

Preface

What is NSP?

The National Science Partnership for Girl Scouts and Science Museums (NSP) establishes partnerships between Girl Scout councils and science-strong institutions across the nation to promote science interest and knowledge in young American girls. Through the National Science Partnership, led by The Franklin Institute and Girl Scouts of the U.S.A., seven hands-on science activity kits and accompanying training workshops are offered to Girl Scout leaders across the country, assisting them in conducting science activities directly linked to the Girl Scout recognition requirements for Brownie and Junior Girl Scouts.

NSP Workshops and Activity Kits

NSP workshops provide an opportunity for leaders to explore hands-on science activities with other leaders. Although leaders will not necessarily have time to try every activity in the kit during a workshop, activities found to be the most enjoyable or challenging have been included in each workshop.

Ideally, each leader should receive the kit for the workshop in which she is participating. Each science activity kit includes the appropriate “Leader Guide” and a box of hard to find materials. (The materials in the kit are meant to be consumed, since many of the activities will result in projects the girls can take home to share with their family and friends.) Activities in the Leader Guide are organized by “week” and are designed to be completed in sequential order during a course of 5 to 7 weeks of troop meetings. However, recognizing the different needs of troops and leaders, the program is also designed to allow for flexibility. The NSP activities can be tailored to suit a variety of models, needs, audiences and situations, such as “Girl Scouting in the School Day,” large events for girls, science theme days, and summer camp programs.

Science Wonders

Preparing to do the Workshop

The purpose of the Science Wonders workshop is to familiarize Brownie Girl Scout leaders with the activities in the Science Wonders kit by having them do many of the activities themselves. This outline is to be used in conjunction with the “Science Wonders” Leader Guide and the “Science Wonders” Master Kit which provide all the instructions and materials to conduct this workshop.

Background

Leaders who attend these training workshops are generally mothers of Girl Scouts or community volunteers. They have a common desire to strengthen their troop’s science program. They are not paid to attend the workshops and most have juggled busy schedules to be with you. Some of the leaders may say that they were “not good at science in school” and some may even admit to being afraid of science. However, some may have science-related jobs or backgrounds and will be more confident in their science abilities. It is important not to let these individuals overshadow the rest. The aim of this workshop is to familiarize leaders with the activities and concepts presented in the kit in a non-threatening, cooperative environment.

Set-Up

The optimal number of participants in the training workshops is 15-25. Since this is a “hands-on” experience, work tables or areas will be needed for the participants. If possible, a demonstration table on which to set up materials is also desirable. Use this outline and the materials list as a guide to setting up work areas. To simplify the set-up process, it is helpful to organize and bag all of the materials ahead of time in sets (for groups of 4-5 leaders per set). Then when you set up for your workshop, you can simply place a bag of materials at each table. You will need a separate bag for demonstration materials.

For the Science Wonders workshop, you will want to be sure to have a source of water and a roll of paper towels to clean up spills. Get in touch with the group’s contact person prior to the workshop to find out what the setting will be like.

It is important to familiarize yourself with the entire outline and kit, and to do each of the activities before conducting the workshop.

Materials

The “Science Wonders” Master Kit consists of materials from two “Science Wonders” activity kits plus perishable or grocery store items below. Enough workshop materials are suggested for five groups of five participants or less; i.e. a maximum of 25 participants per workshop. The Master Kit will need to be checked prior to each training workshop, and refurbished if necessary.

The following is suggested as a way to organize and supply the Master Kit. Group materials

can be placed in large self-sealing plastic bags or baskets and labeled “Group #1” through “# 5.”

“Magnet Hunt” Bags (assemble 5 sets).

Each bag should contain most of the following (other items can be substituted):

- √ 5 bar magnets
- 1 bean
- 1 toothpick
- 1 paper clip
- 1 straight pin
- 1 rubber band
- 1 push pin
- 1 piece of pipe cleaner
- 1 small piece of aluminum foil
- 1 piece of foam
- 1 penny
- 1 metal nut
- other items (optional) √

Group Bags (assemble 5 sets).

Each bag should contain the following:

- 5 sheets black construction paper
- 2 balloons

- 1-3 scissors
- 1 plastic spoon
- 2 film canisters
- 4 film canisters
- (labeled a, b, c, d) with:
- a: sugar
- b: Epsom salt
- c: table salt
- d: decorator sugar
- 1-2 magnifying lenses
- 1 “Magnet Hunt” bag
- (see previous list)
- 1 paper cup

Folder/Envelope

- √ “Workshop Folder” contains: Bingo, Training Outline, Leader Guide, Evaluation.

Paper Making Items

- 5 plastic tubs of paper pulp
- 5 1-inch stacks of newspaper
- 5 2-liter plastic bottles with lid and water
- additions to pulp: thread, grass, dried flowers, dryer lint, carrot shavings, etc.
- √ 5 paper-making screens
- 1-3 rolls of paper towels

Miscellaneous Items

- 1 metal nut, real or a drawing (optional)
- √ 1 sample Journal Cover
- √ “Magnet Hunt” story
- √ 1 sample Magnet Worksheet
- √ 1-2 Magnetic Force demonstration set-up
- √ 25 assembled filing covers with faces
- √ 1-2 cow magnets
- 1 package of crackers
- 1 knife
- 1 apple
- 3-5 baby food jars of sample suspended sugar crystals
- 1-5 bottles or vials of vinegar
- 1-5 cans double-acting baking powder
- 5 baby food jars* each with different mystery powder (flour, sugar, salt, baking soda, baking powder) *You may want to put one jar in each of the group bags.

Preparation prior to Workshop

- Six paper making screens must be assembled.
- Prepare pulp for paper making at least two days prior to the workshop.
- Prepare three sample “suspended sugar crystals” using baby food jars. Fill each jar to at least a 2” depth. Note: The crystals must be prepared at least two weeks before your first workshop. They can be reused in subsequent workshops, and will last a year or

longer.

- Cut all twenty squares from the slide cover sheet. Cut out and insert twenty “faces” from the page of “faces.” Place a pinch of iron filings into each plastic square then seal the open side with transparent tape.
- Prepare one sample “Magnetic Force” demonstration using a soda bottle, iron filings, masking tape, and plastic tube. Do not insert the cow magnet until you conduct the activity.

Conducting the Workshop (Total time - 2 hours)

Introduction (10 minutes)

- Give out an “ice breaker activity” (see attached Bingo) and an evaluation to each leader as she arrives.
- Give the leaders a brief history of the N.S.P. (see Preface), as well as your own personal background and training.
- Have the participants introduce themselves if the group is small enough. Invite participants to share their feelings about science, and what they hope to learn or accomplish as a result of the workshop.
- Give out one Science Wonders kit and Leader Guide to each leader.
- Explain that the kit contains all the instructions for 5 weeks of science activities and supplies of the harder to find materials needed to do the activities. Supplemental materials can be purchased at the grocery store. By completing the kit, the girls earn a Science Wonders Try-It patch.
- Discuss the format of the kit. Each activity consists of the following: a list of materials, a step-by-step procedure, a helpful hints section, a background section called “Whys and Hows” and a list of extension ideas.

(Please Note: Be sure to consult the Leader Guide for detailed instructions.)

WEEK #1 “INTRODUCTION TO SCIENCE WONDERS” (15 minutes)

1. Science Journal

- Ask leaders to describe a scientist in one or two words.

“Debrief by discussing:

- 1) similarities and differences
- 2) gender and appearance of scientists
- 3) ways in which scientists help us.

Explain that the girls will actually draw a scientist, but that the “debriefing” or follow-up discussion would be similar.

Discuss the information provided in the “Whys and Hows” section of this activity, and mention that a list of female scientists and their accomplishments is provided in the Leader Guide.

Discuss the making of journals (show sample cover).

Explain that reproducible recipes which can be added to the journals are provided in the Leader Guide.

2. Fiber Exploration

Distribute sheets of newspaper.

Ask each leader to take a magnifying lens from her kit
Conduct the “Fiber Exploration” activity using the newspaper, and mention that the girls will also examine facial tissue and brown paper bags.
Discuss how texture and strength relate to function (eg. Which type of paper would they rather use to carry a lunch? Blow their nose?)
They have just done a scientific investigation!

3. Paper Making Screen Prep (1 minute)

- Explain how to prepare the screen and pass around samples.

WEEK #2 “HOMEMADE RECYCLED PAPER” (30 minutes)

1. Making Recycled Paper

- Divide the leaders into groups of 4 or 5.
- Give each group their paper making materials (newspaper, towels, 1-liter bottle, screen, and pulp)
- Explain to the leaders that you would like them to try making the paper on their own, following the directions in the Leader Guide, so that they get a feel for the kit’s approach.

WEEK #3 “HOME-GROWN CRYSTALS” (15 minutes)

1. Crystal Quest

Ask the leaders, “What do salt, ice, diamonds, rock candy, quartz and snowflakes all have in common?” (They’re crystals!_

Discuss crystals using information from “Whys and Hows.”

Divide the leaders in groups of 4 or 5, and give each group a sheet of black paper.
Conduct the “Crystal Quest” activity as described in the Leader Guide.

2. Suspended Sugar Crystals

Explain how to make the “suspended sugar crystals” and show samples.

Some troops may not have access to a heat source. Explain that heat is usually a required element in growing crystals. Mention the following possible alternatives:

- 1) Have the girls pair up and do the activity at home with adult supervision (a sugar crystal recipe is provided in the kit).
- 2) Bring a hot plate or electric kettle to the meeting site.
- 3) Save the activity for a troop overnight or gathering when a kitchen would be available.

WEEK #4 “MAGNET HUNT” (20 minutes)

1. The Nut Crisis

Ask the leaders to “put on” their Brownie Girl Scout caps and participate as their troop might.

Hold up the metal nut from the kit and tell the “nut” story as it appears in the Leader Guide (and please “ham it up!”)

Divide the leaders into groups of two or three and ask them to brainstorm solutions to the problem.

- Emphasize that there are many possible solutions to the problem (no one right answer).
- After one or two minutes, ask each group to share one idea with the whole group.
- Try to listen in as the ideas are being discussed in small groups, and, if possible, save the magnet idea for last, leading into the next activity.

2. Magnet Exploration

- Ask leaders to use the bar magnets provided in their kits.
- Conduct the “feeling the Force” activity as described in the Leader Guide.

3. To Attract or Not To Attract

- Show sample “Magnet Hunt” worksheet. Explain how this activity is conducted (refer to Leader Guide for instructions).

4. Magnetic Force

Part One: Magnetic Force

- Show a “Magnetic Force” set-up (soda bottle with iron filings and clear plastic tube inserted).
- Ask the leaders to predict what will happen when the cow magnet is inserted. Have a volunteer leader gently insert one, then roll or carefully shake the bottle until the filings adhere to the magnet.
- Discuss the leaders’ observations.
- Have the leaders remove a clear plastic tube from their kit. Show the leaders how to prepare their plastic tube with masking tape, using the “Magnetic Force” set-up as a model.

*Note: If possible, arrange to have the leaders provide an empty 12 oz. clear plastic soda bottle with the label removed. Then you can have them prepare their own “Magnetic Force”

Part Two: Face Filing Cases

- Show a slide cover sheet and explain how to cut into individual squares without breaking the seal.
- Pass around the sample filing cases and explain how they are made.
- Give the leaders a minute or two to play with the face picture and the magnet.

WEEK #5 “CHEMISTRY MAGIC” (20 minutes)

1. Change (part A)

- Conduct the activity with an apple and cracker (refer to instructions in Leader Guide).
- Discuss chemical vs. physical change
 - Explain the chemical reaction that occurs (see “Whys and Hows”).

2. Balloon Blow-up

- Divide the leaders into groups of 2 or 3.

- Conduct the activity as described in the Leader Guide. (see “Whys and Hows”).

3. Science Journal

- Explain that as a conclusion to Science Wonders, the girls will repeat the “draw a scientist” activity.
- Discuss the importance of “debriefing” this activity by comparing the two drawings and discussing what the girls have learned about science and scientists.
- Discuss how to assemble the journals.

Conclusion (10 minutes)

- Thank the leaders for their participation and ask them to complete their evaluation questionnaire.
- Announce any upcoming training workshops.