

Montessori Zimbabwe

Upper Elementary Curriculum Frame

Mathematics

The inquisitiveness of the upper elementary Montessori student is astounding. The beauty of the advanced squaring and cubing materials beckons like beacons, inviting the students to come explore and learn with them. They dive into the study of fractions and decimals, eager to move beyond to more complex mathematics, geometry, and algebra. While the concrete materials are still in place, the need for repetition is gone. "Show me. Then, show me more" is the litany of the upper elementary Montessori math students. Upper elementary students move quickly from the concrete experience to abstract thought. They are eager to test their knowledge with pencil and paper and need, at times, a gentle reminder to return to the materials as a way of building neurological pathways.

1

Numerical place value in the decimal system

- Recognising numbers up to 9,999,999 on the flat bead frame
- Recognising numbers up to 9,999,999 on the Checkerboard
- Recognising quantities up to 9,999,999 using the long division material
- Recognising quantities up to 9,999,999 using the algebraic pegboard
- Recognizing quantities from 9,999,999 up to 999,999,999,999,999

Operations with whole numbers

Addition

- Oral games to memorise addition facts
- Adding abstract numbers up to 9,999,999 without and with exchanging

Subtraction

- Oral games to memorise subtraction facts
- Subtracting abstract numbers up to 9,999,999 without and with exchanging

Multiplication

- Oral games to memorise multiplication facts
- Multiplying by 1 digit numbers on the Checkerboard
- Multiplying 4 digit numbers by 2 digit numbers on the Checkerboard
- Multiplying 7 digit numbers by 2 digit numbers on the Checkerboard
- Multiplying 7 digit numbers by 2 digit numbers using the Flat Bead Frame
- Multiplying a 4 digit number by 2 digit Multiplier using the Bank Game
- Using Coloured Bead Bars to find Missing Factors
- Performing Category Multiplication on the Checkerboard
- Performing Category Multiplication with Mentally Adding Products in each Category
- Performing Category Multiplication with Mentally Adding Products and with Mental Exchanging
- Multiplying up to 7 digits by 1 digit without the Checkerboard
- Multiplying 2 digits by 2 digits without the Checkerboard
- Multiplying up to 7 digits by 2 digits without the Checkerboard

Division

Multiples, factors, and divisibility

Fractions

Decimal fractions

Percents, ratios and proportions

Rounding off numbers

2

Negative numbers

Non-terminating decimals and irrational numbers

Pre-algebra

3

Practical Applications of Mathematics

Word problems

Money

Weight

Liquid volume

Temperature

Graphs

Bar graphs and circle graphs

Line graphs and scatter plots

Graphing with ordered pairs

Statistics

Geometry

Lines and angles

Triangles

Quadrilaterals

Many-sided polygons

Parts of the circle

Geometric solid shapes

Line symmetry

Constructing geometric figures: circles, ellipses and squares

Constructing the regular polyhedra

Similar, congruent and equivalent shapes

Calculating area of polygons and circles

Calculating volume of geometric solids

Pythagorean theorem

Language Arts

1

Speaking and listening skills

Speaking skills

Public speaking

Interviews

Handwriting (penmanship)

Grammar

Review parts of speech

Nouns

Pronouns

Articles
Adjectives
Conjunctions
Prepositions
Verbs
Adverbs
Sentence analysis

2

Reading and literature

Novels

Mechanics of writing

Punctuation

Word study

Word families, graphemes and homonyms

Acronyms, abbreviations and contractions

Hyphenation

Dictionaries

Writing essays and research reports

Choosing a topic and an approach

Gathering information

Organizing a function

Brainstorming, mapping and making an outline

Writing, revising and presenting

Letter Writing

Zimbabwe History

Indigenous peoples

Exploration and settlement by Europeans

Early European explorers

First immigrants

The Provinces

The Zimbabwean people

Government, politics and citizenship

History of great leaders

Government

etc

World History

The Passage of Time

Human Generations over Time

Time as a Concept

Time and the Rotation of the Earth

Common Needs and Time

Early Ways of Telling Time

Modern Ways of Telling Time

The 12-hour and 24-hour clock systems

The Study of Prehistory

- Common Needs of Early People
- Early Cultures and Societies
- Archaeology

Ancient Civilisations

- Ancient China
- Sumer
- The Maya
- Ancient Egypt
- The Bushmen

Early Exploration

- Early African Explorers
- Early Polynesian Explorers
- Early Boats and Ships
- Early European Explorers

European History to Modern Times

- The Middle Ages
- The Renaissance and Reformation
- The Industrial Revolution
- Researching the History of Modern Countries

Historical Research

- Research Resources
- Research Questions
- Research
- Research Report

Health Sciences

Inside the Human Body

- Review: Nervous, Skeletal, respiratory, Cardiovascular, and Digestive Systems
- Review: The Senses of Taste and Smell
- The Urinary System
- The immune System
- The Endocrine System
- The Senses of Touch, Sight and Hearing
- Overview of Eight Systems in the Human Body

Safe Food Handling and Nutrition

- Safe Food Handling
- Nutrition

Infectious Diseases and Immunisation

Wellness

Healthy Relationships with Self and Others

Physical Education

- The Importance of Physical Education
- Sports Study and Sportsmanship

Botany

Plant review
Classification
Roots
Stems
Leaves
Flowers
Fruits and seeds
Identification
Basic needs of plants
Humans and plants
Microscopic study
 Cells
 Microorganisms and food spoilage
Agriculture

Zoology

Local Animals
External Anatomy and Classification
Identification
Internal anatomy and Physiology
Adapting to Different Habitats
Relationship of Humans with Animals
Farming

Astronomy and Ecology

Astronomy

Current scientific theory about the creation of the universe
The life cycle of stars
The visibility of stars and the constellations
Light-years
Astronomical tools
The solar system
Earth and sun
The moon, tides and eclipses
Asteroids, comets and meteors
Outer Space Exploration

Ecology

The web of life
Food chains
Dependence and interdependence
Adaptation and evolution
Pollution
Water pollution
Air pollution

Scientific Method and Technology

Still directly tied to the Five Great Lessons, the Montessori upper elementary science curriculum is about further development of the scientific method. Children now have the ability to focus on in-depth research. They are able to actively engage with what interests them by conducting experiments based on scientifically formulated hypotheses, collecting and interpreting data, and presenting their results. This is a time when Montessori classroom or school science fairs can be used to encourage scientific exploration, research, and promote the sharing of ideas with others.

Scientific Method

Scientific Tools
Scientific Techniques
Science Experiments

Technology

Technologies to Meet Basic Needs
Engineering Technologies

- Roman arches
- Simple machines

Technology research projects for older students

How to Choose Technology Topics and do Research
Animal Power and Steam Power
The Automobile and the Internal Combustion Engine
The Electric Motor
Lighting and the Electric Bulb
Radio and Television
The Aeroplane
Lasers and Microwaves

Computer Studies

The Computer and the Microchip
History of Computers
How they work
What they consist of

Computer Software

Powerpoint Presentations
Word Processing Programs
Spreadsheets, Number Crunching and Formulae
Email etiquette
Safe Internet usage
Paint Programs and illustrating

Physical Geography

The Great Lessons still figure prominently in the 9-12 Montessori environment. The geographical studies begun in the lower elementary are now explored more deeply. Montessori upper elementary students are now intrigued by the bizarre and extreme and will often come running up, delighted to share their new found information such as:

- *Angel Falls in Venezuela is the world's highest waterfall, at 979 meters. This waterfall is sixteen times the height of Niagara Falls.*
- *According to the Gemological Institute of America, up until the 1730's, India was the only source for diamonds in the world.*
- *Canada has more inland waters and lakes than any other country in the world.*

- *Davao City, located at the Southern state of Philippines, is the largest city in the world in terms of area.*
- *Each day the sun causes about one trillion tons of water to evaporate.*

Earth's Atmosphere

Climate and the atmosphere
 Global weather patterns
 Weather systems and weather maps
 The water cycle, clouds and rainbows

Earth's Hydrosphere

Oceans and seas
 Rivers of water and ice
 Lakes, wetlands and aquifers

Earth's Lithosphere

The earth's layers
 Volcanoes
 Earthquakes
 Continents, islands and coastlines
 Mountains, valleys and plains
 Rocks and minerals
 Zimbabwe's resources
 Weathering and erosion

Cultural Geography

Maps and mapping

Overview of Maps
 Longitude and Latitude
 Topographic Maps
 Street Maps and Route Panning
 Map and Compass
 Overview of Cartography

The Continents

Africa
 North America
 South America
 Europe
 Asia
 Australia and the Pacific Islands
 Antarctica

Environment and culture

Climate and the Common Needs of People
 Cultural Celebrations Around the World

Cultural Geography Research Projects

Economic geography is introduced at the Montessori upper elementary level. Students learn how buy, sell, and trade resources and how a country's wealth can greatly influence the prosperity of their people. In addition, Montessori elementary students continue to go out into the world, taking longer trips, overnight trips as they examine more closely what it means to be a contributing member of a community.

Children are born into a community of family. As they grow, their world and their role in it expands. By recognising that we are all part of a larger, global community that is

interconnected to all life on earth we develop the ability to understand that all of humanity must be agents for peace and harmony.

Matter and Energy

Matter

Atoms
Molecules
Chemical elements
The states of matter
Water pressure and air pressure
Changes in Matter
Combinations of matter
Acids and Bases
Density
Fire and Combustion

Energy

Energy sources
Sound
Light
Electricity and magnetism
Gravity, friction and inertia

Music

Students prepare further for the possibility of theory examinations (optional). They are also invited to try other instrument such as ukulele, guitar, violin, etc. History of music is introduced and famous composers are studied.

Arts and Crafts

Art activities at this level take on more detail and also include history of art and Famous International artists.

Languages

All Upper Elementary students continue their Ndebele and French studies in more depth and with plenty of preparation for examinations at Level 7.