▼ ☐ **Lower Elementary**

Key: Green indicates both Montessori and CoreKnowledge; orange indicates Montessori; blue indicates CK; Ⓜ is a Montessori lesson; Ⓒ are lessons indicated by CK sequence.

   ▼ ☐ **Language**

      ● ☐ The Story of Our Alphabet Ⓜ

      ● ☐ The History of Written Language (Stories) Ⓜ

      ● ☐ The History of Spoken Language (Stories) Ⓜ

      ▼ ☐ **Reading & Spelling**

        see also "Reciting Poetry" under Poetry; "Literature" under Language; and "Drama" under Performing Arts; and "Nomenclature" materials in various areas

        ● ☐ Assessing Reading Informally Ⓜ

          using letter cards, words cards, etc.

        ● ☐ Limiting the Task Ⓜ

          how many letters the child knows already versus how many are left

        ● ☐ 26 Letter Sounds of the Alphabet Ⓒ Ⓜ

          with upper, lower, cursive, and print

        ● ☐ Reading Simple Words Ⓒ Ⓜ

          optionally: phonetic sound game

        ● ☐ Puzzle Words Ⓒ Ⓜ

          50+ non-decodable high frequency words

        ● ☐ Blending Ⓒ Ⓜ

        ● ☐ 26 Letter Names of the Alphabet Ⓒ Ⓜ

        ● ☐ Basic Phonograms with Word Lists Ⓒ Ⓜ

          ai, ee, ie, oa, ue, th, /th/, ch, qu, sh, er, or, au, oo, oy, ng

        ● ☐ Silent "e" Ⓒ Ⓜ

        ● ☐ Language Experience Books Ⓜ

          original autobiographical stories by the child

        ● ☐ Labeling the Environment Ⓜ

        ● ☐ Phonetically-decodable Stories Ⓒ Ⓜ

          pausing at end-punctuation; frequent book reading

        ▼ ☐ **Alternative Phonograms (Phonetic Reading Folders)**

          ● ☐ "ai" sound Ⓒ Ⓜ

            ai, ay, er, a_e, eigh, ey, ei, a

          ● ☐ "ee" sound Ⓒ Ⓜ

            ee, ea, e_e, y, ie, i, e, ey

          ● ☐ "ie" sound Ⓒ Ⓜ

            ie, y, i_e, igh, i

          ● ☐ "oa" sound Ⓒ Ⓜ

            oa, oe, ow, o_e, ou, ough, o

          ● ☐ "ue" sound Ⓒ Ⓜ

            ue, ew, oo, u_e, ou, u, ui_e

- ☐ "er" sound C M
  er, ir, ur
- ☐ "au" sound C M
  a, au, aw, ough
- ☐ "ou" sound C M
  ou, ow, ough
- ☐ "oy" sound C M
  oy, oi
- ☐ "s" sound M
  s, ce, ci
- ☐ "f" sound M
  f, ph
- ☐ "e" sound M
  e, ea
- ☐ "oo" sound M
  oo, u (as in "put")
- ☐ "j" sound M
  j, ge, gi
- ☐ "sh" sound C
  sh, ti, ci, si, ch (as in "chef", "mention")
- ☐ "n" sound A
  n, kn, gn
- ☐ "k" sound A
  k, ch, que
- ☐ "o" sound A
  a, ough, al, o
- ☐ "i" sound A
  i, y, ee

- ☐ Reading Conference C M
  one-on-one student reading with adult (informal assessment)

- ▼ ☐ Spelling
  see also "Using a Dictionary" under Language / Language Conventions / Reference Skills

  - ☐ Personal Spelling Dictionary M

  - ☐ Commonly Misspelled Words C M

  - ☐ Writing from Dictation (with a Partner) C M

    for examples and/or sources, see "Puzzle Words" and "Phonetic Reading Folders" under Language / Reading & Spelling; "Homonyms" under Language / Language Conventions / Word Study; "Contractions" under Language / Language Conventions / Written Elements; "Sayings & Phrases" under Language / Spoken Language; "Poetry" under Language; "Dramatic Interpretation" under Language / Spoken Language / Speech; and various under Language / Language Conventions / Word Study

  - ☐ Spelling Analysis of Child's Work M

    used for planning spelling lessons

- ▼ ☐ Writing

▼ ☐ **Handwriting**

see also "Design with Metal Insets" under Geometry / Geometric Construction;
"Calligraphy" under Arts / Visual Arts; and paper decoration/border ideas under Arts /

- ☐ Posture Ⓜ
- ☐ Pencil Grip Ⓜ
- ☐ Writing on the Line Ⓒ Ⓜ
- ▼ ☐ Formation of Letters Ⓒ Ⓜ
  - ▼ ☐ Cursive

    by initial stroke
    - ☐ i, j, p, r, s, t, u, w Ⓜ
    - ☐ a, c, d, g, o, q Ⓜ
    - ☐ e, l, b, h, k, f Ⓜ
    - ☐ m, n, v, x, y, z Ⓜ
  - ☐ Print Ⓒ

    cf. sassoon montessori print
  - ☐ Joining Letters Ⓜ
  - ☐ Capital Letters Ⓒ Ⓜ
- ☐ Handwriting Analysis of Child's Work Ⓜ

  used for planning handwriting lessons

▼ ☐ **Writing Skills**

see also "Calligraphy" under Arts / Visual Arts; "Bookmaking" under Arts / Crafts

- ☐ Choosing an Illustration Ⓒ Ⓜ

  see also Arts / Visual Arts
- ☐ Using a Mind Map Ⓜ
- ☐ Creating a Title and Caption Ⓒ Ⓜ
- ☐ Descriptive Paragraphs Ⓒ Ⓜ
- ☐ Organizing Paragraphs Ⓒ Ⓜ

  topic sentence, details, indentation
- ☐ Starting with a Hook Ⓜ
- ☐ Conventions for Writing Dialogue Ⓜ
- ☐ Sentence Structure & Style Ⓜ

  see also "Style" under Language / Writing / Skills
- ▼ ☐ Narrative Writing
  - ☐ Narrator Ⓒ Ⓜ

    see "Personal Pronouns" under Language / Language Conventions / Parts of
    Speech; first person, second person, third person
  - ☐ Setting Ⓒ Ⓜ

    setting affects the mood
  - ☐ Character Ⓒ Ⓜ

    process of characterization; main types of characters

- Plot C M
  elements of plot
- Actions Can Reveal Thoughts/Feelings C M
- ▼ Research Process
  - Meaningful Question C M
  - Multiple Sources C M
  - Taking Notes C M
    e.g. notecards
  - Organizing Notes into an Outline C M
    see also "Using a Mind Map" under Language / Writing Skills; for possible models, see also "Question & Answer Game" and "Body Function Material" under Biology / Zoölogy; Timeline under History; "The Fundamental Needs of Human
- Initial Drafting C M
- Editing & Proofreading C M
  3-part editing is author, friend, adult
- Publishing C M
  home letters, emails, newsletter, website, bulletin board posts, public speaking/ performance, visual art
- Keyboard Typing C
- ▼ Forms of Writing
  - Recording Works after Completion M
  - Simple Friendly Letters C M
    heading, salutation, closing, signature
  - Stories C M
    e.g. mystery, love, horror, fantasy, science fiction, historical, sequels/alternative
  - Informative/Explanatory Writing C M
    see also Language / Writing Skills; "Pictorial Graphs" under Math / Numbers & Number Sense; "Conjunction" under Language / Language Conventions / Parts of
  - Persuasive Pieces (Opinion/Essay) C M
  - Poetry Writing Activities C M
    see also "Poetry" under Language
  - ▼ Other Forms of Writing
    see also genres under Language / Literature; and Drama under Arts / Performing Arts
    - Lists M
      groceries, supplies, wish list, vacation ideas, landmarks, etc.
    - Schedules M
    - Acrostics M
    - Comment Card M
    - Journaling (e.g. Gratitude, Weather, etc.) M
    - Cartoon Strip M
    - Navigation Directions M

- ☐ Riddles Ⓜ
- ☐ Interesting Facts Ⓜ
- ☐ Summaries Ⓜ
- ☐ Quizzes Ⓜ
- ☐ Thank You/Gratitude Notes Ⓜ
- ☐ Eulogy Ⓜ
- ☐ Addressing and Stamping an Envelope Ⓜ
  to politicians, diplomats, companies, pen-pals, family, authors, celebrities, etc.
- ☐ Spin Wheel/Wonder Wheel Ⓜ
- ☐ Advertisements Ⓜ
- ☐ Instructional/How-To Ⓜ
  how to do a work, game rules, etc.
- ☐ Review Ⓜ
- ☐ Business Letters Ⓜ
- ☐ Parody Ⓜ
- ☐ Allegory Ⓜ

▼ ☐ Literary Techniques

see also "Sayings & Phrases" under Language / Spoken Language; see also "Nomenclature for Literary Discussion" under Language / Spoken Language / Listening & Responding / Read Aloud & Narration

- ☐ Antithesis Ⓜ
- ☐ Personification Ⓒ Ⓜ
- ☐ Metaphor Ⓒ Ⓜ
- ☐ Simile Ⓒ Ⓜ
- ☐ Euphemism Ⓜ
- ☐ Hyperbole Ⓜ
- ☐ Apposition Ⓜ
- ☐ Oxymoron Ⓜ
- ☐ Paradox Ⓜ
- ☐ Alliteration Ⓜ
- ☐ Assonance Ⓜ
- ☐ Onomatopeia Ⓜ
- ☐ Repetition Ⓜ

▼ ☐ Style

see also "Sentence Structure & Style" under Language / Writing / Skills

- ☐ Enrichment of Vocabulary Ⓜ

  see also "Using a Thesaurus for Diction" under Language / Language Conventions / Reference Skills

- ☐ Using Grammar Symbols & Logical Analysis Material for Style Ⓜ
- ☐ Analyzing Style of an Author Using Grammar Symbols Ⓜ
- ☐ Grammar Symbols & Logical Analysis Material Used for Own Writing Ⓜ
- ☐ Writing in Different Styles Ⓜ

▼ ☐ Spoken Language

  ▼ ☐ Listening & Responding

- ☐ Participating in Discussions Ⓒ Ⓜ

  e.g. book discussions, community meetings, impromptu discussion of displayed

  ▼ ☐ Read-Alouds & Narration

- ☐ Retelling a Read-Aloud Verbally Ⓒ

  communicating details & key ideas

- ☐ Responding to a Read-Aloud Artistically Ⓒ

  see also Visual & Performing Arts, Crafts, under Arts; see Music; see Poetry under Language

- ☐ Making Connections Between Readings Ⓒ
- ☐ Putting Illustrations in Order Ⓒ
- ☐ Describing an Illustration from Memory Ⓒ

  see also Arts / Visual Arts

  ▼ ☐ Referring to the Text in Answering Questions

- ☐ Questions of Author's Intent Ⓒ
- ☐ Questions of Character Motivation Ⓒ
- ☐ Questions of Cause & Effect Ⓒ
- ☐ Making Predictions Ⓜ

- ☐ Responding to Nonfiction Read Alouds (Follow-up Work) Ⓒ Ⓜ

  see also "Topical Timelines" under History / History Timelines; "Mind Map" under Language / Writing / Writing Skills

- ☐ Nomenclature for Literary Discussion

  see also "Literary Techniques" under Language / Writing ; "Nomenclature for a Book" and "Nomenclature for a Story" under Language / Literature; "Nomenclature for Drama" under Arts / Performing Arts; also "Setting", "Character", and "Plot" under Language / Writing / Writing Skills / Narrative Writing

▼ ☐ Speech

  see also "Poetry" under Language / Writing / Forms; and Drama activities under Arts / Performing Arts / Drama; and Singing activities under Music

- ☐ Dramatic Interpretation Ⓜ
- ☐ Oral Presentations Ⓒ Ⓜ

  clear communication

- ☐ Speeches for Various Occasions Ⓜ

  graduations, birthdays, performances, holidays, etc.

- ☐ Debate & Trial Ⓜ
- ☐ Parliamentary Debate Ⓜ

- ▼ ☐ Sayings & Phrases
  - ● ☐ Common Idioms, Phrases, & Proverbs C M
    e.g. "a place for everything, and everything in its place"
- ▼ ☐ Literature
  see also "Poetry" under Language; "Drama" under Arts / Performing Arts
  - ● ☐ Nomenclature for a Book C M
    author, illustrator, front cover, back cover, spine
  - ● ☐ Nomenclature for a Story C M
    narrator, dialogue, hero, heroine, setting, character, and plot
  - ▼ ☐ Nonfiction Genres
    - ● ☐ History C M
    - ● ☐ Biographies, Autobiographies, Memoirs C M
    - ● ☐ Instructional C M
      cookbooks, crafts, health, gardening, sports, hobbies, home maintenance, pet care, coding, personal organization
    - ● ☐ Informational C M
      includes children's books on sports, animals, etc.
    - ● ☐ Fine Arts C M
      poetry, music, theater, visual arts
    - ● ☐ Science C M
    - ● ☐ Humor & Commentary A
    - ● ☐ Travel Writing A
    - ● ☐ Journalism A
      often with interviews
    - ● ☐ Philosophy & Religion A
    - ● ☐ Academic C M
    - ● ☐ Reference C M
  - ▼ ☐ Fiction Genres
    - ▼ ☐ Folklore
      - ● ☐ Fable C M
      - ● ☐ Fairy Tales C M
      - ● ☐ American Tall Tales C
        John Bunyan, John Henry, etc.
      - ▼ ☐ Myths
        - ● ☐ Mythology of Ancient Greece and Rome C
        - ● ☐ Norse Mythology C
        - ● ☐ Sources of English Names of Days C M
    - ● ☐ Mystery M
    - ● ☐ Historical Fiction M

- ☐ Adventure & Survival Ⓜ
- ☐ Fantasy Ⓜ
- ☐ Science Fiction Ⓜ
- ☐ Horror Ⓐ
- ☐ Romance Ⓐ
- ☐ Western Ⓐ
- ☐ Magical Realism Ⓐ
- ☐ Realist Ⓐ
- ☐ History of Literature Ⓜ

  see also History Timelines under History

▼ ☐ Poetry

see also "Poetry Writing Activities" under Language / Writing / Forms of Writing

- ☐ Reciting Poems Ⓒ Ⓜ
- ☐ Introducing Poetry Books Ⓒ Ⓜ
- ▼ ☐ Meters
  - ☐ Iambic Ⓜ
  - ☐ Trochaic Ⓜ
  - ☐ Dactylic Ⓜ
  - ☐ Anapestic Ⓒ Ⓜ
  - ☐ Amphibraic Ⓜ
  - ☐ Spondee Ⓜ
- ☐ Kinds of Rhymes Ⓜ
- ▼ ☐ Rhyming Poems
  - ☐ Couplet Ⓜ
  - ☐ Quatrain Ⓜ
  - ☐ Limerick Ⓒ Ⓜ

    see also "Anapestic" under Forms of Language / Poetry / Meters
- ▼ ☐ Non-Rhyming Poems
  - ☐ Cinquain Ⓜ
  - ☐ Haiku Ⓜ
  - ☐ Tonka Ⓜ
  - ☐ Diamonte Ⓜ
- ▼ ☐ Other Forms of Poems
  - ☐ Weathergram Ⓜ
  - ☐ Haibun Ⓜ
  - ☐ Paradelle Ⓜ

- ☐ Villanelle Ⓜ
- ☐ Sonnet Ⓜ
- ☐ Sestina Ⓜ
- ☐ Core Poems for Read Aloud Ⓒ
  traditional & contemporary

▼ ☐ Language Conventions
  Word Study, Grammar, Syntax, etc.

  ▼ ☐ Word Study
  - ☐ Suffixes Ⓒ Ⓜ
  - ☐ Word Roots Ⓒ Ⓜ
    e.g. vision, visible, visualize
  - ☐ Prefixes Ⓒ Ⓜ
  ▼ ☐ Classified Suffixes
    meaning of suffixes
    - ☐ er, or Ⓒ Ⓜ
    - ☐ ly Ⓒ Ⓜ
    - ☐ less Ⓒ
  - ☐ Compound Words Ⓒ Ⓜ
  - ☐ Word Families Ⓜ
  ▼ ☐ Classified Prefixes
    meaning of prefixes
    - ☐ "re" meaning again Ⓒ
    - ☐ "un" meaning not Ⓒ
    - ☐ "dis" meaning not Ⓒ
    - ☐ "un" meaning opposite or reversing Ⓒ
    - ☐ "dis" meaning opposite or reversing Ⓒ
  - ☐ Synonyms
    see also "Verb Command Cards" under Parts of Speech / The Verb
  - ☐ Antonyms Ⓒ Ⓜ
  ▼ ☐ Homonyms
    same spelling or same pronunciation; different meaning
    ▼ ☐ Homophones Ⓒ Ⓜ
      same pronunciation, different spelling
      - ☐ there/their/they're Ⓒ
      - ☐ your/you're Ⓒ
      - ☐ its/it's Ⓒ
      - ☐ here/hear Ⓒ
      - ☐ to/too/two Ⓒ Ⓜ

- ☐ Homographs/Heteronyms 🅜

  same spelling, different pronunciation & meaning

▼ ☐ Written Elements

can be examined in the context of writing or of reading

- ☐ End Punctuation 🅒 🅜

  periods (see "Subject & Predicate"), question marks, exclamation points (see "The Interjection" under Parts of Speech)

- ☐ Commas 🅒 🅜

  letter greetings & closings; dates; between city, state; after 'yes' or 'no'; items in a

- ☐ Quotation Marks for Speech 🅒 🅜

- ☐ Contractions 🅒 🅜

  I'm, can't, isn't, etc.

- ☐ Apostrophes for Possession 🅒 🅜

  singular, plural

- ☐ Capitalization 🅒

  first word in a sentence, pronoun 'I', proper nouns, months, days of week, titles of people, addresses

- ☐ Abbreviations for Months, Days, Titles, & Addresses 🅒

  St., Rd. Ms., Mrs., Mr., Dr., U.S.A., ft., in., lb.

▼ ☐ Reference Skills

- ☐ Alphabetizing Words to the First Letter 🅒 🅜

- ☐ Alphabetizing Words to the Second Letter 🅒 🅜

- ☐ Using a Dictionary for Definitions & Usage 🅒 🅜

- ☐ Using a Dictionary for Spelling & Etymology 🅒 🅜

- ☐ Using a Thesaurus for Diction 🅒

- ☐ Using a Table of Contents & an Index 🅒

▼ ☐ Parts of Speech

  ▼ ☐ The Noun

  - ☐ Oral Introduction 🅜

  - ☐ Names Are Very Old 🅜

  - ☐ The Story of the Multitude 🅜

  - ☐ Noun Name and Symbol 🅒 🅜

  - ☐ Lists of Nouns 🅒 🅜

    ▼ ☐ Noun Number (Singular & Plural)

    - ☐ Oral Introduction 🅜

    - ☐ Card Work 🅜

    - ☐ Spelling Changes for Plural 🅒 🅜

    ▼ ☐ Noun Gender

    - ☐ Oral Introduction 🅜

- ☐ Masculine & Feminine Ⓜ
- ☐ Gender & Young Ⓜ
- ▼ ☐ Classification of Nouns
  - ☐ Proper & Common Nouns Ⓒ Ⓜ
  - ☐ Concrete & Abstract Nouns Ⓒ Ⓜ
  - ☐ Material & Collective Nouns Ⓜ
  - ☐ Noun Classification Chart Ⓒ Ⓜ
- ▼ ☐ The Article
  
  n.b. articles are now considered a special kind of adjective, cf. determiners
  - ☐ Oral Introduction Ⓒ Ⓜ
  - ☐ Article Grammar Box Ⓒ Ⓜ
  - ☐ Definite and Indefinite Articles Ⓒ Ⓜ
- ▼ ☐ The Adjective
  - ☐ Oral Introduction Ⓒ Ⓜ
  - ☐ Adjective Grammar Box Ⓒ Ⓜ
  - ☐ Noun Family Chart Ⓜ
  - ☐ Adjective Transposition Ⓜ
  - ☐ Adjective Command Cards Ⓒ Ⓜ
  - ▼ ☐ Classification of Adjectives
    
    superlative, comparative, positive
    - ☐ Box IIIF Ⓒ Ⓜ
    - ☐ Box IIIG Ⓒ Ⓜ
- ▼ ☐ The Verb
  
  for Action & Auxiliary, Regular & Irregular, and Tenses, see Language / Language Conventions / Parts of Speech / Verb Tenses
  - ☐ Oral Introduction Ⓒ Ⓜ
  - ☐ Verb Grammar Box Ⓒ Ⓜ
  - ☐ Impressionistic Chart of Noun Family & Verb Ⓜ
  - ☐ Verb Transpostion Ⓜ
  - ☐ Verb Command Cards & Synonyms Ⓒ Ⓜ
- ▼ ☐ The Preposition
  - ☐ Oral Introduction Ⓜ
  - ☐ Preposition Grammar Box Ⓜ
  - ☐ Transpostion Ⓜ
  - ☐ Preposition Command Cards Ⓜ
- ▼ ☐ The Adverb
  - ☐ Oral Introduction Ⓒ Ⓜ

- ☐ Adverb Grammar Box `C` `M`
- ☐ Adverb Transpostion `M`
- ☐ Adverb Command Cards `C` `M`

▼ ☐ The Pronoun

see also "Personal Pronouns" under Parts of Speech

- ☐ Oral Introduction `C` `M`
- ☐ Grammar Box `C` `M`
- ☐ Pronoun Command Cards `C` `M`

▼ ☐ The Conjunction

- ☐ Oral Introduction `C` `M`
- ☐ Conjunction Grammar Box `C` `M`
- ☐ Transposition `M`
- ☐ Conjunction Command Cards `C` `M`
- ☐ Subordinating & Coordinating Conjuctions `C`

▼ ☐ The Interjection

- ☐ Oral Introduction `M`
- ☐ Grammar Box `M`

- ☐ Personal Pronouns `C` `M`

see also "Personal Pronouns" under Sentence Structure (Logical Analysis)

▼ ☐ Verb Tenses

requires "Personal Pronouns"

- ☐ Present Tense `C` `M`
- ☐ Past Tense `C` `M`

including regular and irregular (strong and weak) verbs

- ☐ Auxiliary Verbs `C` `M`

auxiliary vs. action verbs

- ☐ Future Tense `C` `M`
- ☐ Present Perfect Tense `C` `M`
- ☐ Past Perfect Tense `C` `M`
- ☐ Future Perfect Tense `C` `M`

▼ ☐ Other Verb Aspects

- ☐ Infinitive & Mood of the Verb `M`
- ☐ Negative Form of the Verb `M`
- ☐ Transitive & Intransitive Verbs `M`
- ☐ Reflexive Verbs & Pronouns `M`

requires some experience with logical analysis of sentence structure

- ☐ Active & Passive Voice `M`

requires logical analysis of sentence structure

- Sentence Structure (Logical Analysis)
  - Types of Sentences C
    declarative, interrogative, imperative (see also "Elliptical Construction" under Simple Sentence), exclamatory (see also "Interjection" under Parts of Speech)
  - Simple Sentences
    one subject and predicate
    - Subject & Predicate C M
      n.b. verb is an incomplete/simple predicate; verb and object are a complete
    - Direct Object M
    - Adverbial Modifiers M
    - Indirect Object M
    - Elliptical Construction M
    - Inverted Order M
    - Personal Pronouns M
    - Attributives (Adjectival Modifiers) M
    - Appositive M
    - Long Simple Sentence M
    - Further Analysis of Simple Sentences
      - Analysis with Action Verb (with Chart A) M
      - Noun of Direct Address (with Chart A) M
      - Analysis (with Arrows & Circles with Names Only) M
      - Linking Verb (with Chart A) M
      - Writing Analysis on Paper M
      - Modal Verbs (Arrow Material) M
      - Verbal Nouns/Gerunds (with Chart A) M
      - Participles (with Chart A) M
      - Infinitives M
  - Complete Sentences vs. Fragments C
    see also "Subject & Predicate" under Simple Sentence
  - Compound Sentences C M
    more than one subject or predicate
  - Complex Sentences
    contains a subordinate clause
    - Adjectival Clause C M
    - Adverbial Clause M
    - Direct Object Clause M
    - Indirect Object Clause M
    - Subject Clause M

- ▼ ☐ Further Analysis of Complex Sentences
  - ● ☐ Analysis with Chart B Ⓜ
  - ● ☐ Analysis (with Arrows & Circles with Names Only) Ⓜ
  - ● ☐ Writing Analysis on Paper Ⓜ
  - ● ☐ Analysis of Compound Complex Sentences Ⓜ
  - ● ☐ Dependency of Clauses Ⓜ
  - ● ☐ Analysis of Dependency with Chart C Ⓜ
  - ● ☐ Conjunctions & Subordinate Clauses with Chart D Ⓜ
- ● ☐ Academic Words
  e.g. compare, infer, describe
- ▼ ☐ History
  see also "Time" under Measurement in Math
  - ● ☐ The Black Strip Ⓜ
  - ● ☐ The Great Story: The Coming of Human Beings Ⓜ
  - ● ☐ The Hand Timeline Ⓜ
  - ● ☐ The Clock of Eras Ⓜ
  - ● ☐ First Timeline of Human Beings Ⓜ
  - ● ☐ The Fundamental Needs of Human Beings Ⓜ
  - ● ☐ The Second Timeline of Human Beings Ⓜ
  - ● ☐ BCE/CE timeline Ⓜ
  - ● ☐ Timeline of Child's Life Ⓜ
  - ▼ ☐ History Timelines Ⓒ Ⓜ
    With stories and books.
    - ▼ ☐ World Religions (Geography, Symbols, Figures) Ⓒ
      - ● ☐ The history of Judaism, Christianity, and Islam Ⓒ
    - ▼ ☐ Early Exploration & Settlement Ⓒ
      - ● ☐ Columbus' voyage, the Pilgrims, and July 4th "Independence Day" Ⓒ
      - ● ☐ The Conquistadors, and the English settlers in Virginia, Massachusetts, and slavery on Southern plantations. Ⓒ
      - ● ☐ Spanish exploration and settlement Ⓒ
      - ● ☐ The search for the Northwest Passage Ⓒ
    - ▼ ☐ American History Ⓒ
      - ● ☐ Famous U.S. presidents. Ⓒ
      - ● ☐ The American flag and famous landmarks. Ⓒ
      - ▼ ☐ The American Revolution Ⓒ
        - ● ☐ Location of the 13 colonies. Ⓒ
        - ● ☐ The story of the American Revolution. Ⓒ

- ☐ The story of the American Revolution. C
- ☐ The geography of the 13 colonies, and the history of New England, Middle, and Southern Colonies C
- ☐ The story of the Constitution. C
- ☐ The War of 1812. C
- ▼ ☐ Westward Expansion C
  - ☐ The geography and figures of early American expansion past the Appalachians. C
  - ☐ Further expansion Westward and effects on Native Americans. C
- ☐ Major figures of the Civil War, and its story. C
- ☐ History of immigration and modern citizenship. C
- ☐ Suffragettes, civil rights leaders, and other activists for freedom. C
- ☐ Topical Timelines M
- ▼ ☐ Ancient Civilizations C M
  - ▼ ☐ Early World Civilizations C
    - ☐ Mesopotamia. C
    - ☐ Sumer M
    - ☐ Important facts about Ancient Egypt. C M
  - ☐ Ancient Greece, the events, communities, and great figures. C M
  - ▼ ☐ Ancient Rome C M
    - ☐ Geography of Mediterranean C
    - ☐ Early history and republic C
    - ☐ Figures, symbols, and events of the Empire C
    - ☐ Rome's decline and fall C
    - ☐ Eastern Roman Empire C
  - ▼ ☐ Early Asian Civilizations C
    - ☐ The history, rivers, religions, and traditions of China (Yellow River), India (Indus Valley), and Japan. C M
  - ▼ ☐ Amerindian Peoples, Past & Present C
    - ☐ At least one Native American people and their past and present way of life. C
    - ☐ The story of the first peoples arriving in North America. C
    - ☐ The Maya, Aztecs, and Inca C M
    - ☐ Inuits, Anasazi, and Mound Builders as early migrants C
    - ☐ Native American peoples and ways of life in the Southeast, Southwest, and Woodlands C
  - ▼ ☐ Vikings C

- ▾ ☐ Vikings Ⓒ
  - ● ☐ The geography, historical figures, and way of life Ⓒ
  - ● ☐ Medieval Europe Ⓜ
- ▾ ☐ Modern Mexico Ⓒ
  - ● ☐ The geography and culture of Mexico. Ⓒ
- ● ☐ Modern Japan Ⓒ
- ● ☐ History Question Charts Ⓜ
- ● ☐ Three Phases of History Ⓜ
- ▾ ☐ Migrations Ⓜ
  - ● ☐ Breaking the Wall Ⓜ
  - ● ☐ Clearing the Forest Ⓜ
  - ● ☐ The Triplet Chart Ⓜ
  - ● ☐ Billiard Ball Ⓜ
  - ● ☐ Horde Ⓜ
  - ● ☐ Infiltration and Fusion Ⓜ
- ▾ ☐ [In Progress] Geography & Physics
  - ▾ ☐ Human Geography
    - ● ☐ Map: Town and State
    - ● ☐ Map: The United States of America
    - ▾ ☐ Economic Geography
      - ● ☐ Some foods come from farms as crops, protected from weeds and pests, harvested, kept fresh, packages, and transported for purchase and consumption.
        Where does our bread come from?
    - ● ☐ Map: Canada, the USA, Mexico, and Central America
    - ● ☐ Map: Countries of Central America and the Carribean
    - ● ☐ Map: Capitals of the Countries of North America.
    - ● ☐ Map: 50 State Capitals
    - ● ☐ Map: China, India, Japan
    - ● ☐ Map: Territories of the United States
    - ● ☐ South America: Peoples, Nations, History
    - ● ☐ Countries of Africa
    - ● ☐ Countries of Europe
    - ● ☐ Countries of Asia
    - ● ☐ Countries of Oceania
    - ▾ ☐ Canada

- [ ] Provinces
- [ ] Major cities: Montreal, Quebec, Toronto, Vancouver
- [ ] Physical Geography
  - [ ] Spatial Sense
    - [ ] Finds on a map east, west, north, south.
    - [ ] Locates the Equator, Northern Hemisphere, Southern Hemisphere, North and South Poles.
    - [ ] Familiar with keys, or legends, and their contents.
    - [ ] Measures straight line distances using bar scale.
    - [ ] Uses an atlas to find information.
  - [ ] Terminology
    - [ ] Familiar with terms peninsula, harbor, bay, island
    - [ ] Familiar with terms coast, valley, prairie, desert, oasis
    - [ ] Familiar with terms boundary, channel, delta, isthmus, plateau, reservoir, strait
    - [ ] Familiar with river terms: source, mouth, tributary, branches, drainage basin
  - [ ] Identifies and locates seven continents.
  - [ ] Five oceans: Pacific, Atlantic, Indian, Arctic, Southern.
  - [ ] Map: the Great Lakes
  - [ ] Map: the Gulf of Mexico, the Caribbean Sea, and the West Indies
  - [ ] Map: Appalachian and Rocky Mountains
  - [ ] Rivers of North America
  - [ ] Rivers of the World
    - [ ] Asia: Ob, Yellow (Huang He), Yangtze (Chang Jiang), Ganges, Indus, Tigris, Euphrates
    - [ ] South America: Amazon, Parana, Orinoco
    - [ ] North America: Mississippi and major tributaries, Mackenzie, Yukon
    - [ ] Australia: Murray-Darling
    - [ ] Europe: Volga, Danube, Rhine
    - [ ] Africa: Nile, Niger, Congo
  - [ ] Mountain Ranges of North America
  - [ ] Seasons & Weather
    - [ ] Familiar with the four seasons and accompanying weather.
    - [ ] Knows the Sun is a source of light and warmth.
  - [ ] Familiarity with the water cycle.

- ☐ Familiarity with kinds of clouds.
- ▼ ☐ The Earth
  - ☐ Identifies the North Pole, South Pole, and Equator.
  - ☐ Identifies the layers of the earth: crust, mantle, core.
  - ☐ Understands volcanoes and geysers.
  - ☐ Familiar with formation and characteristics of different rocks: metamorphic, igneous, sedimentary.
  - ☐ Familiar with important minerals: quartz, gold, sulfur, coal, diamond, iron ore.
  - ▼ ☐ Stewardship
    - ☐ Understands that some natural resources are limited, and ways we can conserve them.
    - ☐ Familiar with materials that can be recycled, the danger of pollution, and ways to reduce pollution.
- ▼ ☐ Physics
  - Including Astronomy
  - ▼ ☐ Astronomy
    - ☐ Knows the sun is a source of energy, light, and heat.
    - ☐ Knows the moon's phases (full, half, crescent, new)
    - ☐ Identifies the nine planets.
    - ☐ Stars: familiar with the constellation the Big Dipper, and knows the sun is a star.
    - ▼ ☐ Familiar with planet Earth's motions and their effects.
      - ☐ The earth revolves around the sun, and rotates, which makes days, sunrise and sunset.
      - ☐ When it is day where you are, it is night for people on the other side of the globe.
      - ☐ Sunrise is in the east and sunset in the west.
      - ☐ The seasons are caused by the earth's orbit and tilt of axis.
    - ☐ Familiar with the "Big Bang" as a theory of the beginning of the universe.
    - ☐ Understands the scale of the universe is almost unimaginable.
    - ☐ Knows what a galaxy is, and familiar with Andromeda and the Milky Way.
    - ☐ Knows the concept of gravity, gravitational pull, and aware of tides and black holes.
    - ☐ Familiar with asteroids, comets, meteors, including Halley's Comet.
    - ☐ Aware of types of eclipses.
    - ☐ Aware of various stars and constellations.

- ☐ Aware of various stars and constellations.
- ☐ Able of orienteering using the North Star and the Big Dipper.
- ☐ Aware of the history of space observation, including the use of telescopes.
- ☐ Aware of the history of rockets, satellites, and unmanned and manned space flight.
- ☐ Familiar with the Apollo 11 lunar landing.
- ☐ Aware of the space shuttle program.

▼ ☐ Matter
  - ☐ Understands basic concept of atom.
  - ☐ Names and gives examples for three states of matter: solid, liquid, gas.
  - ☐ Familiar with water's three states of matter.

▼ ☐ Electricity
  - ☐ Familiar with static electricity.
  - ☐ Identifies parts of a basic electric circuit: battery, wire, bulb/buzzer, and switch.
  - ☐ Categorizes conductive and non-conductive materials.
  - ☐ Knows electrical safety rules.

▼ ☐ Magnetism
  - ☐ Understands that some forces, like magnets, work without being seen.
  - ☐ Classifies materials as magnetic or not.
  - ☐ Poles of a magnet.
  - ☐ Familiar with lodestones, magnetic poles seeking north and south, magnetic field, attraction and repelling, and iron in magnets.
  - ☐ Use of magnetized needle in compass.

▼ ☐ Machines
  - ☐ Simple machines: levers, pulleys, wheel-and-axle, gears, wedge, screw, inclined plane, and friction
  - ☐ Compound machines, such as: scissors, pencil sharpener, bicycle, wheelbarrow, etc.

▼ ☐ Light & Optics
  - ☐ Knows that light travels exceedingly fast.
  - ☐ Knows that light travels in straight lines.
  - ☐ Aware of objects being transparent, translucent or opaque.
  - ☐ Aware of mirrors being plane, convex, or concave.
  - ☐ Aware of some uses of mirrors, as in telescopes and some microscopes.

- ☐ Knows that white light is made up of a spectrum (cf. prism).
- ☐ Knows that light can be bent with lenses: magnifying glass, microscope, camera, telescope, binoculars.

▼ ☐ Sound

- ☐ Knows that sound is caused by an object vibrating rapidly.
- ☐ Aware that sound can travel through solids, liquids, and gases.
- ☐ Aware that sound waves are much slower than light waves.
- ☐ Understands physical qualities of sound vibrations: pitch, intensity
- ☐ Knows that the human voice comes from the larynx, and aware of the effect of the length and thickness of the vocal cords.
- ☐ Aware of protective measures for your hearing.

▼ ☐ Science Biographies

- ☐ Isaac Newton, Rachel Carson, George Washington Carver, Abbe Cleveland
- ☐ Galileo, Shi Shen, Gan De, & Wu Xian, Jacque Cousteau, Gordon Gould, Archimedes
- ☐ Dmitiri Mendeleev, John James Audubon, Marie Tharp, Louis Pasteur
- ☐ Petrus Peregrinus de Maricourt, Elijah McCoy, Gregor Mendel, John Muir, Edward D. Cope & Othniel C. Marsh, Evangelista Torricelli, Benjamin Franklin, Tetsuya Fujita & Alan Pearson

▼ ☐ Biology

   ▼ ☐ The Story of the Coming of Life with the Timeline of Life Ⓜ

- ☐ Scientists analyze and interpret fossils (bones, amber, traces, impressions) for evidence of how organisms and environments have changed over time. Ⓒ

   ▼ ☐ Botany Ⓒ Ⓜ

      ▼ ☐ Needs of Plants Ⓒ Ⓜ

- ☐ Basic Needs Ⓒ Ⓜ
  Warmth, Light, Water
- ☐ Plants Grow toward Light Ⓜ
- ☐ Further Needs of Plants Ⓒ Ⓜ
  Minerals

      ▼ ☐ The Leaf Ⓒ Ⓜ

- ☐ Main Function Ⓒ Ⓜ
  Producing Glucose as Food
- ☐ Arrangements Ⓜ
- ☐ Stomata Ⓜ
- ☐ Leaves Give Off Water Ⓜ
- ☐ Leaves Give Off Oxygen Ⓜ

- Parts of the Leaf M
- Varieties of Leaves M
  - Different Venations M
  - Simple and Compound Leaves M
  - Simple Classification M
  - Varieties of Leaves by Other Functions M
    - Two kinds of plants: deciduous and evergreen. C
- The Root C M
  - Main Function M
  - Roots Grow Around Objects M
  - Parts of the Root M
  - Collaboration between Roots and Leaves M
  - Roots Hold the Plant to the Earth M
  - Roots Help Prevent Erosion M
  - Two Main Types of Roots M
  - Other Sensitivities of the Root M
  - Roots Grow toward the Ground M
  - Varieties of Root M
- The Stem C M
  - Main Function M
  - Two Main Kinds of Stems M
  - Parts of a Wood Stem M
  - How Water is Moved through the Stem M
  - Varieties of Stems M
    - Underground Stems M
    - Erect and Procumbent Stems M
    - Climbing Stems M
- The Flower C M
  - Main Function C M
  - Parts of a Flower M
  - Parts of the Pistil M
  - Parts of the Stamen M
  - Varieties According to Flower Parts M
    - Complete, Incomplete M
    - Perfect, Imperfect M

- ☐ Position of the Ovary in Relation to the Flower Parts M
- ☐ Simple Classification M
- ▼ ☐ Specialization of Flowers to Ensure Pollination M
  - ☐ Flower of Insects M
  - ☐ Who Does the Advertizing and How? M
  - ☐ Another Way to Advertize M
  - ☐ Other Ways Pollination Occurs M
  - ☐ Flowers: Follow-Up Activities M
- ▼ ☐ Fruit C M
  - ☐ Main Function of the Fruit C M
  - ☐ Two Kinds of Fruit M
  - ☐ Parts of the Succulent Fruit M
  - ☐ Kinds of Succulent Fruits, Based on Parts M
  - ☐ Kinds of Succulent Fruits, Based on Flowers M
  - ☐ Kinds of Dry Fruits M
- ▼ ☐ The Seed C M
  - ☐ Main Function and Parts of Seeds C M
    Seeds as food for new plant
  - ☐ Two Kinds of Seeds M
  - ☐ Seed Dispersal C M
- ☐ Nomenclature Cards M
- ☐ Botany Command Cards M
- ▼ ☐ Zoölogy C M
  - ▼ ☐ Animal Stories C M
    - ☐ Introduction M
    - ☐ Reading Activity with Animal Story Material M
      Life cycles; including insects ("helpful" and "harmful"; "social" and "solitary"; body part names); animals live in habitats they are suited to. C
    - ☐ Sorting Activity with Animals' Foods M
  - ▼ ☐ Question and Answer Game C M
    - ☐ Describing an Animal from Animal Stories M
    - ☐ Classifying Animal Pictures with Questions and Answers M
  - ▼ ☐ Animal Exploration Activities C M
    - ☐ Vertebrates & Invertebrates C M
    - ☐ Cold-blooded vs. Warm-blooded C
    - ☐ Metamorphoses: Frogs, Butterflies, etc. C

- ▼ ☐ Body Functions of Animals **M**
  - Five classes of vertebrates and characteristics **C**
  - ● ☐ Matching Complete Text Cards **M**
  - ● ☐ Using Incomplete Text Cards **M**
- ▼ ☐ Scientific Classification **M**
  - ▼ ☐ Kingdom Vegetalia **M**
    - ● ☐ Classification - Presentation of Folders **M**
    - ● ☐ Classification - Alternative Presentation of Folders **M**
    - ● ☐ Classification - Book Work **M**
    - ● ☐ Classification - Genera **M**
    - ● ☐ Classification - Geneology of a Plant **M**
    - ● ☐ Tree of Classification - Kingdom Vegetalia **M**
  - ▼ ☐ Kingdom Animalia **M**
    - ● ☐ Classification - Presentation of Folders **M**
    - ● ☐ Classification - Geneology of an Animal **M**
    - ● ☐ Tree of Classification - Kingdom Animalia **M**
- ▼ ☐ The Human Body **C** **M**
  - ● ☐ Vaccinations. **C**
  - ● ☐ Taking care of your body means exercise/movement, cleanliness, healthy food, and rest. **C**
  - ● ☐ The Great River **M**
  - ▼ ☐ Cells comprise tissues, tissues comprise organs. **C**
    - ● ☐ Cell Types: Stem, Bone, Blood, Muscle, Fat, Skin, Nerve
  - ▼ ☐ Body systems: digestive, excretory, muscular, skeletal, nervous, and vision/hearing.
    - ▼ ☐ Vision and Hearing **C**
      - ● ☐ Parts of the eye (cornea, iris and pupil, lens, retina), optic nerve, farsighted, nearsighted **C**
      - ● ☐ Sound as vibration, outer ear, ear canal, eardrum, three tiny bones (hammer, anvil, and stirrup) pass vibrations to the cochlea, auditory nerve **C**
    - ● ☐ Digestive system: salivary glands, taste buds, teeth, esophagus, stomach, etc. **C**
    - ▼ ☐ Nervous system. **C**
      - ● ☐ brain, nerves **C**
      - ● ☐ spinal cord, reflexes, brain: medulla, cerebellum, cerebrum, cerebral cortex **C**
    - ● ☐ Circulatory system: heart, blood. **C**

- ☐ Circulatory system: heart, blood. `C`
- ▼ ☐ Muscular system. `C`
  - ☐ muscles `C`
  - ☐ involuntary and voluntary muscles `C`
- ☐ Digestive system: mouth, stomach. `C`
- ▼ ☐ Skeletal system. `C`
  - ☐ skeleton, bones, skull `C`
  - ☐ marrow, spinal column, vertebrae, ribs, rib cage, sternum, scapula, pelvis, tibia, fibula, broken bones, x-rays, musculoskeletal connections: ligaments, tendon (Achilles), cartilage `C`

▼ ☐ **Ecology** `C` `M`

- ▼ ☐ **Foundational Concepts** `C` `M`
  - ☐ Biotic, Abiotic `C` `M`
  - ☐ Producer, Consumer (Primary, Secondary, Tertiary), Decomposer `C` `M`
  - ☐ Herbivores, Carnivores, Omnivores `C` `M`
  - ☐ Symbiosis (Mutualism, Commensalism, Parisitism) `M`
- ▼ ☐ **Further Concepts** `C` `M`
  - ☐ Food Web `C` `M`
  - ☐ Seasonal changes affect ecosystems `C`
  - ☐ Animals can change their ecosystem directly (e.g. beavers, zebra mussels) `C`
  - ☐ Animals can change their ecosystem indirectly (e.g. disappearance of predators may lead to over-grazing and desertification) `C`
  - ☐ Plants can change their ecosystem (e.g. hyacinth, kudzu) `C`
  - ☐ Environment can affect variations in a species' traits for survival & reproduction `C`
- ▼ ☐ **Ecosystems** `C` `M`
  - ☐ Ocean `C`
    - fish, plankton, whales, oysters, and starfish
  - ☐ Tundra `C`
    - plants of small size, etc.
  - ☐ Tropical forest `C`
    - vines, epiphytes, etc.
  - ☐ Desert `C`
    - cactus, lizard, and scorpion
  - ☐ Underground `C`
    - fungi, moles, and worms
  - ☐ Meadow and Prairie `C`
    - wildflowers, grasses, and prairie dogs

- ☐ **Deciduous Forest** `C`
  oak trees, squirrels, raccoons, snails, and mice
- ☐ **Ponds, lakes, rivers, and streams** `C`
▼ ☐ **Stewardship** `C`
  - ☐ **Dangers to ocean life, including overfishing, pollution, oil spills** `C`
  - ☐ **Dangers to land ecosystems, including rainforest clearing, development, and pollution** `C`
  - ☐ **Sources of land, air, and water pollution sources: emissions, smog, industrial waste, farm run-off water** `C`
  - ☐ **Protective measures: conservation, sustainable farming, reforestation, recycling, etc.** `C`
- ☐ **Chart of Interdependencies** `M`
▼ ☐ **Arts**
  ▼ ☐ **Visual Arts** `C` `M`
    ▼ ☐ **Elements of Art** `C` `M`
      ▼ ☐ **Color** `C` `M`
        Observe color in works of art.
        - ☐ **Hue** `M`
        - ☐ **Secondary colors** `M`
        - ☐ **Tertiary colors** `M`
        - ☐ **Highlight** `M`
        - ☐ **Shadow** `M`
        - ☐ **Intensity** `M`
        - ☐ **Harmony** `M`
        - ☐ **Warm, cool, and complementary colors** `M`
      - ☐ **Line** `C` `M`
      - ☐ **Texture: describing by feel and sight, like rough, bumpy, etc.** `C` `M`
      - ☐ **Light and space** `C` `M`
        Observe light and space in artworks.
      - ☐ **Shape** `M`
      - ☐ **Form** `M`
      - ☐ **Texture** `M`
    ▼ ☐ **Principles of Design** `M`
      Observe how elements work together in artwork.
      - ☐ **Balance** `M`
      - ☐ **Movement** `M`
      - ☐ **Rhythm** `M`
      - ☐ **Emphasis** `M`

- ☐ Emphasis Ⓜ
- ☐ Harmony/unity Ⓜ
- ☐ Proportion Ⓜ
- ☐ Variety Ⓜ
- ☐ Kinds of Pictures Ⓒ
  - ☐ Portrait or self-portrait Ⓒ
  - ☐ Still Life Ⓒ
  - ☐ Mural Ⓒ
  - ☐ Landscape Ⓒ
- ☐ Drawing Ⓜ
  - ☐ Scribble art with labelling Ⓜ
  - ☐ Ten steps of gradation from black to white Ⓜ
  - ☐ Modified contour drawing Ⓜ
  - ☐ Drawing negative space Ⓜ
  - ☐ Drawing something upside-down Ⓜ
  - ☐ Drawing different types of lines Ⓜ
  - ☐ Color and line in student's work Ⓒ
  - ☐ Drawing a sphere Ⓜ
  - ☐ Seeing geometric shapes in an object to draw Ⓜ
  - ☐ Cross hatching Ⓜ
  - ☐ Stippling Ⓜ
  - ☐ Using a vanishing point Ⓜ
  - ☐ Using colored pencils Ⓜ
  - ☐ Using charcoal Ⓜ
- ☐ Calligraphy Ⓜ
- ☐ Painting Ⓜ
  - ☐ Mixing primary colors to make other colors Ⓒ
  - ☐ Using acrylic paints Ⓜ
  - ☐ Using watercolors: wet on wet, dry on dry, wet on dry, dry on wet Ⓜ
  - ☐ Using watercolors: layering, blending, lifting off Ⓜ
  - ☐ Dry brush (dry on dry) drawing techniques Ⓜ
- ☐ Clay Building Ⓜ
  - ☐ Coil pot Ⓜ
  - ☐ Pinch pot Ⓜ
  - ☐ Building a clay model Ⓜ

- ☐ Print-making M
- ☐ Collage M
- ▼ ☐ Sculpture C
  - ☐ Recognizeable sculptures within the United States C
  - ☐ Origami M
- ▼ ☐ Art Styles & Movements C M
  - ☐ Abstract Art C M
  - ☐ Impressionism M
  - ☐ Pointillism M
- ▼ ☐ Architecture C
  - ☐ Symmetry and line of symmetry C
  - ☐ Historical architectures C
- ▼ ☐ Prehistoric and Ancient Art C
  - ☐ Cave paintings C
  - ☐ Art of Egypt C
  - ☐ Art of Rome and Byzantium C
- ☐ Amerindian Art C
- ☐ Biographies and Works of Artists M
- ▼ ☐ Crafts M
  - ☐ Bookmaking M
  - ☐ Sewing M
  - ☐ Embroidery M
  - ☐ Braiding and knots M
  - ☐ Crochet & knitting M
- ▼ ☐ Performing Arts
  - ☐ Nomenclature for Drama C M
    actors, actresses, costumes, scenery, props, theater, audience, stage
  - ☐ Dramatic Productions M
  - ☐ Improvisation & Dramatic Games M
    see also "Dramatic Interpretation" under Language / Spoken Language / Speech
  - ☐ Readers Theater A
  - ☐ Skits M
    see also "Grace & Courtesy" under Life Skills
- ▼ ☐ [In Progress] Music
  - ▼ ☐ Elements of Music
    - ☐ Familiar with, through singing and playing, rhythm, melody, harmony, form, timbre, etc.

- ☐ Familiar with, through singing and playing, rhythm, melody, harmony, form, timbre, etc.
- ☐ Familiar with whole note, half note, and quarter note.
- ☐ Familiar with staff, treble clef, whole rest, half rest, quarter rest
- ☐ Familiar with C major, using "do re mi"
- ▼ ☐ Listening
  - ☐ Familiar with the form and sound of common instruments.
  - ☐ Familiar with several classic works.
- ▼ ☐ Composers
  - ☐ Defines a composer.
  - ☐ Familiar with Mozart and one of his works.
- ▼ ☐ Orchestra
  - ☐ Familiar with families: strings, brass, woodwinds, percussion.
  - ☐ Understands who the "conductor" is.
  - ☐ Familiar with string family: violin, viola, cello, double bass.
  - ☐ Familiar with percussion family: drums, snare, xylophone, wood block, maracas, cymbals, triangle, tambourine.
- ▼ ☐ Opera
  - ☐ Understands Opera combines music, singing, and acting.
  - ☐ Familiar with one opera.
- ▼ ☐ Ballet
  - ☐ Understands that ballet combines music and movement, and often story.
  - ☐ Familiar with one ballet.
- ▼ ☐ Jazz
  - ☐ Familiar with the history and character of jazz, and important figures.
- ▼ ☐ Songs
  - ☐ Familiar with, through singing, traditional children's songs.
- ☐ Keyboards
- ▼ ☐ Mathematics
  Including Logic, Measurement, Time
  - ☐ Story of Our Numerals Ⓜ
  - ▼ ☐ Numbers and Number Sense (Foundational)
    - ☐ Ordinal Language (1st - 10th) Ⓒ
      (remediation)
    - ▼ ☐ Teens & Tens
      (remediation)
      - ☐ Teens Quantities Ⓜ

- ☐ Teens Symbol C M
- ☐ Teens Quantity & Symbol United M
- ☐ Tens Quantity & Symbol C M
- ☐ Reading Numbers to 100 in Letters C
- ☐ Counting forward and backward up to 100 C
- ☐ Roman Numerals to XX C
- ☐ Ordinal Language (11th - 100th) C
  (remediation)
- ☐ Tallies C
- ☐ Number Lines with Positive Numbers C
- ☐ Pictorial Graphs C
- ☐ Terms: Dozen, Half-dozen, Pair C
- ☐ Comparing with <, >, & = C
- ▼ ☐ The Decimal System
  (remediation)
  - ▼ ☐ Introducing Decimal System (Quantity) M
    - ☐ More than 1 in Each Category M
  - ☐ Introducing Symbol C M
  - ☐ Linking Quantity & Symbol M
  - ☐ Exchanging C M
- ☐ Rounding to Nearest 10 & Nearest 100 C
- ▼ ☐ Wooden Hierarchical Material (WHM)
  - ▼ ☐ Introduction to Quantity and Language C M
    - ☐ Comparative Language "Greater than", "Most", etc. C
  - ☐ Geometric Shape and Families M
  - ▼ ☐ Introduction to Symbol C M
    - ☐ Reading Numbers to 1,000 in Digits and Letters C
    - ☐ Reading Numbers to 100,000 in Digits and Letters C
  - ☐ Symbol and Quantity M
- ▼ ☐ Large Bead Frame (LBF) Introduction
  - ☐ Counting M
  - ☐ Composing Numbers on Frame M
  - ☐ Writing on Notation Paper (No Zeroes) M
  - ▼ ☐ Composing & Writing; Writing & Composing (with Zeroes) C M
    - ☐ Writing Numbers to 100 in Digits C
    - ☐ Writing Numbers to 1,000 in Digits C

- - Writing Numbers to 100,000 in Digits C
- Extending Numerical and Symbolic Patterns C
- Commutative Law

  See "Commutative Law of Multiplication" under Multiplication
- Distributive Law

  See "Distributive Law" under Computation / Problem Solving & Equations
- Multiples
  - Concept of Multiples C M
  - Concept of Common Multiples M
  - Table E, Multiples 1-100 C M
    - Skip counting by 2, 3, 5, and 10, up to 100 C
  - Tables A, B M
  - Table C M
  - Lowest Common Multiple (LCM) M
- Bar Graphs C
- Recording Numeric Data; Identifying Lowest & Highest Values (Range). C
- Factors
  - Concept of Factors C M
  - Prime Factors of Numbers M
  - Prime Factors on the Peg Board M
  - Highest Common Factor (HCF) M
  - Finding HCF with Table C M
  - Finding Lowest Common Multiple (LCM) with Table C M
  - Finding LCM with Factor T M
- Divisibility
  - Divisibility by 2 M
  - Divisibility by 5 M
  - Divisibility by 25 M
  - Divisibility by 4 M
  - Divisibility by 8 M
  - Chart for Divisibility M
  - Divisibility by 3 M
  - Divisibility by 6 M
  - Divisibility by 9 M
  - Divisibility by 11 M
  - Divisibility by 7 M

- ☐ Divisibility Using Prime Factors Ⓜ
- ☐ Decomposing Numbers into Expanded Form

  see "Multiplication with LBF"; e.g. 365 = 300 + 60 + 5
- ☐ Perfect Squares to 100

  see Squares & Cubes of Numbers
- ☐ Square Root Sign √

  see Square Root
- ☐ Negative Numbers & Uses

  see Signed Numbers
- ☐ Number Lines with Positive & Negative Numbers

  see "Introduction to Signed Numbers"
- ☐ Line Graphs Ⓒ

▼ ☐ Fractions

  ▼ ☐ Introductory

  - ☐ Concept of the Fraction Ⓒ Ⓜ
  - ☐ Naming Fractions Ⓒ Ⓜ
  - ☐ Symbol & Notation Ⓒ Ⓜ
  - ☐ Nomenclature for Fractions Ⓒ Ⓜ

    numerator, denominator
  - ☐ Other Representations for Fractions Ⓜ

    rectangles/squares, triangles, etc.
  - ☐ Equivalence Ⓒ Ⓜ
  - ☐ Nomenclature for Equivalence Ⓜ

    raising, lowering
  - ☐ Mixed Numbers Ⓒ

    see "Multiplication by a Whole Number" under Fractions / Simple Operations
  - ☐ Comparing Like Fractions Using <, >, = Ⓒ
  - ☐ Percentages as Fractions

    see "Centesimal" & "Percentages" under Decimal Fractions

  ▼ ☐ Simple Operations

  - ☐ Addition with Like Fractions Ⓜ

    same denominators
  - ☐ Subtraction with Like Fractions Ⓜ

    same denominators
  - ☐ Multiplication by a Whole Number Ⓜ
  - ☐ Division of Fractions by Whole Numbers Ⓜ

  ▼ ☐ Adding & Subtracting Unlike Fractions

  - ☐ Adding Unlike Fractions Ⓜ
  - ☐ Subtracting Unlike Fractions Ⓜ
  - ☐ Equivalencies for Unlike Fractions (to Abstraction) Ⓜ

- ☐ Adding Unlike Fractions (to Abstraction) Ⓜ
- ☐ Adding Unlike Fractions Using LCM Ⓜ
  requires LCM; same procedure for subtracting
- ☐ Fractions as Part of a Set Ⓜ
- ▼ ☐ Multiplication & Division by a Fraction
  - ☐ Mulitplication by a Fraction Ⓜ
  - ☐ Multiplication by a Fraction (to Abstraction) Ⓜ
  - ☐ Division by a Fraction Ⓜ
  - ☐ Division by a Fraction (to Abstraction) Ⓜ
  - ☐ Group Division by a Fraction Ⓜ
- ▼ ☐ Decimal Fractions
  "Decimals"
  - ▼ ☐ Introductory
    - ☐ Introduction to Quantity & Language Ⓒ Ⓜ
    - ☐ Introduction to Symbolic Notation Ⓒ Ⓜ
    - ☐ Translates 1/4, 1/2, & 3/4 to Decimal Fractions, and the Reverse
      see "Centesimal Frame"
    - ☐ Introduction to Decimal Board Ⓜ
    - ☐ Reading & Writing Decimal Fractions Ⓒ Ⓜ
  - ▼ ☐ Simple Operations
    with decimal board
    - ☐ Addition (Decimal Board) Ⓒ Ⓜ
    - ☐ Subtraction (Decimal Board) Ⓒ Ⓜ
    - ☐ Addition (Paper Only) Ⓒ Ⓜ
    - ☐ Subtraction (Paper Only) Ⓒ Ⓜ
    - ☐ Multiplication by Unit Multiplier (Decimal Board) Ⓒ Ⓜ
    - ☐ Division by Unit Divisor Ⓒ Ⓜ
  - ▼ ☐ Decimal Multipliers & Divisors Ⓜ
    with decimal board
    - ☐ Multiplication by Decimal (Final Product) Ⓜ
    - ☐ Multiplication by Decimal (Partial Products) Ⓜ
    - ☐ Relative Size of Numbers When Dividing Ⓜ
    - ☐ Division by Decimal Ⓜ
  - ☐ Decimal Squares Ⓜ
  - ▼ ☐ Multiplication with Decimal Chequerboard Ⓜ
    - ☐ Introduction to Decimal Chequerboard Ⓜ
    - ☐ Mixed Number × Mixed Number Ⓜ

- ☐ Large Mixed Number × Mixed Number Ⓜ
- ☐ Decimal × Decimal Ⓜ
- ☐ Recording Partial Products Ⓜ
- ☐ Multiplication (Paper Only) Ⓜ
- ☐ Division (Paper Only) Ⓜ
- ▼ ☐ Centesimal Frame
  - ☐ Algorithms for Decimal Fractions Ⓜ
  - ☐ Rounding with Decimal Numbers Ⓜ
  - ☐ Conversion Ⓒ Ⓜ
- ▼ ☐ Percentage
  - requires some decimal fractions, centesimal frame
  - ☐ Percentage with Graph Paper Ⓒ Ⓜ
  - ☐ Percentage with Centesimal Frame Ⓒ Ⓜ
- ▼ ☐ Money
  - ☐ Nomenclature: Pennies, Nickels, Dimes, Quarters, Dollar Ⓒ
  - ☐ Symbol & Quantity: 1¢, 5¢, 10¢, 25¢, $1 Ⓒ
    - see "Percentage" under Decimal Fractions
  - ☐ Exchanging between Pennies, Nickels, Dimes, Quarters Ⓒ
  - ☐ Making Change with the Fewest Coins Ⓒ
  - ☐ Adding & Subtracting with Money Ⓒ
    - see "Addition" & "Subtraction" under Decimal Fractions / Simple Operations
  - ☐ Decimal Points for Money Ⓒ
    - see "Reading & Writing Decimal Fractions"
  - ☐ Multiplying & Dividing Money with Whole Numbers Ⓒ
    - see "Multiplication" & "Division" under Decimal Fractions / Simple Operations
- ▼ ☐ Computation
  - ▼ ☐ Addition & Subtraction
    - ☐ Nomenclature: Addend, Sum, Minuend, Subtrahend, Difference Ⓒ Ⓜ
    - ▼ ☐ Addition with Golden Beads
      - (remediation)
      - ▼ ☐ Writing Sum at End Ⓜ
        - ☐ Sums up to 100 Ⓒ
        - ☐ Sums up to 1,000 Ⓒ
        - ☐ Three Addends Ⓒ
      - ☐ Writing Sum as You Solve Ⓜ
      - ☐ Writing before Each Bead Movement Ⓜ
      - ▼ ☐ Solving without Beads Ⓒ Ⓜ
        - ☐ Addends up to 10,000 Ⓒ

- Addends up to 10,000 C
- Using Subtraction to Check Addition (Inverse Operation) C
- Subtraction with Golden Beads
  (remediation)
  - Writing Difference at End M
  - Writing Difference as You Solve M
  - Writing before Each Bead Movement M
  - Solving without Beads C M
    - Minuends & Subtrahends up to 10,000 C
- Using Addition to Check Subtraction (Inverse Operation) C
- Checking a Sum or Difference by the Last Odd/Even Digit
- Mentally Subtracting 10 from a Two-digit Number C
- Estimating Sums and Differences C
- Memorization of Addition & Subtraction Facts with Finger Charts C M
  (remediation)
  - Writing Math Facts Equations C
  - Self-Timing Facts to Two Minutes C
- Writing the same + or - Problem Vertically & Horizontally C

- Problem Solving & Equations
  - Solving for Missing Addend in Addition, or Minuend or Subtrahend in Subtraction C
    using the inverse relationship of addition and subtraction operations
  - Solving for Missing Multiplicand in Multiplication Facts, or Missing Divisor or Dividend in Division Facts C
    using the inverse relationship of division and multiplication operations
  - Word Problems
    see also "Solving Elapsed Time Word Problems" under Math / Measurement / Time
    - Writing an Addition or Subtraction Equation to Solve Basic One-step Story & Picture Problems C
    - Simple Fraction Word Problems C M
    - Two-step Word Problems C
    - Two-step Fraction Word Problems C M
      may include time, distance
    - Ratio Word Problems
      see Ratio & Proportion
    - Distance, Velocity, & Time
      - Sensorial Problems
        - Solving for Distance M
        - Solving for Velocity M

- Solving for Time Ⓜ
- ▼ Arithmetic Problems
  - Solving for Distance Ⓜ
  - Solving for Velocity Ⓜ
  - Solving for Time Ⓜ
- ▼ Algebraic Problems
  - Solving for Distance Ⓜ
  - Solving for Velocity Ⓜ
  - Solving for Time Ⓜ
- ▼ Principal, Interest, Rate, Time
  - ▼ Solving for Interest
    - Sensorial Ⓜ
    - Arithmetic Ⓜ
    - Algebraic Ⓜ
  - ▼ Solving for Rate
    - Sensorial Ⓜ
    - Arithmetic Ⓜ
    - Algebraic Ⓜ
  - ▼ Solving for Principal
    - Sensorial Ⓜ
    - Arithmetic Ⓜ
    - Algebraic Ⓜ
  - ▼ Solving for Time
    - Sensorial Ⓜ
    - Arithmetic Ⓜ
    - Algebraic Ⓜ
- ▼ Distributive Law
  see also "Commutative Law" (under "Multiplication")
  - Multiplication of a Sum by One Digit Ⓒ Ⓜ
  - ▼ Multiplication of a Sum by a Sum Ⓒ Ⓜ
    - Laying out Cards and Signs Ⓒ Ⓜ
    - Passage to Abstraction: Laying out Sums Ⓒ Ⓜ
  - ▼ Application to the Decimal System
    - Laying out Cards and Signs Ⓜ
    - Laying out the Sums Ⓜ
    - "htu" Notation Ⓜ

- ○ "htu" Notation Ⓜ
- ○ Equations with Multiple Operations, Parentheses for Order of Operations Ⓒ

  e.g. (43 - 32) x (5 + 3) = ___.

- ▼ ○ Multiplication

  see also "Multiples" under Numbers & Number Sense

  - ▼ ○ Multiplication with Golden Beads

    (remediation)

    - ○ Writing Product at End Ⓜ
    - ○ Writing Product as You Solve Ⓜ
    - ○ Writing before Moving Beads Ⓜ
    - ▼ ○ Solving without Beads Ⓒ Ⓜ
      - ○ 3-digit Multiplicand by 1-digit Multiplier, Dynamic Ⓒ

        i.e. with exchanging ("regrouping")

  - ○ Terms: Multiplicand, Multiplier, Product Ⓒ Ⓜ
  - ○ Commutative Law of Multiplication, Introduction to Ⓒ Ⓜ
  - ○ Simple Word Problems for Multiplication Ⓒ Ⓜ
  - ○ Memorization of Multiplication Facts with Finger Charts Ⓒ Ⓜ

    (remediation)

  - ○ Estimating Products Ⓒ
  - ○ What Happens When Multiplying by 1, and by 0 Ⓒ
  - ○ Multiplying by 10, 100, and 1000 Adds Zeroes Ⓒ Ⓜ

    prerequisite to LBF work

  - ▼ ○ Long Multiplication with the Large Bead Frame (LBF)

    requires multiplication facts, golden beads experience

    - ○ [Decomposing Numbers into Expanded Form] Ⓒ Ⓜ

      e.g. 365 = 300 + 60 + 5

    - ○ Writing Problem & Final Product: Two-Digit Multiplier Ⓜ
    - ○ Writing Problem & Final Product: Three-Digit Multiplier Ⓜ
    - ○ Writing Partial Products Ⓜ

  - ▼ ○ Bank Game

    requires LBF experience

    - ○ Exchanging at Final Product Ⓜ
    - ○ Exchanging at Partial Products Ⓜ
    - ○ Exchanging throughout Ⓜ

  - ○ Writing Numbers in Expanded Form Multiplication Ⓒ

    see bank game; e.g. 9,278 = (9 x 1,000) + (2 x 100) + (7 x 10) + 8

  - ▼ ○ Chequerboard

    requires experience with bead bars, golden beads multiplication

    - ○ Introduction (Composing & Reading Numbers) Ⓜ

- ☐ Long Multiplication with No Number Facts Ⓜ
- ☐ Long Multiplication with Number Facts Ⓜ
- ▼ ☐ Flat Bead Frame (FBF)

  requires some experience with LBF

  - ☐ Recording Final Product Ⓜ
  - ☐ Recording Partial Products Ⓜ
- ▼ ☐ Geometric Form of Multiplication Ⓜ
  - ☐ Variation: Multiplying Category by Category Ⓜ
- ▼ ☐ Category Multiplication

  with the chequerboard

  - ☐ Working on the Diagonal Ⓜ
  - ☐ Placing Final Product Only Ⓜ
  - ☐ Voicing the Categories Multiplied Ⓜ
  - ☐ Writing the Categories Multiplied Ⓜ
  - ☐ Working Just on Paper Ⓜ
  - ☐ Number of Multiplications per Category Ⓜ
- ☐ Long Multiplication in the Abstract Ⓜ
- ▼ ☐ Division
  - ☐ Terms: Dividend, Divisor, Quotient, Remainder Ⓒ Ⓜ
  - ▼ ☐ Division with Golden Beads

    (remediation)

    - ☐ Writing Quotient at End Ⓜ
    - ☐ Writing Quotient as You Solve Ⓜ
    - ☐ Writing before Moving Beads Ⓜ
    - ☐ Solving without Beads Ⓒ Ⓜ
  - ☐ "0" Cannot Be a Divisor Ⓒ
  - ☐ Any Number Divided by 1 Equals That Number Ⓒ
  - ☐ Multiplication & Division Are Inverse Operations Ⓒ Ⓜ
  - ☐ Checking Division Answers by Multiplying (& Adding Remainder) Ⓒ Ⓜ
  - ☐ Memorization of Division Facts with Finger Charts Ⓒ Ⓜ

    (remediation)

  - ▼ ☐ Long Division with Racks & Tubes
    - ☐ Review: Single-digit Divisor Ⓒ Ⓜ

      recording problem, quotient, remainder

    - ☐ Recording Final Answer Ⓜ

      multi-digit divisors with racks and tubes

    - ☐ Recording Intermediate Remainders, Quotient, & Final Remainder Ⓜ

- Recording What Has Been Used, Intermediate Remainders, Quotient, & Final Remainder Ⓜ
- Special Cases Ⓜ
- ▼ Group Division with Stamp Game
  - One-digit Divisor Ⓒ Ⓜ
  - Multi-digit Divisor Ⓜ
  - Special Case: Zero in Quotient Ⓜ

▼ Measurement

  see also measurement of "Angles" under Geometry

  - Comparative Language: Longer, Lighter, etc. Ⓒ
    (remediation)
  - ▼ Length
    - Small Non-standard Unit of Measurement Ⓒ Ⓜ
    - Larger Non-standard Unit of Measurement Ⓒ Ⓜ
    - Story of Historical Measurements with Body Parts Ⓜ
    - ▼ Story of Metric Measurements Ⓒ Ⓜ
      - Standard Unit of Measurement (Length) Ⓒ Ⓜ
      - Estimating Length & Checking Ⓒ
      - Drawing Line Segments to a Centimeter Precision Ⓒ
      - The Metric System (Length) Ⓜ
        With the Decimal Fraction Board
    - ▼ Story of English Customary Measurements Ⓒ Ⓜ
      1 ft = 12 in; 1 yd = 3 ft; 1 yd = 36 in
      - Drawing Line Segments to a Quarter Inch Precision Ⓒ
      - Measuring with Inches & Feet Ⓒ
      - Abbreviations: ft., in. Ⓒ
      - Measuring a Rectangle's Perimeter in Inches
      - Measuring with Yards Ⓒ
      - A Meter is a Bit More than a Yard Ⓒ
  - ▼ Volume (Capacity)
    see also "Volume of …" in Geometry
    - Volume (Metric) Ⓒ Ⓜ
    - Metric Volume with the Decimal Fraction Board Ⓜ
    - Customary Units Ⓒ Ⓜ
      1 quart = 2 pints; 1 gallon = 4 quarts; etc.
    - Conversion between Metric & Customary Units Ⓒ Ⓜ
      1 L is a bit more than 1 qt; 1 in is about 2.5 cm; 1 lb is about .5 kg
    - Estimating then Measuring Liquid Volume (Capacity) in Various Units Ⓒ

- ▼ ☐ Weight
  - ● ☐ Non-standard Units of Weight. Ⓒ
  - ● ☐ Weight (Standard Metric Unit) Ⓒ Ⓜ
    Using a Balance Scale; Abbreviations
  - ● ☐ Metric Weights with the Decimal Fraction Board Ⓜ
  - ● ☐ Customary Units of Weight Ⓒ Ⓜ
    Using a Scale; Abbreviations
  - ● ☐ Estimating then Measuring Weight in Various Units Ⓒ
- ● ☐ Area Ⓜ
  see also "Area of …" in Geometry
- ▼ ☐ Temperature
  - ▼ ☐ The Fahrenheit Scale Ⓒ Ⓜ
    degree sign (°); freezing point of water 32° F
    - ● ☐ Measuring and Recording Temperature in ° F Ⓒ
  - ▼ ☐ The Celsius Scale Ⓒ Ⓜ
    freezing point of water 0° C
    - ● ☐ Measuring and Recording Temperature in ° C Ⓒ
  - ● ☐ The Kelvin Scale Ⓜ
- ▼ ☐ Time
  - ● ☐ Time (The History of Telling Time) Ⓜ
  - ▼ ☐ Clock Time (Using a Clock Face)
    - ● ☐ Telling Time to the Hour Ⓒ Ⓜ
    - ● ☐ A.M. & P.M. Ⓒ Ⓜ
    - ● ☐ Telling Time to the Half Hour Ⓒ
    - ● ☐ Telling Time to the Five-Minute Interval Ⓒ
    - ● ☐ Telling Time to the Minute Ⓒ Ⓜ
    - ● ☐ Telling Time Using Fractions Ⓒ Ⓜ
      "a quarter to", "half past", etc.
    - ● ☐ Reading Roman Numerals Ⓜ
    - ● ☐ Reading a 24-hour Clock Face Ⓜ
  - ▼ ☐ The Year, Days of the Week, Months of the Year Ⓒ Ⓜ
    see also "Sources for English Names of Days" under Language / Literature / Fairy Tales & Myths
    - ● ☐ The Ordinal Number of Each Day of the Week Ⓒ
    - ● ☐ The Ordinal Number of Each Month Ⓒ
    - ● ☐ Writing the Date in Both Words and Numbers Ⓒ
    - ● ☐ Reading a Calendar for Day, Date, Month, & Year Ⓒ Ⓜ
  - ● ☐ Solving Elapsed Time Problems Ⓒ
    see also Problem Solving & Equations

- ▼ ☐ Squares & Cubes of Numbers
  - ● ☐ Concept & Notation of Square of a Number Ⓒ Ⓜ
  - ● ☐ Concept & Notation of Cube of a Number Ⓜ
  - ● ☐ Finding Squares in Multiplication Bead Bar Layout Ⓜ
  - ● ☐ Building the Decanomial with Bead Bars Using Distributive Law Ⓜ
    "Tower of Jewels"
  - ● ☐ Building the Decanomial with Paper Squares & Rectangles Ⓜ
  - ● ☐ Finding Patterns in Successive Differences of Squares of Numbers Ⓜ
- ▼ ☐ Squaring & Cubing
  - ▼ ☐ Squaring
    - ▼ ☐ Transformation of a Square
      - ● ☐ Transformation of a Square of 10 into a Binomial Ⓜ
      - ● ☐ Transformation of a Square of 10 into a Trinomial Ⓜ
      - ● ☐ Paper Squares of Ten Ⓜ
      - ● ☐ Graph Paper Ⓜ
      - ● ☐ Binomial Expressed Algebraically Ⓜ
      - ● ☐ Trinomial Expressed Algebraically Ⓜ
    - ▼ ☐ Passing from One Square to Another
      - ● ☐ Passing from a Square to Its Successive Square Ⓜ
      - ● ☐ Passing from Each Square to Each Successive Square Ⓜ
      - ● ☐ Passing to a Non-Successive Square Ⓜ
    - ▼ ☐ Squaring a Sum
      - ● ☐ Squaring a Binomial Ⓜ
      - ● ☐ Squaring a Trinomial Ⓜ
      - ● ☐ Squaring with Algebraic Expression Ⓜ
    - ▼ ☐ Squaring with Hierarchical Value
      - ● ☐ Squaring a Binomial with Golden Bead Material Ⓜ
      - ● ☐ Squaring a Binomial Using the Peg Board Ⓜ
      - ● ☐ Squaring a Trinomial Using the Peg Board Ⓜ
      - ● ☐ Squaring on Graph Paper Ⓜ
      - ● ☐ Extraction of the Rules for Squaring Ⓜ
      - ● ☐ Squaring Generalizations Ⓜ
  - ▼ ☐ Cubing
    - ▼ ☐ Arithmetic Passages
      see also "Volume" under Geometry
      - ● ☐ Passing from a Given Cube to a Successive Cube Ⓜ

- From a Given Cube to a Non-Successive Cube Ⓜ
- Cubing a Binomial (Numeric), Starting from the Square Ⓜ
- Cubing a Binomial (Numeric), Starting from the Cube of the First Term Ⓜ
- ▾ Algebraic Passages
  - Cube a Numeric Binomial, Derive a Formula, Introduce Algebraic Binomial Ⓜ
  - ▾ The Algebraic Formula for Cube of a Trinomial Ⓜ
    - Extension: Plugging Numbers into Formula Ⓜ
    - Extension: Labelling the Prisms Ⓜ
    - Extension: Quadrinomials Ⓜ
- ▾ Application to the Decimal System
  - The Story of the Three Kings Ⓜ
  - Cubing a Number Given in Place Value Notation Ⓜ
- ▾ Square Roots & Cube Roots
  - ▾ Square Roots
    - Concept and Notation of Square Root Ⓒ Ⓜ
    - Square Root of More Than One Digit Ⓜ
    - ▾ Square Root of Any Size Number
      - Writing Final Answer Ⓜ
      - More Writing: Intermediate Amounts Ⓜ
      - Writing Throughout: What Has Been Used Ⓜ
    - Square Root: Backtracking Ⓜ
    - ▾ Passages to Abstraction
      - Completing the Square as You Go Ⓜ
      - Calculating the Next Digit Ⓜ
      - Next Step to Abstraction Ⓜ
    - Special Cases Ⓜ
    - Rule for Extraction Ⓜ
  - ▾ Cube Root
    - Concept of Cube Root Ⓜ
    - Extracting Large Cube Roots Ⓜ
    - Extracting with More Writing Ⓜ
    - Backtracking Ⓜ
    - Three-digit Cube Roots: Category by Category Ⓜ
    - Last Steps to Abstraction Ⓜ

- ☐ Rule for Abstracting Cube Root Ⓜ
- ▼ ☐ Powers of Numbers
  - ☐ Numerical Value & Notation for Powers of Two Ⓜ
  - ☐ A Unit Can Be Any Size Ⓜ
  - ☐ The Base Can Be Any Number Ⓜ
  - ☐ Powers of Ten - The Decimal System Ⓒ Ⓜ
    requires preceding work in powers
  - ▼ ☐ Operations with Powers
    - ☐ Addition Ⓜ
    - ☐ Subtraction Ⓜ
    - ☐ Multiplication Ⓜ
    - ☐ Division Ⓜ
  - ▼ ☐ Exponential Operations
    - ☐ The Decimal System Ⓒ Ⓜ
    - ☐ Addition Ⓜ
    - ☐ Subtraction Ⓜ
    - ☐ Short Multiplication Ⓜ
    - ☐ Long Multiplication Ⓜ
    - ☐ Division Ⓜ
  - ☐ Further Notes on Powers of Numbers Ⓜ
- ▼ ☐ Other Number Bases
  - ☐ Counting in Different Bases Ⓜ
  - ☐ Expressing the Same Quantity in Different Bases Ⓜ
  - ▼ ☐ Operations in Non-decimal Bases
    - ☐ Addition Ⓜ
    - ☐ Subtraction Ⓜ
    - ☐ Multiplication Ⓜ
    - ☐ Distributive Division Ⓜ
    - ☐ Group Division Ⓜ
  - ▼ ☐ Operations in Non-decimal Bases (Paper Only)
    - ☐ Addition Ⓜ
    - ☐ Subtraction Ⓜ
    - ☐ Multiplication Ⓜ
    - ☐ Division Ⓜ
  - ☐ Conversion between Bases Ⓜ
- ▼ ☐ Signed Numbers

- ▾ ☐ **Signed Numbers**
  - ● ☐ **Introduction to Signed Numbers** C M
    with number line
  - ● ☐ Negative Snake Game M
  - ● ☐ Addition M
  - ● ☐ Subtraction M
  - ● ☐ Multiplication M
  - ● ☐ Division M
- ▾ ☐ Ratio & Proportion
  - ▾ ☐ Ratio
    - ● ☐ Introduction to Ratio M
    - ● ☐ Equivalent Ratios M
    - ▾ ☐ Word Problem Solving with Ratios
      - ● ☐ Sensorial Introduction M
      - ● ☐ Paper Only M
    - ● ☐ Applying Knowledge of Common Fractions M
    - ● ☐ More Word Problems M
  - ▾ ☐ Proportion
    - ● ☐ Introduction to Proportion M
    - ● ☐ Fractions in Proportion M
    - ● ☐ Word Problems M
  - ● ☐ Activities for Ratio & Proportion M
- ● ☐ Introduction to Algebra
  coming in 2023
- ● ☐ Mathematician Biographies
- ▾ ☐ Logic
  - ● ☐ Venn Diagram
- ▾ ☐ **Geometry**
  - ● ☐ The Story of How Geometry Got It's Name M
  - ● ☐ Left vs. right hand. C
  - ● ☐ Seeing shapes in objects and artifacts (windows, pictures, cars, etc.) C
  - ▾ ☐ **Congruency, Similarity, Equivalency**
    Recognizing and making figures and designs
    - ● ☐ **Congruent** C M
    - ● ☐ Similar M
    - ● ☐ Equivalent M

- ▾ ☐ Geometric Construction
  - • ☐ Zeroing a Ruler Ⓜ
  - • ☐ Using a Compass Ⓜ
  - • ☐ Using a Set-Square Ⓜ
  - • ☐ Design with Metal Insets Ⓜ
  - • ☐ Design with Compass and Ruler Ⓜ
  - • ☐ Making symmetric figures with a line of symmetry Ⓒ
- ▾ ☐ Equivalent Figures with Elementary Metal Insets
  - • ☐ Triangle Ⓜ
  - • ☐ Rhombus: Minor Diagonal Ⓜ
  - • ☐ Rhombus: Major Diagonal Ⓜ
  - • ☐ Trapezoid Ⓜ
  - • ☐ Decagon to Broad Rectangle Ⓜ
  - • ☐ Decagon to Narrow Rectangle Ⓜ
  - • ☐ Pentagon Ⓜ
- ▾ ☐ Lines
  - • ☐ Concept of a Line: Rectilinear & Curvilinear Ⓜ
  - • ☐ Parts of a Straight Line (Ray, Line Segment) Ⓜ
  - • ☐ Labelling/Reading Line Segments with Letters Ⓒ
  - • ☐ Position of a Straight Line: Horizontal, Vertical, Oblique Ⓒ Ⓜ
  - • ☐ Position of Two Lines: Parallel, Converging, Diverging Ⓒ Ⓜ
  - • ☐ Intersection of Two Lines: Intersecting, Perpindicular Ⓒ Ⓜ
- ▾ ☐ Polygons
  - • ☐ Concept of a Polygon Ⓜ
  - • ☐ Names of Regular Polygons Ⓒ Ⓜ
  - ▾ ☐ Nomenclature of Polygons Ⓒ Ⓜ
    - • ☐ Sides as line segments (for example, side CD). Ⓒ
    - • ☐ Types of Triangles Ⓜ
    - • ☐ Parts of a Trapezoid Ⓜ
    - • ☐ Parts of a Rhombus Ⓜ
    - • ☐ Parts of a Regular Polygon Ⓒ Ⓜ
  - ▾ ☐ Types of Triangles Ⓜ
    - • ☐ According to sides Ⓜ
    - • ☐ According to angles Ⓜ
    - • ☐ Detective Triangle Game

- ○ Detective Triangle Game
- ○ According to sides and angles Ⓜ
- ○ Parts of a Right Angle Triangle Ⓜ
- ▼ ○ Types of Quadrilaterals Ⓒ Ⓜ
  - ○ The Family Tree of Quadrilaterals Ⓜ
- ○ Types of Planar Simple Closed Curves Ⓜ
- ○ Sums of Angles in Polygons Ⓜ
- ▼ ○ Diagonals of Polygons Ⓜ
  - ○ Number of Diagonals for Stability Ⓜ
  - ○ Number of Diagonals in a Polygon Ⓜ
- ▼ ○ Angles
  - ○ Concept of an Angle Ⓜ
  - ○ Types of Angles Ⓜ
  - ○ Parts of Angles Ⓜ
  - ○ Labelling/Reading Angles with Letters (e.g., angle ABC). Ⓒ
  - ○ Relationships between Angles Ⓜ
  - ○ Angles Made by a Transversal Ⓜ
  - ○ Relationship between Angles of Parallel Lines Cut by Transversal Ⓜ
  - ○ Measurement of an Angle Ⓜ
  - ○ Addition and Subtraction of Angles with Montessori Protractor Ⓜ
  - ○ Bisecting an Angle Ⓜ
- ▼ ○ Equivalence
  - ○ Story of Pythagoras
  - ▼ ○ Equivalence with Iron Material
    - ○ Triangle - Sensorial Ⓜ
    - ○ Rhombus - Sensorial Ⓜ
    - ○ Triangle - Reasoning Ⓜ
    - ○ Triangle, Rhombus, & Rectangle - Reasoning Ⓜ
    - ○ Trapezoid - Sensorial Ⓜ
    - ○ Trapezoid - Reasoning Ⓜ
    - ○ Decagon 1 - Sensorial Ⓜ
    - ○ Decagon 2 - Sensorial Ⓜ
    - ○ Decagon 1 - Reasoning Ⓜ
    - ○ Decagon 2 - Reasoning Ⓜ
  - ○ Pythagoras Plate I Ⓜ

- ☐ Pythagoras Plate II Ⓜ
- ☐ Pythagoras with Constructive Triangles Ⓜ
- ☐ Euclid's Plate - Sensorial Ⓜ
- ☐ Euclid's Plate - Stage 2 Ⓜ
- ▾ ☐ Area of Plane Figures
  - ▾ ☐ Concept of Area Ⓒ Ⓜ
    - ☐ Rectangle, including in square inches and centimeters Ⓒ Ⓜ
    - ☐ Parallelogram Ⓜ
    - ☐ Acute Triangle: Double the Area Ⓜ
    - ☐ Acute Triangle: Half the Height Ⓜ
    - ☐ Acute Triangle: Half the Base Ⓜ
    - ☐ Right Triangle: Double the Area Ⓜ
    - ☐ Right Triangle: Half the Height Ⓜ
    - ☐ Right Triangle: Half the Base Ⓜ
    - ☐ Obtuse Triangle: Double the Area Ⓜ
    - ☐ Obtuse Triangle: Half the Height Ⓜ
    - ☐ Obtuse Triangle: Half the Base Ⓜ
  - ▾ ☐ Deriving Area Formulae with Yellow Material Ⓜ
    - ☐ Rectangle Ⓜ
    - ☐ Parallelogram Ⓜ
    - ☐ Acute Triangle: Double the Area Ⓜ
    - ☐ Acute Triangle: Half the Height Ⓜ
    - ☐ Acute Triangle: Half the Base Ⓜ
    - ☐ Right Triangle: Double the Area Ⓜ
    - ☐ Right Triangle: Half the Height Ⓜ
    - ☐ Right Triangle: Half the Base Ⓜ
    - ☐ Obtuse Triangle: Double the Area Ⓜ
    - ☐ Obtuse Triangle: Half the Height Ⓜ
    - ☐ Obtuse Triangle: Half the Base Ⓜ
  - ▾ ☐ Deriving Area Formulae with Iron Material Ⓜ
    - ☐ Triangle and Rectangle Plate Ⓜ
    - ☐ Rhombus Ⓜ
    - ☐ Trapezoid Ⓜ
    - ☐ Extension: Pentagon Ⓜ
    - ☐ Decagon Ⓜ

- ▼ ☐ The Circle
  - ● ☐ Concept of a Circle Ⓜ
  - ● ☐ Parts of a Circle Ⓜ
  - ● ☐ Nomenclature Ⓜ
  - ● ☐ Relationship of Circle and Line Ⓜ
  - ● ☐ Relationship of Two Circles Ⓜ
  - ▼ ☐ Area of a Circle Ⓜ
    - ● ☐ Circle as a Special Polygon Ⓜ
    - ● ☐ Circumference of a Circle Ⓜ
    - ● ☐ Deriving the Formula for Area of a Circle Ⓜ
- ● ☐ Relationship between Apothem and Side of a Plane Figure Ⓜ
- ▼ ☐ Solids Ⓒ Ⓜ
  - ● ☐ Nomenclature Ⓒ Ⓜ
  - ● ☐ Constructing Geometric Solid Figures Ⓜ
  - ● ☐ Basic Concepts of Dimensions Ⓜ
  - ● ☐ Regular Prisms - Transformation into Rectangular Prisms Ⓜ
  - ● ☐ Polyhedra Ⓜ
  - ▼ ☐ Surface Area of Solids Ⓜ
    - ● ☐ Rectangular Prism Ⓜ
    - ● ☐ Triangular Prism Ⓜ
    - ● ☐ Cylinder Ⓜ
    - ● ☐ Pyramid Ⓜ
    - ● ☐ Cone Ⓜ
- ▼ ☐ Volume Ⓜ
  - ● ☐ Concept of Volume Ⓜ
  - ● ☐ Comparing Solids Built with Unit Cubes Ⓜ
  - ▼ ☐ Volume of a Right Rectangular Prism Ⓜ
    - ● ☐ Three Important Dimensions Ⓜ
    - ● ☐ Algebraic Formula Ⓜ
  - ▼ ☐ Volume of Non-rectangular Prisms Ⓜ
    - ● ☐ Rhombic Prism Ⓜ
    - ● ☐ Triangular Prism Ⓜ
    - ● ☐ Hexagonal Based Prism Ⓜ
  - ● ☐ Volume of a Pyramid Ⓜ
  - ▼ ☐ Solids of Rotation Ⓜ

- ☐ Volume of a Cylinder Ⓜ
- ☐ Volume of a Cone Ⓜ
- ☐ Volume of a Sphere Ⓜ
- ☐ Story of Archimedes Ⓜ

▼ ☐ Life Skills
Including Practical Life, Grace & Courtesy

  ▼ ☐ Health & Wellness
  - ☐ Nutrition
  - ☐ Personal Hygeine
  - ☐ Cognitive-Emotional Skills
  - ☐ Risk Management

  ▼ ☐ Practical Life
  Including Going Out
  - ☐ Cooking
  - ☐ Shopping
  - ☐ Navigation & Transportation
  - ☐ Cleaning
  - ☐ Home Repair
  - ☐ Engineering
    Machines, wood, metal, and plastics
  - ☐ Personal Finance

  ▼ ☐ Grace & Courtesy
  - ☐ Nonverbal communication
  - ☐ Listening Skills
  - ☐ Key concept: consideration
  - ☐ Eating Etiquette
  - ☐ Sportsmanship
  - ☐ Meeting & Greeting
  - ☐ Hosting & Being a Guest
  - ☐ Phone and Letter Etiquette
  - ☐ Tipping
  - ☐ Workplace Etiquette
  - ☐ Accepting and giving gifts

  ▼ ☐ Workplace Skills
  - ☐ Organizational Skills
  - ☐ Technology Skills

- ☐ Agriculture
- ☐ Sports