? ..... *10.03*

#### III.5.MS.3

LEC8 Describe how all organisms in an ecosystem acquire energy directly or indirectly from sunlight.

Food Chain of the Pond (song) ..... *8.05*  
 Food Chains & Webs ..... *9.09*  
 Food Chain ..... *Critters*

How do communities of living things change over time?

#### III.5.MS.4

LEC9 Describe the likely succession of a given ecosystem over time.

Pond Today, Meadow Tomorrow ..... *Water Precious Water*  
 The Pickle Jar Aquarium..... *Magnificent Microworld Adventures*  
 Making a Hay Infusion ..... *Magnificent Microworld Adventures*  
 The Hanging Drop ..... *Magnificent Microworld Adventures*  
 Life in Glass Houses ..... *Magnificent Microworld Adventures*

How do materials recycle through an ecosystem and get reused in the environment.

#### III.5.MS.5

LEC10 Identify some common materials that cycle through the environment.

How do humans and the environment interact?

#### III.5.MS.6

LEC11 Describe ways in which humans alter the environment.

#### III.5.MS.7

LEC12 Explain how humans use and benefit from plant and animal materials.

Trees as a Crop ..... *Our Wonderful World*

## IV. Use Scientific Knowledge From the Physical Sciences in Real-World Contexts - Grades 5-7

### MATTER & ENERGY

#### Content Standard 1:

All students will measure and describe the things around us; explain what the world around us is made of ; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.

How do we describe the things around us?

#### IV.1.MS.1

PME8 Measure physical properties of objects or substances (mass, weight, temperature, dimensions, area, volume).

Weight Watchers .....	<i>Math + Science a Solution</i>
Mini Metric Olympics .....	<i>Math + Science a Solution</i>
Metric Scavenger Hunt .....	<i>Math + Science a Solution</i>
Make your own Measuring Cup .....	<i>Water Precious Water</i>
All Bottled Up .....	<i>Water Precious Water</i>
Volumes of Fun .....	<i>Hardhatting in Geoworld 96</i>
Sink or Swim .....	9.08
All Wrapped Up.....	11.07
What's in a BB? .....	9.07
Which Way is Up? .....	<i>Floaters and Sinkers 95</i>
Can You Tell?.....	<i>Floaters and Sinkers 95</i>
Tin Can Space.....	<i>Floaters and Sinkers 95</i>
Displaced Object.....	<i>Floaters and Sinkers 95</i>
Fill 'er up Gravel.....	<i>Floaters and Sinkers 95</i>
Fill 'er up Sand.....	<i>Floaters and Sinkers 95</i>
One Way or Another.....	<i>Floaters and Sinkers 95</i>
Will It Float?.....	<i>Floaters and Sinkers 95</i>
Play Ball .....	<i>Floaters and Sinkers 95</i>

#### IV.1.MS.2

PME9 Describe when length, mass, weight, area, or volume are appropriate to describe the size of an object or the amount of a substance.

Massive Boxes.....	<i>Floaters and Sinkers 95</i>
Mass-ter Minds.....	<i>Floaters and Sinkers 95</i>

#### IV.1.MS.3

PME10 Classify substances as elements, compounds, or mixtures.

Messing with Mixtures.....	12.07
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What is the world around us made of?

IV.1.MS.4

PME11 Describe matter as consisting of extremely small particles (atoms) which bond to form molecules.

Water Molecule .....	<i>Water Precious Water</i>
Macro Molecules .....	<i>Soap Films &amp; Bubbles</i>
Atoms .....	<i>Electrical Connections</i>
It's a Small World .....	<i>Soap Films and Bubbles</i>
Fork in the Road .....	10.01
Make Room for Me! .....	10.02

IV.1.MS.5

PME12 Describe the arrangement and motion of molecules in solids, liquids, and gases.

Moving Molecules .....	<i>Water Precious Water</i>
Color Magic .....	2.01
Kool Aid Kaper .....	3.05
Taking a Jab at Rice.....	12.04
Solidifying Sand .....	13.04
Don't Flip Your Lid.....	13.01
A Salty Solution.....	<i>Floaters and Sinkers 95</i>

What is energy?

IV.1.MS.6

PME13 Describe energy and the many common forms it takes (mechanical, heat, light, sound, electrical, magnetic, chemical, nuclear).

What is Energy? .....	<i>Primarily Physics</i>
What is Heat?.....	<i>Primarily Physics</i>
What is Light? .....	<i>Primarily Physics</i>
What is Sound? .....	<i>Primarily Physics</i>
Hot Pocket .....	13.02

IV.1.MS.7

PME14 Describe how common forms of energy can be converted, one to another.

Burning Walnut .....	<i>Off the Wall Science</i>
Photosynthesis .....	<i>Budding Botanist</i>
Electromagnetic Connection .....	<i>Electrical Connections</i>
All Fired Up .....	9.09
Tints and Temps .....	10.01
Cold Comfort .....	12.06
Zapped.....	13.01

How do electricity and magnetism interact with matter?

IV.1.MS.8

PME15 Describe electron flow in simple electrical circuits.

Path Finders .....	<i>Electrical Connections</i>
Make a Switch .....	<i>Electrical Connections</i>
Sparky's Light Kit .....	<i>Electrical Connections</i>
Bridging the Gap .....	9.04
Can-Sealed Circuits .....	9.03
Circuit Quiz Board .....	<i>Electrical Connections</i>
Electric Circuits.....	<i>Electrical Connections</i>
Short Cuts.....	<i>Electrical Connections</i>
Circuit Breakers .....	<i>Electrical Connections</i>

IV.1.MS.9

PME16 Use electric currents to create magnetic fields.

Electromagnetic Connection .....	<i>Electrical Connections</i>
Electromagnetism .....	<i>Electrical Connections</i>
Make an Electromagnet .....	<i>Mostly Magnets</i>
Build a Better Magnet .....	<i>Electrical Connections</i>

## CHANGES IN MATTER

Content Standard 2:

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

How does matter change?

IV.2.MS.1

PCM4 Describe common physical changes in materials: evaporation, condensation, thermal expansion, & contraction.

Moving Molecules .....	<i>Water Precious Water</i>
MiniWater Cycle .....	<i>Water Precious Water</i>
Dry Idea.....	<i>Middle Series 2 Binder</i>
I Scream .....	<i>Fun with Foods</i>
Hot Air Balloon .....	2.07
Gem of an Experience .....	8.05
Make a Thermometer .....	<i>Primarily Physics</i>
Hot Meets Cold .....	<i>Primarily Physics</i>
Drip on a String .....	<i>Bats Incredible</i>
Fabulous Fountain.....	11.06
Dealing with Density .....	11.06
Icy Conditions .....	12.08

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## IV.2.MS.2

PCM5 Describe common chemical changes in terms of properties of reactants and products.

Homemade Fire Extinguisher .....	<i>Off the Wall Science</i>
Rubber Eggs .....	1.07
Test a Seed .....	<i>Budding Botanist</i>
Curds and Weigh .....	9.03
Give Me an Indication .....	8.02
How Sweet It Is .....	<i>Fun with Foods</i>
Pouring Carbon Dioxide Gas .....	<i>Off the Wall Science</i>
Red C .....	<i>Fun with Foods</i>
Feel the Heat .....	10.10
Using Technology with Feel the Heat .....	12.01
Change Matters.....	11.08
A Strange Change.....	11.10
Basic Indications.....	11.05

How do living things (and human technology) change matter and transform energy?

## IV.2.MS.2

PCM6 Distinguish between physical and chemical changes in natural and technological systems.

## IV.2.MS.3

PCM7 Describe how waste products accumulating from natural and technological activity create pollution.

How are visible changes in matter related to changes in atoms and molecules?

## IV.2.MS.4

PCM8 Explain physical changes in terms of the arrangement and motion of atoms and molecules.

Moving Molecules .....	<i>Water Precious Water</i>
Mini Water Cycle .....	<i>Water Precious Water</i>
Gem of an Experience .....	8.05

## MOTIONS OF OBJECTS

### Content Standard 3:

All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.

### How do things move around us?

#### IV.3.MS.1

PMO4 Qualitatively describe and compare motions in three dimensions.

Be a Roto Promotor .....	<i>Sky's the Limit</i>
Easy Glider .....	3.02
Roll er Up.....	11.01

### Why do things move as they do?

#### IV.3.MS.2

PMO5 Relate changes in speed or direction to unbalanced forces in two dimensions.

Kite Kapers .....	3.08
Canopy Pilot .....	9.08
Hanging in the Balance .....	9.10
Level the Lever .....	10.06
MVP-Most Valuable Place.....	<i>Brick Layers</i>
Fiddling with Fulcrums.....	<i>Brick Layers</i>
Beams Overboard .....	<i>Brick Layers</i>
Effort-Less.....	<i>Brick Layers</i>
Cycloids .....	<i>Brick Layers</i>
Bug on a Roll .....	<i>Brick Layers</i>
Bug - a - long .....	<i>Brick Layers</i>
Speed Bug .....	<i>Brick Layers</i>
Stable Structures .....	<i>Brick Layers</i>
A Stable Table .....	<i>Brick Layers</i>
Angle Fixer .....	<i>Brick Layers</i>
Stress on a String .....	<i>Brick Layers</i>
Tug Teams .....	11.07
Clever Lever 1, 2 & 3.....	<i>Machine Shop</i>
Kinetic Straws.....	11.08
Whack the Stack.....	11.07
Tug Teams .....	11.07
Pushes and Pulls.....	11.07
Balloon on a Straw .....	11.05
Tilt Tube .....	11.03
Roll er Up.....	11.01
A Pirate's Pendulum.....	12.01
Stream Lined.....	12.09
Brick Slide.....	12.03
Water Snakes.....	13.03

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## IV.3.MS.3

PMO6 Describe the forces exerted by magnets, electrically charged objects, and gravity.

Static Magic .....	<i>Popping with Power</i>	96
Balance Your Charge Account .....	<i>Electrical Connections</i>	
Holding Power .....	<i>Mostly Magnets</i>	
Weightless Wonder .....		10.08
Balancing Bats .....		11.03
A Coffee Can Gravitational Field Simulator .....		11.02
Have a Ball.....	<i>Popping with Power</i>	96
On the Rebound .....	<i>Popping with Power</i>	96
From the Ground Up .....	<i>Popping with Power</i>	96

How can we control the motions of objects?

## IV.3.MS.4

PMO7 "Design strategies for moving objects by application of forces, including the use of simple machines."

Gearing Up Gears .....	<i>Machine Shop</i>	
One Good Turn Deserves Another .....	<i>Machine Shop</i>	
Winding Wheels .....		8.06
Hang Gliding .....		9.10
Turn Around .....	<i>10.02 and Brick Layers</i>	
Magic String .....	<i>10.06 and Brick Layers</i>	
A First Class Job .....		10.08
Force ups .....	<i>Brick Layers</i>	
MVP-Most Valuable Place .....	<i>Brick Layers</i>	
Fiddling with Fulcrums .....	<i>Brick Layers</i>	
Beams Overboard .....	<i>Brick Layers</i>	
Effort-Less .....	<i>Brick Layers</i>	
Wheeling Your Way to the Top .....	<i>Brick Layers</i>	
A Shift in Lift .....	<i>Brick Layers</i>	
Slot Cars .....	<i>Brick Layers</i>	
LEGO® Launcher .....	<i>Brick Layers</i>	
Reel Changes .....	<i>Brick Layers</i>	
Dial-a-Gear .....	<i>Brick Layers</i>	
The Governor Rules .....	<i>Brick Layers</i>	
Gear Guessing .....	<i>Brick Layers</i>	
The Big Boom Construction Contest .....	<i>Brick Layers</i>	
Sand Bagging the See Saw .....	<i>Machine Shop</i>	
Meet the Equalizer .....	<i>Machine Shop</i>	
Block and Tackle .....	<i>Machine Shop</i>	
Nuts and Bolts .....	<i>Machine Shop</i>	
Clever Lever 1, 2, 3 .....	<i>Machine Shop</i>	
Catapults .....		11.09
Give me a Lift .....		12.04
Blow Up .....		13.01
Slip Sliding Away .....		13.03
Inclined to Work .....		12.08

## WAVES & VIBRATIONS

### Content Standard 4:

All students will describe sounds and sound waves; explain shadows, colors, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.

How can we describe sound?

#### IV.4.MS.1

PWV6 Explain how sound travels through different media.

Traveling Sounds ..... *Primarily Physics*

#### IV.4.MS.2

PWV7 Explain how echoes occur and how they are used.

Sensational Ears ..... *Bats Incredible*

Family Sense ..... *Bats Incredible*

Hide and Seek ..... *Bats Incredible*

Information about Echolocation ..... *Bats Incredible*

Make believe Bats ..... *Bats Incredible*

Click, Click. Who's There? ..... 10.03

How can we describe light?

#### IV.4.MS.3

PWV8 Explain how light helps us to see.

From Rays to Reasons ..... 8.05

#### IV.4.MS.4.

PWV9 Explain how objects or media reflect, refract, transmit, or absorb light.

The Mysterious Penny ..... 9.10

Glow with the Flow ..... 10.01

Reflections of Ray ..... 10.10

Bobbing for Light ..... 11.04

The Mysterious Penny ..... 9.10

Clownin' Around ..... 12.01

An Oily Illusion ..... 12.05

Slides of Refraction ..... 13.03

How can we describe and measure vibrations and waves?

#### IV.4.MS.5

PWV10 Describe the motion of pendulums or vibrating objects (frequency, amplitude).

Swing in time ..... 11.04

Threads of Time ..... 11.4

Swinging Bears ..... 4.08 or *Popping with Power*

Galileo & Pendulum ..... 4.08

Heartbeats and Pendulums ..... *Historical Connections 1*

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How do waves and vibrations transfer energy?

IV.4.MS.6

PWV11 Explain how waves transmit energy.

Wave article .....	4.02
Roller Coaster & Bumper Cars .....	9.06
How Sweet It Is .....	10.09

## V. Use Scientific Knowledge from the Earth and Space Sciences in Real World Contexts - Grades 5-7

### GEOSPHERE

Content Strand 1:

All students will describe the earth's surface; describe and explain how the earth's features change over time; and analyze effects of technology on the earth's surface and resources.

What is the earth's surface like?

V.1.MS.1

EG7 Describe and identify surface features using maps.

Were You Aware? .....	<i>Water Precious Water</i>
Surf and Sand Toss .....	<i>Finding Your Bearings</i>
Surf and Sand Spin .....	<i>Finding Your Bearings</i>
Surf and Sand Count .....	<i>Finding Your Bearings</i>
Topping off Mt. St. Helens .....	<i>Through the Eyes of Explorers</i>
Space Maps .....	<i>Through the Eyes of Explorers</i>
Mystery Mountain .....	<i>Finding Your Bearings</i>
Squiggle Summit.....	12.02

How do the earth's features change over time?

V.1.MS.2

EG8 Explain how rocks and minerals are formed.

Gem of an Experience .....	8.05
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V.1.MS.3

EG9 Explain how rocks and fossils are used to determine the age and geological history of the earth.

Rate of Decay .....	8.07
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V.1.MS.4

EG10 Explain how rocks are broken down, how soil is formed, and how surface features change.

Ice Breakers .....	8.09
Craters .....	10.03
Soil Tables .....	10.08

What effect has technology had on the earth's surface and resources?

V.1.MS.5

EG11 Explain how technology changes the surface of the earth.

What on Earth Can We Do? .....*Down to Earth*

## HYDROSPHERE

Content Standard 2:

All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; analyze the interaction of human activities with the hydrosphere.

Where is water found on the earth and what are its characteristics?

V.2.MS.1

EH5 Describe various forms that water takes on the earth's surface and conditions under which they exist.

Were you Aware? .....*Water Precious Water*

Surf and Sand Toss .....*Finding your Bearings*

Surf and Sand Count .....*Finding your Bearings*

Surf and Sand Spin .....*Finding your Bearings*

How does water move?

V.2.MS.2

EH6 Describe how rain water in Michigan reaches the oceans.

Moving Molecules .....*Water Precious Water*

Moving Water .....*Water Precious Water*

How do human activities interact with the hydrosphere?

V.2.MS.3

EH7 Describe the origins of pollution in the hydrosphere.

A Little Cup will Do It. ....*Water Precious Water*

Water Treatment.....*Water Precious Water*

Water Drop Census .....*4.02*

## ATMOSPHERE AND WEATHER

### Content Standard 3:

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

Where is water found on the earth and what are its characteristics?

#### V.3.MS.1.

EAW5 Describe the composition and characteristics of the atmosphere.

Temperature Rate ..... *Down to Earth*  
 Forecast for Today ..... *Finding your Bearings*  
 Layers of Our Atmosphere..... *12.08*

#### V.3.MS.2

EAW6 Describe patterns of changing weather and how they are measured.

Weather Watch ..... *10.02*  
 World Wide Highs..... *11.05*  
 Green Sleeves ..... *12.02*

What causes different kinds of weather?

#### V.3.MS.3

EAW7 Explain the water cycle and its relationship to weather patterns.

Mini Water Cycle ..... *Water Precious Water*  
 Moving Water ..... *Water Precious Water*  
 In a Fog ..... *8.06*  
 Nature's Sound and Light Show ..... *Electrical Connections*

What are the relationships between human activity and the atmosphere?

#### V.3.MS.4

EAW8 Describe health effects of polluted air.

Every Breath You Take ..... *Down to Earth*  
 What's in the Air? ..... *Our Wonderful World*

## SOLAR SYSTEM, GALAXY AND UNIVERSE

### Content Standard 4:

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

How does our planet and sun compare to other planets and star systems?

#### V.4.MS.1

ES3 Compare the earth to other planets in terms of supporting life.

Can You Planet? .....	<i>Out of this World 94</i>
Planetary facts .....	<i>Out of this World 94</i>
Extra Terrestrial Excursions .....	<i>Out of this World 94</i>

How do objects in the solar system move?

#### V.4.MS.2

ES4 Describe, compare, and explain the motions of planets, moons, and comets in the solar system.

Me and My Shadow .....	<i>Pieces and Patterns</i>
Sun Watchers .....	<i>Pieces and Patterns</i>
A Handy Timepiece .....	9.04
Sizing Up Shadows .....	<i>Through the Eyes of Explorers</i>
Pasta Parallels .....	9.06
Facing Up to the Moon .....	10.08
Apparent Sizes .....	11.04

#### V.4.MS.3

ES5 Describe and explain common observations of the day and night skies.

The Moon shines Bright .....	<i>Out of this World 94</i>
Sun Watchers.....	<i>Pieces and Patterns</i>

How did the universe begin?

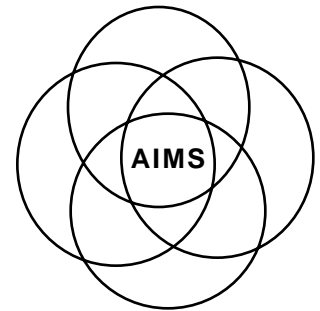
#### V.4.MS.4

ES6 Explain how the solar system formed.

Michigan's  
**Science**  
Standards and Benchmarks  
and  
Suggested *AIMS* Activities



High School



Compiled by Michigan  
AIMS Facilitators

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## Michigan Essential Goals and Objectives in Science Education and Correlated AIMS Activities

### Key to abbreviations and typeface:

*Italics* indicate the source of the activity. 5.02 means volume 5, number 2 of the AIMS Magazine or Newsletter.

### I. Construct New Scientific and Personal Knowledge -High School

#### Content Standard 1:

All students will ask questions that help them learn about the world; design and conduct investigations using appropriate methodology and technology; learn from books and other sources of information; communicate their findings using appropriate technology and reconstruct previous learned knowledge.

How do scientists ask questions that help them learn about the world?

#### I.1.HS.1

C13 Develop questions or problems for investigation that can be answered empirically.

Rubber Eggs .....	1.07
Seeing Is Not Observing .....	11.01
Flow Fingers .....	11.03

How do scientists figure out answers to their questions by investigating the world?

#### I.1.HS.2

C14 Suggest empirical tests of hypotheses.

Dry Idea .....	<i>Middle Series 2 Binder</i>
Hang Gliding .....	9.10

#### I.1.HS.3

C15 Design and conduct scientific investigations

Dry Idea.....	<i>Middle Series 2 Binder</i>
Bear-Barrow and Challenge.....	<i>Brick Layers</i>
The Big Boom Construction Contest .....	<i>Brick Layers</i>
Build a Better Magnet.....	<i>Electrical Connections</i>
All Wrapped Up.....	11.07
Pillars of Strength.....	9.07

#### I.1.HS.4

C16 Diagnose possible reasons for failures of mechanical or electronic systems.

Make a Dimmer Switch .....	<i>Electrical Connections</i>
Make a Switch.....	<i>Electrical Connections</i>
Electric Circuits.....	<i>Electrical Connections</i>
Put Your Name in Lights .....	<i>Electrical Connections</i>

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Electromagnetic Connection.....	<i>Electrical Connections</i>
Make a Galvanometer .....	<i>Electrical Connections</i>
How to Make an Electric Motor .....	<i>Electrical Connections</i>
Electromagnets .....	<i>Electrical Connections</i>
Catapult.....	11.09
Wing on a Straw.....	11.01

## I.1.HS.5

C17 Assemble mechanical or electronic systems using appropriate tools and instructions.

Make a Dimmer Switch .....	<i>Electrical Connections</i>
Make a Switch.....	<i>Electrical Connections</i>
Electric Circuits.....	<i>Electrical Connections</i>
Put Your Name in Lights .....	<i>Electrical Connections</i>
Electromagnetic Connection .....	<i>Electrical Connections</i>
Make a Galvanometer .....	<i>Electrical Connections</i>
How to Make an Electric Motor .....	<i>Electrical Connections</i>
Electromagnets .....	<i>Electrical Connections</i>
Tuning in Your Crystal Radio .....	11.04

## I.1.HS.6

C18 Recognize and explain the limitations of measurement devices.

Make Room for Me.....	10.02
Where Do You Draw the Line?.....	<i>Floaters and Sinkers 95</i>

How do scientists learn about the world from books and other sources of information?

## I.1.HS.7

C19 Gather and synthesize information from books and other sources of information.

Leaf Facts .....	<i>Primarily Plants</i>
The Truth about Bananas .....	<i>Math + Science: A Solution</i>
Fingerprinting .....	<i>Jawbreakers &amp; Heart Thumpers</i>
Tree Cookies .....	<i>Our Wonderful World</i>
Energy .....	<i>Primarily Physics</i>
Food Chain .....	<i>Critters</i>
Electromagnetism .....	<i>Electrical Connections</i>
Plant Facts .....	<i>Budding Botanist</i>

How do scientists communicate their findings to other scientists and the rest of society?

## I.1.HS.8

C20 Discuss topics in groups by being able to restate or summarize what others have said, ask for clarification or elaboration, and take alternative perspectives.

Are You as Dense as I Am? .....	<i>Floaters and Sinkers 95</i>
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How do scientists reconstruct knowledge that they have partially forgotten?

## I.1.HS.9

C21 Reconstruct previously learned knowledge

## II. Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge - High School

Content Standard 1:

All students will analyze claims for their scientific merit and explain how scientists decide what constitutes scientific knowledge; how science is related to other ways of knowing; how science and technology affect our society; and how people of diverse cultures have contributed to and influenced developments in science.

How do scientists decided what to believe?

II.1.HS.1

R11 Justify plans or explanations on a theoretical or empirical basis.

II.1.HS.2

R12 Describe some general limitations of scientific knowledge.

How is science related to other ways of knowing?

II.1.HS.3

R13 Explain how common themes of science, mathematics, and technology apply in selected, real-world contexts.

Homemade Fire Extinguisher .....	<i>Off the Wall Science</i>
Sparky's Light Kit .....	<i>Electrical Connections</i>
Short Stretches .....	<i>Upper Series 2 Binder</i>
All Wrapped Up.....	11.07
Watts Going On.....	<i>Popping with Power 96</i>
Afloat.....	<i>Floaters and Sinkers 95</i>

II.1.HS.4

R14 Discuss the historical development of key scientific concepts and principles.

When I Was Ten.....	<i>Electrical Connections</i>
Electricity Time Line .....	<i>Electrical Connections</i>

How do science and technology affect our society?

II.1.HS.5

R15 Evaluate alternative, long-range plans for resource use and by-product disposal in terms of environmental and economic impact.

How have people of diverse cultures contributed to and influenced developments in science?

II.1.HS.6

R16 Describe the historical, political, and social factors affecting developments in science.

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### III. Use Scientific Knowledge from the Life Sciences in Real-World Contexts - High School

#### CELLS

Content Standard 1:

All students will apply an understanding of cells to the functions of multicellular organisms; and explain how cells grow, develop and reproduce.

What are cells?

III.1.HS.1

LC5 Classify cells/organisms on the basis of organelle and/or cell types.

III.1.HS.2

LC6 Explain how multi-cellular organisms grow, based on how cells grow and reproduce.

III.1.HS.3

LC7 Compare and contrast ways in which selected cells are specialized to carry out particular life functions.

Cell Facts .....	<i>Budding Botanist</i>
Model of a Cell .....	<i>Budding Botanist</i>
Focus on Cells .....	<i>Budding Botanist</i>
Protozoan a Going: Dropping in on Protozoa .....	9.04
Cell your Fruits and Vegetables .....	<i>Budding Botanist</i>
Important Things Come In Tiny Packages .....	1.07
The Cell as a Factory .....	<i>Magnificent Microworld Adventures</i>
Blood .....	<i>Magnificent Microworld Adventures</i>
A Fish Tale .....	<i>Magnificent Microworld Adventures</i>
A Complete Package .....	<i>Magnificent Microworld Adventures</i>
At the Heart of Daphnia.....	<i>Magnificent Microworld Adventures</i>
Algae - The Food Factory .....	<i>Magnificent Microworld Adventures</i>

How are cells adapted to survive, grow, develop and reproduce?

III.1.HS.4

LC8 Compare and contrast the chemical composition of selected cell types.

III.1.HS.5

LC9 Compare the transformations of matter and energy during photosynthesis and respiration.

Photosynthesis .....

*Budding Botanist*

III.1.HS.6

- LC10 Explain how essential materials move into cells and how waste and other materials get out.  
       Molecules on the Move ..... *Magnificent Microworld Adventures*  
       Casing the System ..... *11.01*

III.1.HS.7

- LC11 Explain how cells use food to grow.

ORGANIZATION OF LIVING THINGS

Content Standard 2:

All students will use classification systems to describe groups of living things; compare and contrast differences in the life cycles of living things; investigate and explain how living things obtain and use energy; and analyze how parts of living things are adapted to carry out specific functions.

How are groups of living things classified?

III.2.HS.1

- LO10 Classify major groups of organisms on the basis of the five-kingdom system.  
       Sea Life Shuffle ..... *6.10*

How do life cycles of living things differ?

III.2.HS.2

- LO11 Describe the life cycle of an organism associated with human disease.

How do living things obtain and use energy?

III.2.HS.3

- LO12 Explain the process of food storage and food use in organisms.  
       Photosynthesis ..... *Budding Botanist*  
       Transpiration ..... *Budding Botanist*

How are the parts of living things adapted to carry out specific functions?

III.2.HS.4

- LO13 Explain how living things maintain a stable internal environment.

III.2.HS.5

- LO14 Describe technology used in the prevention, diagnosis, and treatment of diseases.  
       Disease X ..... *4.10*

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## HEREDITY

### Content Standard 3:

All students will investigate and explain how characteristics of living things are passed on through generations; explain why organisms within a species are different from one another; and explain how new traits can be established by changing or manipulating genes.

How are characteristics of living things passed on through generations?

#### III.3.HS.1

LH4 Explain how characteristics of living things are passed on from generation to generation.

Teddy Bears come in Pairs .....	2.05
Traits Combo Extension .....	6.10
Are you a square? Extension .....	<i>Hardhatting in a Geo-world</i>
Traits Combo .....	6.10
Picturing a Dichotomy .....	9.08

Why are organisms within a species different from one another?

#### III.3.HS.2

LH5 Describe how genetic material is passed from parent to young during sexual and asexual reproduction.

How can new traits be established by changing or manipulating genes?

#### III.3.HS.3

LH6 Explain how new traits may be established in individuals/populations through changes in genetic material.

## EVOLUTION

### Content Standard 4:

All students will explain how scientists construct and scientifically test theories concerning the origin of life and evolution of species; compare ways that living organisms are adapted (suited) to survive and reproduce in their environments; and analyze how species change through time.

How do scientists trace the origin and development of species?

#### III.4.HS.1

LE4 Describe what biologists consider to be evidence for human evolutionary relationships to selected animal groups.

In what ways are living things adapted (suited) to survive in their environments?

III.4.HS.2

LE5 Explain how a new species or variety may originate through the evolutionary process of natural selection.

How do species change through time?

III.4.HS.3

LE6 Explain how new traits might arise and become established in a population.

## ECOSYSTEMS

Content Standard 5:

All students will explain how parts of an ecosystem are related and how they interact; explain how energy is distributed to living things in an ecosystem; investigate and explain how communities of living things change over a period of time; describe how materials cycle through an ecosystem and get reused in the environment and analyze how humans and the environment interact.

How are parts of an ecosystem related and how do they interact?

III.5.HS.1

LEC13 Describe common ecological relationships among species.

How is energy distributed to living things in an ecosystem?

III.5.HS.2

LEC14 Explain how energy flows through familiar ecosystems.

Catch Me if You Can .....	<i>Critters</i>
Nocturnal Hunter .....	4.05
Food Chain of the Pond (song) .....	8.05
Food Chains & Webs .....	9.09
Food Chain .....	<i>Critters</i>

How do communities of living things change over a period of time?

III.5.HS.3

LEC15 Describe general factors regulating population size in ecosystems.

III.5.HS.4

LEC16 Describe responses of an ecosystem to events that cause it to change.

The Pickle Jar Aquarium .....	<i>Magnificent Microworld Adventures</i>
Making a Hay Infusion .....	<i>Magnificent Microworld Adventures</i>

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How do materials cycle through an ecosystem and get reused in the environment?

III.5.HS.5

LEC17 Describe how water, carbon dioxide, and soil nutrients cycle through selected ecosystems.

How do humans and the environment interact?

III.5.HS.6

LEC18 Explain the effects of agriculture and other human activities on selected ecosystems.

Trees as a Crop .....*Our Wonderful World*

## Use Scientific Knowledge from the Physical Sciences in Real-World Contexts - High School

### MATTER & ENERGY

Content Standard 1:

All students will measure and describe the things around us; explain what the world around us is made of ; identify and describe forms of energy; and explain how electricity and magnetism interact with matter.

How do we describe the things around us?

IV.1.HS.1

PME17 Describe and compare objects in terms of mass, volume, and density.

Weight watchers .....	<i>Math + Science a Solution</i>
Mini Metric Olympics .....	<i>Math + Science a Solution</i>
Metric Scavenger Hunt .....	<i>Math + Science a Solution</i>
Make Your Own Measuring Cup .....	<i>Water Precious Water</i>
All Bottled Up.....	<i>Water Precious Water</i>
Volumes of Fun .....	<i>Hardhatting in Geoworld</i>
Icebergs .....	10.04
Sink or Swim.....	9.08
The Orange's Life Jacket .....	5.08
Predicting Float Lines.....	<i>Historical Connections Vol. 1</i>
Icebergs.....	10.04
Wat-ar Density .....	<i>Floaters and Sinkers 95</i>
The Orange's Life Jacket .....	<i>Floaters and Sinkers 95</i>
It Sinks! It Floats.....	<i>Floaters and Sinkers 95</i>
Denser Sensor .....	<i>Floaters and Sinkers 95</i>
See Level.....	<i>Floaters and Sinkers 95</i>
Are You as Dense as I Am .....	<i>Floaters and Sinkers 95</i>
Floating Wood.....	<i>Floaters and Sinkers 95</i>
Sink or Swim.....	<i>Floaters and Sinkers 95</i>
What's in a BB? .....	<i>Floaters and Sinkers 95</i>

IV.1.HS.2

PME18 Explain how families of elements are related by common properties.

IV.1.HS.3

PME19 Analyze properties of common household and agricultural materials in terms of risk/benefit balance.

What is the world around us made of?

IV.1.HS.4

PME20 Describe and explain the structural parts and electrical charges of atoms.  
 Water Molecule ..... *Water Precious Water*  
 Macro Molecules ..... *Soap Films & Bubbles*  
 Atoms ..... *Electrical Connections*  
 It's a Small World ..... *Soap Films and Bubbles*

What is energy?

IV.1.HS.5

PME21 Describe how energy is conserved during transformations.

IV.1.HS.6

PME22 Explain changes in matter and energy involving heat transfer.  
 Feel the Heat ..... *10.10*  
 Using Technology with Feel the Heat ..... *12.01*

How do electricity and magnetism interact with matter?

IV.1.HS.7

PME23 Describe how electric currents can be produced by interacting wires and magnets.  
 Electromagnetic Connection..... *Electrical Connections*  
 Make a Galvanometer ..... *Electrical Connections*  
 How to Make an Electric Motor ..... *Electrical Connections*  
 Electromagnets ..... *Electrical Connections*

IV.1.HS.8

PME24 Construct and explain simple circuits using wires, light bulbs, fuses, switches, and power sources.  
 Make a Dimmer Switch ..... *Electrical Connections*  
 Make a Switch ..... *Electrical Connections*  
 Electric Circuits..... *Electrical Connections*  
 Put Your Name in Lights ..... *Electrical Connections*  
 Electromagnetic Connection..... *Electrical Connections*  
 Make a Galvanometer ..... *Electrical Connections*  
 How to Make an Electric Motor ..... *Electrical Connections*  
 Electromagnets ..... *Electrical Connections*  
 Circuit Breakers ..... *Electrical Connections*

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## CHANGES IN MATTER

### Content Standard 2:

All students will investigate, describe and analyze ways in which matter changes; describe how living things and human technology change matter and transform energy; explain how visible changes in matter are related to atoms and molecules; and how changes in matter are related to changes in energy.

### How does matter change?

#### IV.2.HS.1

PCM9 Explain how mass is conserved in physical and chemical changes.

Curds and Weigh .....9.03

Icebergs.....10.04

Corny Balloons .....12.03

#### IV.2.HS.2

PCM10 Describe nuclear changes in terms of the properties of reactants and products.

Rate of Decay .....8.07

### How do living things (and human technology) change matter and transform energy?

#### IV.2.HS.3

PCM11 Trace, to an original source, the energy used by living things and machines.

#### IV.2.HS.4

PCM12 Describe how common materials are made and disposed of or recycled.

### How are visible changes in matter related to changes in atoms and molecules?

#### IV.2.HS.5

PCM13 Explain chemical changes in terms of the arrangement and motion of atoms and molecules.

#### IV.2.HS.6

PCM14 Describe, compare, & contrast changes in atoms and/or molecules during physical, chemical, & nuclear changes.

### How are changes in matter related to changes in energy?

#### IV.2.HS.7

PCM15 Describe energy changes associated with physical and chemical changes.

Feel the Heat .....10.10

#### IV.2.HS.8

PCM16 Describe, compare, & contrast relative magnitude of energy changes involved in physical, chemical, nuclear changes.

## MOTIONS OF OBJECTS

### Content Standard 3:

All students will describe how things around us move and explain why things move as they do; demonstrate and explain how we control the motions of objects; and relate motion to energy and energy conversions.

### How do things move around us?

#### IV.3.HS.1

PMO8 Perform measurements and calculations to describe the speed and direction of an object.

Be a Roto Promotor .....	<i>Sky's the Limit</i>
Easy Glider .....	3.02
Rally Round the Room .....	<i>Pieces and Patterns</i>
LEGO® Launcher.....	<i>Brick Layers</i>
Great Catapult Caper .....	<i>Machine Shop</i>
Time Trials .....	11.02

### Why do things move as they do?

#### IV.3.HS.2

PMO9 Describe that whenever one object exerts a force on a second object, the second object exerts an equal and opposite force on the first object.

Stable Table .....	<i>Brick Layers</i>
Angle Fixers.....	<i>Brick Layers</i>
Stress on a String.....	<i>Brick Layers</i>
The Pressure's On.....	12.02
Water Attractions .....	12.01

### How can we control the motions of objects?

#### IV.3.HS.3

PMO10 Analyze the operation of machines in terms of force and motion.

Gearing Up Gears.....	<i>Machine Shop</i>
One Good Turn Deserves Another .....	<i>Machine Shop</i>
Winding Wheels .....	8.06
Force ups.....	<i>Brick Layers</i>
MVP-Most Valuable Place.....	<i>Brick Layers</i>
Fiddling with Fulcrums.....	<i>Brick Layers</i>
Beams Overboard .....	<i>Brick Layers</i>
Effort-Less.....	<i>Brick Layers</i>
Canopy Pilot .....	9.08

### How is motion related to energy and energy conversion?

#### IV.3.HS.4

PMO11 Explain energy conversions in moving objects and in simple machines.

Force Ups .....	<i>Brick Layers</i>
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## WAVES & VIBRATIONS

### Content Standard 4:

All students will describe sounds and sound waves; explain shadows, colors, and other light phenomena; measure and describe vibrations and waves; and explain how waves and vibrations transfer energy.

How can we describe sound?

IV.4.HS.1

PWV12 Relate characteristics of sounds that we hear to properties of sound waves.

IV.4.HS.2

PWV13 Explain how sound recording and reproducing devices work.

How can we describe light?

IV.4.HS.3

PWV14 Relate colors to wavelengths of light.

IV.4.HS.4

PWV15 Explain how we see colors of objects.

How can we describe and measure vibrations and waves?

IV.4.HS.5

PWV16 Describe different types of waves and their technological applications.

IV.4.HS.6

PWV17 Describe waves in terms of their properties (frequency, amplitude, wavelength, wave velocity).

Slides of Reflection ..... 13.03

IV.4.HS.7

PWV18 Describe the behavior of waves when they interact.

IV.4.HS.8

PWV19 Relate changes in detected frequency of a source to the motion of the source and/or the detector.

How do waves and vibrations transfer energy?

IV.4.HS.9

- PWV20 Explain how energy is stored and transformed in vibrating and oscillating objects.  
 How Sweet It Is ..... 10.09

**V. Use Scientific Knowledge from the Earth and Space Sciences in Real World Contexts - High School**

**GEOSPHERE**

Content Strand 1:

All students will describe the earth’s surface; describe and explain how the earth’s features change over time; and analyze effects of technology on the earth’s surface and resources.

What is the earth's surface like?

V.1.HS.1

- EG12 Explain the surface features of the Great Lakes region using Ice Age theory.

How do the earth’s features change over time?

V.1.HS.2

- EG13 Use the plate tectonics theory to explain features of the earth's surface and geological phenomena and . . .  
 Drifting Apart .....Finding Your Bearings

What effect has technology had on the earth's surface and resources?

V.1.HS.3

- EG14 Explain how and why earth materials are conserved and recycled.

**HYDROSPHERE**

Content Standard 2:

All students will demonstrate where water is found on earth; describe the characteristics of water and how water moves; analyze the interaction of human activities with the hydrosphere.

How does water move?

V.2.HS.1

- EH8 Explain how water moves below the earth's surface.

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How do human activities interact with the hydrosphere?

V.2.HS.2

EH9 Explain relationships between the hydrosphere, regional climates, and human activities.

V.2.HS.3

EH10 Describe how human activities affect the quality of water in the hydrosphere.

A Little Cup will Do It. .... *Water Precious Water*

Water Treatment..... *Water Precious Water*

Water Drop Census .....4.02

## ATMOSPHERE AND WEATHER

Content Standard 3:

All students will investigate and describe what makes up weather and how it changes from day to day, from season to season and over long periods of time; explain what causes different kinds of weather; and analyze the relationships between human activities and the atmosphere.

What makes up weather and how does it change from day to day, from season to season, and over long periods of time?

V.3.HS.1

EAW9 Describe patterns of air movement in the atmosphere and how they affect weather conditions.

What causes different kinds of weather?

V.3.HS.2

EAW10 Explain and predict general weather patterns and storms.

V.3.HS.3

EAW11 Explain changes in climate over long periods of time.

What are the relationships between human activity and the atmosphere?

V.3.HS.4

EAW12 Explain the impact of human activities on the atmosphere & demonstrate means for limiting pollution from households and personal transportation.

## SOLAR SYSTEM, GALAXY AND UNIVERSE

### Content Standard 4:

All students will compare and contrast our planet and sun to other planets and star systems; describe and explain how objects in the solar system move; explain scientific theories as to the origin of the solar system; and explain how we learn about the universe.

How does our planet and sun compare to other planets and star systems?

V.4.HS.1

ES7 Compare our sun to other stars and star systems.

V.4.HS.2

ES8 Explain common observations of the day and night sky.

How do objects in the solar system move?

V.4.HS.3

ES9 Describe the position and motion of our solar system in the universe.

Facing up to the Moon ..... *10.08*

V.4.HS.4

ES10 Explain why seasons occur on earth.

Pasta Parallels ..... *9.06*

Greensleeves..... *12.02*

How did the universe begin?

V.4.HS.5

ES11 Explain how stars form and how they produce energy.

How do we learn about the universe?

V.4.HS.6

ES12 Explain how technology and scientific inquiry have helped us learn about the universe.

Stars in the Milky Way Galaxy

*Out of This World 94*

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