STEM 4 innovation

TEXAS A&M AGRILIFE EXTENSION

Junior Master Gardener®

growing good kids℠

STEM 4 Innovation Conference

Junior Master Gardener® Training Workshop

Horticulture/Forestry Sciences Building & Howdy Farm, Thursday, January 26th

STEM 4 innovation @ TEXAS A&M UNIVERSITY

Texas A&M AgriLife Extension

STEM 4 innovation

& School Garden Projects

Junior Master Gardener®
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STEM 4 innovation

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Texas A&M AgriLife Extension

- A school garden is a living laboratory
- Observe/interact with cycles, living systems at work.
- Real/relevant experimentation & exploration
- Use technology to examine & document.
- JMG Garden-based learning allow students to plan, create, develop, arrange & build.
- Real math & practical application of estimating, measuring, sampling, weighing, charting, projecting, testing, revising & researching.

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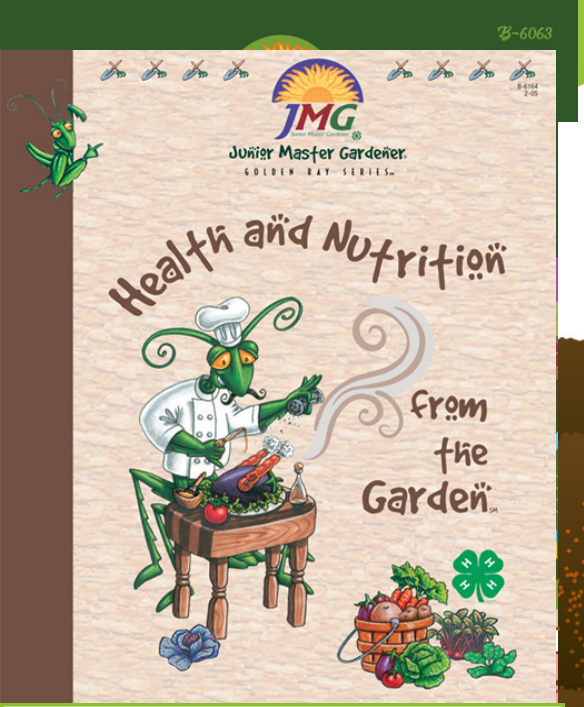
growing good kids℠

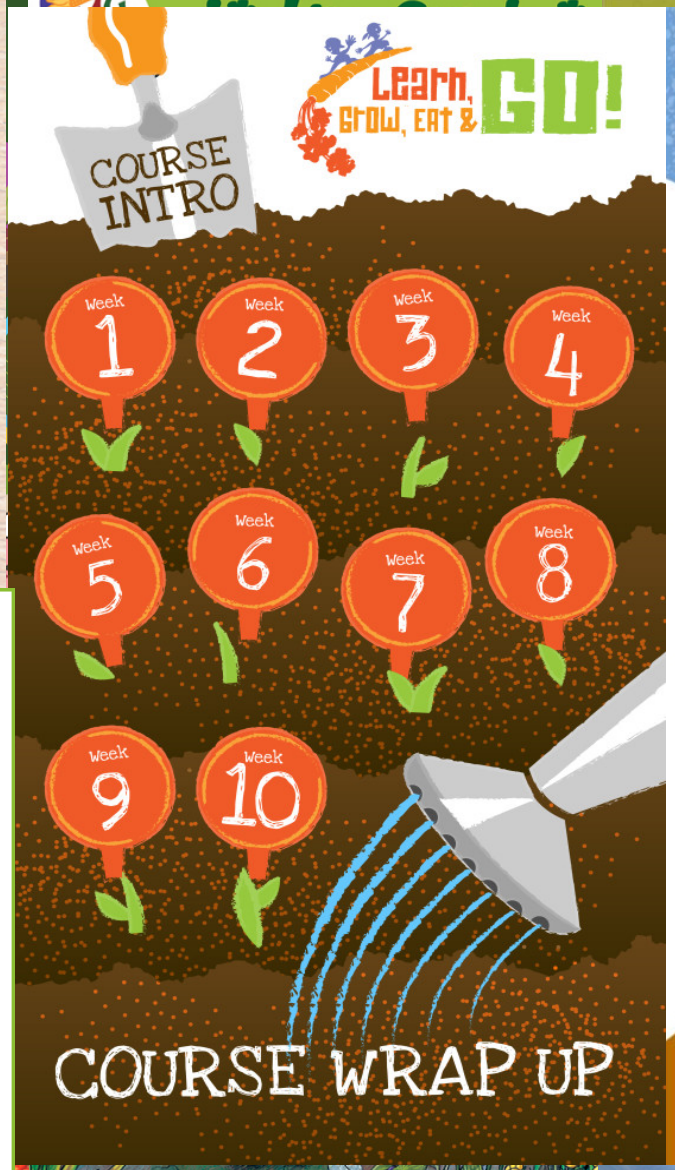
2017 JMG:

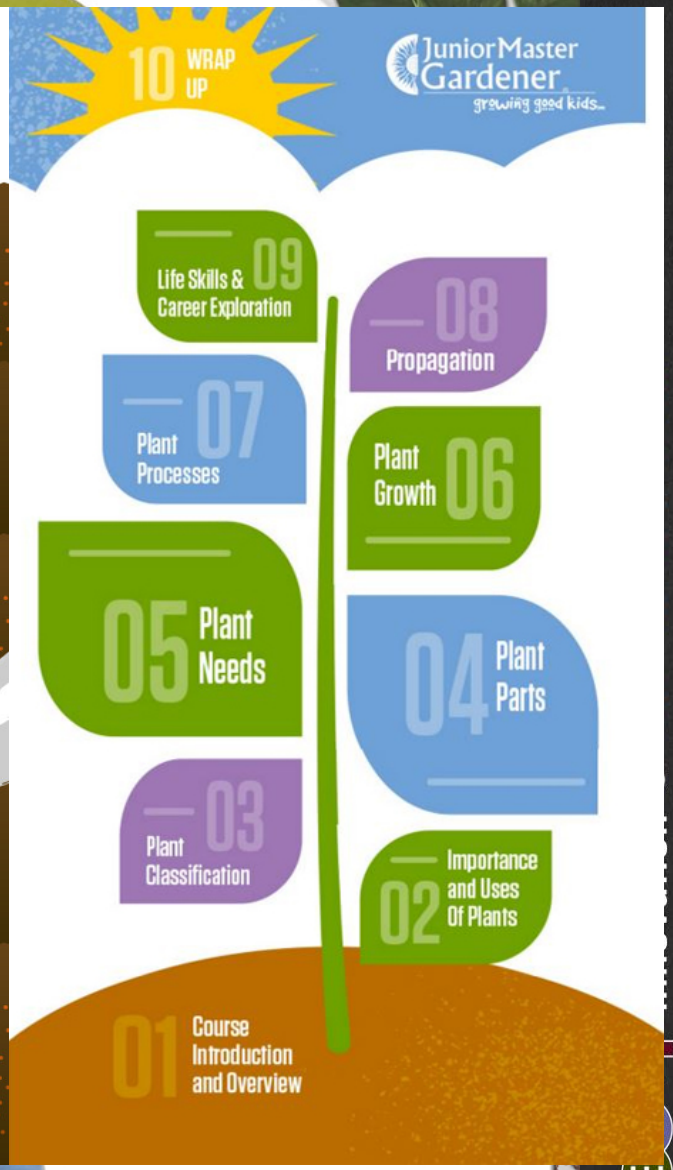
- JMG in all 50 States, 10 countries
- 38 State Partners
- 4 International Partners

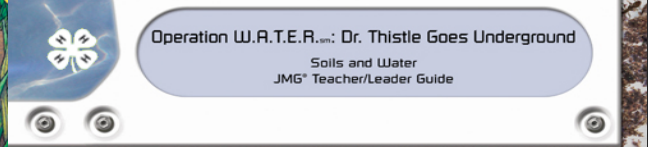
STEM 4 innovation @ TEXAS A&M UNIVERSITY


B-6063
JMG
Junior Master Gardener
GOLDEN RAY SERIES
Health and Nutrition
from the Garden


JMG-001
S/15
Learn, Grow, Eat & GO!
Junior Master Gardener
growing good kids


COURSE INTRO
Learn, Grow, Eat & GO!
Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
COURSE WRAP UP


10 WRAP UP
Junior Master Gardener
growing good kids
Life Skills & Career Exploration 09
Propagation 08
Plant Processes 07
Plant Growth 06
05 Plant Needs
04 Plant Parts
Plant Classification 03
Importance and Uses Of Plants 02
01 Course Introduction and Overview


Operation W.A.T.E.R.sm: Dr. Thistle Goes Underground
Soils and Water
JMG® Teacher/Leader Guide

Curriculum Design

- Hands-On and Project Based
- Integrated across all subject areas
- Flexibility of use
- Community service and leadership incorporated in all units

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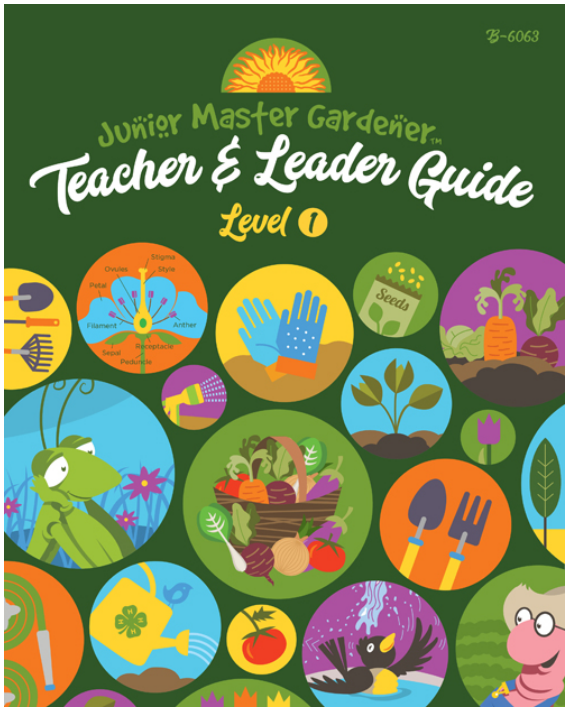
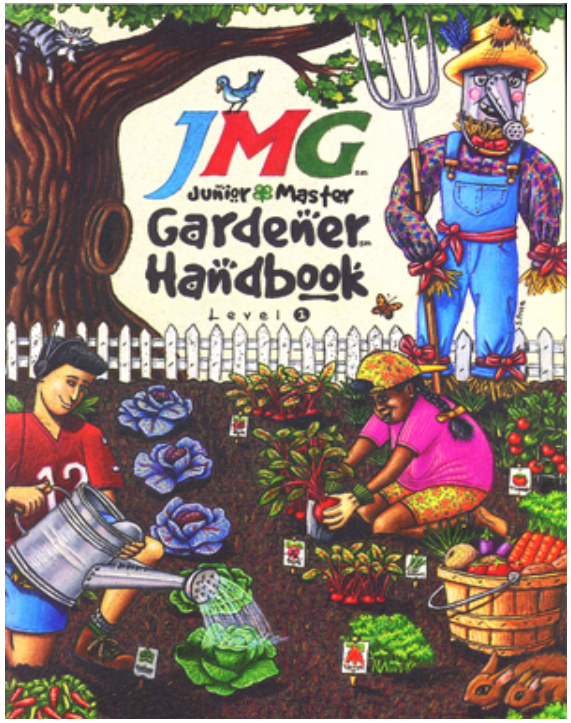
Junior Master Gardener®

Level One Core Curriculum



JMG Teacher Guide



JMG Youth Handbook

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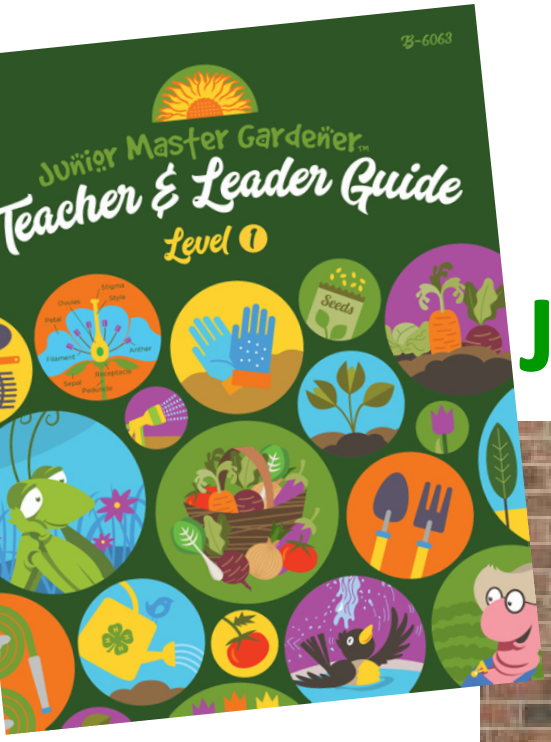
Contents



JMG Teacher/Leader Guide

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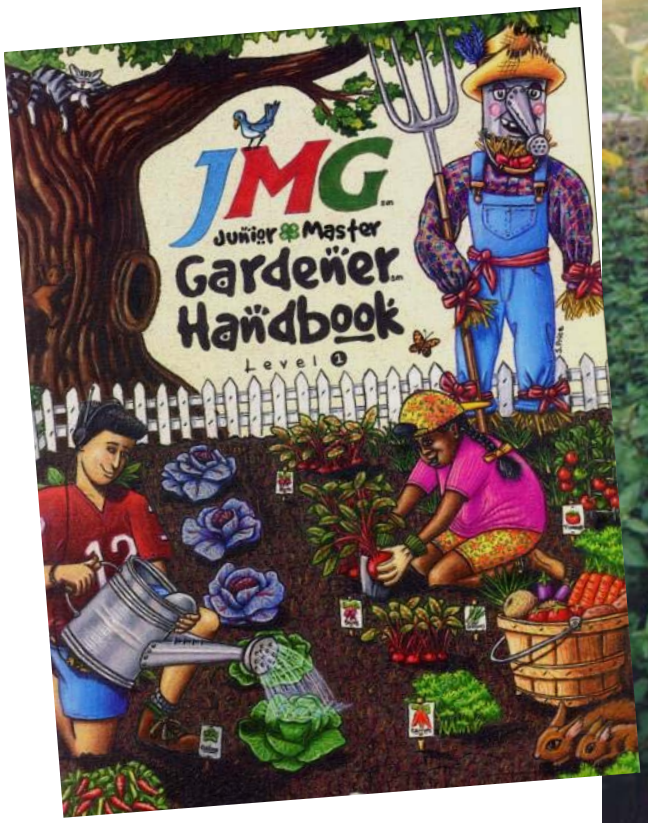
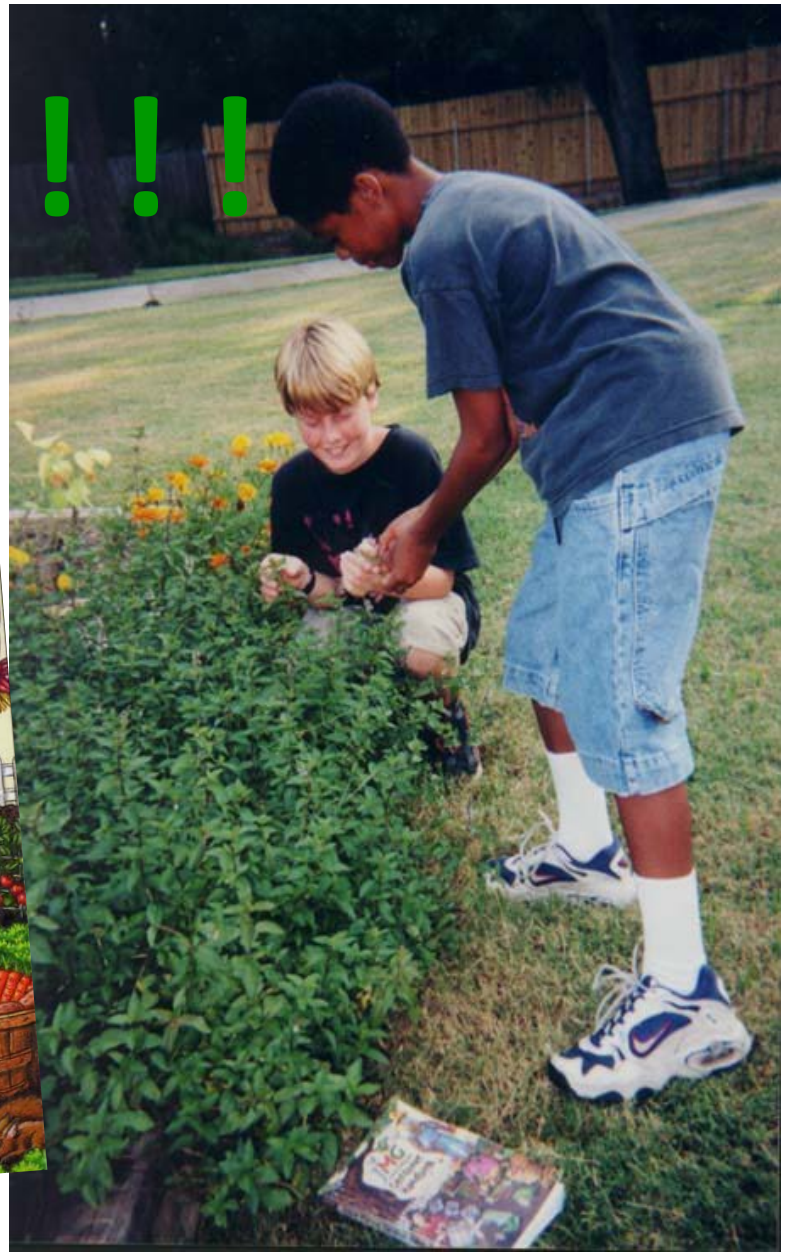
Go and Do It ! ! !





Service Learning & Leadership Development

Certified Junior Master Gardeners®

STEM 4 innovation

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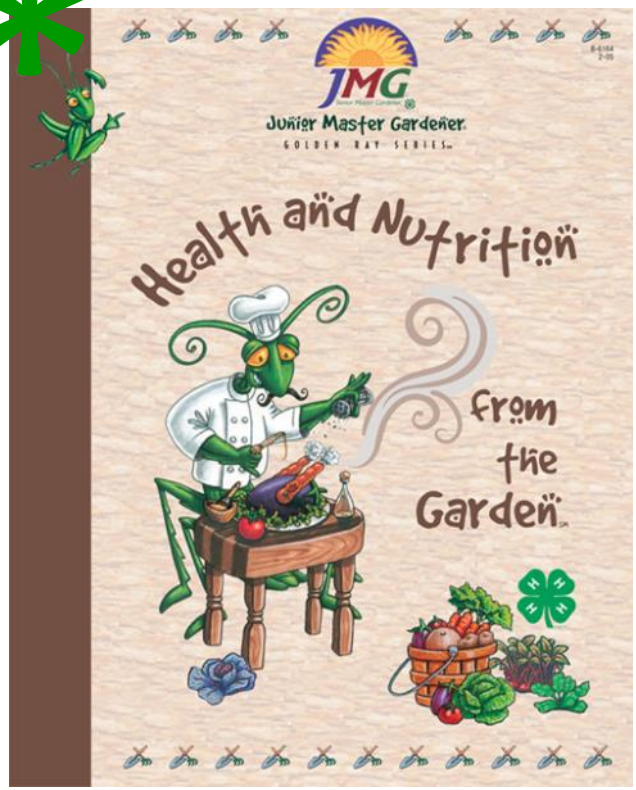
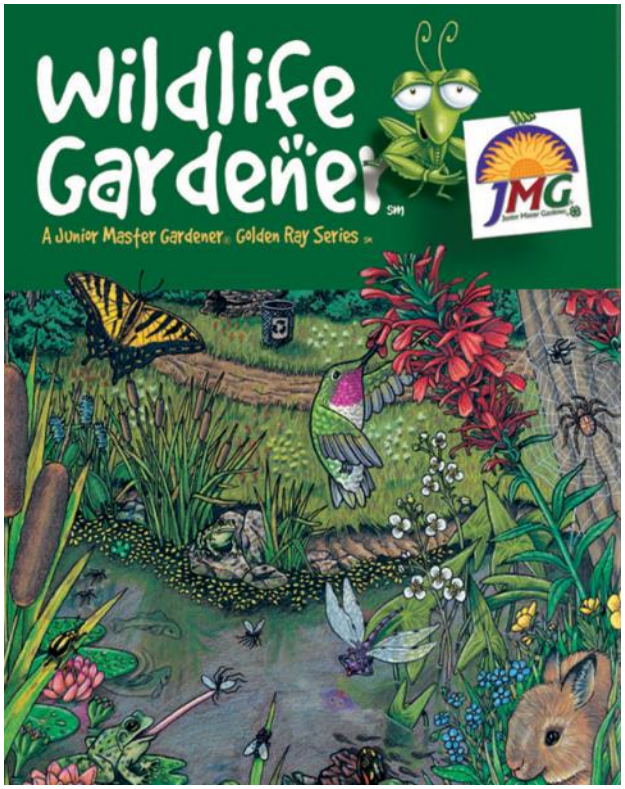
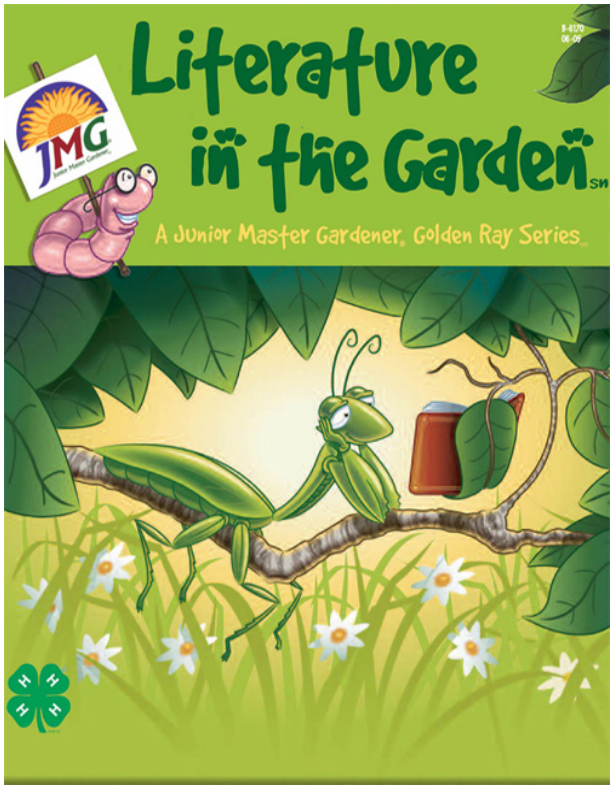
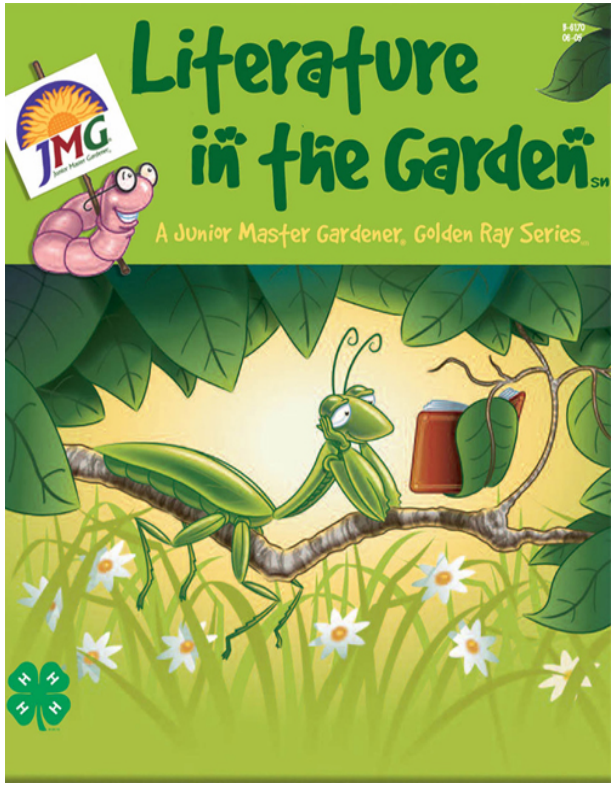
Golden Ray Series
thematic Level One Curricula





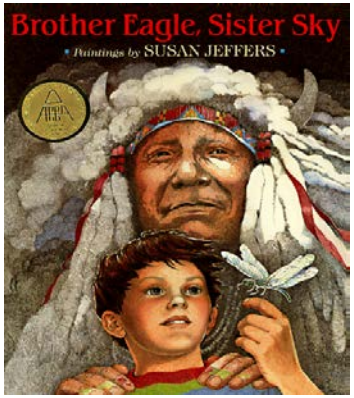


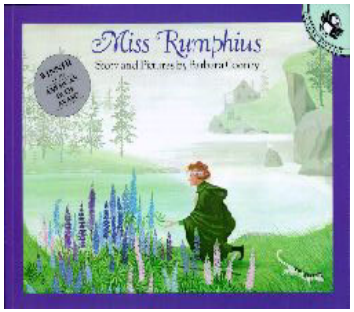
Junior Master Gardener®
Golden Ray Series
thematic Level One Curricula

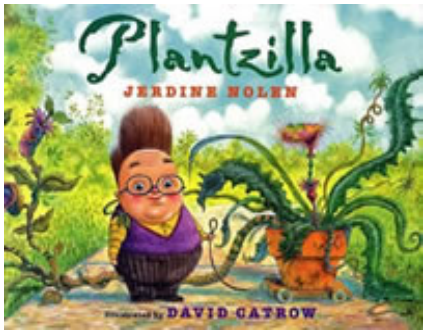


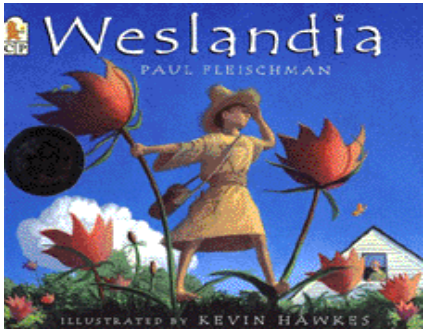
teaching concepts:

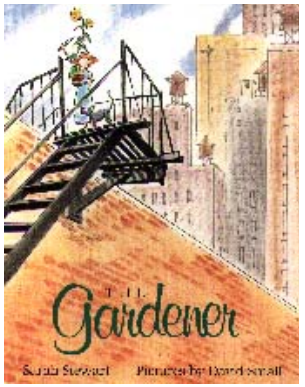
- **Gardening Basics**

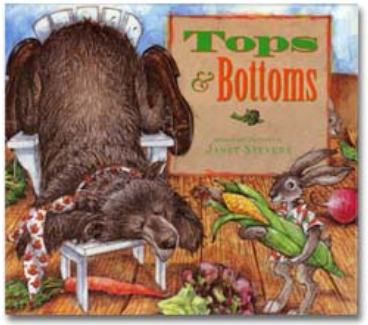








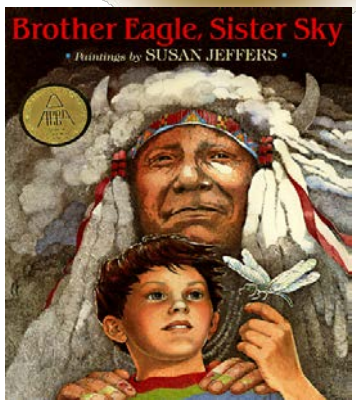


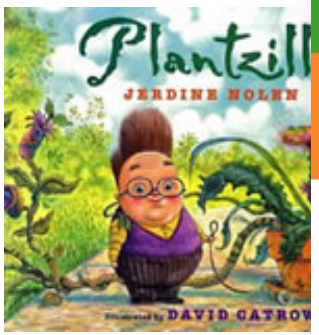


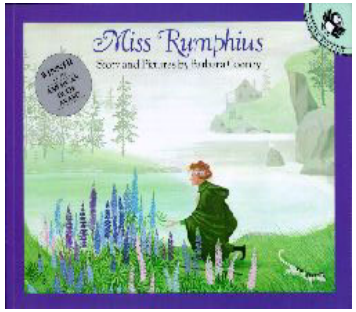
GROWING GOOD KIDS℠

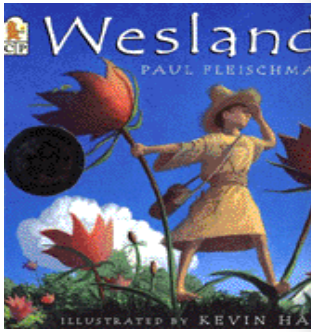
Excellence in Children's Literature

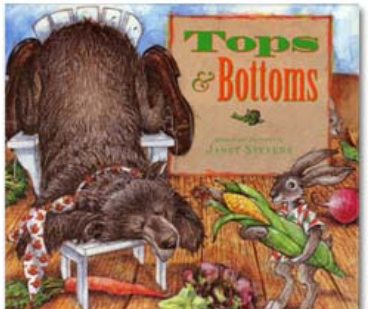
Book Awards Program

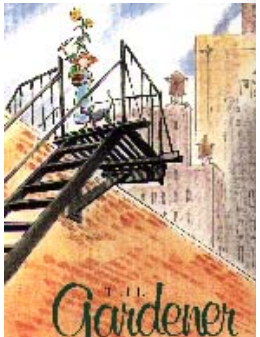


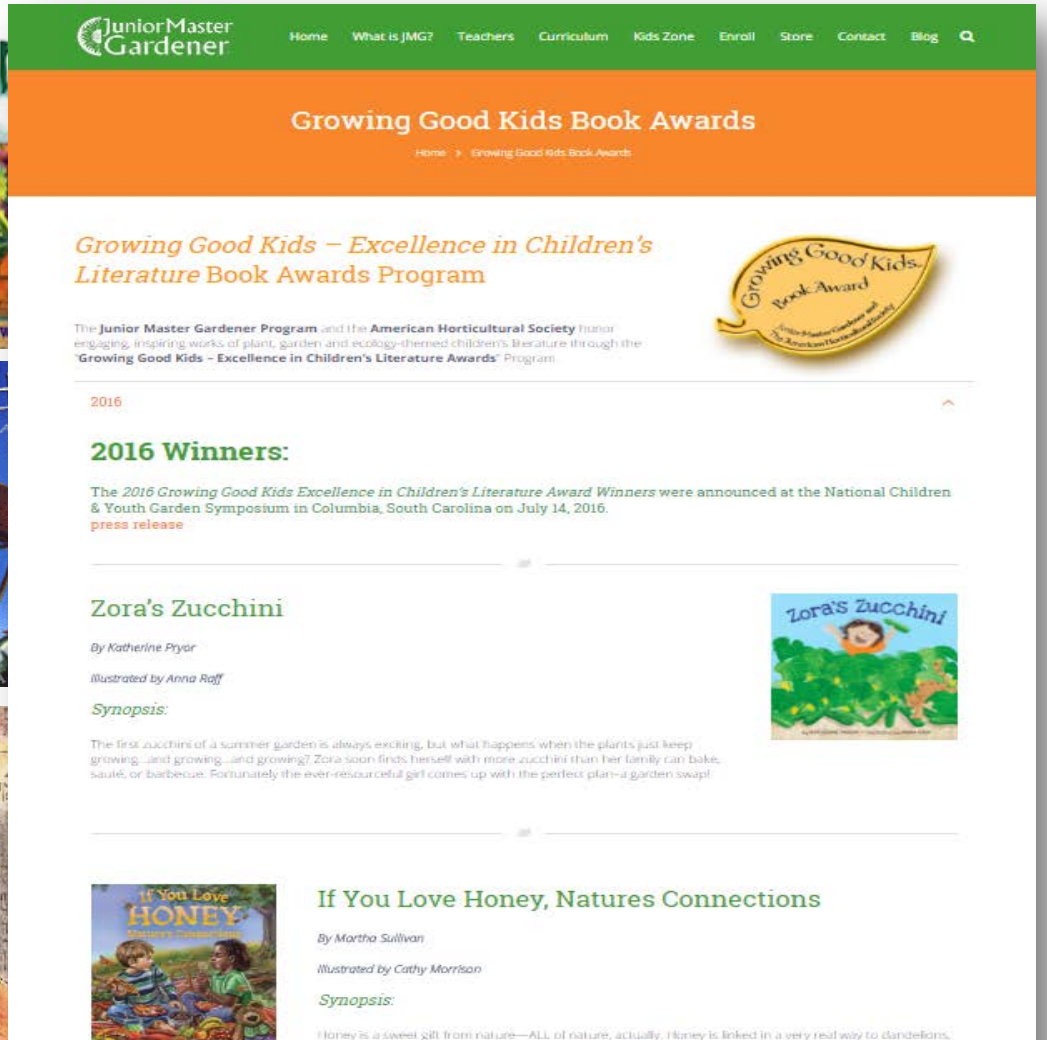












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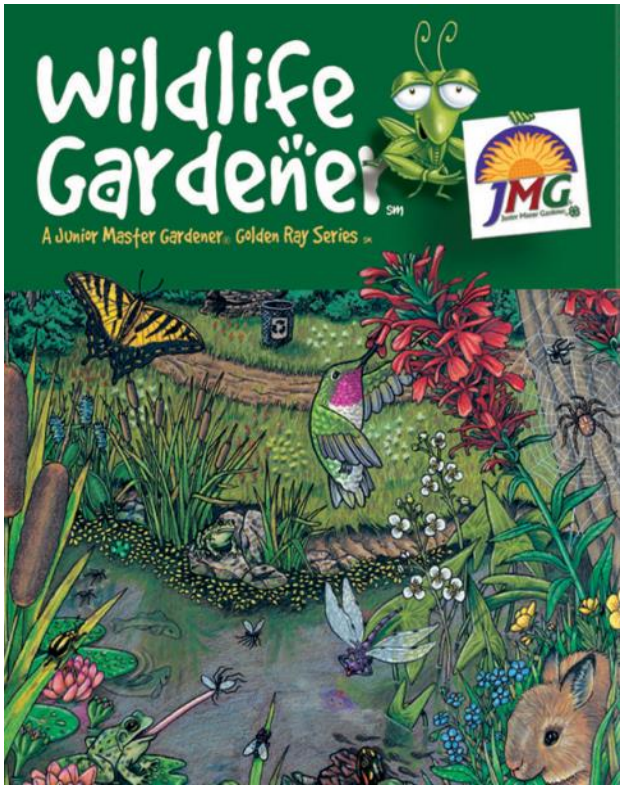
thematic Level One Curricula



NATIONAL WILDLIFE FEDERATION®
www.nwf.org®

Dig into to *gardening for wildlife!*

Identify local birds, mammals, insects, reptiles and amphibians.

Investigate life cycles and interrelatedness of wildlife/plants.

Discover how to attract desirable wildlife to your garden.

Establish a NWF® Certified Schoolyard Habitat®!

Activity Session

Secret Smells (pg. 79, *Teacher/Leader Guide*)

Paper Towel Gardening (pg. 63, *Teacher/Leader Guide*)

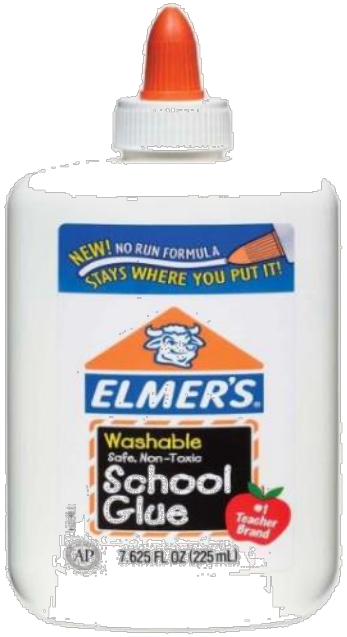
Fruit Frenzy (pg. 79, *Teacher/Leader Guide*)

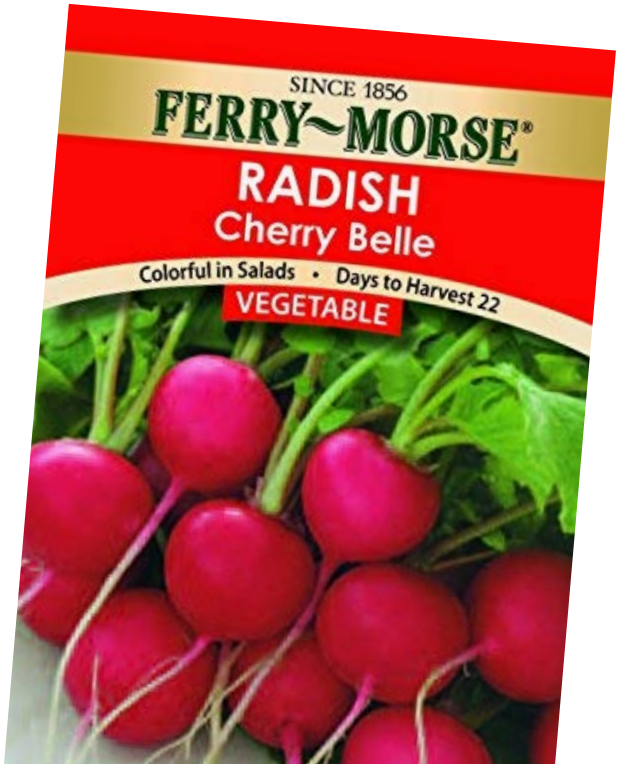
Growing Clean Air Neck Pet
(pg. 4, *Literature in the Garden*)

Junior Master Gardener® growing good kids℠

Texas A&M AgriLife Extension

STEM 4 innovation @ Texas A&M University





Garden Planting Chart

Crop	Recommended planting date	Number of days until emerging	Number of seeds or plants per paper towel	Planting depth	Number of days to harvest
Beans (bush)		5–10	9	1 inch	45–60
Beans (pole)		5–10	8	2 inches	50–70
Beets		7–10	9	½ inch	55–70
Bell peppers		9–14	1	½ inch	110–120
Bok choy		3–10	4	¼ inch	45–50
Broccoli		Transplant	1	Transplant	60–80
Brussels sprouts		5–10	1	¼ inch	120–150
Cabbage		5–10	1	¼ inch	60–120
Carrots		12–18	16	¼ inch	70–80
Cauliflower		Transplant	1	Transplant	60–100
Collards		5–10	4	½ inch	45–80
Cucumbers		6–10	2	1 inch	50–70
Garlic		5–10	16 cloves	1 inch	100–200
Kohlrabi		6–9	1	½ inch	50–75
Lettuce (head)		5–8	4	½ inch	45–90
Lettuce (leaf)		6–8	4	¼ inch	45–60
Mustard greens		3–8	4	½ inch	30–50
Onions		10–14	16	1 inch	80–120
Potatoes		14–28	1 seed potato piece	4 inches	70–90
Radishes		3–6	16	½ inch	25–40
Spinach		7–12	9	½ inch	40–60
Squash		4–6	1 seed per 4 squares	1 inch	45–90
Sugar snap peas		10–12	8	1 inch	60–100
Swiss chard		7–10	4	1 inch	45–80
Tomatoes		Transplant	1	Transplant	60–80
Turnip greens		4–8	4	½ inch	30–60
Turnips		4–8	9	½ inch	30–60

See page# for details of where to find recommended planting date information for your area.

Local Extension support provide info on your local planting dates

Brazos County Master Gardener Association

Vegetable Planting Guide for Brazos County

Bryan/College Station Area average freeze dates: November 28 and March 5

Texas A&M AgriLife Extension

	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Asparagus *		1/15 - 3/15										
Bean, bush			3/10 - 5/5					8/15 - 9/15				
Bean, pole			3/10 - 4/10					8/10 - 9/10				
Beet		1/5 - 3/5							9/1 - 10/20			
Broccoli *		1/20 - 3/5							9/10 - 11/15			
Brussels Sprouts *	12/20-1/15								9/10 - 11/5			12/20
Cabbage *		1/1 - 3/5							9/15 - 12/31			
Cabbage, Chinese (bok choy)		2/1 - 3/10							9/1 - 10/15			
Carrot	12/20 - 3/5								9/15 - 11/30			12/20
Cauliflower *		2/15 - 3/20							9/20 - 10/31			
Corn, sweet			3/5 - 5/5				7/15 - 8/20					
Cucumber			3/20 - 6/15				7/20 - 8/15					
Eggplant *			3/25 - 6/10				7/10-7/31					
Garlic		1/1 - 3/15						8/10 - 10/20				
Greens:												
Chard, Swiss		2/1 - 4/20							8/20 - 11/15			
Collard *		2/10 - 3/31								10/1 - 10/31		
Kale *		1/20 - 3/10								10/1 - 10/31		
Kohlrabi		1/20 - 3/10							9/20 - 11/30			
Lettuce, leaf		1/15 - 3/20							9/15 - 11/30			
Mustard		1/20 - 4/15							8/20 - 11/15			
Spinach		1/20 - 2/20							9/5 - 10/25			
Turnip		1/15 - 4/20							8/20 - 11/20			
Melons				4/5 - 6/15			7/15-7/31					
Okra				4/5 - 6/15			7/15-7/31					
Onion, bulb *	1/5 - 2/5											
Onion, green *										10/1 - 10/31		
Pea, Edible Pod		1/25 - 3/5							9/15-9/30			
Pea, English		1/20 - 2/20							9/15-9/30			
Pea, Southern				4/5 - 6/15			7/15-7/31					
Pepper *				4/5 - 6/15				8/1 - 9/15				
Potato, Irish *		2/5 - 3/5						8/15-8/31				
Potato, sweet *				4/5 - 5/20								
Pumpkin				4/5 - 6/15			7/15-7/31					
Radish			1/25 - 5/5						9/1 - 11/30			
Squash, summer			3/15 - 6/15				7/15 - 8/20					
Squash, winter			3/15 - 6/15				7/15 - 8/10					
Tomato *			3/5 - 4/20					8/1 - 9/15				

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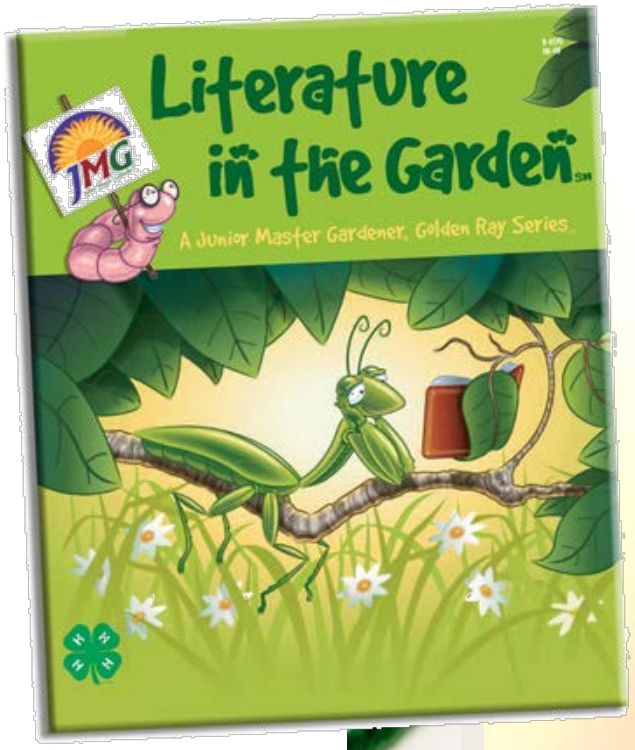
Plantzilla
JERDINE NOLEN

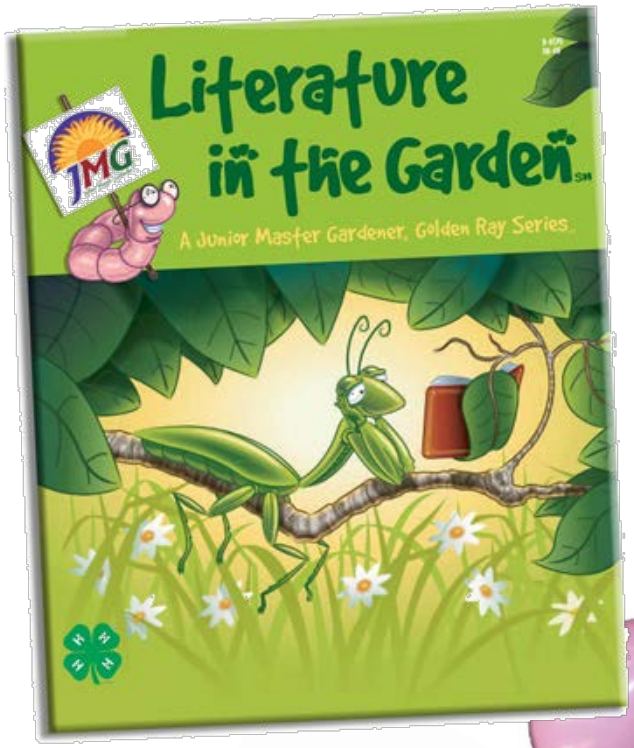

POUND-O-TRON
OPEN THIS END
LEAD BELLY
Heavy Cream

Growing Clean Air Neck Pet, p40



growingSTEM

Monster Flowers, p23



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Fruit Frenzy

Objective: To become familiar with how fruits develop around seeds.
Time: 30 minutes.
Materials: Several fruits, knife, Fruit Frenzy! page (in the Appendix), paper.

This is an explorative activity. It can be messy, but fun. It is a good idea to choose fruits that form seeds in different ways and are different colors.

es of the Fruit Frenzy! page. Hold up a piece of fruit that has a single seed, such as peach. Have the gardeners draw an outline shape of the fruit in the first box on the ge. Tell them that in the middle of almost all fruit grows a seed. Have them predict s are in the fruit and write it in the Guess circle.

half and show the gardeners the half with the seed. Have them draw the seed in them how many seeds were in that fruit and if all fruits have the same number of uld write the number of seeds in the Actual circle.

r job is to open a fruit, look at it, draw a picture of the seeds in the remaining boxes predict the number of seeds each will contain, just as they did in the first box. n into groups of three and give them enough fruits to complete their pages. Help beginning a cut into the fruit and allowing them to tear it open with their hands. the seeds and record the number on the Fruit Frenzy! page. As they complete the spread the seeds on newspapers and allow them to dry for future use.

Name _____ Date _____

Fruit Frenzy!

Guess how many seeds a fruit has, and write the number in the Guess circle. Then, open each fruit and sketch what it looks like in the box. Then count the seeds and write that number in the Actual circle.

Guess
Actual

Guess
Actual

Guess
Actual

Guess
Actual

STEM 4 innovation

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Junior Master Gardener®

growing good kids℠

STEM 4 Innovation Conference

Junior Master Gardener® Training Workshop

Horticulture/Forestry Sciences Building & Howdy Farm, Thursday, January 26th

STEM 4 innovation @ TEXAS A&M UNIVERSITY

broccoli	broccoli	cauliflower	cauliflower
carrots	radish	bok choy	kale
carrots	radish	bok choy	green onions
leaf lettuce	baby spinach	baby spinach	baby spinach

#STEM4innovation

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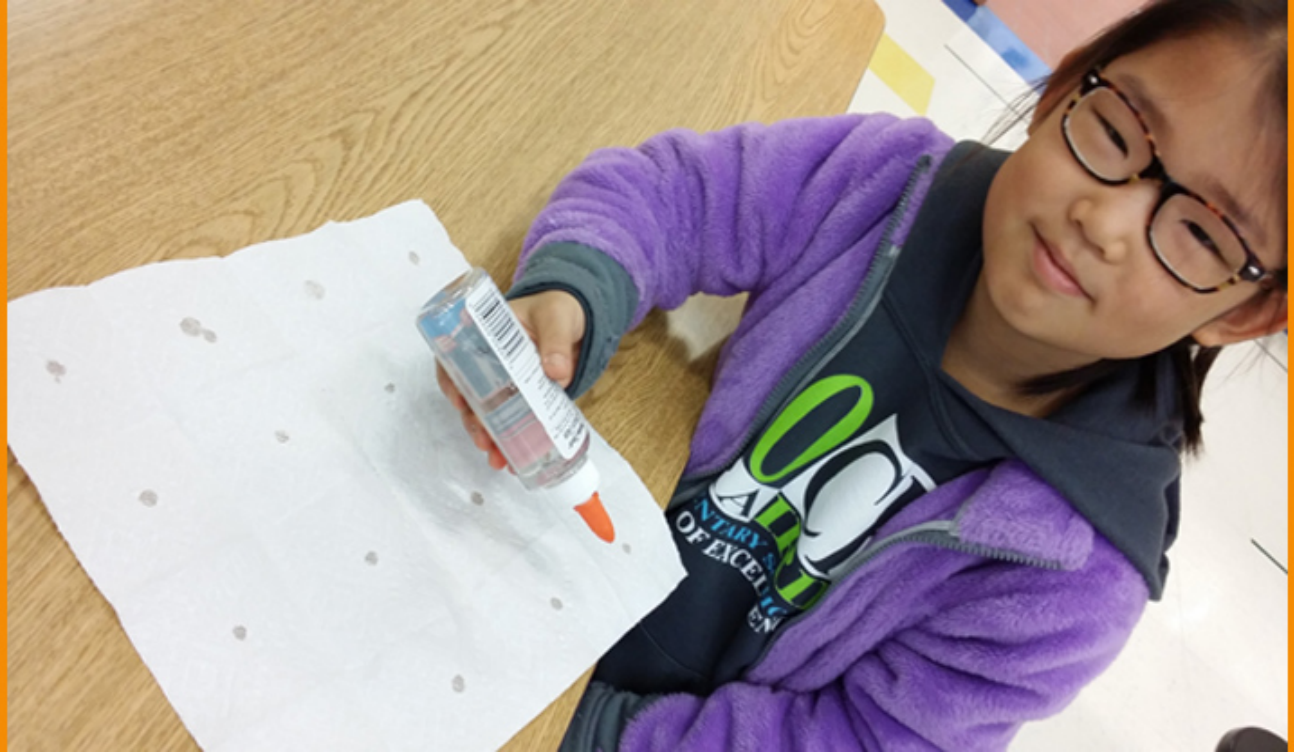
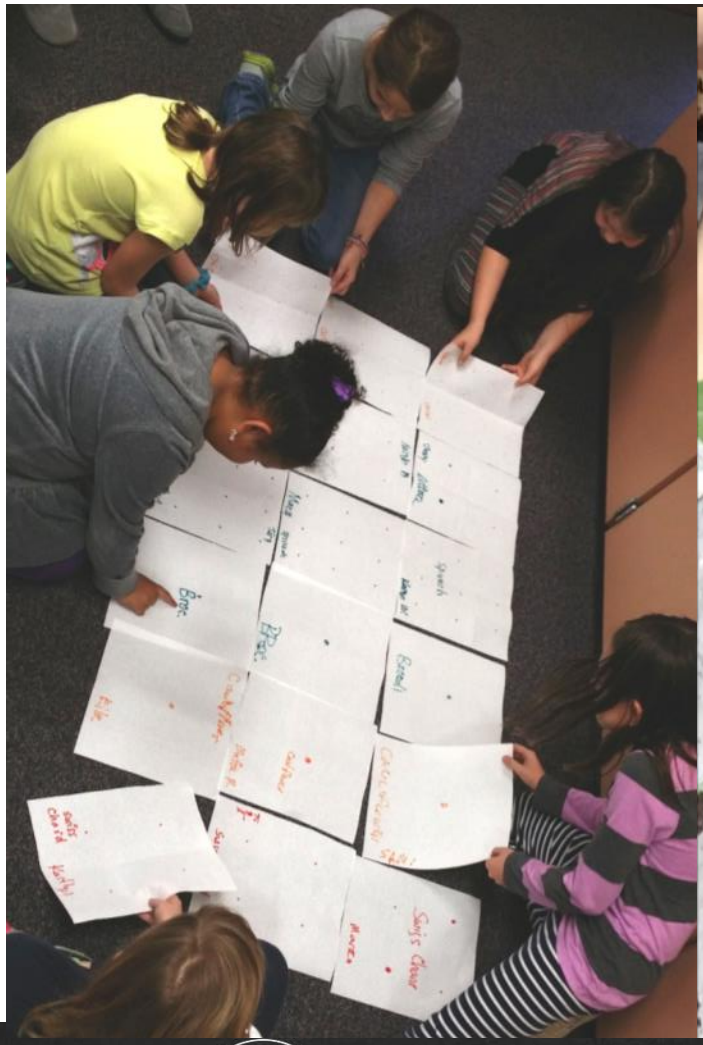
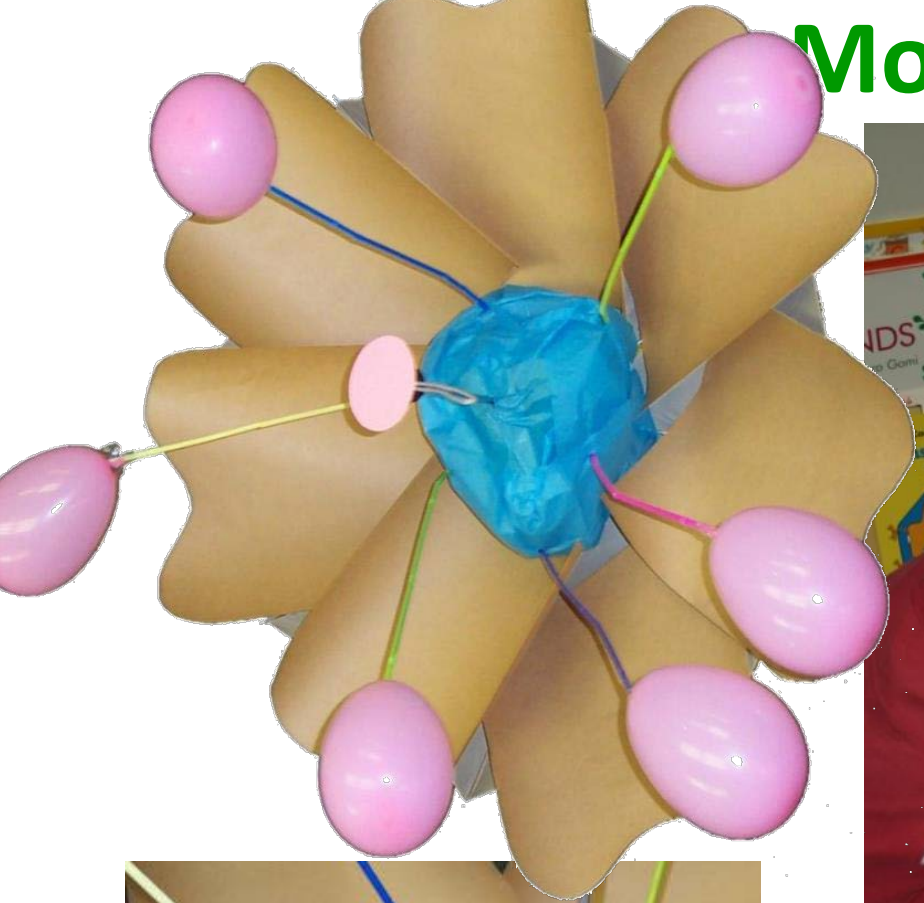
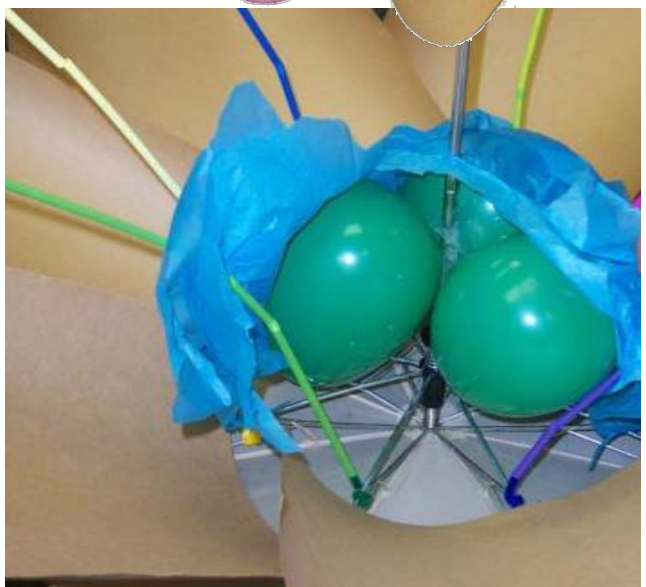




Monster Flowers, p23





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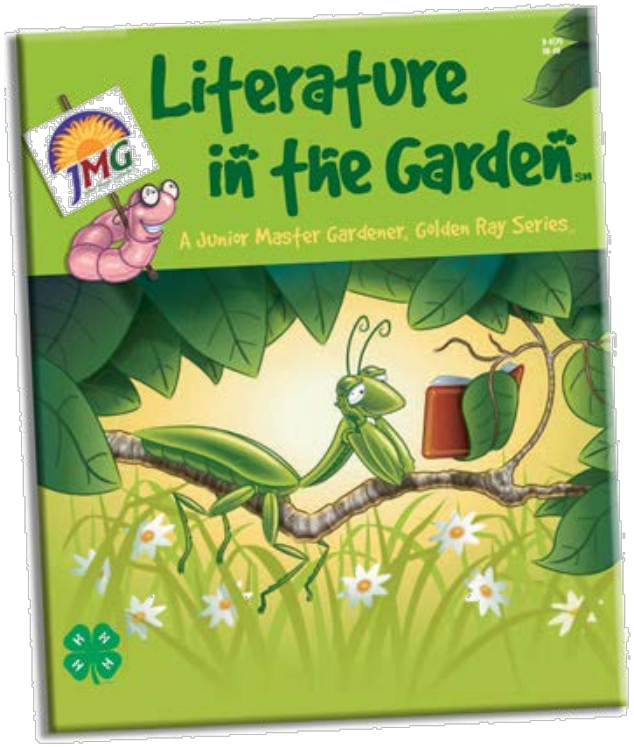
Growing Clean Air Neck Pet, p40



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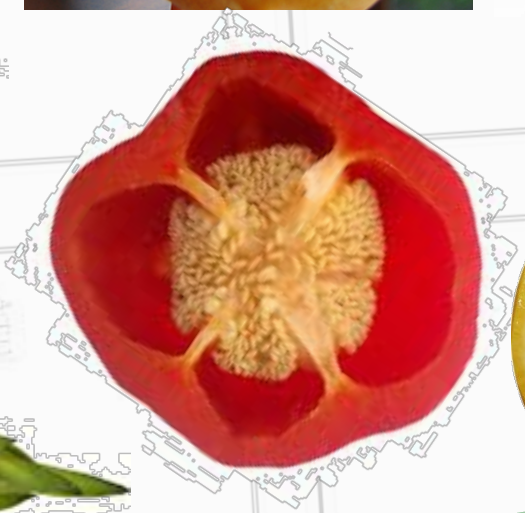
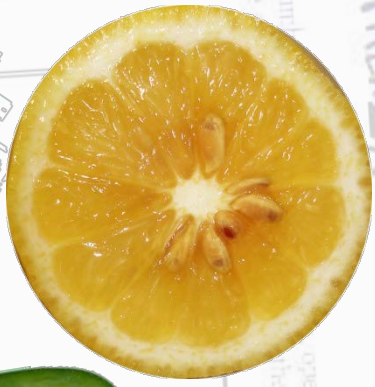




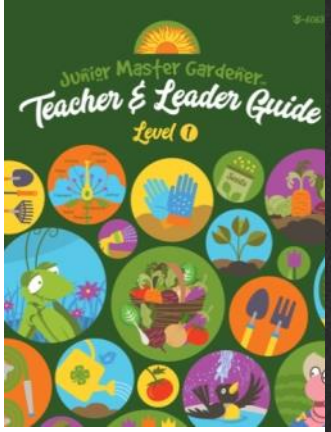
STEM 4 innovation

TEXAS A&M AGRILIFE EXTENSION

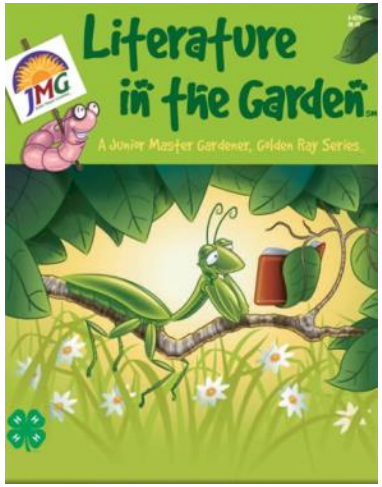
Recognizing Students' Work

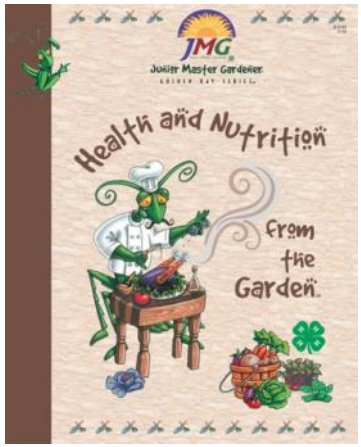
STEM 4 innovation @ TEXAS A&M UNIVERSITY

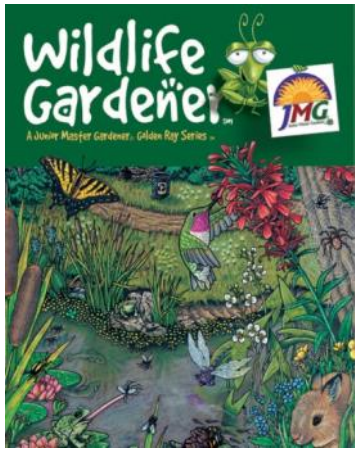
Junior Master Gardener®
Golden Ray Series
Recognition Certifications



stand-alone curriculum:







chapters/themes:

- Plant Growth & Development
- Soils & Water
- Insects & Plant Diseases
- Ecology & Environmental Hort
- Landscape Horticulture
- Fruit & Nutrition
- Vegetables & Herbs

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STEM 4 innovation

TEXAS A&M AGRILIFE EXTENSION

Becoming a registered JMG group!

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Make Plans Now to Grow Science Achievement this Spring!

Earning a **Junior Master Gardener® Certification in Plant Growth & Development** is achieved by completing any 12 lessons from the JMG® Plant Growth & Development chapter. But there are so many activities to choose from!

Want to know the Plant Growth & Development top 12 lessons rated as favorites by classes across the country?

The National Science Teacher Association Reports: "School Gardens Grow Science Achievement Test Scores."

ENROLL YOUR CLASS FOR FREE

SEE CURRICULUM OPTIONS

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Junior Master Gardener

Junior Master Gardener
growing good kids

Welcome to Junior Master Gardener Online

- ○ I have a profile
- ◉ I need to setup a profile
- ○ I forgot my password

State: Alabama

County: Autauga

Email:

Confirm Email:

Last Name:

Password:

Password:

Role: Teacher/Leader

Create Login

4HOnline Registration powered by 4HOnline

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STEM 4 innovation

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Interested in being a JMG author?

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TEACHERS ARE THE AUTHORS

growing STEM

STEM DESIGN PROCESS

DEFINE PROBLEM
PLAN SOLUTIONS
MAKE MODEL
TEST MODEL
REDESIGN

ASK/IMAGINE
PLAN/TEAMWORK
IMPLEMENTATION/DATA
CONCLUSIONS/NEW QUESTIONS

TEACHERS ARE THE AUTHORS

growing STEM

STEM PROCESS SKILLS/PRIORITIES

- Inquiry-based learning
- Open-ended
- Real-world problem
- Observe, gather data
- Team/collaborative problem solving
- Integration of subject areas
- Incorporate tech

www.JMGkids.us/STEM

growing STEM

growing STEM

How to Grow Plant-Based STEM Education

The lesson extensions featured below are being developed to help grow STEM in your classroom.

If you already have the JMG Teacher Guide, use these extensions are used before, during and after existing JMG lessons to maximize use of these STEM priorities:

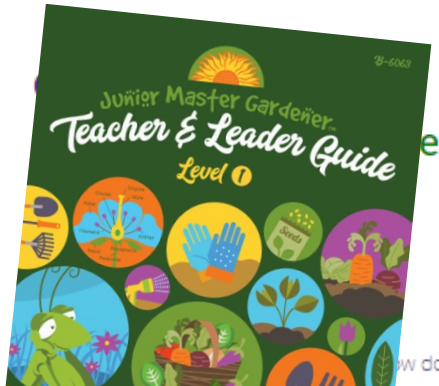
- Inquiry-based/open-ended learning
- Use of Design process
- Real-world problem solving
- Observation, gathering data
- Team/collaborative problem solving
- Integration of subject areas
- Incorporation of technology

> *If you are interested piloting new STEM lessons are they are being created, providing feedback on these, or contributing your your ideas on plant-based STEM, we want to hear from you!*

Be a Contributor or Author!

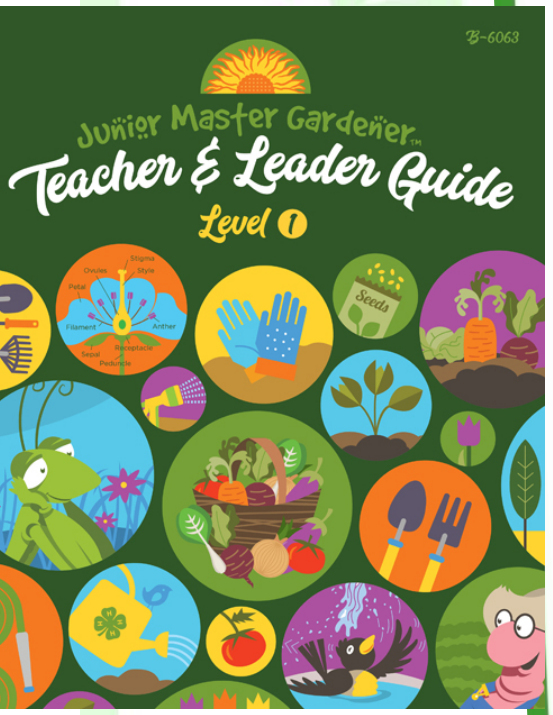
Fruit Frenzy

Coconut Float



eds that can be dispersed

w do seeds get to the place where they grow?



Fruit Frenzy

Coconut Float

Fruit Frenzy p.152

Investigate seed formation in fruit & vegetables

Before the lesson

ASK/IMAGINE:

- Think of a fruit or vegetable you like. When you eat it, do you also eat the seeds?
- Think of a fruit/vegetable that you have seen with seeds. Make a sketch of the cross-section of a fruit or vegetable that shows it's seeds.
- Do seeds form in the same location in all fruits/vegetables? Do all fruits/vegetables contain seeds?

During the lesson

PLAN/TEAMWORK

- Provide class with at least 8 different fruits or vegetables.
- Divide students into teams of 3-4. Have teams discuss how they could begin work to investigate & answer the questions:
  - *Do seeds form in the same location in all fruits/vegetables? Do all fruits/vegetables contain seeds?*
- Allow teams a few minutes to discuss then facilitate whole class discussion of how teams can work together to examine fruits/vegetable provided. Task teams with determining way to collect/record data about seed quantities and formation with in the sample fruits/vegetable then share with other teams.

IMPLEMENTATION/DATA COLLECTION

- If needed, provide Fruit Frenzy cross-section worksheet (p.275) to teams.
- Remind teams to carefully examine their fruits/vegetables, make sketches, count seeds, etc. As needed, facilitate teams sharing date with the rest of the class.
- Facilitate class discussion in response to the initial questions.
  - *Do seeds form in the same location in all fruits/vegetables? Do all fruits/vegetables contain seeds*

Closing the lesson

CONCLUSIONS/NEW QUESTIONS

- As teams provide responses, have them point to evidence that the larger class gathered to back up their claims.
- Encourage teams to continue collecting more information on fruits/vegetable seed formation at research links below (coming soon).
- Help guide the class to come up with a 1-2 statement answer to each of the questions posed.
  - for example:
    - Do seeds form in the same location in all fruits/vegetables? *Most of the time seeds are in the center of the fruits and vegetables but they can be scattered inside like in watermelon or even covering the outside like on strawberries.*
- Challenge each team to come up with 1-2 questions that may have come up in their minds while they were working.That could be a future exploration for the class.

growingSTEM

BE A TEACHER AUTHOR & CONTRIBUTOR?

JuniorMaster Gardener

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Be a Contributor or Author!

www.JMGkids.us/STEM

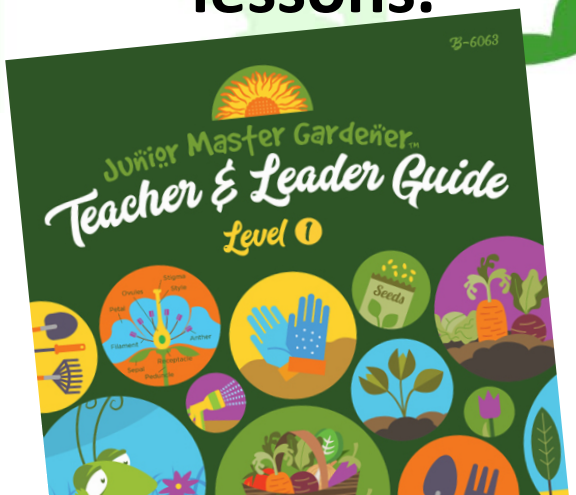
growing STEM

BE A TEACHER AUTHOR & CONTRIBUTOR?

Seeking your:

- **STEM-focused extensions/adaptations for JMG existing lessons**

- **Experiences & ideas for original plant-based STEM lessons.**



growing STEM

Want to be a contributor for JMG?

We are looking for teachers to share ideas for plant-based STEM lessons. If you have ideas or experiences that could be developed into a STEM lesson feature, we want to hear from you! Share your thoughts in the email form here and we'll follow up with next steps!

Name *

Email *

Phone Number

Message *

submit your idea!

JMGkids.us/STEM

growing STEM

STEM 4 innovation

TEXAS A&M AGRILIFE EXTENSION

Junior Master Gardener®

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STEM 4 Innovation Conference

Junior Master Gardener® Training Workshop

Horticulture/Forestry Sciences Building & Howdy Farm, Thursday, March 30th

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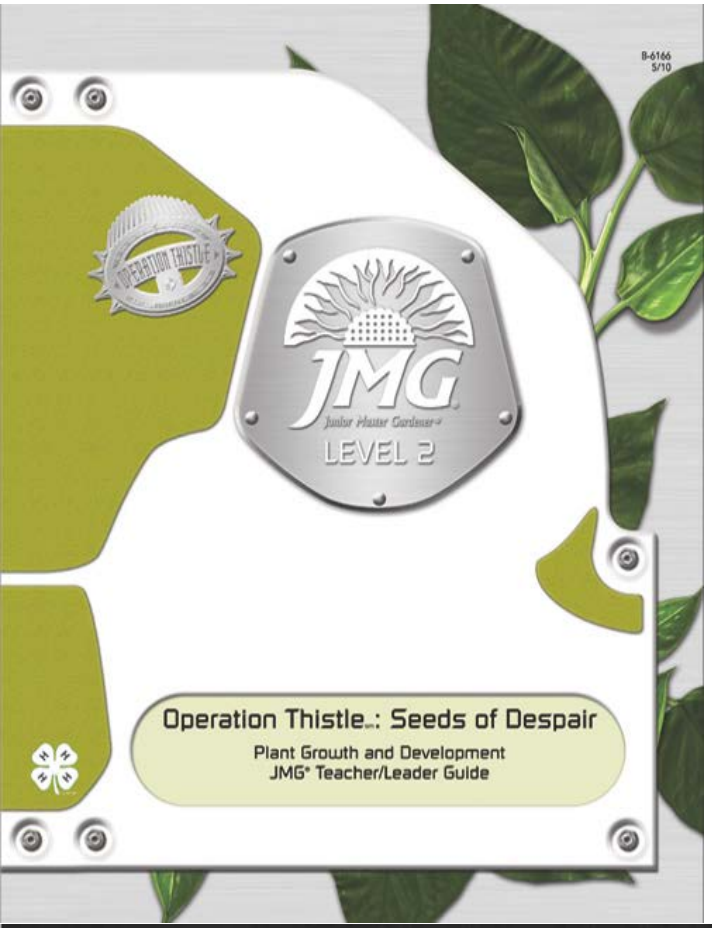
Operation Thistle: Seeds of Despair
Plant Growth and Development



teaching concepts:

- Importance and Uses of Plants
- Plant Classification
- Plant Parts
- Plant Needs
- Plant Processes
- Plant Growth
- Seed Propagation
- Vegetative Propagation

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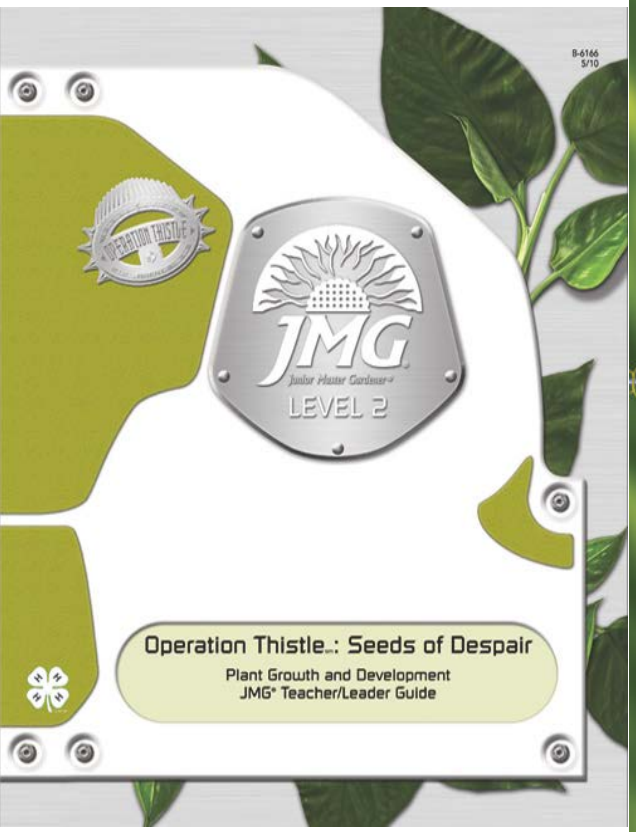
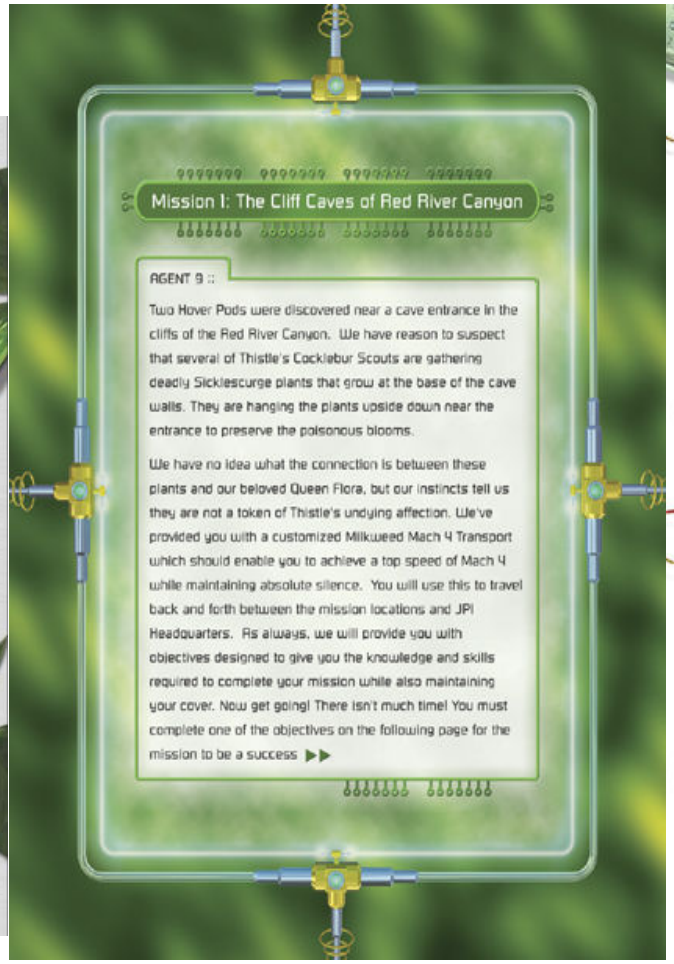
FOR GRADES 6-8

Operation Thistle: STUDENT PAGES

MISSION BRIEF





MISSION OPTIONS

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FOR GRADES 6-8

Operation WATER: Thistle Goes Underground

Plant Growth and Development

teaching concepts:

- Soil Color, Texture, & Structure
- Nutrients
- Soil Improvement
- Soil Conservation
- Water Cycle and You
- Water Movement
- Watersheds, Wetlands & Aquifers
- Water Conservation

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FOR GRADES 6-8

Classifying Characteristics

Plant Category

Dicot
Leaves have netted veins and produce flowers.
Their seeds have two cotyledons (oak trees, bean plants).

Monocot
Leaves have parallel veins and produce flowers.
Seeds have only one cotyledon (corn plant, grasses).

Conifer
Have needle-like leaves, no flowers, produce cones, and leaf type is always simple
(pine trees, cedar trees).

Leaf Type

Simple leaf
Blade of leaf is one unit.

Compound leaf
Leaf is made up of smaller individual blades called leaflets.

Leaf Arrangement

Opposite

Alternate

Whorled

Leaf Shapes

1. needle-shaped
2. awl-shaped
3. linear
4. cordate
5. deltoid
6. lanceolate
7. elliptic
8. oblong
9. ovate
10. obovate
11. sagittate
12. peltate
13. spatulate
14. reniform
15. orbicular

Root Types

Tap root

Fibrous root

Storage root

Classifying Characteristics

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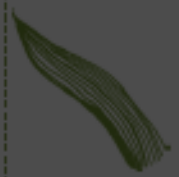

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15. orbicular

Root Types

Tap root

Fibrous root

Storage root

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Operation Thistle

Indoor Botanical Garden of Art (pg 20)

students create paper sculptures to learn plant terms

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Many plants root very easily. However, a rooting hormone can be used on more difficult to root plants. Rooting hormones can be purchased at most garden centers and the cutting can be dipped into the rooting hormone before it is put into the soil.

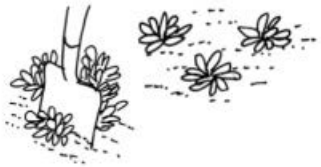
Many plants can be propagated using the leaf.

Remove a healthy leaf from the plant, make a shallow hole in the potting soil, and gently firm the soil around the cutting.

Cover your leaf cutting with a clear plastic bag to keep it moist and encourage rooting. You will begin to see new plantlets forming at the base of the leaf within 4–6 weeks. Once the plantlets are big enough for you to pick up easily, the plastic can be removed and the plantlets can be put in an individual container.

Many plants can be propagated by division.

Use a sharp shovel or spade to divide a mother plant.



You can also use your hand to divide plants into smaller sections. Each section should have a mass of roots. These can be potted into individual containers.

Many plants like Sanseveria, more commonly known as Mother-in-Law's Tongue, can be propagated by taking multiple leaf cuttings.

ge leaf from
nt with a

Use a knife
multiple cut
sure that the
put into the
position, wi
down.

, like blackbe

Cover your root cuttings with a clear plastic bag to keep them moist and encourage rooting. Be sure to check daily to make sure that they do not dry out.

enough to remove easily, remove the plastic and place them into their own container. This technique does not work with all plants. Have fun experimenting to see what plants can propagate using their roots!

from JMG® Level 2, Operation Thistle (Plant Growth & Development)

There are many plants that can be propagated by leaf cuttings. Bego propagates very easily using the whole leaf, sections, or squares of th

Use a ruler and a sharp knife or X-acto® knife to measure and cut 3/4-inch squares from the leaf. Be sure that a part of a vein is in each square!

Lay the leaf squares on top of the potting soil about 1/2 inch apart.

Cover your leaf squares with a clear plastic bag. This will keep them moist and help them to start forming roots.

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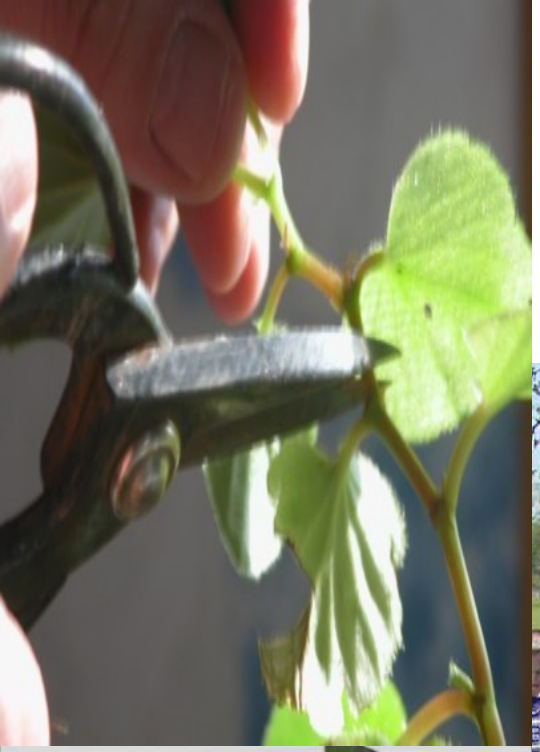
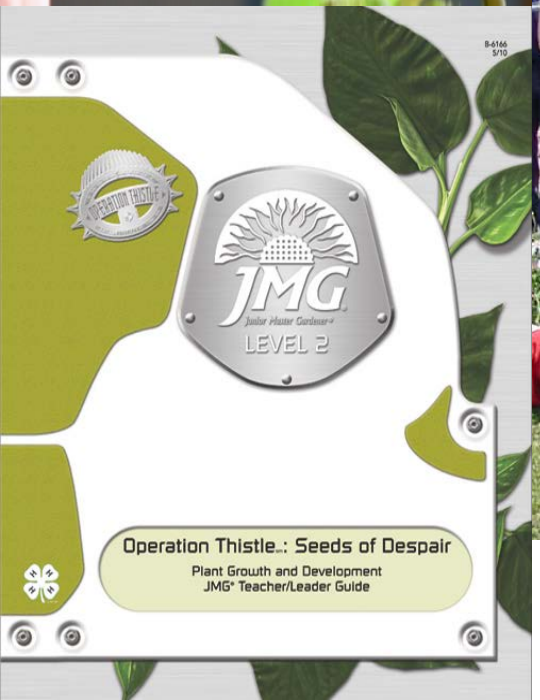
Operation Thistle

Six Week Propagation **(pg 106)**

Production Venture





Plants *grow* funds with a class run business

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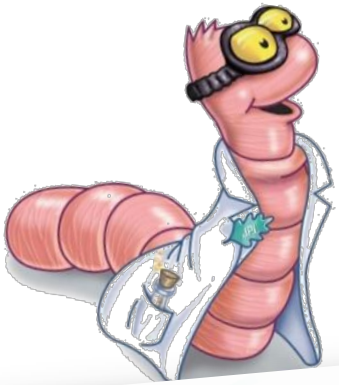
Operation Thistle

Survivor Seedlings(pg 60)



Make craft materials available and allow partners to bring any other desired materials from home the next day. Items may include:

natural seed

string
confetti
scissors
staplers
yarn
etc.

nk about

trategy

g

treme

r

Student-created survivor seed

2. Survivor Seedlings

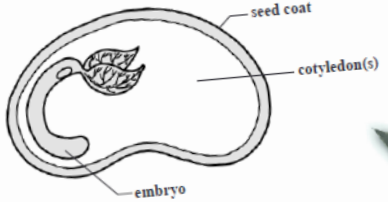
Objective: To create three-dimensional models of seeds and seedlings to survive extreme environmental conditions

Time: Two 45-minute sessions

Materials: Coconut, avocado seed, at least four additional seeds (see note below regarding various seed coat types), "Survivor Seedlings Specifics" page (following this lesson, on page 63)

***Note:** Before this activity, you will need different types of seeds available for gardeners to examine, including seed specimens with fleshy fruit. Seeds that would work well with this activity are peanuts (in-shell), fresh green beans, pecans, walnuts and coconuts (if possible with yellow-green husk). Examples of seed specimens with fleshy fruit would be peaches, mangos and apples. Cut or break open to expose seeds and seed parts, and if possible, have at least two seed types available for each gardener to examine individually.*

Remind gardeners of the three main parts of the seed and their function:



seed coat: protects the seed and may help provide means of dispersal for seed

cotyledons: provides energy for the seed to germinate and helps produce the *true leaves*

embryo: the young plant itself

Explain that as a seed germinates to become a young plant, called a **seedling**, the parts begin to change and new parts begin to grow:

seed coat: splits and falls away from the plant as it grows

roots: grow into the soil to absorb mois-

the young seedling

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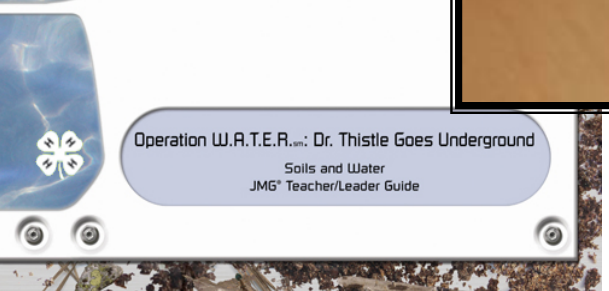
Operation W.A.T.E.R.

2 Liter Compost Capsule (p49)

Determine variables that make composting happen most efficiently



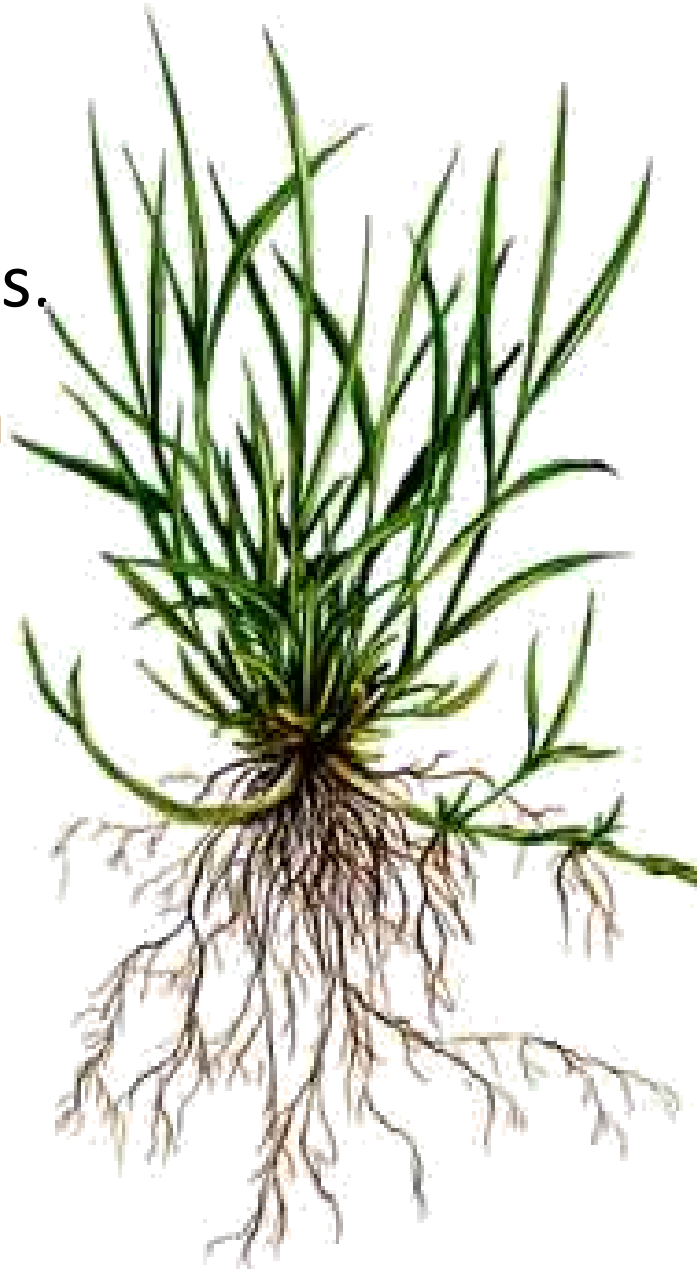
Operation W.A.T.E.R.

Root Zone Water Police **(p135)**

1. Run the sprinklers for 15 minutes.

2. Twenty-four hours later, dig up a shovelful of soil to measure the number of inches deep the soil is moistened.

3. Divide 90 by the depth in inches of the moistened soil.

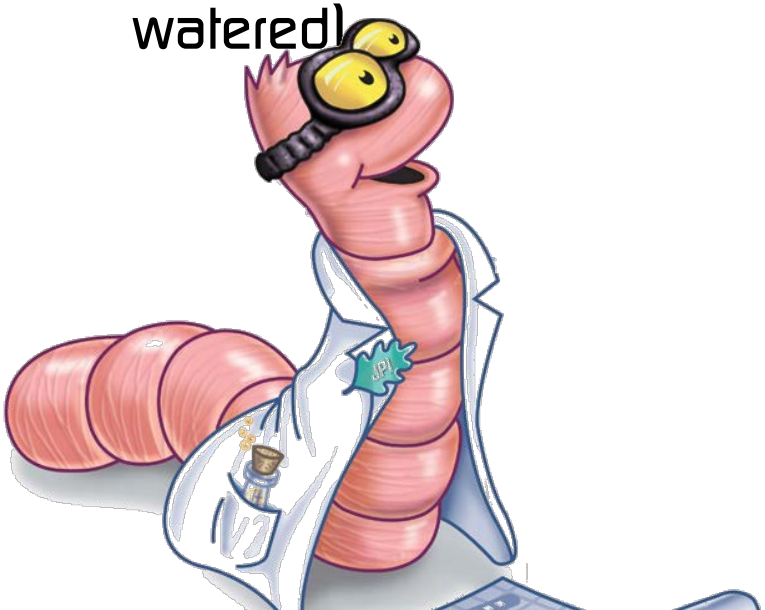


Students protect water and serve their community by providing customized info about a lawn's specific water needs

How does work?!

Students determine a simple ratio:

$$\frac{\text{X inches (tested depth of moisture)}}{\text{15 minutes (number of minutes watered)}} = \frac{\text{6 inches (ideal depth of moisture)}}{\textit{Y minutes (number of minutes that area should be watered)}}$$

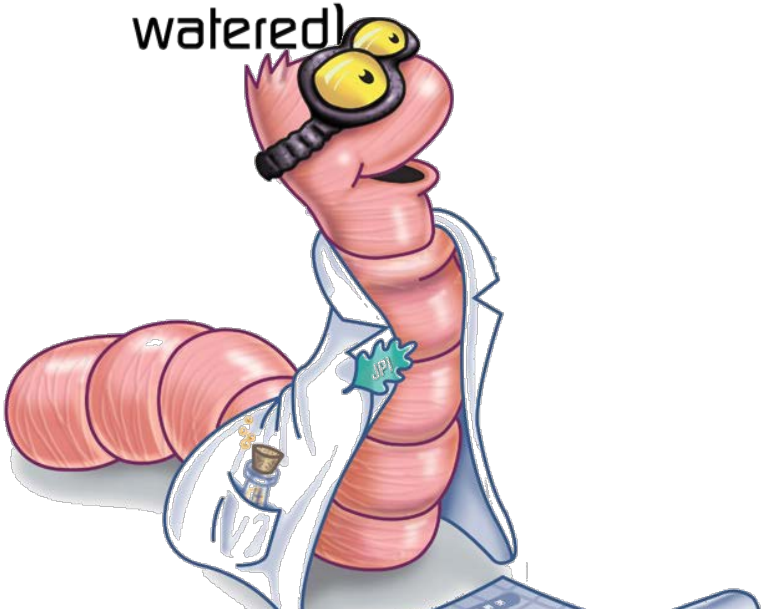



2 inches

How does work?!

Students determine a simple ratio:

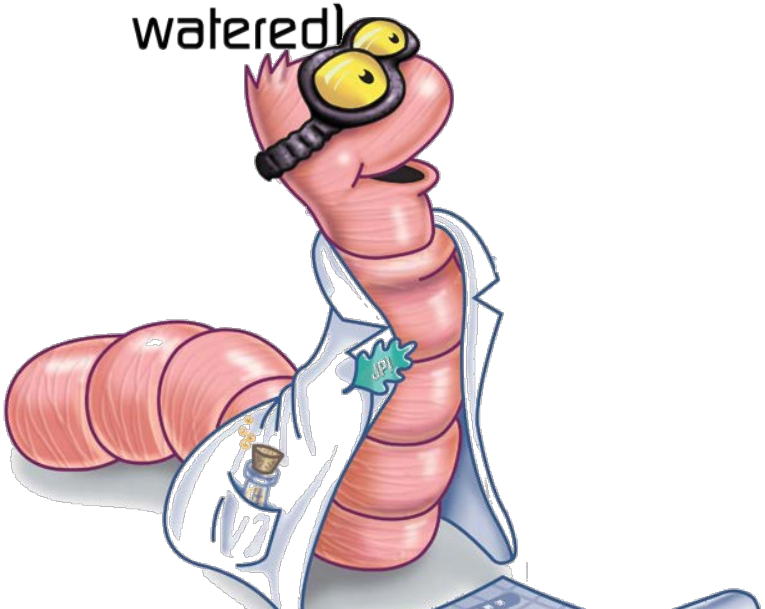
$$\frac{\text{2 inches (tested depth of moisture)}}{\text{15 minutes (number of minutes watered)}} = \frac{\text{6 inches (ideal depth of moisture)}}{\textit{Y minutes (number of minutes that area should be watered)}}$$



How does work?!

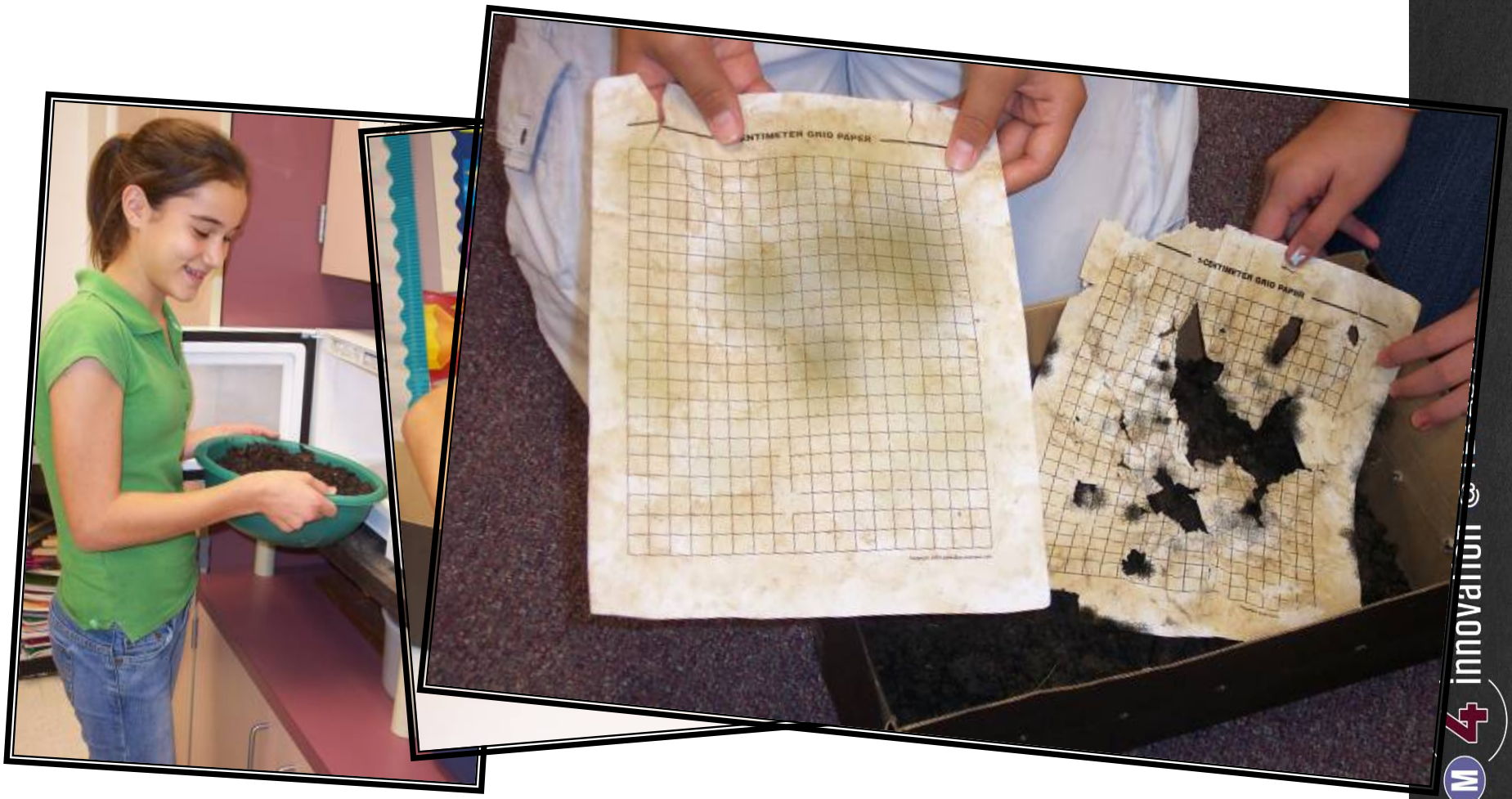
Students determine a simple ratio:

$$\frac{\text{2 inches (tested depth of moisture)}}{\text{15 minutes (number of minutes watered)}} = \frac{\text{6 inches (ideal depth of moisture)}}{\textit{45 minutes (number of minutes that area should be watered)}}$$



Operation W.A.T.E.R.

Micro-Baked Dirt Cake **(p36)**



what happens when soil organisms are not present?

STEM 4 innovation

Texas A&M AgriLife Extension

Junior Master Gardener®

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STEM 4 Innovation Conference

Junior Master Gardener® Training Workshop

Horticulture/Forestry Sciences Building & Howdy Farm, Thursday, March 30th

"JMG is a hands-on program aligned to academic standards… It is *so refreshing for our students to be able to cover the TEKS in other than a test format*. The children enjoy the activities."

Kathleen Coburn, Ph.D., Director of Math, Science, Gifted Education, Temple ISD

STEM 4 innovation @ TEXAS A&M UNIVERSITY

Program Evaluation

National Online Survey for Leaders

- Over 85% of respondents stated that

  JMG has increased youth interest in science

- Over 83% of respondents stated JMG has

  contributed to higher academic standards

- Over 85% of respondents said JMG youths were

  more enthusiastic about learning

2007 issue of Hort Technology

Studies specifically examining the benefits of students participating in JMG Curricula :

"…results show once weekly use of gardening activities and hands-on classroom activities ***help improve science achievement*** test scores."

Impact of Hands-on Science through School Gardening in Louisiana Public Elementary Schools

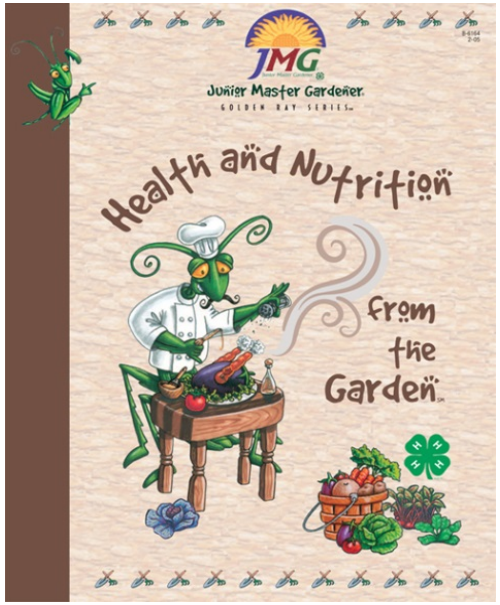
- "Students in the experimental group scored significantly ***higher on the science achievement test*** compared to the students in the control group ."

Growing Minds: The Effect of a School Gardening Program on the Science Achievement of Elementary Students

knowledge & behavior change

increased **fruit and vegetable** *consumption*

Koch, 2001



Research Project: **Texas Grow! Eat! Go!**

Expansion/Implementation/Research Study Project

MICHAEL & SUSAN DELL CENTER *for* HEALTHY LIVING

TEXAS A&M AGRILIFE

EDUCATION & HUMAN DEVELOPMENT

TEXAS A&M HEALTH SCIENCE CENTER SCHOOL OF RURAL PUBLIC HEALTH

UTHealth | School of Public Health
The University of Texas Health Science Center at Houston

Walk Across Texas!

Junior Master Gardener
growing good kids

STEM 4 innovation @ TEXAS A&M UNIVERSITY

LGEG Evidence Based Outcomes

Significant Improvements in:

- MVPA
- Total Physical Activity
- Vegetables Consumption
- Vegetable Preferences
- Healthy Beverage Preferences
- Self-Efficacy & Knowledge
- Parent/child cooking, physical activity and gardening
- Reaches into the home to support positive family health practices

- **BMI Significantly Reduced for use of LGEG**

Preliminary Conclusion: Family-focused garden, nutrition and physical activity programs significantly improve health behaviors in children.

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Learn!
Grow!
Eat!
Go!

Learn!

CURRICULUM DESIGN

10 weeks,
2 lessons/week

Sequence, integration, pace, *& flexibility*

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Learn, Grow, Eat & GO! Base curriculum

Food exposures
and physical activity features

» Week 1
45 minutes – Know & Show Sombrero
30 minutes – 5 Senses Food, Tasting I: Fresh carrots

» Week 2
30 minutes – *Tops & Bottoms*, Plant Parts We Eat
45 minutes – Nutrients to Grow

» Week 3
15 minutes – Don't Crowd Me
45 minutes – Paper Towel Gardening

» Week 4
30 minutes – *A Place to Grow*, Home Sweet Home
45 minutes – Balloon Hot Potato

» Week 5
30 minutes – Rules are Rules and Schedule It*
30 minutes – MyPlate

» Week 6
60 minutes – Veggie Research and Garden Graffiti
30 minutes – GO, SLOW, WHOA Classification

» Week 7
30 minutes – 10 in 2 Color Box
30 minutes – 1-Week Dinner Tracker

» Week 8
40 minutes – Fruity Beauty and Blind Taste Test
40 minutes – *Ugly Vegetables*, The Tasty Unknown, Paper Chain

» Week 9
40 minutes – *Two Old Potatoes & Me*, Growing New from Old
40 minutes – Greasy Grid Evaluation

» Week 10
45 minutes – Kitchen Cotton Quantity Conversion
40 minutes – *I Will Never Not Ever Eat a Tomato*, Menu Mind Makeovers

Base curriculum
2 lessons/week

To earn certification, the students in your class must complete the base curriculum and participate in a class service-learning project (pages 174–175).

Garden start window of time

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Week 1

Plants need *P.L.A.N.T.S.*

a. Know & Show Sombreros 45 minutes

Objective
Analyze what plants need and how they support people and animals.

Supplies
1 assembled and decorated Know & Show Sombrero
Large writing surface, such as a poster, dry-erase board, or smart board
1 marker
Miscellaneous craft materials, such as balloons, feathers, and pipe cleaners
For each student: 2 large, square sheets of newspaper; 1 pen or pencil; 1 sheet of paper
For each group of 3 students: 1 roll of packing tape

Walk into the classroom wearing your Know & Show Sombrero. When the students ask about it, tell them that they will find out soon and will make one of their own. But first they must answer a few questions.

Begin a discussion about what people must have to be able to live. As the students call out needs, create a list on a poster or other large writing surface in front of the class. Include the five basic needs that all people share: air, clothing, food, shelter, and water.

Ask a student to circle the items that the group says plants must have in order to live.

Next ask: Is there anything that plants need that people do not? *None need clothing; most need no shelter unless they have been moved from their natural homes.*

P lace
L ight
A ir
N utrients
T hirsty
S oil

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b. 5 Senses Food

Objective

Evaluate a food sample u

Supplies

Large writing surface such as a poster, a
Marker
For each student: 1 baby carrot; 1 *Garden Journal* (phot
Appendix or JMG website); 1 pencil
1 packet of sunflower seed

TASTING 1: Carrots

You've learned that eating something is not just tasting—it's using all 5 of your senses! Today you will give a report card to a carrot. Give it a separate grade for each sense—sight, smell, feel, sound, and taste.

Sight	A	B	C	D	F
Smell	A	B	C	D	F
Feel	A	B	C	D	F
Sound	A	B	C	D	F
Taste	A	B	C	D	F

d a little more firm. Some really
rising tangy, sour flavor in the very

nibbles at the top of the berry
uiciest!

Prompt the ssmate and describe a favorite food, pointing out what makes that food so g e conversations begin, walk around listening and making notes of any sensory words you hear.

Garden Journal: Week 1

Write a plant need beside each letter below:

P

L

A

N

T

S

Your teacher has given you a seed. What might it grow into if you plant it and give it everything it needs? Maybe it will grow into a tree, a flower, or some tasty new veggie that you've never even seen before.

1. Draw a picture of what you think this seed might become one day:
2. Write 2 sentences to describe what you think the plant would look like when it's grown. (Include at least 3 describing words in these sentences.)
3. Write one more sentence to tell how this grown plant might be useful to you.

TASTING 1: Carrots

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Taste	A	B	C	D	F

- ✓ Know & Show Sombrero 45 mins
- ✓ 5 Senses Food 30 mins

Week 1

This week's lessons

a. **Know & Show Sombrero** *45 minutes*
b. **5 Senses Food** *30 minutes*

Weekly features

Fresh Food Exposure (pages 132–137)
Garden Kitchen Recipe Demo (pages 138–139)
Quick Classroom Exercise (page 161)

Tip of the Week

The 5 Senses Food lesson has the students evaluating fresh carrots. This is the first of what could be a weekly sampling and evaluation of a new vegetable. See page 5 for suggestions on how to find helpers to prepare and provide these samples for your students.

a. Know & Show Sombrero 45 minutes

Objective
Analyze what plants need and how they support people and animals.

nutrient-dense planting list

carrots
cauliflower
leaf lettuce
spinach
broccoli
bok choy
potatoes
cherry tomatoes
swiss chard
sugar snap peas
bell pepper
squash

(choose 6 to plant in your school garden)

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first food exposures

- one bite fresh, raw samples

2nd food exposures

Garden Kitchen recipe demos

A. Cinnamon Carrot Crunch

Prep time: 15 minutes

Serves: 12

Serving size: 1/4 cup

Utensils needed

- Peeler
- Knife
- Cutting board
- Large mixing bowl
- Measuring spoons
- Measuring cup
- Mixing spoon

Nutrition Facts

Serving Size 1/4 cup
Servings Per Container 12

Amount Per Serving	
Calories 70	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 30mg	1%
Total Carbohydrate 17g	6%
Dietary Fiber 2g	8%
Sugars 14g	
Protein 1g	
Vitamin A 70% • Vitamin C 6%	
Calcium 4% • Iron 2%	

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Saturated Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

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Ingredients

- 4 medium carrots, grated
- 2 medium apples, chopped
- 1 celery rib, chopped
- 1 tablespoon of lemon juice
- 3/4 cup of raisins (soak them overnight in 1 cup of water in the refrigerator)
- 3/4 cup of vanilla yogurt
- 1 teaspoon of cinnamon

Directions

1. Wash your hands and clean your cooking area.
2. Wash the carrots, apples, and celery.
3. With a knife or peeler, peel the carrots.
4. Chop the carrots, apples, and celery, and place them in large mixing bowl.
5. Add the lemon juice, raisins, yogurt, and cinnamon to the bowl of chopped carrots, apples, and celery.
6. Stir them until they are coated evenly.
7. Chill the salad before serving it.

Kitchen math

1. Carrots are a great source of what vitamin? Vitamin _____
2. On average, how many pounds of carrots does a person eat each year? _____ (Hint: Use your *Veggie Mania Research Chart*)
3. In 5 years, how many pounds of carrots does the average person eat? _____

   Show your work here:
4. How many cups does 1 stalk of chopped celery fit into? _____
5. Circle the bigger measure:

   teaspoon tablespoon

How the children can help: Wash the produce, peel the carrots, measure the ingredients, and stir the salad

GROW! Quick & Easy Garden Kit

Provides teachers with steps on:

- **Getting Materials**
- **Building the Garden**
- **Planting It**

with the help of one volunteer with a drill!

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Quick & Easy Garden Kit

- **Getting Materials: What are we growing?**
  - *growing 6 seasonal crops*
  - *3 square ft. plantings of each*
  - *extra space for kids to choice plantings*
  - *simplicity of steps/supplies*

Sample Cool Season 3x7 raised bed:

carrots	leaf lettuce	baby spinach	cauliflower	broccoli	swiss chard	kids' choice
carrots	leaf lettuce	baby spinach	cauliflower	broccoli	swiss chard	kids' choice
carrots	leaf lettuce	baby spinach	cauliflower	broccoli	swiss chard	kids' choice

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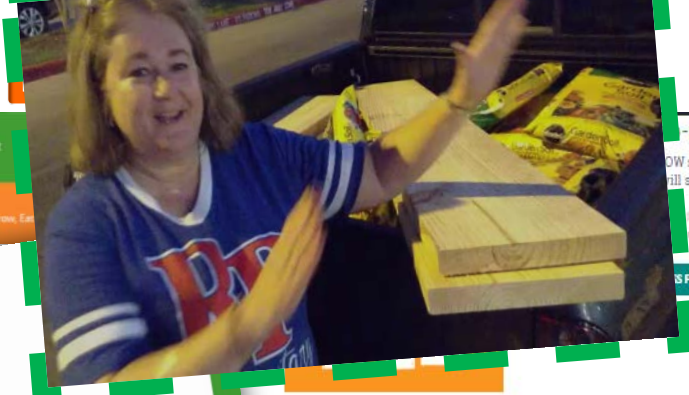

Junior Master Gardener

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Learn, Grow, Eat & Go!

-maintain thriving garden.

OW section of your *Learn, Grow, Eat & Go!* curriculum, the ill support your class's garden thriving garden project.

or free by clicking the link below. This allows JMG to know you are better support your efforts!

S FOR FREE | PURCHASE LEARN, GROW, EAT & GO!

Teacher Resources

The Resources below are referenced in *Learn, Grow, Eat & GO!* and support your class's Grow component.

- Gardening Planning & Site Selection
- Getting Materials
  - **Quick & Easy School Garden Kit:** Getting Materials Infographic
  - Garden Materials Shopping Video
- Quick & Easy Garden Build
- Planting the Garden
- Students Maintaining the Garden
- Harvesting
- Other Recommended Resources

he help of one volunteer with a
u class's garden can be built in
minutes.
School Garden Kit, p.118

esources

e referenced in *Learn, Grow, Eat & GO!* and support your class's Grow component.

Site Selection

Getting Materials

Quick & Easy School Garden Kit: Getting Materials Infographic

Garden Materials Shopping Video

Quick & Easy Garden Build

Planting the Garden

Students Maintaining the Garden

Harvesting

Learn — Support your class's 10 week, teacher-created curriculum project. → LEARN MORE

Grow — Help your students' easy-to-build garden get started, growing & thriving. → LEARN MORE

Eat — Give your class a taste of nutrient-dense food growing in their garden. → LEARN MORE

Go! — Strengthen your students' brains & bodies with short activity breaks. → LEARN MORE

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EXTENDING KNOWLEDGE, PROVIDING SOLUTIONS

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Help Desk

ASK THE HELP DESK – CALL (979) 823-0129

Whether you are new to Brazos County, to the state of Texas or just new to gardening, we are here to help.

If you have a gardening question, call us or email us.
Office Hours: Monday – Friday, 8 am to 5 pm
Call: (979) 823-0129

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- Calendar
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YOUR NAME (REQUIRED)

CITY (REQUIRED)

STATE (REQUIRED)

YOUR EMAIL (REQUIRED)

SUBJECT

YOUR MESSAGE

Texas A&M AgriLife Extension

JMGkids.us/MyCounty

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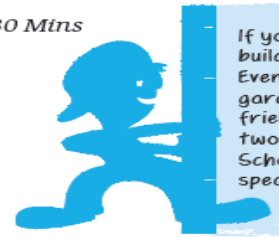
This Week's Lessons:

a. Rules are Rules and Schedule It *30 Mins*
b. MyPlate *30 Mins*

Weekly Ala Carte Features:

Fresh Food Exposure, page #
Garden Kitchen Recipe Demo, page #
Quick Classroom Exercise, page #



Tip

If you haven't already build your class garde Even if you are starti garden, it can be an e friendly experience w two volunteers. See t School Garden Plans specifics on a class-b can be assembled

a. Rules Are Rules and Schedule It 30 minutes

Objectives

Recognize and solve problems by planning and assigni responsibilities.
Establish routines and rules for outdoor safety.

Supplies

2 poster boards
2 markers
1 large calendar
For each team of 2 students: 1 sheet of paper; 1 pen or pencil

Ruling the garden

Before the garden is developed, ask the students to create rules that can help make it a safer place for plants and people. Brainstorm the rules with the students.

Then team up the students in groups of two.

Introduce the following situations to guide them in developing rules for their garden. Each team will create a rule to respond to the need of the situation. One teammate will write down the rule; the other will state how it would be helpful. They will switch roles after each scenario. After a few minutes, ask a few students to share their rule ideas.

- ★ Someone is dashing through the garden and accidentally runs over and crushes a plant.
- ★ A student is playing with a shovel by spinning it in the air and hits another person.

STEM 4 innovation

Texas A&M AgriLife Extension

Junior Master Gardener®

growing good kids℠

STEM 4 Innovation Conference

Junior Master Gardener® Training Workshop

Horticulture/Forestry Sciences Building & Howdy Farm, Thursday, March 30th

Activity Session

Secret Smells (pg. 79, *Teacher/Leader Guide*)

Paper Towel Gardening (pg. 63, *Teacher/Leader Guide*)

Fruit Frenzy (pg. 79, *Teacher/Leader Guide*)

Growing Clean Air Neck Pet
(pg. 4, *Literature in the Garden*)

Ladybug Lunch Line/Suck a Bug
(pg. 102, *Wildlife Gardener*)

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