# TEACHERS' GUIDE

Washington STATE FAIR 2014
DO THE PUYALLUP!
SEPT. 5 - 21

The Seattle Times NEWSPAPERS IN EDUCATION
INSPIRING STUDENTS TO LEARN

## INTRODUCTION

Nearly every teacher and student in the Puget Sound region receives a complimentary gate ticket to the Washington State Fair. This year's theme for the fair is "We Are Washington." This guide explores the variety of activities at the fair through discussion, projects and hands-on experiments. The activities are aimed at students in grades four through 12. These lessons are to be used with content that will appear in The Seattle Times on September 4, 11 and 18. The guide will appear in September on both The Seattle Times Newspapers In Education (NIE) website (www.seattletimes.com/nie) and the Washington State Fair's website (**www.thefair.com**).

## NOTE TO EDUCATORS

Activities in this guide are built on knowledge and information provided in the e-Edition of The Seattle Times on September 4, 11 and 18. On each Thursday, you will find a full page of Washington State Fair exhibits, fun facts and thought-provoking questions in the newspaper. You can visit the NIE website (www.seattletimes.com/nie) to find the exact location of these pages in the newspaper. Have students take notes from the in-paper content each week to use in combination with this guide. Teachers are encouraged to modify the guide to fit their individual classroom needs.

## THE SEATTLE TIMES NEWSPAPERS IN EDUCATION (NIE)

To enroll in The Seattle Times NIE program and receive free access to the electronic version (e-Edition) of the newspaper, lesson plans and curriculum guides, as well as the in-paper content for this guide, please email nie@seattletimes.com or call 206.652.6290.

## WASHINGTON STATE SCIENCE STANDARDS

This guide addresses Washington State Math and Science Standards for grades six through eight listed below. Please adapt the lessons to meet your classroom needs.




**The Seattle Times Newspapers In Education (NIE)**
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## PLANT CLASSIFICATION

**Objective**
Classify fruit and vegetables through observation and research.

**Materials**
Edible plants from the grocery store such as apples, blueberries, raspberries, strawberries, pineapples, peaches, tomatoes, beets, turnips, kale, squash, eggplant, bell peppers, cabbage, lettuce, spinach, celery, carrots, potatoes, onions, broccoli, cauliflower, asparagus and nuts.

**Lesson**

1. Describe the difference between fruits and vegetables. Fruits have seeds and develop from flowering plants. Vegetables are all other parts of plants that have roots, stems and leaves.

2. Classify the above plants and/or other plants as fruits or vegetables.

3. Discuss:
   - Do any of your classifications surprise you? Why?
   - Why might farmers and chefs differ on the classification of fruits and vegetables?
   - What words do we often use to describe the taste of fruits? How about vegetables?
   - What are the exceptions to these descriptions?

4. Make a chart for fruits within the following categories: fleshy (those with a flesh area between the seeds and the edible skin), dry (those which have a hard texture and when pressed do not feel soft), aggregate (those in which one flower produces many tiny fruits clustered tightly together) and multiple (those which develop from a cluster of flowers). Classify the fruits into these categories.

5. Make a chart for vegetables within the following categories: leaves, roots, flowers and shoots. For example, cabbage would fit into the leaves category while carrots would be in the roots category. Classify the vegetables into these categories.

6. Review the definition of the fruit and vegetable classifications monocots and dicots:

   Dicots are flowering plants that produce seeds and two seed leaves. Most dicots also produce flowers and flowering parts in multiples of two, four or five and leaves with branching (or netted) veins.

   Monocots are flowering plants that produce seeds with one seed leaf. Most monocots also produce flowers with flowering parts that are in multiples of three and have long, narrow leaves with parallel veins.

7. Classify both the fruits and vegetables into these classifications.

8. Discuss:
   - Do all fruits or all vegetables fit into one classification (monocot or dicot)?
   - How are the fruits and vegetables dispersed between the two classifications?
   - How do you think you can further classify fruits and vegetables?
   - How do you think farmers use this information in their work?
   - How are these or other classifications used to display fruits and vegetables at the supermarket?

**Sources:**

http://extension.uga.edu/k12/science-behind-our-food/lesson-plans/UnderstandingPlants1.pdf

http://www.livescience.com/33991-difference-fruits-vegetables.html

# "WE ARE WASHINGTON: PEOPLE OF THE FAIR"

## LESSON ONE

### Digestive Systems

**Objective**
Construct and analyze models of human and animal digestive systems.

**Materials**

- One resealable zippered plastic bag (such as Ziploc brand) per participant
- One piece of bread per participant
- One bottle of orange juice or cola (Additional bottles may be needed with an increased number of participants. On average, one two-liter bottle will work for 18 participants.)
- Optional: one 3 ounce cup (for holding liquid) per participant
- Paper towels (enough for each participant to have one regular sized piece, and for and cleanup after the lesson)
- Clock or stopwatch
- Trash bag

**Preparation**

1. Place one piece of bread in a resealable zippered bag for each participant.

2. Fill one 3 ounce cup full with liquid for each participant or plan on passing the bottle of cola or orange juice around to participants.

**Lesson**
Discussion: Answer the following questions based on what you know and learned in the article:

- What is digestion and why is it important?
- What are the types of digestive systems explained?
- Which animals have digestive systems similar to humans'?
- What are the key differences between these two systems?

1. Begin by passing out a resealable zippered bag with a piece of bread in it to each participant. Explain that the bag is like a stomach: a muscle that contains and squeezes food.

2. Pour about three ounces of orange juice or cola into the bag to act as the "digestive juices."

3. Once the bread and fluid are combined, have participants observe what begins to happen to the bread.

4. Ask participants what they see happening in their bag.

5. Then, have participants predict what will happen if they squeeze their bags.

6. Pass out a piece of paper towel to participants and have them place it around their bags so that they cannot see what is happening.

7. Have the participants gently squeeze the bag for two minutes. Participants need to be gentle to avoid poking holes in the bag.

8. While participants are squeezing their bags, ask them the following questions to review:
    - What type of digestive system do humans have?
    - What is a livestock species that has a similar stomach to humans?
    - What type of digestive system do sheep and goats have?
    - What is the difference between the ruminant and monogastric digestive system?

9. After squeezing the bag for two minutes, have participants remove the paper towel and observe the changes to the contents of the bag. They should not open their bag.

10. While observing the changes to the bread, ask participants the following questions:
    - What caused the changes to the bread?
    - Would the change have been different if the liquid added was water? Why or why not?
      *Answer: Yes. The acids in orange juice or cola accelerate the breakdown process.*
    - How does this lab relate to animal digestion?
      *Answer: When the stomach of an animal receives fluid, the consumed contents in the stomach are churned like the squeezing action of the stomach.*

11. Go around the room with a trash bag and have participants place their entire bag in the trash.

**Expansion**

1. Review the digestion process in monogastric animals and humans. Place participants in a straight line and have each participant name a step. For example: In monogastric animals, food is placed in the mouth, chewed by the teeth and swallowed. It then moves down the esophagus to the stomach. In the stomach the food is churned and digestive acids begin to break down the food. From the stomach, food travels to the small intestine where the majority of digestion will take place. After the small intestine, food travels to the cecum, large intestine and rectum before exiting through the anus.

2. Once participants have reviewed the general digestion process, explain that ruminant animals are similar to monogastric animals in that they have four compartments to their stomach and are cud-chewing.

3. Ask participants, "What does it mean when someone says an animal is chewing its cud?"

4. Select participants to share their responses. Make sure to highlight that the cud is food that is regurgitated, re-chewed and re-swallowed. The purpose of this is to help regulate rumen health and pH while further breaking down fibrous particles of feed.

5. To further expand, explain that the ruminant digestive system consists of four compartments. In order of food passage, they are the rumen, reticulum, omasum and abomasum.

6. As a review, arrange participants into four equal size groups where each group is assigned a compartment of the stomach.

7. Give each group 30 seconds to come up with one or two words that describes their stomach compartment.

8. Then, when pointed to, have each group state their stomach compartment as well as the word or words describing it. For example:
    a. Rumen = fermentation
    b. Reticulum = honeycomb
    c. Omasum = many folds
    d. Abomasum = mixes

9. As a closing, challenge participants to think about how livestock digest the food they eat. Are some things quicker or harder for the animal to digest?

**Source**

http://4h.msue.msu.edu/uploads/files/Livestock/Animal_Digestion_-_A_Stomach_at_Work.pdf

**Additional resource**

http://communities.naae.org/thread/4207

## LESSON TWO
**Math behind the Photo Salon**

**Objective**
Calculate percentages to determine a prize-winning photo.

**Lesson**
When Eric Bastin of the Photo Salon has to choose a prize-winning photo, he uses percentages.

In this example he has 240 images entered in the division. He needs to have a target of 50 percent acceptance. The lowest score is 13 and highest score is 24. To get approximately 50 percent, he needs to accept images that scored 20 and above. That gives him an acceptance rate of 48 percent. Although it is difficult to match the exact percentage or image count he needs, the table helps him make an educated decision of what scores to accept into the competition.

| PHOTO | | | | |
|---|---|---|---|---|
| Score | Number | Percentage | Print Count | Total |
| 27 | | 0% | 0 | 240 |
| 26 | | 0% | 0 | Target |
| 25 | | 0% | 0 | 50% |
| 24 | 6 | 3% | 6 | |
| 23 | 12 | 8% | 18 | |
| 22 | 16 | 14% | 34 | |
| 21 | 32 | 28% | 66 | |
| 20 | 50 | 48% | 116 | |
| 19 | 38 | 64% | 154 | |
| 18 | 41 | 81% | 195 | |
| 17 | 22 | 90% | 217 | |
| 16 | 15 | 97% | 232 | |
| 15 | 6 | 99% | 238 | |
| 14 | 1 | 100% | 239 | |
| 13 | 1 | 100% | 240 | |
| 12 | | 100% | 240 | |
| 11 | | 100% | 240 | |
| 10 | | 100% | 240 | |
| 9 | | 100% | 240 | |
| 8 | | 100% | 240 | |
| 7 | | 100% | 240 | |
| 6 | | 100% | 240 | |
| 5 | | 100% | 240 | |
| 4 | | 100% | 240 | |
| 3 | | 100% | 240 | |
| | | | | |

1. What would the lowest score of an accepted image be if there were no images with a score of 13, and seven images with a score of 24?

2. What would the revised print count be in the above scenario?

## LESSON THREE
### Pumpkin Investigation

**Objective**
Observe, hypothesize, experiment, analyze and share results of a pumpkin investigation.

**Materials**
Several, or a class set, of pumpkins for students to observe and use to conduct investigations.

**Lesson**
Discuss the following questions with a partner or group. Share your hypotheses before conducting an investigation. Document and share your results after investigating.

1. There are creases that run side by side (stem to bottom) on the outside of a pumpkin. Are there more creases on bigger pumpkins than on smaller ones?
2. Is there something on the inside of the pumpkin that lines up with the creases on the outside?
3. Where on a pumpkin are the creases the deepest? The shallowest?
4. Where on a pumpkin are the creases closest together? The furthest apart?
5. Do pumpkins with more creases have more seeds?
6. Are the creases closer together on bigger pumpkins than on smaller ones?
7. By looking at a pumpkin, can you tell which side was on the ground?
8. From looking only at the stem, can you determine which side of the pumpkin was on the ground?
9. Are pumpkins mostly full or mostly empty?
10. How is the size of pumpkin related to the amount of empty space?
11. Are the seeds scattered around inside a pumpkin or are they arranged in certain groups and patterns?
12. If the seed are in groups and patterns, are the groups and patterns the same for different pumpkins?
13. If we call the stem end of the pumpkin “up,” do the pointed ends of the seeds point up, down, sideways or in different directions?
14. What is the relationship between pumpkin size and seed size? Do bigger pumpkins have bigger seeds?
15. Think of a way of finding the number of seeds in a pumpkin without actually counting each seed.
16. Do bigger pumpkins have more seeds than smaller pumpkins?
17. In one pumpkin, are the seeds all the same size? If not, where are the seeds the largest? The smallest?
18. Hit pumpkins of different sizes to see where you get the lowest and highest sounds.
23. Where are pumpkin shells the thinnest? The thickest? Be careful to measure shell thickness the same way.
24. Determine if there is a relationship between shell thickness and pumpkin size.
25. A pumpkin was once the bottom part of a beautiful yellow flower. Find the place on the pumpkin where the blossom part of the flower grew.
26. Try to figure out what the stringy stuff on the inside of the pumpkin does. Is it attached to the shell? The seeds?
27. If the stringy stuff is attached to the seeds, is it attached to the pointed or rounded end of the seed? Does the string from the seed attach directly to the shell wall or to something else?

**Source**
http://teachers.net/lessons/posts/660.html

## "WE ARE WASHINGTON: INSIDE THE FAIR"

### Practicing Peripheral Vision

**Objective**
Demonstrate understanding of peripheral vision through experiential learning and video watching analysis.

**Materials**
Colored paper, colored markers, big piece of butcher paper or a page of newspaper.

**Lesson 1**

1. Seeing something out of the corner of your eye is called peripheral vision. To find out how well you can see something moving; or a color, shape and or detail with your peripheral vision, cut out a different shape from each different color of paper. Suggested shapes are a square, a circle and a triangle.

2. Write a different letter of the alphabet on each shape.

3. Stand on a piece of butcher paper or newspaper and have a friend draw a semicircle about arm's length away from your feet.

4. Look straight ahead while your friend holds a shape and walks around the outside of the semicircle he or she drew.

5. Describe when you first notice anything moving, what shape and color it is and what letter (detail) is on it. Be sure to keep looking straight ahead!

6. Ask another friend to write "motion," "color," "detail" or "shape" at those spots on the semicircle where you first saw those things.

7. Now switch roles and use a different colored marker to mark the semicircle for each friend.

8. Compare your results. Did you see the same things at the same points on the semicircle? Did you see each thing in the same order? Did some people see something first but see others last? How good is your peripheral vision? Is it better when you're in a bright room or a dark room?

**Lesson 2**
Watch the video clip on the use of peripheral vision in basketball at http://pbskids.org/zoom/activities/sci/peripheralvision.html and answer the following questions:

1. How much faster does Corey react in the first trial? How many feet of separation does that translate to?
2. Why does the separation get greater as the trigger lights get further apart?
3. What was the end result of the experiment on who reacts more quickly to objects in the corner of their eyes?
4. What function do receptor cones and receptor rods have?
5. How does basketball player Steve Nash use peripheral vision?
6. How does the phrase "eyes in the back of one's head" relate to the scientific concept of peripheral vision?

**Sources**

http://www.sciencekids.co.nz/videos/sports/peripheralvision.html

**Additional resources:**

http://www.teachengineering.org/view_activity.php?url=collection/van_/activities/van_robotic_vision_activity1/van_robotic_vision_activity1.xml

http://faculty.washington.edu/chudler/chvision.html