WHAT'S IN THIS BOOK?

•Denotes the "For My Notebook" page *Denotes a lab or activity

3 An Introduction to R.E.A.L. Science
5 What's the Big Idea?
9 Lab Material List
11 Collecting and Housing Garden Snails
13 Additional Reading Suggestions
17 Website Suggestions
19 Science Journal Ideas
21 •Unit 1: What is Life?
23 *Signs of Life
27 *Plot Study
31 •Unit 2: The Cell
33 *An Egg is a Cell
37 *Plant and Animal Cells Differ
41 Unit 3: The Human Body
43 *Human Body Folder
45 •Unit 4: Skeletal and Muscular Systems
47 *My Skeleton Holds Me Up
51 *Muscles Aren't Pushy
57 •Unit 5: Circulatory System
59 *Your Heart Rate
63 *Blood Model
67 •Unit 6: Respiratory System
69 *Breathing Rate
73 *I Need Oxygen
77 •Unit 7: Digestive System
79 *Digestive Diagram
83 *Food Travels Far!
87 •Unit 8: Nervous System
89 *Reaction time
93 *I'm Sensible (5 senses)
97 •Unit 9: Growth and Genetics
99 *I'm the Only Me! (genetics)
103 *My Own Fingerprints
107 •Unit 10: Five Kingdoms of Living Things
109 *Classifying Critters
115 Unit 11: Animal Kingdom
117 *Prepare Animal Kingdom Book
119 •Unit 12: Cnidaria
121 *Sea Jellies Change
125 *Animal Kingdom Book – Cnidaria
129 •Unit 13: Worms
131 *The Great Worm Hunt
135 *Earthworm Composting
139 *Earthworms Aren't Senseless
143 *Animal Kingdom Book – Worms
147 •Unit 14: Mollusks
149 *Mollusk? Who Me?
153 *Snail Anatomy
157 *Animal Kingdom Book – Mollusks
161 •Unit 15: Echinoderm
163 *Give Me Five (Echinoderm Patterns)
167 *Animal Kingdom Book – Echinoderms
171 •Unit 16: Arthropod + Insects
173 *Butterfly Metamorphosis
177 *Caterpillar to Butterfly
181 •Unit 17: Arthropod – Arachnids
183 *The Spider Song
185 *Insect or Spider
191 •Unit 18: Arthropod – Crustaceans
193 *Isopod Hunt
197 *Roly-Poly Poetry
201 *A Home for Isopod
205 *Animal Kingdom Book – Arthropods
209 •Unit 19: Vertebrates – Introduction
211 *Invertebrate or Vertebrate
213 •Unit 20: Vertebrates – Fish
215 *Measure a Fish
219 *Fish Floaters
223 •Unit 21: Vertebrates – Amphibians
225 *Complete and Incomplete Metamorphosis
229 *No "Ear" in Hearing
233 •Unit 22: Vertebrates – Reptiles
235 *How Dry I Am
239 *Lizard Poem
241 •Unit 23: Vertebrates – Birds
243 *Birds of a Feather (grouping birds)
247 *How Ducks Stay Dry
249 *Are You My Brother?
255 *My Wild Bird Life List
257 •Unit 24: Vertebrates – Mammals
259 *What's In a Name?
263 *Coat of Blubber
267 *Animal Kingdom Book – Vertebrates
271 *Animal Kingdom Summary – What Am I?
281 •Unit 25: Plant Kingdom – Flowers
283 *Color The Flower
287 *What Makes Up a Flower?
291 •Unit 26: Plant Kingdom – Seeds
293 *Inside The Seed (seed dissection)
297 *Traveling Seeds
301 •Unit 27: Plant Kingdom – Leaves
303 *What Makes a Leaf Green (chloroplast)
305 *Color Me Green
309 •Unit 28: Plant Kingdom – Stems and Roots
311 *Water Please
317 *Stems Move Water
319 *Plant Summary – Plant Parts Salad
323 Vocabulary
327 Bibliography

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MATERIAL LIST

Material is listed by unit in the order in which it is first needed. + means it will be needed for later units also. The amounts listed are totals for the entire course. Most items are common household items. * means it requires some explanation. Ordering hints or explanations are given on page 10.

REUSABLE EQUIPMENT / MATERIAL

UNIT		AMOUNT
1+	Plant with many healthy leaves	1
1	Rock to observe (optional)	1
1	Wild area to study (field, forest etc.)	
1	String	4 meters
1+	Meter/yard stick combination	1
1+	Clipboard	1
1+	Large clear jar with lid (32 oz. or more)	1 - 4
1+	Hand lens (Magnifying glass)	1
1 *	Field guides to local insects, animal tracks plants (optional)	
2+	Small plates	3
2+	Small round bowl (to hold 2 cups)	2
2	Small square pan (to hold 2 cups)	1
3+ *	Glue gel (like Elmer's School glue gel)	1
3+	Hole punch	1
3+	Scissors	1
3+	Colored pencils, crayons, markers	
3+	Stapler	
4	White or gold pen (to mark on black)	1
4+	Ruler with centimeters and inches	1
5	Tennis ball	1
5+	Watch with second hand	1
5+	Spoons (at least one metal)	2
6	Long tube (wrapping paper, vacuum cleaner...)	1
6	Small colored counters- blue and red	10 each
7+	3" x 5" index cards (white)	7 or more
8+	Small jars with lids (see-through)	3
8	Dry erase marker	1
11+	Various art supplies- stamps, stickers etc.	
13+	Flashlight	1
13	Red cellophane (optional)	approx. 4" x 4"
13	Pitchfork (to dig up worms)	1
13+	Mister with water	1
13+	Tray with sides (9" x 9" pan, food storage container etc.)	1
13	Sandpaper- rough	approx. 9" x 9"
14+ *	Gram scale or triple beam balance	1
15+	Kitchen knife	1
16+ *	Butterfly house (bought or made)	1
18	Small piece of rotting log for critter keeper	
18	Chalkboard or whiteboard (or butcher paper)	1
18	Heating pad or hot water bottle	1
18+	Zipper type plastic bag- (1-1 gallon) (2 small)	
20	Fish net - small for netting goldfish	1
20+ *	Thermometer- science type	2
20	Thermometer - sterile, human type	1
20+ *	Glass eyedropper	1
21	Metal Slinky toy	1
21	Metal pie pan	1
22	Cookie sheet	1
22	Waterproof marker	1
23+	Zoo or wildlife center to study	
23 *	Binoculars (optional)	1
24	Samples of animals studied: shells, rubber or plastic critters, live insects or worms in vials, pictures, dried coral or sea star...	
25	Tweezers (optional)	1
26	Computer with internet access (optional)	
26	Sunday cartoon section of the newspaper	1
28	Identical, upright plants in small pots	2
28	Clear drinking glasses	3
28	Clock	1

PERISHABLES

2	Chicken egg	1
2	Light colored gelatin (lemon)	6 oz. box
2	Green grapes	20
2	Strawberries or orange slices	2
3+	12" x 12" colored cardstock	8
3	12" x 18" construction or other heavy paper	1
3+	Yarn- any color	about 12 yards
4	8 1/2" x 11" black construction paper	1
4	8 1/2" x 11" tagboard or thick paper	1
4+	Metal fastener (brad)	2
4	Thin string or thick thread	28" long
4+	Tape	
5	Light corn syrup	1/2 cup
5	Red Hot candies	1/2 cup
5+	Dry large lima beans	6
5	Dry lentils or split yellow peas	1 Tbl
6+	8 1/2" x 11" white paper	6
8	Paper towels	15
8	Items to test senses- may include: coins cotton swab, paper clips, vinegar, garlic, chocolate chips, banana, orange, bells	
8+	Paper sacks (4 lunch size) (1 large)	4
12	Styrofoam cups (stacking)	4
13+	Sand	about 2 cups
13+	Soil	about 2 cups
13	Oatmeal (dry)	about 1 cup
13+	Aluminum foil	about 14"
13	Vinegar	1/4 tsp.
14	Snail food (lettuce, cabbage, ivy, cucumber)	
15	Banana (unpeeled)	1
18	Ice	
19	Card stock or construction paper 18" x 12"	1
19	Magazines with animal pictures (vertebrate and invertebrate) - cuttable	1 - 4

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UNIT	PERISHABLES (CONT.)	AMOUNT
21	Salt	1 Tbl.
21	Manila file folders	2
23	Vegetable oil	2 Tbl.
24	Shortening or lard	1/2 cup
24	Butcher paper	approx. 3' x 6'
25	Flower (gladiolus is best)	1
26	Corn seeds	11
26	Dried kidney beans	11
26	Socks- big, old	2
26	Cranberry and other fruit (to show seeds)	26
	Seed selection- maple, dandelion, elm	
28	Stalk of celery with leaves on top	1
28	White carnation	1
28	Food coloring- red and blue	
28	Salad dressing	
28	Salad fixings of your choice	

CRITTERS

UNIT		AMOUNT
13+	*Earthworms (dug up or bought)	6
14+	*Garden snails	5
16+	* Butterfly larvae (gathered or bought)	5
17+	* Spider to observe (real or photos)	1
18+	* Isopods (roly-polies, pill bugs)	10
20	Fish - goldfish works well	1

Please Note: All experiments are designed to teach about the animals without harming them.

SPECIFIC EQUIPMENT: HINTS AND ORDERING

1. **Field guides to insects, plants, birds etc.:** A list of good field guides is provided at the bottom of the list of reading suggestions on page 15.
2. **Glue gel:** We call this "blue glue" because it is blue. It is the "Elmer's washable school glue gel." It sticks better than a glue stick and isn't as messy as white glue. It is available at almost any office or school supply store.
3. **Gram scale or triple beam balance:** Either of these will weigh items in grams. Gram scales are easier to use. Triple beam balances are frequently used in many laboratories so it may be worth purchasing one and learning how to use it. Gram scales are available at many drug stores. Either can be purchased from Nasco (see below).
4. **Butterfly house:** can be made from a box with netting over one side. Look for specific instructions on the internet. Plan about 3 weeks ahead if you want to buy one. You can purchase one from Classical Home Education and it will come with a certificate to get 5 butterfly larvae. You just send in the certificate (and a few dollars for shipping) about a week before you are ready to start your butterfly unit.
5. **Thermometer:** A good science thermometer goes down on its own like a room thermometer. Remember a human thermometer must be shaken down. You will need a thermometer that isn't a permanent part of a decoration and that has the temperatures marked right on it. Some food thermometers are built right but don't go very low as they are used for hot cooking. You need one to go down to 30° F or 0°C. If all else fails, order one from Nasco.
6. **Glass eyedropper:** This should be easy but it isn't always. Drug stores usually offer big, bulky plastic ones but these won't do what you need. Find a nice, small, old-style, glass thermometer. I found one at an old-style pharmacy. Otherwise, order one from a science catalogue.
7. **Binoculars:** 7 X 35 is a nice choice to get for birdwatching. I would avoid the $10 ones as you won't see much but you don't have to spend $100 on a set for your kids either. Whatever you get, look through them first. The optics can vary from one pair to another. Look in the sports or electronics department .
8. **Garden snails:** There is a care sheets provided (pg. 11) that gives hints on finding and housing snails.
9. **Earthworms, butterfly larvae, spiders (optional) and isopods** (pill bugs): Finding and housing them is explained in the labs where they are first needed.

SOURCES FOR SCIENCE MATERIALS

Nasco (vast array of science materials from frogs to magnets)
901 Janesville Ave., Fort Atkinson, WI 53538-0901 Phone: 1-800-558-9595 www.eNASCO.com

Classical Home Education (offers butterfly houses with a certificate for larvae as well as science kits and books)
18400 SE Hwy. 42, Weirsdale, FL 32195 Phone: 325-821-4400 www.ClassicalHomeEd.com

Insect Lore (fun equipment for learning about and raising critters – crabs to ants)
P.O. Box 1535, Shafter, CA 93263 Phone: 1-800-LIVE BUG www.insectlore.com

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