Leaping into Science Exploration: An Early Childhood *UPK* Science Curriculum

for the Greater Rochester Summer Learning Association / summerLEAP Program

Developed by

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summer LEAP

Learning Enrichment to Achieve Potential

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Dear summerLEAP Teachers,

Science is an extremely effective method for engaging children in learning. Much of that learning won't be communicated to a teacher verbally, but inside the developing brain, knowledge is being constructed from sensory experiences. If science is done well, children are completely engrossed, smiling and laughing, reluctant to stop, eager to talk about what they are doing and hopeful that they can do it again. We call this kind of teaching "best practice". Unfortunately, many teachers bypass science due to the cost of materials, lack of training, and the perceived need for elaborate preparation.

The goal for the 2019 Summer LEAP program is to remove barriers to teaching science by providing teachers everything needed to be successful:

- ☑ easy to follow manual
- ☑ hands-on teacher training
- ☑ all required materials
- ☑ sets of children's books on related science topics
- ☑ science journals for children to share with parents
- ☑ review of the Highscope COR Advantage Scoring Guide
- ☑ introduction to the NYS Science Standards
- ☑ opportunities to talk with colleagues about their experience with the program

By engaging students weekly in hands-on science activities, reading books about science, modeling scientific processes, and drawing pictures in their science journals, students will develop critical thinking skills, expressive language, vocabulary and an understanding of what science is and what scientists do. At the same time, they will have a wonderful summer of exciting scientific discoveries.

We wish you much success with this program and thank you for your dedication to the children in your care.

Sarah and Aimee

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Topic- Five Senses

Exploration: Cinnamon Powder (*Sense of Taste and Smell)*

Key Learning

Tiny particles called molecules float through the air and land inside our nose and send messages to our brain. Molecules also touch our tongue when we eat and drink allowing us to taste.

Objective

Students will rub a piece of cinnamon bark with sandpaper making powdered cinnamon. They will taste it with and without sugar and sprinkled on sliced apples.

Materials Provided

- ☑ 3 in. sandpaper squares
- ☑ cinnamon sticks

Items Needed *(*to be provided by teacher*)*

- ○ small paper plates to capture the cinnamon powder
- ○ teaspoon
- ○ popsicle sticks
- ○ white sugar
- ○ apple slices
- ○ napkins
- ○ knife

Preparation

1. Have children wash their hands.
2. Wash and slice apples.
3. Give each child a paper plate to capture the cinnamon powder, a piece of sandpaper, a cinnamon stick, popsicle stick and a napkin.

Experiment

1. Rub the cinnamon stick against the sandpaper and taste the powder using your fingertip.
2. Mix sugar with the cinnamon on your plate using a popsicle stick. Taste again.
3. Dip apple slices in the cinnamon sugar and enjoy.

Extensions

Expand this experience by offering a variety of apple slices: Granny Smith, Gala, McIntosh. Use a bar chart to record favorite apple variety.

Topic- Five Senses

Exploration: Guessing Cup Game *(Sense of Touch)*

Key Learning

Our skin has nerves that send messages to our brain. We feel with our hands, but also with any part of our body. We can tell what something is by touching it, even if we can't see it.

Objective

Students will play a guessing game using small objects and a guessing cup made from a plastic tumbler and a tube sock. They will feel inside and then match the hidden object with one from an assortment of possibilities.

Materials Provided

- ☑ plastic tumblers
- ☑ tube socks
- ☑ small toy animals, two of each

Items Needed *(*to be provided by teacher*)*

- ○ pairs of small classroom objects
- ○ tray

Preparation

1. Assemble six guessing cups by pushing a cup right side up into a tube sock.
2. Combine doubles of classroom objects with pairs of small animals provided.
3. Separate the objects into two groups. Half will be used to hide inside the guessing cup, half will be displayed for finding a match.

Experiment

1. Pick an object and secretly place it inside the cup.
2. Invite a friend to reach inside, feel the object, and point to the matching object on the tray without peeking inside the guessing cup. Did you get it right?
3. Switch roles and repeat.

Discovery Questions

How else could we play this game? How does our sense of touch keep us safe? Can you think of examples?

Extensions

Ask a volunteer to close their eyes and then touch them with the eraser of a pencil on their head, neck, or ankle. Ask them to say" touch" every time you touch them. Talk about how messages travel up our arms and legs to relay messages to our brain. Show the class an illustration of the human nervous system.

Topic-Five Senses

Exploration: Matching Sound Shakers *(Sense of Hearing)*

Key Learning

Sound travels through the air in waves to our ears and sends messages to our brain. Our ears can tell the difference between sounds that are loud and soft.

Objective

Students will play a matching game with plastic eggs filled with a variety of materials.

Materials Provided

☑ 24 plastic Easter eggs

Items Needed *(*to be provided by teacher*)*

- **12 different materials to fill the eggs:** dried rice, dried beans, small Lego blocks, marbles, bouncy balls, nuts, metal washers, Q tips cut in half, broken crayons, checker pieces, candy, paper punches from 3-hole punch, paper clips, pompoms, brass fasteners, gravel, pennies
- empty egg carton for displaying the 12 materials used to fill the eggs
- clear tape
- Sharpie pen

Preparation

1. Create 12 pairs of shakers using a variety of materials.
2. Tape the eggs shut.
3. Number the eggs and make a list of the contents for easy reference.

Experiment

1. Shake and listen to all 12 eggs by passing them around in a circle.
2. Look at the different materials found inside the eggs.
3. Pick an egg and guess which material is inside the egg. Ask your teacher if you got it right.

Discovery Questions

Which materials make loud sounds and which ones make quiet sounds?

Extensions

Select pairs of eggs matching the number of children in the group. Distribute two non-matching eggs to each child. Invite them to walk around and find a partner with an egg with a matching sound. If they find a match they raise their hands and the teacher checks using the handy reference chart.

Topic-Five Senses

Exploration: Optical Toys *(Sense of Sight)*

Key Learning

Light travels to our eyes and helps us to see the world around us. Our eyesight is very important and we should be careful to protect our eyes.

Objective

Students will explore a variety of optical toys enjoying their sense of sight. They will assemble and decorate a pair of cardstock glasses to take home.

Materials Provided

- ☑ variety of optical toys: small binoculars, kaleidoscopes, bug viewers
- ☑ copies of eyeglass template printed on cardstock
- ☑ cello sheets

Items Needed *(*to be provided by teacher*)*

- ○ glue sticks
- ○ markers
- ○ tape

Preparation

1. Cut cello sheets to appropriate size for eyeglass openings
2. Cut out paper glasses, one per child.
3. Tape temples of glasses to frame

Experiment

1. Look through the various optical toys and talk to a friend about what you see.
2. Glue the cello sheets to the back of the paper glasses.
3. Decorate the front with colored markers.
4. Try on for fun.

Discovery Questions

What would it be like if you couldn't see? People who can't see are blind. They have to use their other senses to help them. Blind people have special books which they can read using their sense of touch. The books are printed in braille.

Extensions

Borrow books in braille from the local library to show to the class.

Topic- Light

Exploration: Sun Prints

Key Learning

Sunlight does not travel through all materials. Sunlight causes damage to materials. Sunlight can change the color of paper left outside.

Objective

Students will make sun prints by arranging objects on construction paper and leaving them exposed to sunlight.

Items Needed *(*to be provided by teacher*)*

- dark construction paper
- variety of classroom and natural objects
- markers

Preparation

1. Collect a variety of natural objects and classroom items.
2. Write children's names on papers.

Experiment

1. Go outside on a sunny day.
2. Arrange objects on top of a piece of construction paper.
3. Leave papers undisturbed in direct sunlight for several hours.
4. Collect objects and papers, go inside and look closely at the paper.

Discovery Questions

What happened to the places on the paper where the objects were placed? Did the sunlight touch the paper in those places? What did the sunlight do to the paper?

Extensions

Take several pieces of construction paper and leave them exposed to sunlight over several days or a week. Compare them to fresh pieces of paper the same color.

Topic- Light

Exploration: Tracing Shadows

Key Learning

Shadows are made when sunlight is blocked. We can make shadows with our bodies. Our shadows change shape depending on the time of day.

Objective

Students will trace their shadows three times during a morning and observe that their shadows change shape.

Materials provided

☑ sidewalk chalk

Preparation

1. Select a sunny day for tracing shadows outside three times during one morning.

Experiment

1. Go outside.
2. Stand where your body makes a shadow.
3. Ask a friend to trace your shadow.
4. Write your name where your feet are standing.
5. Return one hour later, stand in the same position and ask someone to trace your shadow again.
6. Repeat one more time.

Discovery Questions

Were the three shadows the same or different? Why did the shadows change shape? Is the sun always in the same place?

Extensions

Make a sundial using classroom materials. Discuss how shadows can be used to measure time.

Topic- Light

Exploration: Blocking Light

Key Learning

Shadows are made when sunlight is blocked. Some materials block light better than others.

Objective

Students will experiment with different materials to see which one blocks light best.

Materials Provided

- ☑ cardboard
- ☑ fabric
- ☑ wax paper
- ☑ aluminum foil
- ☑ transparent plastic shapes of various colors

Preparation

1. Select a sunny day for experimenting with materials outdoors.

Experiment

1. Go outside.
2. Hold the different materials so they make shadows on the ground.
3. Experiment with all the materials to determine which makes the darkest shadow.
4. Regroup inside and discuss the results. Make a chart and have students vote on which material made the darkest shadow.

Discovery Questions

What makes a shadow dark? What makes a shadow light? What kind of objects block light completely?

Extensions

We have already learned that sun can damage paper. Can sun damage our skin? Can we protect ourselves by standing in shadows?

Topic- Water

Exploration: Sink and Float

Key Learning

Not all objects float. Some materials sink.

Objective

Students will experiment with different materials to see which float and which sink.

Materials

- ☑ variety of small objects
- ☑ cups to hold test materials
- ☑ aluminum foil (for extension activity)
- ☑ Yes/No worksheet

Items Needed (*to be provided by teacher*)

- ○ water table

Preparation

1. Fill a water table half full.
2. Prepare small collections of materials for children to test.

Experiment

1. Choose an item to test.
2. Predict whether it will float before placing it in the water.
3. Test each object.
4. Complete the Yes/No worksheet using the Yes column for objects that float.

Discovery Questions

What was the same about the items that floated? What was the same about the items that sank? Did any of the results surprise you?

Extensions

Can we design a boat out of foil that will float with small objects in it? How many objects can your boat hold before sinking?

Topic- Water

Exploration: Tornado Bottles

Key Learning

Water takes up space. Air takes up space. In order for a tornado bottle to work, the water and air must trade places. To do this, a vortex must be created.

Objective

Students will play with tornado bottles and learn about the vortex created when the water is swirled in a circular motion.

Materials Provided

- ☑ food coloring
- ☑ 2 connecting tubes

Items Needed (*to be provided by teacher*)

- ○ 4 (2-liter) bottles

Preparation

1. Fill two soda bottles halfway with colored water.
2. Connect the bottles to empty bottles using connecting tubes.

Demonstration

1. Gather the students for a demonstration.
2. Turn the tornado bottle upside down, but don't start it in motion.
3. Allow the water to remain in the top bottle and ask the children why it isn't going down.
4. Clarify that the bottle appears empty, but is full of something.
5. Ask the kids what is in the bottle.
6. Demonstrate how to get the vortex started.

Experiment

1. Experiment with the tornado bottles.
2. Observe what is happening inside.

Discovery Questions

Have you ever seen water going around in a circle in other places at your house or at school? Why do you think water goes in a circle down the drain?

Extensions

Use the two tornado bottles for races. Create two-person teams. One person holds the base of the bottle as the other turns the top to generate the vortex.

Topic- Water

Exploration: Water Droplet Fun

Key Learning

Water droplets on wax paper are rounded and like to combine with other droplets.

Objective

Students will use pipettes to drip water on wax paper and move them around.

Materials

- ☑ small cups
- ☑ water
- ☑ pipettes
- ☑ wax paper
- ☑ baking pan

Preparation

1. Cut lengths of wax paper to fit inside the cookie pans.
2. Pour water in cups.

Experiment

1. Using a pipette, drip water on wax paper.
2. Observe.
3. Experiment trying to get droplets to combine.

Discovery Questions

What is the shape of a drop of water? Why doesn't the wax paper absorb the water? What is wax? What else is made from wax?

Extensions

How many drops of water can fit on a penny? Ask students to count as they drip water on the top of a penny. Assist with the counting if necessary. Record the data from all the students. Are the results similar or different? Look closely at the penny loaded with water. What shape is the water?

Topic- Air

Exploration: Air Pump Races

Key Learning

Air is a gas. It is invisible. It is strong enough to move objects.

Objective

Students will use air to move objects across a tabletop.

Materials Provided

- ☑ balloon pumps
- ☑ feathers
- ☑ pompoms
- ☑ stones
- ☑ misc. other small items

Items Needed (*to be provided by teacher*)

- ○ plastic container to hold the objects
- ○ other misc. small items

Preparation

1. Move chairs away from a child height table.

Experiment

1. Use the air pump to try moving objects across the table.
2. Test all the materials.

Discovery Questions

Which objects were you able to move with air? Which objects could not be moved? Why?

Extensions

Using standard classroom unit blocks, let the children set up a race course with two lanes. Pick identical objects and have two children race by blowing the object from the start of the race course to the finish line.

Topic- Air

Exploration: Painting with Air

Key Learning

People need air to breathe. We fill our lungs with air when we breath in. Air can be directed through a straw and can push paint across paper.

Objective

Students will use plastic straws to make a painting.

Materials Provided

☑ straws

Items Needed (*to be provided by teacher*)

- liquid tempera paint
- paper
- cups for paint
- plastic spoons

Preparation

1. Pour paint into cups.
2. Test to see if paint needs to be thinned with water.
3. Write students' names on their paper.

Experiment

1. Spoon a small amount of paint in the middle of the paper.
2. Blow through a straw to move the paint into dry areas of the paper.
3. Use the end of the straw to make small round rings of paint by gently pressing the straw end onto the paper.
4. Combine several colors of paint on the same paper.

Discovery Questions

Where did the air come from that moved the paint? Do you think you could blow the paint without the straw? Why was it important to blow through the straw?

Extensions

Mix dish soap with paint and dip a straw into the paint. Blow a bubble and let it drop onto a piece of white paper. Repeat with bubbles of different sizes.

Topic- Air

Exploration: Blowing Bubbles

Key Learning

Bubbles are filled with air. They are round like a ball. Dry objects will pop a bubble. Bubbles don't mind being touched by wet, soapy fingers and objects.

Objective

Students will blow bubbles inside a paper cup using a straw until the bubbles come up and over the side. They will work with friends to make a giant bubble mountain.

Materials Provided

- ☑ Straws
- ☑ Paper cups
- ☑ Plastic tablecloth
- ☑ Dawn dish soap

Items Needed (*to be provided by teacher*)

- ○ Water
- ○ Container for bubble solution

Preparation

1. Mix together bubble solution. (1 cup of dish soap, 1 cup of water)
2. Cover a table with a plastic tablecloth for easy cleanup.

Experiment

1. Set a cup on top of a covered table.
2. Pour about a half inch of bubble solution into the cup.
3. Using a straw, create bubbles in your cup.
4. Keep blowing until the bubbles come out over the top of the cup.
5. Make your bubbles connect with your friends.
6. Stick your straw into one of the bubbles and gently blow more air in it to make it bigger.

Discovery Questions

What did you do to make the bubble larger? Smaller? What shape is the bubble? Does it remind you of the water droplets on the wax paper?

Extensions

Invent other bubble wands using recyclable objects such as berry baskets and water bottles cut in half.

Topic- Magnets

Exploration: Material Sort

Key Learning

Magnets are attracted to certain types of metal objects. They do not attract wood, plastic, or fabric.

Objective

Students will test a variety of materials to determine which objects are attracted to magnets and which are not and sort them into groups on a Yes/No graphic organizer provided.

Materials

- ☑ wand magnets
- ☑ assorted materials
- ☑ Yes/No worksheet *(found in appendix, page 29)*

Preparation

1. Copy the worksheet

Experiment

1. Test all the different materials to see which are attracted to the magnet and which ones do not stick to the magnet.
2. Sort the items into two groups on the Yes/No chart provided.

Discovery Questions

What was the same about all the materials that stuck to the magnet? What are they made of? What else in this classroom might stick to a magnet?

Extensions

Electromagnets are used to sort and move large metal objects. Show the children YouTube videos of electromagnets being used in salvage yards. Preview the videos as some of the adults' language may not be appropriate for children.

Topic- Magnets

Exploration: Repel and Attract

Key Learning

Magnets have two poles, negative and positive. Magnets can stick to each other when their poles are opposite. We call this attract. If the poles are arranged with like poles aligned, magnets can push apart. This is called repel.

Objective

Children will experiment with various magnets on a tabletop to see if they can move a magnet without touching it. They will stack round magnets on a pencil and see that they seem to float in air.

Materials Provided

- ☑ wand magnets
- ☑ round magnets

Items Needed (*to be provided by teacher*)

- ○ unsharpened pencils

Preparation

1. Collect materials and place on a tabletop.

Experiment

1. Explore how magnets behave with each other by touching two magnets together.
2. Turn one upside down and see if it behaves differently.
3. Try threading round magnets on a pencil. If they attract, reverse the top magnet and see what happens. Continue adding round magnets until you have several appearing to float in air.

Discovery Questions

What did you notice about the magnets? Do magnets always attract or did you find they sometime push away? Did both types of magnets attract and repel? What did you do to change the force from attract to repel?

Extensions

Read a book about magnets and explain that planet Earth has magnetic properties. It has a north and a south pole.

Topic- Magnets

Exploration: Testing Magnets

Key Learning

Magnets are powerful and their force can go through layers of materials.

Objective

Children will experiment with wand magnets to see if the magnetic force can be blocked by paper, aluminum foil, wood, fabric, cardboard and plastic.

Materials

- ☑ wand magnets
- ☑ assorted materials: paper, wood, plastic, fabric, foil
- ☑ washers
- ☑ paper clips

Items Needed (*to be provided by teacher*)

- ○ other misc. small items

Preparation

1. Collect materials and place on a tabletop.

Experiment

1. Pick up a paperclip with a magnet.
2. Place a piece of wood under the magnet and try to pick up the paperclip.
3. Continue experimenting with each material and combinations of materials.

Discovery Questions

Was there any combination of materials that completely blocked the magnet's ability to pick up the paperclip? Did the magnet's strength seem to get weaker?

Extensions

A magnet's force can be shared with an object it attracts. Let the children experiment picking up paperclips to see if the first paperclip will attract another paperclip. How many paperclips can be strung together before the magnetic force is too weak and the next paperclip falls?

Topic- Chemistry

Exploration: Vinegar and Baking Soda

Key Learning

A chemical reaction happens when two materials mix and cause a reaction.

Objective

Children will combine vinegar and baking soda and see that this combination creates bubbles filled with a gas called carbon dioxide.

Materials Provided

- ☑ baking pan
- ☑ pipettes
- ☑ white vinegar
- ☑ baking soda

Items Needed (*to be provided by teacher*)

- ○ small cups for vinegar and baking soda
- ○ plastic spoons

Preparation

1. Prepare cups of vinegar and baking soda for each child.

Experiment

1. Make small piles of baking soda on the baking tray using the teaspoon.
2. Using the pipette, drizzle vinegar into the piles of baking soda and watch the reaction.

Discovery Questions

What happened when you dripped the vinegar on the pile of baking soda? How long did it bubble? Did it ever stop? If you put more vinegar on it, did it start to bubble again?

Extensions

Repeat this experiment inside a small baby food jar or cup. Add dish soap and red food coloring to the vinegar to create a mini-volcano

Topic- Chemistry

Exploration: Mixing Colors

Key Learning

Colors can be mixed to make new colors.

Objective

Children will combine colored water to make new colors and will dribble these new colors on white paper towels.

Materials Provided

- ☑ ice trays
- ☑ pipettes
- ☑ primary food coloring
- ☑ quality paper towels like Bounty

Preparation

1. Fill six openings of an ice tray with water so that the compartments are half full.
2. Color two compartments red, two blue, and two yellow.
3. Provide a pipette for each color.
4. Cut paper towel in 3 in. squares

Experiment

1. Place six paper towel squares on the baking tray.
2. Drip a combination of colors on each piece of paper towel to see what colors can be created by combining red, yellow and blue.

Discovery Questions

What colors did you make? What happened when you mixed all three colors together?

Extensions

Fold a piece of paper towel into eighths. Dribble different colored water on the top layer and push down so that it soaks all the way through to the bottom. Open up the paper towel to see the design made. Allow to dry overnight. Discuss evaporation.

Topic- Chemistry

Exploration: Vinegar and Egg Shells

Key Learning

Vinegar dissolves the shell of an egg.

Objective

Hardboiled eggs will be placed in cups of vinegar and left for several days. Children will discover that the shell has dissolved leaving the hardboiled egg with a rubbery covering. They will make observations during the process.

Materials

- ☑ white vinegar
- ☑ quality white paper towels like Bounty
- ☑ magnifying glasses

Items Needed (*to be provided by teacher*)

- ○ eggs
- ○ cups
- ○ tape
- ○ marker

Preparation

1. Pour vinegar in plastic cups.
2. Mark each cup with names.

Experiment

1. Place an egg in the cup of vinegar.
2. Set it out on a shelf where it can sit undisturbed for several days.
3. Observe the eggs each day using a magnifying glass.
4. Discuss observations.
5. Remove egg from cup and place on paper towel. Touch.

Discovery Questions

What happened to the hard shell of the egg? Did you notice any bubbles on the egg during the time it was in the vinegar? Does this remind you of what happened with the vinegar and baking soda?

Extensions

Repeat the experiment using brown eggs and white eggs. Compare results.

Appendix

A Framework for P-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas

National Research Council of the National Academies, 2012

"Currently, K-12 science education in the United States is not organized systematically across multiple years of school, emphasizes discrete facts with a focus on breadth over depth, and does not provide students with engaging opportunities to experience how science is actually done. The Framework is designed to directly address and overcome these weaknesses".

Practices for P-12 Classrooms

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information.

After the Framework was published in 2012, New York State used it as a guide for developing the NYS Science Standards published in Dec. 2016. Many of the NYS standards align with the Highscope COR Advantage Goals. Almost all the goals from both sources can be incorporated into the six weeks of Summer LEAP. The checked items "✓" below indicate areas where the science activities and standards overlap.

In this section, the Highscope COR and the NYS Science Standards are condensed for easy reference. COR Levels 1 or 2 are not listed because most four year olds would be scoring above a 2 heading into kindergarten. If you have children below level 3, refer to your Highscope manuals for descriptors. For the NYS Standards, both Pre-K and K are listed to give LEAP teachers an understanding of what lies ahead for their students entering kindergarten.

Highscope COR Advantage 1.5 Scoring Guide

BB Observing and classifying

- ✓ Level 3 Child sorts or matches things and may identify things as being same or different.
- ✓ Level 4 Child sorts things based on one characteristic and describes the reason.
- ✓ Level 5 Child sorts based on two characteristics and gives the reason.
- ✓ Level 6 Child intently or repeatedly observes something and describes his or her discoveries in detail.
- ✓ Level 7 Child divides a category into sets, divides the sets into subsets, and describes the characteristics of each subset and how it relates to the original category and to the other subsets.

CC Experimenting, predicting, and drawing conclusions

- ✓ Level 3 Child describes a change in an object or situation.
- ✓ Level 4 Child makes a verbal prediction at random.
- ✓ Level 5 Child gives a reason for the result of his or her experiment.
- ✓ Level 6 Child applies a conclusion he or she made from a previous experience to a new situation.
- ✓ Level 7 Child poses a question and systematically tests out possible answers.

DD Natural and physical world

- ✓ Level 3 Child initiates or talks about performing an action helpful to plants or animals.
- ✓ Level 4 Child talks about where different types of wildlife live or are found (habitats).
- ✓ Level 5 Child identifies a change in a material or the environment & possible cause.
- ✓ Level 6 Child explains how or why people's behavior can be harmful to the environment and offers an idea to help.
- ✓ Level 7 Child identifies and describes a cycle or system.

EE Tools and technology

- ✓ Level 3 Child uses tools to support his or her play.
- ✓ Level 4 Child explains in a simple way how a tool works.
- ✓ Level 5 Child explains in a simple way how to make a piece of technology work.
- ✓ Level 6 Child explains how tools and technology assist in the tasks of daily living.
- ✓ Level 7 Child uses technology to look up information he or she is interested in.

New York State P-12 Science Learning Standards

Pre-K and Kindergarten

P. Physical Sciences

- ✓ P-PS1-1. Ask questions and use observations to test the claim that different kinds of matter exist as either a solid or liquid.
  P-PS2-1. Use tools and materials to design and build a device that causes an object to move faster with a push or a pull.
  PPS4-1. Plan and conduct investigations to provide evidence that sound is produced by vibrating materials.

P. Life Sciences

- ✓ P-LS1-1. Observe familiar plants and animals (including humans) and describe what they need to survive.
- ✓ P-LS-2. Plan and conduct an investigation to determine how familiar plants and/or animals use their external parts to help them survive in the environment.
- ✓ P-LS3-1. Develop a model to describe that some young plants and animals are similar, but not exactly like, their parents.

P. Earth and Space Sciences

- ✓ PESS1-1. Observe and describe the apparent motions of the Sun, Moon, and stars to recognize predictable patterns.
- ✓ P-ESS2-1. Ask questions, make observations, and collect and record data using simple instruments to recognize patterns about how local weather conditions change daily and seasonally.
- ✓ PPS3-1. Plan and conduct an investigation to determine the effect of sunlight on Earth's surface.

K. Matter and Its Interactions

- ✓ KPS1-1. Plan and conduct an investigation to test the claim that different kinds of matter exist as either solid or liquid, depending on temperature.

K. Forces and Interactions: Pushes and Pulls

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
K-PS2-2. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.

K. Forces and Interactions: Pushes and Pulls

K-PS2-1. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object
K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or pull.

K. Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

- ✓ K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.
- ✓ K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
- ✓ K-ESS3-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.
- ✓ K-ESS3-3. Communicate solutions that will reduce the impact of humans on living organisms and non-living things in the local environment.

K. Weather and Climate

- ✓ K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
- ✓ K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
- ✓ K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.
- ✓ K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Book List

5 Senses

Look, Listen, Taste, Touch and Smell, by Pamela Nettleton
My Five Senses, by Aliki
I Hear a Pickle, by Rachel Isadora

Light

Sunshine Makes the Seasons, by Franklyn M. Branley, Michael Rex
The Sun is My Favorite Star, by Frank Asch

Water

What Floats? What Sinks? A look at Density, by Jennifer Boothroyd
I Am Water, by Jean Marzollo, Judith Moffatt

Air

Where Do Puddles Go?, by Fay Robinson
Solids, Liquids, and Gases, by Ginger Garrett, Linda Bullock
Pop! A Book About Bubbles, by Kimberly Brubaker Bradley

Magnets

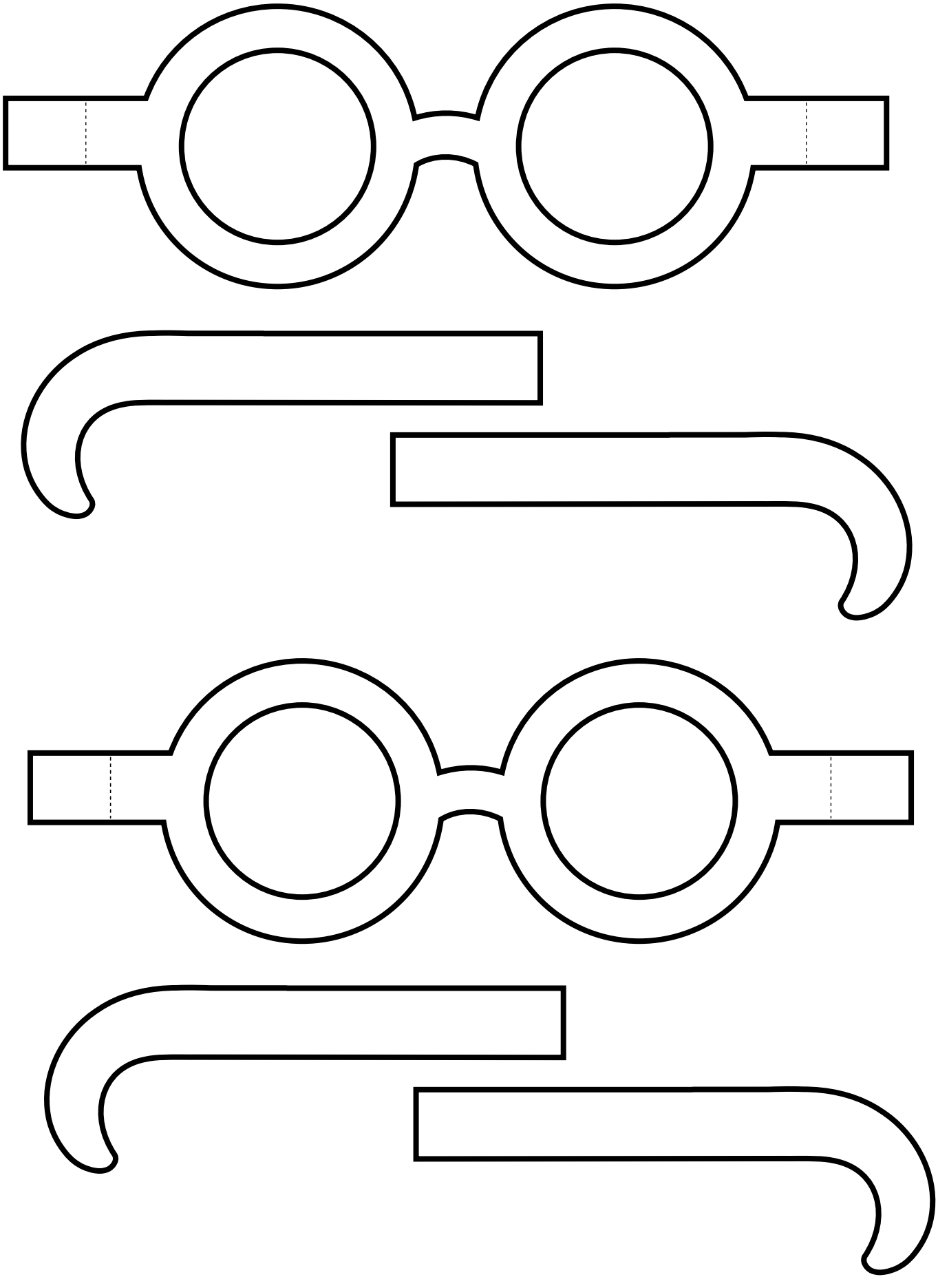
What Magnets Can Do, by Allan Fowler
Magnet Max, by Monica Lozano Hughes, Holly Weinstein

Chemistry

I Use Science Tools, by Kelli Hicks
What is Science? By Rebecca Kai Dotlich, Sachiko Yoshikawa

 Yes	No 

Round Eyeglasses



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