# Wilsonville Public

# Library

8200 SW Wilsonville Road Wilsonville, OR 97070 503-682-2744 www.wilsonvillelibrary.org





We hope you enjoy *Science Adventure*-"One World, Many Explorations"





"One World, Many Explorations"

Science Guidebook

Summer 2011



## What is a Scientist?

"A scientist is a person who asks questions and tries different ways to answer them. . .

A scientist is a person who...

- Asks questions
- Learns from her senses
- Notices details
- Draws
- Writes
- Measures
- Counts
- Sorts
- Tests predictions
- Experiments
- Thinks logically
- Keeps trying
- And has fun.
- That's what a scientist is!"
  - Barbara Lehn
    - from: *What is a Scientist* (Millbrook, 1998)

## Science Websites for Students

#### General experiments:

- www.tryscience.org
- ♦ www.sciencebug.org
- www.sciencebob.com/experiments/index.php
- ♦ www.vickicobb.com

Physics: www.bitesizephysics.com/experiments.html

Kitchen Chemistry: www.home.ntelos.net/~rollinso/ SciFood.html

Astronomy: www.kidsastronomy.com

Geology: www.rocksforkids.com

Weather: www.weatherwizkids.com/

## Online Oregon Field Guides

#### Birds of Oregon

- www.paulnoll.com/Oregon/Birds/Likely/
- www.whatbird.com/browse/objs/All/birds\_na\_147/38/ Location/878/Oregon/default.aspx

#### Insects of Oregon

 www.insectidentification.org/ Search for Insects (select color and Oregon)

#### Mammals of Oregon

- www.mammalsociety.org/statelists/ormammals.html
- http://nrimp.dfw.state.or.us/nrimp/feature/2002/10-2002.htm (Oregon Mammal Tracks Quiz)

## Reptiles and Amphibians of Oregon

http://pages.uoregon.edu/titus/herp/checklist.html

## Check it out at the Wilsonville Public Library!

## Natural Sciences Books Organized by the Dewey Decimal System



#### A Note to Families:

Welcome to *Science Adventure*! After last summer's successful debut, the Wilsonville Public Library is once again offering a science component to our Summer Reading Program.

The goals for *Science Adventure* are similar to our Reading Program:

- To provide a low key, fun, environment for children to retain and build the skills they learned during the school year.
- To enjoy self-directed reading, learning and exploring.
- To have fun (of course)!

Our *Science Adventure* program has these components: weekly preschool drop-in programs; school-age science activities; this takehome *Science Adventure* Science Guidebook for all ages; and a Science Log with stickers to document your explorations.

You are holding the *Science Adventure* Science Guidebook. We hope your child will use this guide to explore science at home and record their efforts with their Science Log. Once completed, your child can return the log to the library for a special prize and a chance to win a family membership for the Evergreen Aviation & Space Museum.



The Youth Services team has done a wonderful job putting this program together. We hope you will enjoy these scientific explorations together with your child. We will be happy to hear from you about your experiences. Your comments will help make *Science Adventure* even better for years to come.

Thanks,

Patrick Duke, Library Director

#### What is Science Adventure and who can do it?

*Science Adventure* is an on-going addition to our summer reading program. We hope to inspire children of all ages to learn more about science and the world.

#### How do I do Science Adventure?

- 1) Choose an exploration from this guide, complete it, and record your results and observations in the provided spaces.
- If you choose your own explorations, record your results and observations on the blank pages at the end of this guide or in a science notebook you create.
- 3) Put a sticker on your Science Log for each day you have completed an exploration.

#### What if my child is under 5?

Use the explorations as a framework for play. Playing and exploring are foundational scientific

experiences for young children. We have an additional list of ideas available for children under five at the Children's Reference desk and on our website.

#### What if I do more than one exploration in a day?

Good job scientist! <u>But remember, place only one sticker per day on</u> your Science Log.

#### May I do science explorations not listed in this guide?

Yes! Choose your own explorations or use ideas from books and websites. Recommendations are listed at the end of this guide.

#### What happens when I finish my log?

Congratulations! You are becoming a Science Explorer. You may bring your finished log into the library and receive a prize.

#### What is the latest I can finish?

Finish and bring in your log by August 30 to earn your free science prize. You will also qualify for a chance to win an annual family pass to the Evergreen Aviation & Space Museum.

#### Can I keep doing science after I finish?

Yes! Create your own science notebook and keep exploring.

## How is Science Adventure funded?

*Science Adventure* is primarily funded by the Wilsonville Public Library Foundation.

The Wilsonville Public Library is deeply grateful to the Wilsonville Public Library Foundation. *Science Adventure* would not be possible without their support.





## Explore the Natural World In and Beyond Wilsonville



**Champoeg State Park**, south of Wilsonville, has ten miles of hiking and biking trails that wind through old growth hardwood forests along the Willamette River.

#### METRO's Graham Oaks Nature Park on

Wilsonville Road. Visit the park's elder oak tree that is over 200 years old. Explore trails through old forest, wetlands and an oak savannah that is being restored.





Magness Memorial Tree Farm-Spend A Day In The Woods ~ Free guided tour each Sunday at 2:00 pm. 31195 SW Ladd Hill Rd

**Baldock rest area**, just south of Wilsonville on Interstate 5 (milepost 281.6) is known for its short loop walk through the **Grove of the States**. The

grove was dedicated in 1967 and features trees of the original 13 colonies, with the remainder of the states and territories organized in geographical areas.



Willamette River Water Treatment Plant Park

10350 SW Arrowhead Creek Lane. An open meadow in the park is composed of native grasses and a loop path looks over the Willamette River.

Fields Bridge Park, West Linn, Oregon. Three remnants of cataclysmic ice-age floods, granite glacial erratics,

weighing a combined 54,500 pounds are on display.



Visit the City of Wilsonville's website for a total list of city parks and trails. www.ci.wilsonville.or.us

#### What do I do with this Science Guidebook?

Here are a few thoughts to help you on your way:

- Use this Science Guidebook in the way that works best for YOU.
- The Science Guidebook includes ideas for science explorations, but you can also try explorations from books or websites, or make up your own.
- Scientists record the results of their explorations in science notebooks.
- We are including blank pages in the back of this guide. Feel free to use them to record the results of your own explorations.
- Every scientist has his or her own way of thinking. You may choose to make your own notebook at home and decorate it. Your notebook may look like ours, or it may look totally different.
- Always be mindful of safety when you try science activities. Check with an adult if you are thinking of working with any dangerous materials.
- Remember, staff at the library can help you with your questions. Call us at 503-570-1599, or email us at engelfried@wilsonvillelibrary.org





## What are some ways to do science?

There are many ways to do science. We've outlined a few ways to help you on your journey to become a Science Explorer!

## OBSERVE:

Take the time to watch something closely and learn from it. Examine all the details and see if you notice something new. If you have a magnifying glass, use it! Ask questions while you're observing.

## ASK/PREDICT/TEST:

Ask a question, predict (a bestguess-answer or hypothesis) and then set up an experiment to test your prediction and find an answer to your question. This can be fun!

## INVESTIGATE:

This is where you read or listen to information from a book, an online source, an interview, or any other way you can get the "nittygritty" on what you're wondering about. Investigating to find background information helps scientists further their explorations.

## ORGANIZE/CATEGORIZE:

Scientists classify objects into groups according to certain characteristics. Finding similarities and differences between objects helps us use what we know in order to organize them into groups that make sense to us. There's no right or wrong way do this.

#### DESIGN YOUR OWN:

Think outside the box and create your own way of doing science. Be creative and have fun!



Date:

Concept:

Description of Exploration:

Notes:



Concept:

Description of Exploration:

Notes:

Now it's your turn to explore the world around you.



EXPLORE!

RECORD!



BE SAFE! (Work with an adult)

HAVE FUN!

## In my Science Guidebook

- 1. I will think about what I know and ask questions.
- 2. I will make predictions.
- 3. I will use my five senses to investigate problems
- I will record my observations with pictures, words, and realistic details
- 5. I will support my claims with evidence.
- 6. I will ask new questions.
- 7. I will do my best work.



**Concept:** Botany is the study of plants, which include flowers, bushes, trees, algae, fungi, lichens, mosses, and ferns and fruits and vegetables. Explore plants in the world around you. Draw or write what you OBSERVE.

## Description of Exploration:

Visit the Villobois Sunday Market or visit a local farm. There are many U-pick farms and produce stands around Wilsonville.

- Make a list of all the seasonal produce you see.
- Draw a picture of a fruit or vegetable.
- Try tasting an edible plant that is new to you. What did it smell or taste like?

Date:

Concept:

Description of Exploration:

Notes:

**Visit a garden**. Walk to Wilsonville's Community Garden near Wilsonville Memorial Park. Visit CREST's (Center for Research in Environmental Sciences and Technologies) gardens near Boones Ferry Primary School. What is growing there? As a guest in these private gardens, you may observe, look but don't touch!









Concept:

Description of Exploration:

Notes:

#### Date:

**Concept:** Habitats are the environments that organisms live in. INVESTIGATE the habitats in the world around you.

**Description of Exploration:** Visit one of the many different habitats that are in your neighborhood or state.

- River, stream, creek, or pond
- Lake or ocean
- Hill or mountain
- Desert
- Meadow or field
- Forest



Draw what the habitat looks like. Put in as much detail of the rocks, water, plants and animals that you see. Label things you can identify. Look up information about the habitat in a book or online. What did you learn?



**Concept:** Astronomy is the study of outer space including the planets, the moons, the sun and other stars and galaxies.

**Description of Exploration:** Go outside when it is dark. Lay on the grass or climb up onto a play structure. OBSERVE the stars and the moon. Look for falling stars, satellites and planes traveling at night too. Talk about any constellations you see.



- Now draw a picture of the night sky.
- Identify and sketch the Big Dipper, drawing the stars in the constellation and connecting them with lines.
- INVESTIGATE this topic by reading a book (look in the J520's for outer space books) or going online.
  What are the names of other constellations in the night sky?

Date:

Concept:

Description of Exploration:

Notes:



Concept:

Description of Exploration:

Notes:

#### Date:

**Concept:** OBSERVE the phases of the Earth's moon.

**Description of Exploration:** Draw a new picture of the moon on the chart each night for 28 days. (It doesn't have to be perfect so don't stress.) Talk about the changes of what you see over time. Identify the new moon and the full moon.

Examples:





**Concept:** ASK/PEDICT/TEST to make a milk rainbow and learn about surface tension, soaps and fats, currents and color mixing.

## Description of Exploration:

- 1. Pour one cup 2% milk (room temperature is best) into a pie pan or deep plate.
- 2. Carefully drop 3 drops of yellow food coloring into center, then next to the yellow, drop 3 drops red, then 3 drops blue next to the red, and lastly, 3 drops of green next to the blue.
- 3. GUESS what will happen when soap is added to the milk and colors. Write your PREDICTION here.
- 4. Now dip a Q-tip into a small cup of dish-washing soup, and then hold the soapy Q-tip into the center of the food color.

### What happened?



Sketch what you saw:

Date:

Concept:

Description of Exploration:

Notes:



Concept:

Description of Exploration:

Notes:

#### Date:

**Concept:** ORGANIZE/CATEGORIZE to learn about classification.

Description of Exploration: Look in one place for different

objects, such as your pantry, desk, toy box, bathroom drawer, or clothes closet. Sort the objects you find by size, color, texture, the material they are made of, how they are used, or by some other characteristic. Name each category.



Notes: This is how I organized the objects:

Category #1 \_\_\_\_\_

Objects that fit in this category:

Category #2 \_\_\_\_\_

Objects that fit in this category:

Category #3 \_\_\_\_\_

Objects that fit in this category:

Category #4 \_\_\_\_\_

Objects that fit in this category:



**Concept:** Our eyes see color all around us, which is really light of different wavelengths. ASK/PREDICT/TEST to see what colors are in black ink. Use the science of paper chromatography to Paper Strip in Jar

separate out the ink's colors.

#### **Description of Exploration:**

Cut a white paper towel in 3" x 4" pieces. With a black water-based marker, draw a small face or a dot on one towel. Tape the paper towel to a pencil and balance it on lip of a glass filled with just enough water to touch the bottom of the towel. The water will start to travel up the towel.



Notes: What did you OBSERVE?

What colors are in the black ink?

What color is lightest and goes farther up?

Experiment Further: Try the exploration using different colored markers, or a different brand of black marker, on the remainder of the towel pieces. What happens?

## Date: June 23

## Description of Exploration: ASK/PREDICT/TEST

What will float in my bathtub? I picked 5 different things to put in my bathtub. First I guessed what would float and what would sink, and then I tested it. 

Ice cube: yes

Wash cloth: no

Rock: no

Toilet paper: no

Test Results:

Toy boat: yes

Ice cube: yes

Wash cloth: floated until it got wet, then sank Rock: no

Toilet paper: floated until it got wet, then sank

Here are two examples of possible science explorations that you might choose and record on the following blank pages.

## Date: June 22

## Description of Exploration: $\ensuremath{\text{OBSERVE}}$

Observe the bugs on a nature walk. My dad and I took a walk in the field behind my house.

## Notes:

- There is an ant mound hole right behind my house. The ants are tiny and it looks like there are thousands of them!
- The ants are making a trail from their hole to my house. Uh, oh!
- Near the ant hole I can hear grasshoppers or crickets, but I cannot see them. What can I do to try to catch one?
- Underneath a rock I found a pill-bug and an earthworm.
- When I tried to pick up the pill-bug, it curled up into a ball. I wonder if he's scared of me?



## Date:

**Concept:** Explore density (the mass or weight of an item) to OBSERVE what in the world floats. ASK/PREDICT "What items will sink and what will float?" TEST your predictions.

Object I am testing:	GUESS/PREDICT: Will it sink or float?	OBSERVE: Did it Sink? Did it Float? If it floated, how high in the glass did it float?
Glass of Root Beer		
Glass of Diet Root Beer		
Whole Orange (or other citrus fruit)		
Peeled Orange (or other citrus fruit)		
The peel from the Orange		
Raw Egg in Shell		
Hard Boiled Egg in Shell		

**Experiment Further:** Make a new chart. Compare if and how different <u>unpeeled</u> fruits float. Try grapes, or a lemon, lime, tangerine, banana, orange, or grapefruit. What do you OBSERVE?



Note: You may try this exploration with any type of soda, not just root beer!

**Concept:** Zoology is the study of animals. What animals live in the world around you? OBSERVE and INVESTIGATIVE to learn about animals.

**Description of Exploration:** Spend an hour outside in a backyard, on a balcony, or in a park watching and listening. Make a list or sketch of all the animals that you see. Look for insects, spiders, amphibians, reptiles, birds, fish, and mammals.

Sketch or List:

## Date:

**Concept:** Geology is the study of the solid earth and earth materials like rocks and minerals. Learn about classifying rocks through ORGANIZE/CATEGORIZE.

**Description of Exploration:** Take a nature walk and collect rocks you find. Once you have a nice collection, sort these rocks by color, size, and shape.

Notes: Sketch and describe your rocks here.

Group 1 : Category	Group 2 : Category
Group 3 : Category	Group 4 : Category
Group 3 : Category	Group 4 : Category
Group 3 : Category	Group 4 : Category
Group 3 : Category	Group 4 : Category
Group 3 : Category	Group 4 : Category

Go to www.rocksforkids.com to learn all about rocks and minerals.



Try and identify what you are seeing with a field guide that you check out from the library or have at home, or look online for more information. (See back of Guide for websites.)

**Concept:** INVESTIGATE sound in our world.

**Description of Exploration:** Compare how sound travels through air, water and solids.

How does sound travel through the air? Talk through a used paper towel roll. What happens to your voice?

How does sound travel in water? While taking a bath (or while in a swimming pool) lie with your ears in the water and talk to yourself. Next, ask a friend or parent to talk to you while your ears are in the water. If you are in the bath, tap the bathtub.

What do you hear?

How does sound travel through objects? Create a "telephone" using two paper cups linked with a long string that is poked and tied through a whole in the bases of the cups. Pull the string tight and talk through the telephone.

Why do you think this phone works?



## Date:

Concept: Learn about color through ASK/PREDICT/TEST.

**Description of Exploration:** Discover how to use primary colors to create new colors. PREDICT what colors will be created.



Materials: Red, yellow and green food coloring; white frosting; small bowls; and spoons for mixing. Sugar cookies or graham crackers to frost and eat.

Put 3 tablespoons of frosting in 3 different bowls. Add food coloring to the frosting so that you have 1 bowl of each of the primary colors (red, yellow, and blue). Scoop a tablespoon of the following 2 color combinations into an empty bowl, and mix them to see what new color they make.

#### Notes:

Red + Yellow = \_\_\_\_\_

Red + Blue = \_\_\_\_\_

Blue + Yellow = \_\_\_\_\_

**Experiment futher.** Experiment with creating other colors or different shades. Use different amounts of frosting or how much food coloring is added to the white frosting. Try adding white frosting to an already mixed bowl, to see how it adjusts the color.

What colors did you make?

**Note:** Color mixing can also be done with food coloring and water to make different colored ice cubes for a cool drink on a summer day.

**Concept:** Weather involves temperature and wind and clouds and precipitation. INVESTIGATE CONDENSATION—Make it rain to begin exploring our world's weather.



## Description of Exploration:

Materials: Ice cubes; hot tap water; a widemouth jar; and a small plate.

1. Pour two inches of very hot tap water (get help from an adult with this ) into a widemouthed glass container (like a mayonnaise jar).

- 2. Cover the jar with a plate.
- 3. Allow the hot water to sit for a few minutes.

4.Place ice cubes on top of the plate.

5. OBSERVE:

Notes: Draw or explain what is happening

### Date:

**Concept:** Our World is 70.8% Water, and most of that, 97%, is salt water. Salt water is denser (heavier) than fresh water. ASK: Will things float or sink differently in salt water? PREDICT and TEST!

#### Description of Exploration: Explore the World's Water.

- 1. Put 2 cups of tap water in a glass. TEST if a raw egg floats in tap water.
- 2. In another glass, add 4 tablespoons of salt to 2 cups water. TEST if a raw egg floats in salt water.

#### Notes:

Object to Test	PREDICT	TEST RESULT	
Raw Egg (in Shell)	Will it Float?	Did it Float?	
In Glass of Tap Water			
In Glass of Salt Water	j		

How do you explain what happened?

**Try this EGG-citing Trick:** Fill a glass half-full with the salt water as described above. Slowly add plain water to the glass, leaning the glass as you pour so it won't mix up with the salt water.

PREDICT what a raw egg will do in this new glass. Then gently drop the egg into the water. Observe and watch. What happened?



INVESTIGATE more about weather at the library (Call Number J551) or at http://www.weatherwizkids.com/

What do you think this has to do with weather?

**Concept:** ASK/PREDICT/TEST to learn about inertia and centrifugal force. Learn about physics!

**Description of Exploration:** PREDICT what will happen if you swing a bucket of water upside down over your head.



Fill a small bucket or pail (with a handle) 1/2 full of water. Go outside on a warm day. If you hold the bucket upside down over your head, you will get wet. But what will happen if you *swing* the bucket over your head in the path of an arc? Make sure the handle is strong and the bucket is not too full or too heavy.

TEST: Get the cup or bucket swinging a bit from right to left in front of you, and then swing it all the way up and over your head in an arch. If all goes well the *inertia* will hold the water in the bucket and you will stay dry. What happened?



## Date:

**Concept:** Chemistry is the study of stuff (or matter) and how it changes. Chemistry is everywhere around us, whatever you can see, hear, touch, smell, or taste. There are many chemicals in your kitchen which you can use to explore our world. ASK/PREDICT/TEST.

#### Description of Exploration: Can you bend a bone?

- 1. Save a chicken leg bone after dinner.
- 2. Remove any meat from the bone by rinsing it under water.
- 3. Gently try bending the bone. Can you? How hard is the bone?
- 4. Cover the bone with white vinegar in a jar covered with a lid.



- Figure 9.1
- 5. Let it sit for 3 days and then remove the bone. Rinse it off and try bending it again.
- Notes: What happened to the bone? Does it feel different?

Look up *inertia* at the library or online. After you INVESTIGATE, write the answers to your wonderings in your notebook.

Things I learned:

1.

2.

Bones have a mineral called calcium, which makes them hard. What do think happened to the bone's calcium in this experiment?

**Experiment Further**: Try using different types of vinegar or different sized bones over different amounts of time. What happens?

**Concept:** Physics is everywhere all around us. It is the science that deals with matter/stuff, energy, motion, and forces. Explore physics through ASK/PREDICT/TEST by experimenting with paper airplanes to learn about gravity, basic aerodynamics, wind and air currents.

## Description of Exploration:

Materials: Paper; scissors; and paper clips.



- 1. Make a paper airplane. If you need help go to <u>www.bestpaperairplanes.com</u>. Keep it simple.
- 2. Decorate your plane if you wish.
- 3. Now, Play with your paper airplane.

## Notes:

- TEST. Stand at the top of stairs and fly it down. Throw it up near an air vent. Try it outside. What happens if you throw it into the wind?
- Add a paperclip to the front of the paper plane.
  PREDICT what will happen?

TEST: How does it fly differently?

- Make a few line cuts in the sides of the paper airplane.
  - TEST: What happens now?

## Date:

**Concept:** Oregon doesn't have many tornados, but this winter there was one south of Salem. Build a model to OBSERVE how a vortex forms in a tornado.

## Description of Exploration:

Materials: 8 oz. jar with lid; water; white vinegar; liquid dish soap; and a pinch of glitter or tiny pieces of cut foil.

1. Fill the jar 3/4 full of water.

2. Put in one teaspoon of white vinegar and one teaspoon of dish soap.

3. Sprinkle in a small amount of glitter.

4. Close the lid and rotate the jar around and around in a circular motion. You will see a <u>vortex</u> like a tornado form.

INVESTIGATE tornadoes in a library book or online.

Things I learned:

Fact 1:

Fact 2:

Fact 3:

Books or online resources I used:

