

# **Plant a Seed:** *Gardening and Nutrition with Elementary School Students*



Lee Honors College Thesis Project

Kaisa Heib

Bronson School of Nursing Scholarly Event

April 8, 2014

# Acknowledgments



- ❧ Thesis Chair
  - ❧ Dr. Sally Vliem, RN, CPNP
- ❧ Thesis Committee Members
  - ❧ Professor Susan Houtrouw, RN, MNSc, CNS
  - ❧ Professor Wendy Kershner, MSN, CPNP, RN, IBCLC
- ❧ Edison Environmental Science Academy, Kalamazoo Communities in Schools, and 21<sup>st</sup> Century After-School Program Staff
- ❧ Elizabeth Amaya, WMUSN and Assistant Site Coordinator at Edison



# Objectives



- ❧ Identify and describe the need for a nutrition and gardening intervention for elementary school students
- ❧ Describe research study design, implementation, and results
- ❧ Discuss the implications for nursing practice

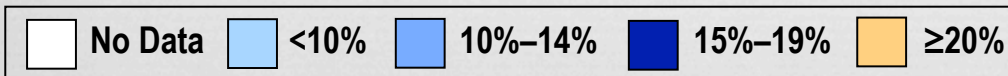
# Background and Significance





**BRFSS, 2000**  
(\*BMI  $\geq 30$ , or  $\sim 30$  lbs. overweight for 5' 4" person)

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs. overweight for 5' 4" person)

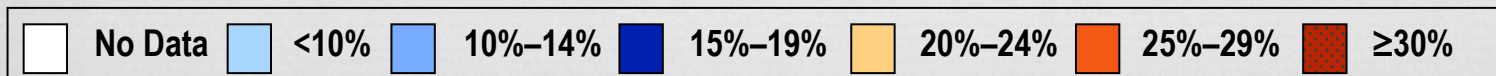
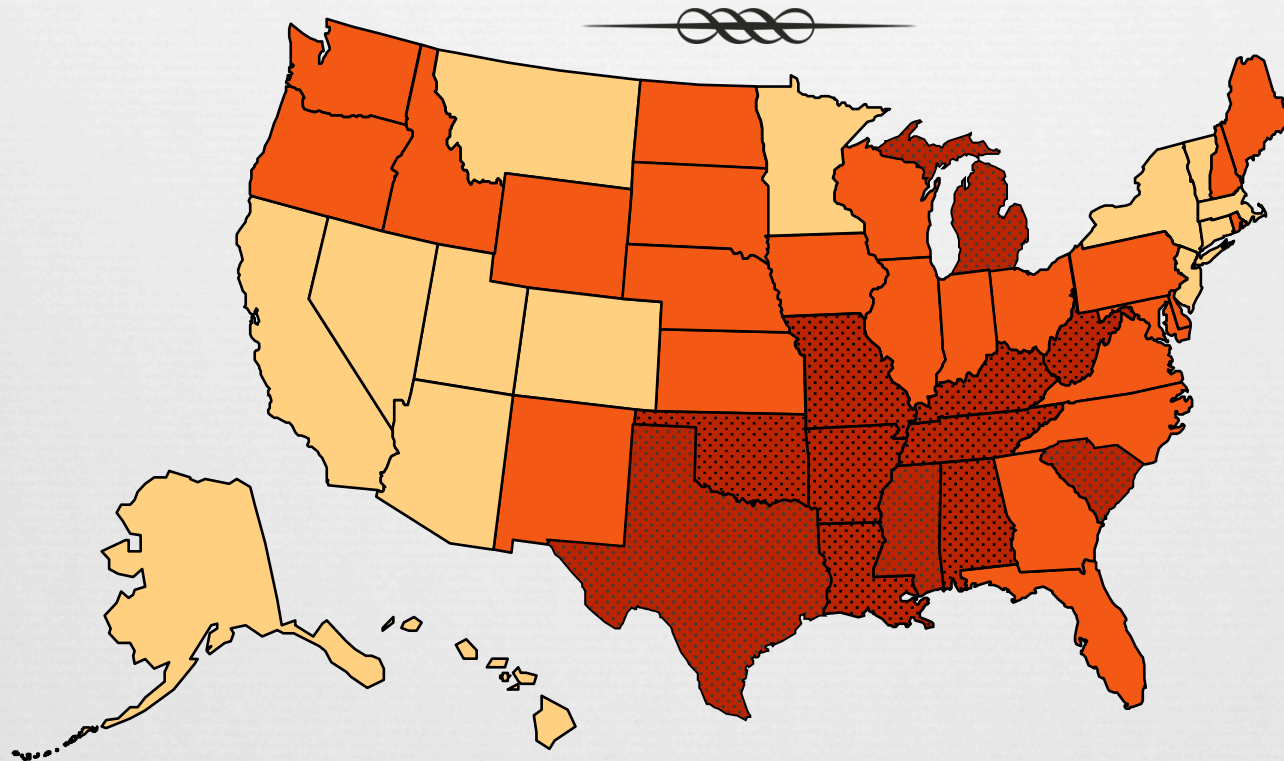


(Centers for Disease Control and Prevention, 2014)

# Obesity Trends\* Among U.S. Adults

BRFSS, 2010

(\*BMI  $\geq 30$ , or  $\sim 30$  lbs. overweight for 5' 4" person)



(Centers for Disease Control and Prevention, 2014)

# Background and Significance



- ❧ Chronic disease
  - ❧ Heart disease
  - ❧ Stroke
  - ❧ Type II Diabetes Mellitus
  - ❧ Cancer
- ❧ Increasing costs of healthcare
  - ❧ \$1429 estimated annual cost of obesity

(Centers for Disease Control and Prevention, 2014)

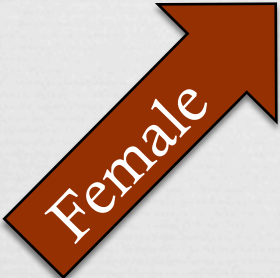


# Background and Significance




- ⌘ Behaviors that increase obesity may begin in childhood
- ⌘ Rates of obesity significantly increasing for children

15.0%



13.8 %

18.6 %



14.0%

(Healthy People, 2013)

(Centers for Disease Control and Prevention, 2012)

(Cunningham, Kramer, & Narayan, 2014)

# Current Initiatives



- ❧ Healthy People 2020
  - ❧ **NWS-10.2** Reduce the proportion of children ages 6-11 who are considered obese
  - ❧ **NWS-14** Increase the contribution of fruits to the diets of the population aged 2 years and older
  - ❧ **NWS-15.2** Increase the contribution of total vegetables to the diets of the population aged 2 years and older
- ❧ First Lady, Michelle Obama's Let's Move Program

(Healthy People, 2013)  
(Let's Move, 2014)

# Purpose



- ❧ Design and implement a gardening intervention that will increase fruit and vegetable consumption, reduce weight and BMI, and increase confidence in gardening for fourth-graders at a local elementary school
- ❧ Determine students' ability to maintain health behaviors independently



# Design and Sample



- ❧ Time Series Design
- ❧ Convenience Sample
- ❧ Inclusion Criteria
  - ❧ Participant in the After-School Program at Edison
  - ❧ Informed consent
  - ❧ Student assent
- ❧ Exclusion Criteria
  - ❧ Lack of informed consent from parent
  - ❧ Lack of student assent

# Subject Recruitment



- ❧ Edison Environmental Science Academy 21st Century After-School Program
- ❧ Permission obtained from Principal and KCIS Site Coordinator
- ❧ Approval received from Human Subjects Institutional Review Board at WMU

# Subject Recruitment



- ∞ Fourth-graders recruited for experimental group
- ∞ Third-graders recruited for control group



# Sample Description



- ❧ Urban elementary school with 98.2% free-and-reduced lunch rate
- ❧ Ages 8-11 years old
- ❧ Experimental Group
  - ❧ Nine fourth graders
  - ❧ 22.2% Male / 77.8% Female
- ❧ Control Group
  - ❧ Eight third graders
  - ❧ 50% Male / 50% Female

# Research Procedure



## ❧ Data Collection Points

- ❧ At baseline
- ❧ Immediately after 3-week, 6-session intervention
- ❧ After 3 month summer break

## ❧ Data collected:

- ❧ Weight
- ❧ Height
- ❧ Responses to Block Fruit, Vegetable, and Fiber Screener

# Block Fruit, Vegetable, and Fiber Screener



- ❧ NutritionQuest
- ❧ 10 questions
- ❧ 10-15 minutes
- ❧ Inquires about fruit, vegetable, and fiber intake over the past week

(Block Fruit, Vegetable, and Fiber Screener-Last Week, 2009)



“Think about your eating habits over the past week. About how often did you eat each of the following foods? Remember breakfast, lunch, dinner, snacks and eating out. Mark one bubble [box] for each food” (Block Fruit, Vegetable, and Fiber Screener-Last Week, 2009).

Fruits and Vegetables	(0) Less than 1/ week	(1) Once a week	(2) 2-3 times a week	(3) 4-6 times a week	(4) Once a day	(5) 2+ times a day	Score
How often do you eat any fruit, fresh or canned (not counting juice?)							_____
Any other vegetables, including string beans, peas, corn, broccoli or any other kind							_____
			Fruit Vegetable Score				_____

# Gardening and Nutrition Intervention



- ❧ 45- minute lesson
  - ❧ 20 minutes in greenhouse
  - ❧ 25 minutes in classroom
- ❧ Document growth of plant in journal
- ❧ Observe group plants
- ❧ Water and nurture plants



Gardening Lesson	Nutrition Lesson	Food of the Day
<ul style="list-style-type: none"> <li>•How to plant a seed</li> <li>•Create pots out of milk cartons</li> </ul>	----	----
<ul style="list-style-type: none"> <li>•Watering plants</li> </ul>	<ul style="list-style-type: none"> <li>•Importance of fruits and vegetables in daily diet</li> </ul>	<ul style="list-style-type: none"> <li>•Carrots</li> <li>•Strawberries</li> </ul>
<ul style="list-style-type: none"> <li>•Perennials, annuals, and seasonal foods</li> </ul>	<ul style="list-style-type: none"> <li>•Canned vs. Fresh Fruits</li> </ul>	<ul style="list-style-type: none"> <li>•Peas</li> <li>•Corn</li> <li>•Oranges</li> </ul>
<ul style="list-style-type: none"> <li>•Recycled materials in gardening</li> </ul>	<ul style="list-style-type: none"> <li>•Making a meal out of vegetables</li> </ul>	<ul style="list-style-type: none"> <li>•Tomatoes</li> <li>•Cucumbers</li> <li>•Herbs</li> </ul>
<ul style="list-style-type: none"> <li>•Harvesting seeds</li> </ul>	<ul style="list-style-type: none"> <li>•Natural vs. added sugars</li> </ul>	<ul style="list-style-type: none"> <li>•Apples</li> <li>•Beets</li> </ul>
<ul style="list-style-type: none"> <li>•Foods that can be grown at home</li> <li>•How to care for plant at home</li> </ul>	<ul style="list-style-type: none"> <li>•Community gardens and farmers markets</li> </ul>	<ul style="list-style-type: none"> <li>•Bell peppers</li> </ul>





Green Beans



Strawberries



Romaine Lettuce

# Three Months Post- Intervention



- œ One camera returned
- œ No journals returned
- œ Most students reported bean plan did not survive the summer



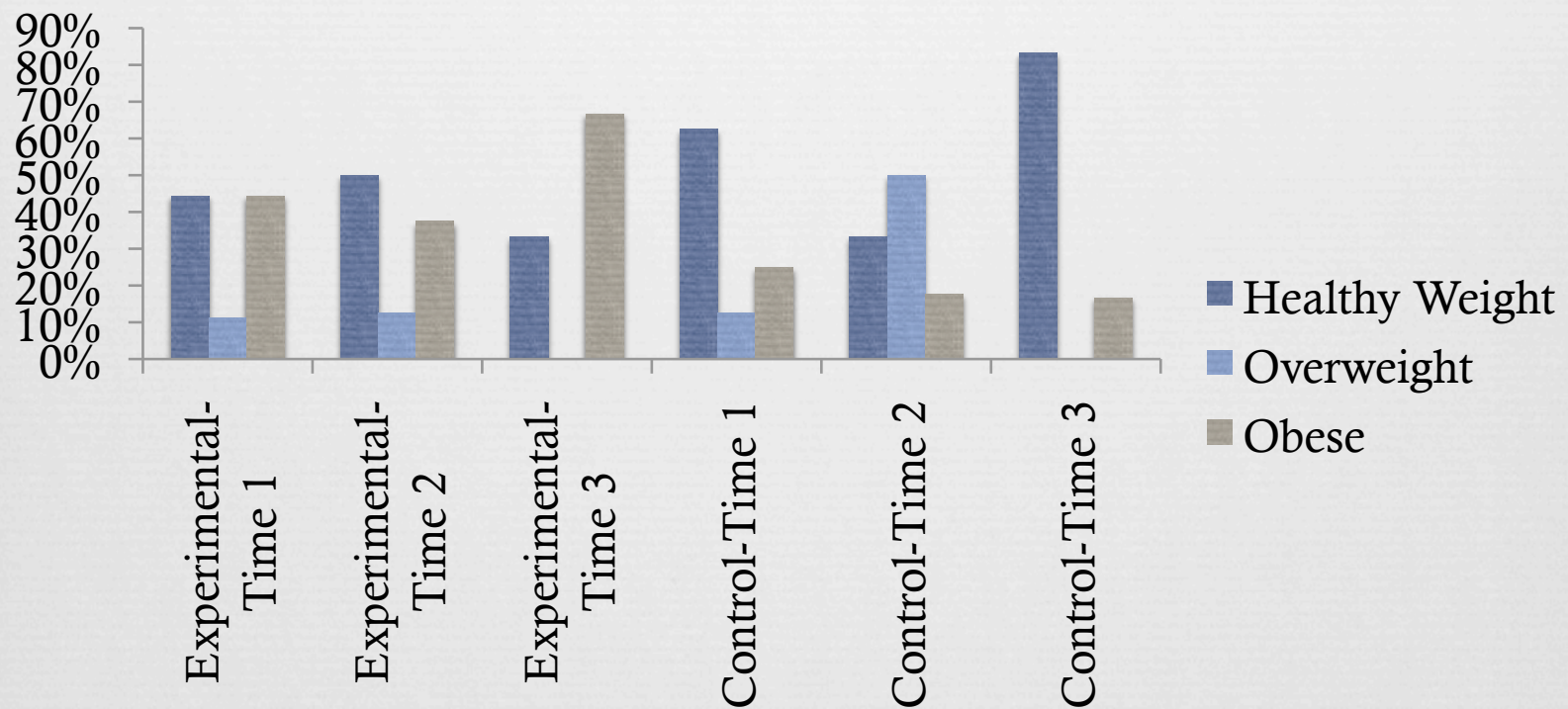
# Data Analysis



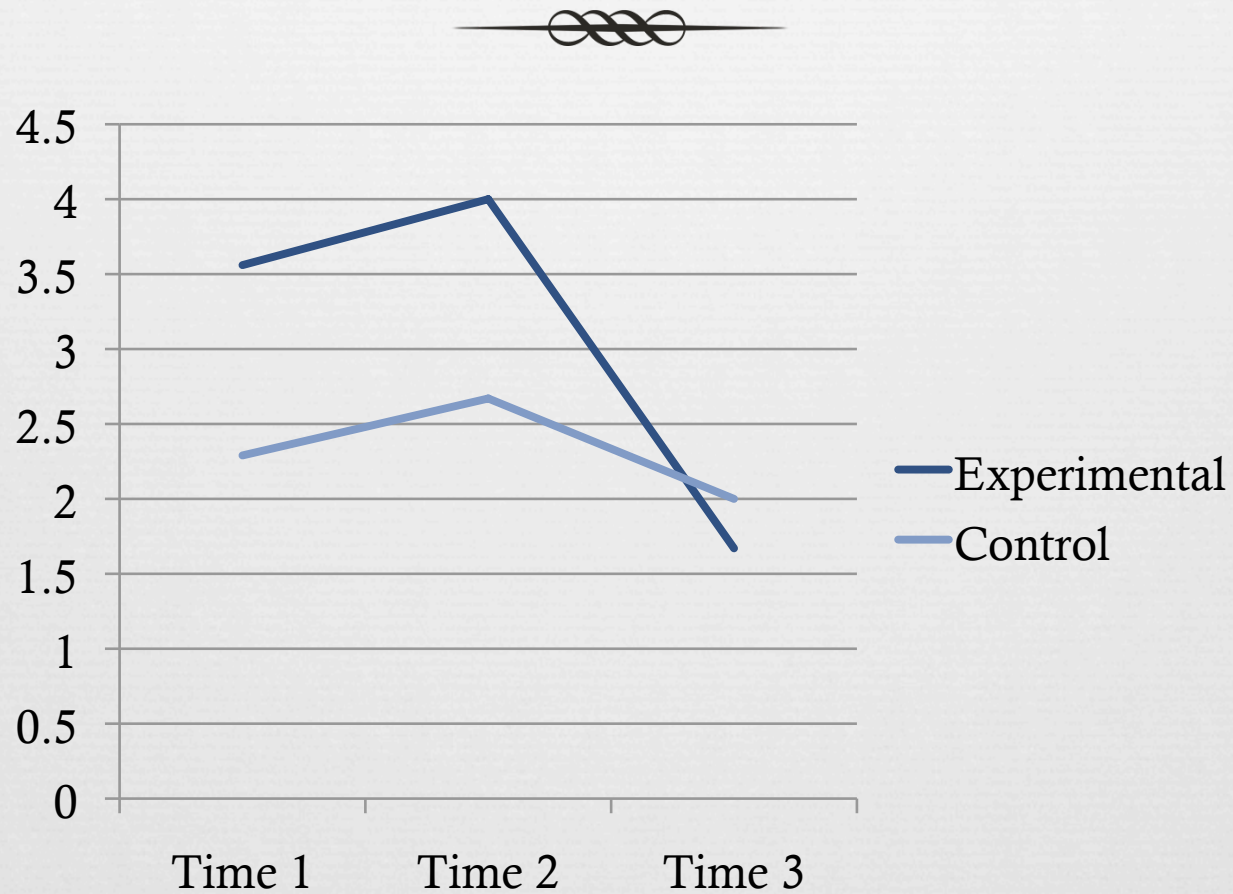
- ∞ IBM SPSS Statistics
  - ∞ Frequency
  - ∞ Independent t-tests
  - ∞ Bivariate statistics
    - ∞ Correlation coefficient



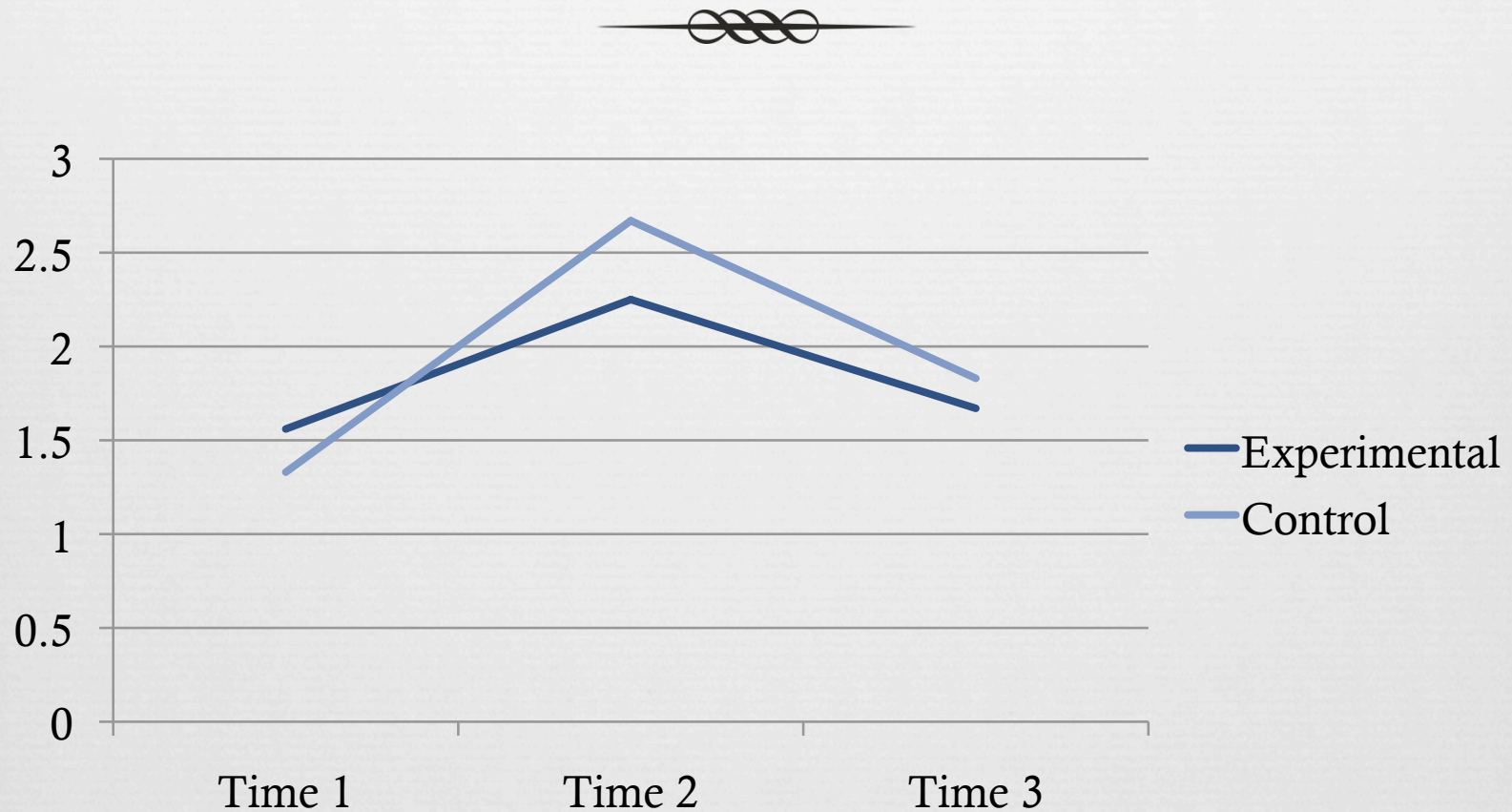
# BMI Frequency



# Fruit Intake



# Vegetable Intake



# Results



- ∞ Significant negative correlation ( $p < .05$ ) between the BMI and vegetables at time 2 after the intervention
  - ∞ As vegetable intake increased, BMI decreased
- ∞ No significant correlation for fruit



# Limitations



- ❧ Convenience sample
- ❧ Small sample size
- ❧ Fluctuating attendance
- ❧ Nutrition screener
- ❧ Age of participants
  - ❧ Growth
  - ❧ Access to resources
  - ❧ Familial support
- ❧ Home environment



# Implications for Nursing Practice



- ❧ “Plant a seed” for each individual
- ❧ Long-term implementation requires support and further research





# Questions?



# References



- ❧ Block Fruit, Vegetable, and Fiber Screener-Last Week. (2009). Berkeley, CA: NutritionQuest
- ❧ Centers for Disease Control and Prevention. (2012). *Fruits and vegetables*. Retrieved from Nutrition for Everyone: <http://www.cdc.gov/nutrition/everyone/fruitsvegetables/index.html>
- ❧ Centers for Disease Control and Prevention. (2014). *Adult obesity facts*. Retrieved from Overweight and Obesity: <http://www.cdc.gov/obesity/data/adult.html>
- ❧ Cunningham, S. A., Kramer, M. R. & Narayan, V. (2014). Incidence of childhood obesity in the United States. *The New England Journal of Medicine*, 370(5), 403-411. doi: 10.1056/NEJMoa1309753



# References



- ❧ Healthy People. (2013). *National snapshot*. Retrieved from Nutrition and Weight Status: <http://www.healthypeople.gov/2020/topicsobjectives2020/nationalsnapshot.aspx?topicId=29>
- ❧ Healthy People. (2013). *Objectives*. Retrieved from Nutrition and Weight Status: <http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=29>
- ❧ Let's Move. (2014). *Gardening guide*. Retrieved from Let's Move: <http://www.letsmove.gov/gardening-guide>