

Teach Science Teach Math!!



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Science Process Skills



Levels of thinking while doing Science

Observation

Learning about your world through your senses (Seeing, hearing, touching, smelling, tasting). Use your senses to find out about objects and events: their characteristics, properties, differences, similarities, and changes.

Communication

Communicating to others by talking, writing, drawing, diagramming, charting, or graphing

Comparing and Classifying

Organizing your materials and events according to an observed property then, compare and contrast objects or events (How are they alike? How are they different?)

Using Math to support your Observations

Sort and classify objects into given categories, count number of objects in each category and compare groups. Organize represent and interpret data. Help construct and interpret picture graph and or bar graph to represent data. Interpret data and solve simple put-together, take-apart and compare problems using this collected data. Use measurement to help your observations and organization of what you are observing.

Organizing

Putting data in some order (seriation, grouping, sequencing, categorizing, graphing, or charting) to help us learn more about something being observed.

Using Number Relationships

Applying number and their mathematical relationships to make decisions and come to conclusions.



Relating and Predicting

Seeing consistency (over and over) interactions in our world and predicting possible outcomes for these outcomes.

At first these predictions may be just guessing but in later stages they will become an inference.

Inferring

Interpreting or explaining observations, making an educated guess about an object or event based on previously gathered data or information.

Applying

Using information we have learned and applying it to our world.

Observations



Date _____

I looked

at _____



A picture of what I saw

Here are some of the things I

observed _____

Asking Thoughtful Questions To Get Thoughtful Answers

Questions:

What happens if?

How did you?

Have you thought of?

What might you do about
that?

What does that make you think about?

How did you do that?

What did you think when?

How did you decide?

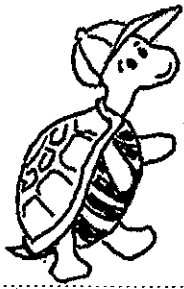
How did you know to do that? What might you
change next ? Why?

Explain this to me

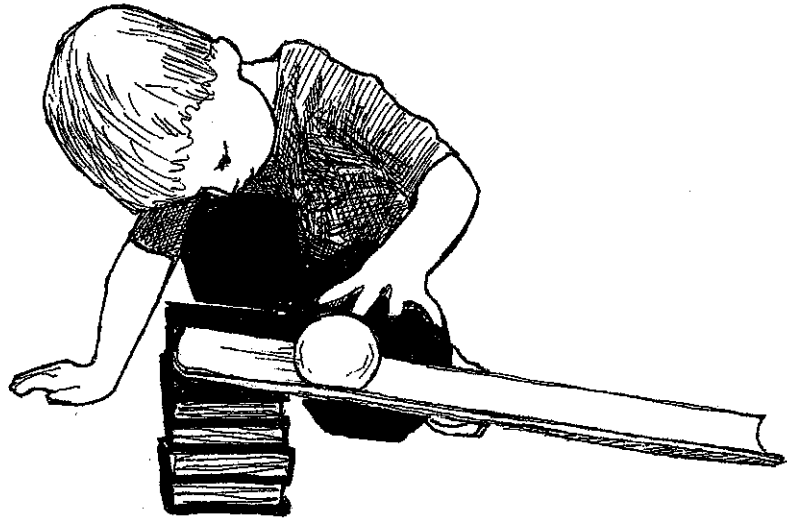
Look carefully and tell what you see.

Make it a new way





Down The Ramp



TOPIC

Force and Motion

MATERIALS

- Balls of different sizes
- Tubes such as wrapping paper tubes or cardboard
Uniform units of measure appropriate for age of students such as straws, unifix cubes, paper clips etc.
- Labels -provided in lesson
- 6 Books of uniform size

VOCABULARY

- Roll
- Ramp
- Short
- Long

LITERARY CONNECTIONS

- Stop That Ball By Mike McClintock



LESSON OBJECTIVES:

- Children will learn that a ball can move by being pushed, and also by placing the ball on a ramp (incline plane).
- Children will learn how the movement of a ball changes when the incline of a ramp changes.
- Children will learn how to use non-standard measurement tools to measure the distance a ball travels given the incline change of the ramp.

TEACHER PREPARATION:

- Find an area in the room or outside where the ball can have room to travel.
- Collect tubes or flat boards (cardboard that fabric is wrapped around can be obtained free at fabric stores)
- Either collect balls of different sizes or ask parents to send them to class.
- Cut out labels and place them in small plastic bags for use with Part Two of the lesson.
- Cut paper tubes in half

PROCEDURE:

PART ONE:

1. Students should have participated in the previous lesson "Bouncing and Traveling Balls".
2. Ask the children what they learned about balls in the last lesson. You should refer to the word wall and ask them how they made the balls bounce or move. Also discuss the bouncing and moving of different sizes and types of balls.
3. Show them a tube which has been cut in half; also show them the cardboard.
what cardboard? First time I see this mentioned what size is it? Is this the pusher?
4. Set the tube flat on the floor, and place the ball on one end of the tube. Ask the class how to make the ball move. They should direct you to use pushes to move the ball. Allow student time to explore using the tubes. Repeat this with the flat cardboard.
5. Have students demonstrate how they made the ball move on the flat surfaces. Students should discuss the fact that the ball will not move if it is placed off of the tube or board, and that they must push the ball to make it move. Point to the word push on the word wall.

PART TWO:

1. The next day, ask the children if they can think of a way to make the ball move without pushing it. Allow each pair of students or parent and child to try to make it move without pushing it. They should eventually come up with the idea that placing the tube or board on an angle will make it move without pushing. If they do not, the teacher may want to ask questions to encourage them.
2. Bring the class back together and have each group demonstrate how they made the ball move. Tell them that the word we use for what they made is a ramp. Add the word ramp to the word wall.
3. Show them how to make a ramp using books or something else that creates a uniform increase in height of ramp (i.e., books of a uniform thickness).
4. Ask them if the height of the ramp will make a difference in how far the ball travels.
5. Allow them time to explore increasing the height or incline of the ramp and ob-

serving how far the ball rolls. Give groups the labels provided in the lesson to mark the distance the ball travels with a 1 book ramp, a 2 book ramp etc.

6. On the next day, students age 60 months or older can use uniform units to measure the distance the ball has traveled.
7. Repeat the above sequence (exploring, then comparing the distance by using labels provided, and finally, the uniform increase of the ramp and measuring the distance traveled, using same size units) using different size balls.

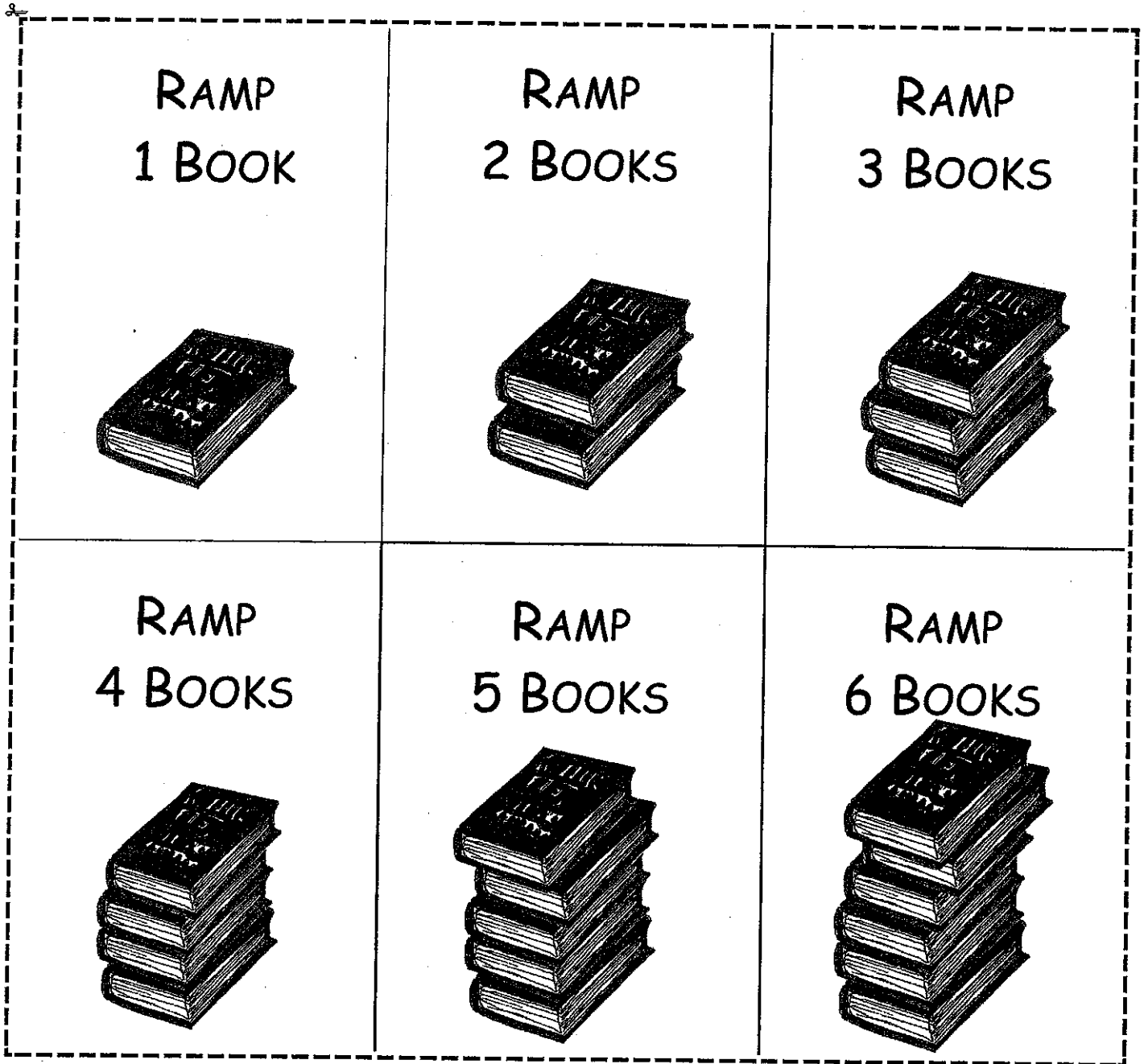
HOME/SCHOOL CONNECTION ACTIVITY FOR PARENTS:

- See Home Connection page included in this activity.

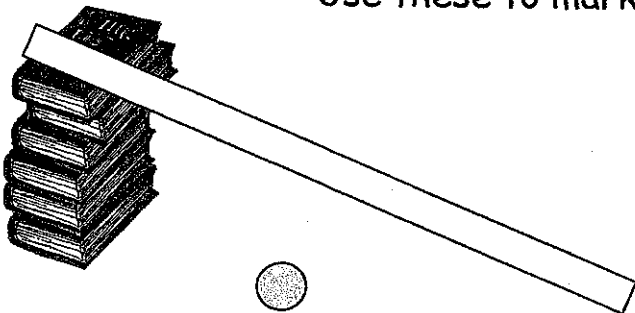
ASSESSMENT/EVALUATION

1. The teacher has the student compare the length of two objects to see if the student uses appropriate words to compare length.
2. Ask the students about the length of an object, having available standard tools (paper clips, straws, cubes etc.).
3. Use proper vocabulary.

LABELS FOR PART TWO

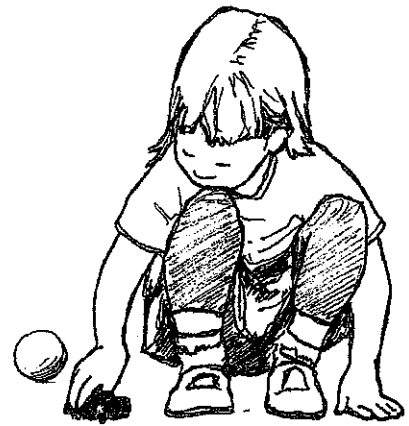


Use these to mark where the balls stop.



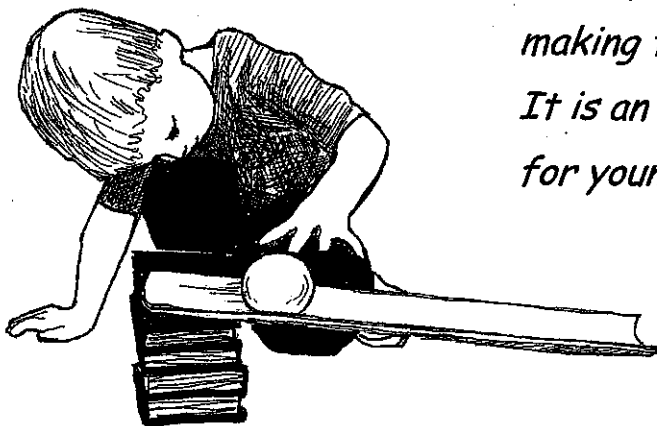
Home Connection:

Down The Ramp



We are learning about how things move and measuring how far. Can you help us?

1. Find objects such as toy cars, balls, blocks or tops.
2. Lay them on the floor and ask your child how to make these toys move. After you and your child have played with them and made them move, encourage them to use the word push to describe what must happen to make them move.
3. Ask your child to think of a way to make the toys move without pushing them. If they do not come up with the idea of creating a ramp, help them to make a ramp. Both of you observe and describe how the objects moved without pushing them.
4. Compare how far the objects moved using words such as longer and shorter. Encourage your child to play with toys and the ramp. Support your child in using words to describe what happens.
5. Use same size (uniform) objects to measure the distance each toy traveled after leaving the ramp.



Gravity is actually the pull (force) making the toys move down the ramp. It is an invisible force and very hard for young learners to understand.

CRITTER MUSEUM



What Students will learn:

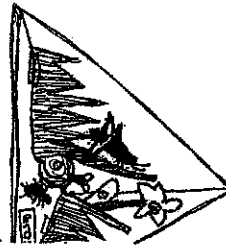
Science concept: The students know that species have different adaptations to help them survive and reproduce in their environment.

Science concept: The students knows that adaptations may increase the survival of members of a species.

Measurement can help us learn more about living things.

Materials:

Plastic Insects or picture cards provided
Venn Sorting Mats
Shoe Boxes or Triorama Displays



Procedure:

1. Pass out plastic Insects. Allow students time to explore the model insects using hand lenses or Jeweler's Loops.
2. As a class, discuss the similarities and differences of the insects observed. These characteristics should be listed on a Science Word Wall so they may be used later.
3. Pass out one Venn hoop and ask them to sort to a specific characteristic. The insects that do not have that characteristic should be outside the hoop in the universal set. Do this several times.
4. Pass out a second Venn hoop and have them sort to two characteristics. The critters that have both characteristics should be placed in the intersection. Discuss what is in each hoop and the intersection.
5. For Third Grade and above, have students sort to three characteristics. Of course, the critters with all three should be placed in the intersection.



7. As a form of assessment have the students make Trioramas (directions included) and create a Critter Museum. The Critter Museum must include labels for each room in the museum; students must be prepared to be a guide ready to explain why the museum was designed with critters placed in respective rooms. The labels should include the characteristics, measurements, and where these critters might live given their characteristics (structures). Allow time for half the class to go on tour (*gallery tour or walking field trip*) and the rest of the teams to act as guides. Trade roles and complete the museum tour.



Thoughtful Questions:

- Explain why you placed your critters where you did when designing your museum.
- Describe characteristics that caused critters to be in a small group or a large group.
- Design a critter that would not fit in any of the groups.
- What do the characteristics of the critters have to do with where they live?

Assessment:

Give the students two new critters and have them determine the set or exhibit in which they would be placed.



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The Moon Seems to Change

TOPIC

Changes in the size and shape of the moon, phases of the moon

MATERIALS

- Class calendar or
- Moon journal (you will need space for drawing and recording children's moon observations.)



VOCABULARY

- . Big
- . Half
- . Small
- . Crescent
- . Medium
- . Quarter
- . Full
- . Moon

LITERARY CONNECTIONS

- I'll See You When the Moon is Full by Suzi Gregg Fowler
- So That's How the Moon Changes Shape by Allan Fowler
- The Moon Seems to Change by Barbara Ann Novelli

WHAT WILL STUDENTS ACTUALLY DO?

- Children will learn how to observe the moon nightly and use words to compare the sizes of the moon over the course of a month.
- Children will become aware of the names that describe each phase of the moon.

TEACHER PREPARATION:

Check the newspapers or internet to find out when the moon will be full. It is best to start your observation at this time. Familiarize yourself with the phases of the moon; if you have a parent education session do the following mini activity with parents only.

- * Adult lesson is included at the end of this lesson.



PROCEDURE:



1. Read the story I'll See You When the Moon Is Full by Suzi L. Gregg Fowler. Ask the children if they have noticed how the moon changes.
2. Tell them that starting tonight we are going to watch the moon for the next month. Explain that every day at school you will ask them to tell you what the moon looked like the night before.
3. Encourage them to ask their parents to help them draw pictures of the moon each night and bring them to school each morning.
4. Each day at opening ask students to describe the moon. Ask them if the moon was bigger or smaller than the night before. Record their observations and comparison on the class calendar.
5. If children brought sketches of the moon to school, let them share these.
6. On day three of observing the moon send the moon journal home with the families.
7. Read So That's How the Moon Changes Shape by Allan Fowler. Discuss what they are observing and compare it to the book.
8. If you have a parent meeting prior to sending the journal home, do the phases of the moon activity with adults only. It will help them support their child in observing the moon.
9. Continue observing the moon over an entire month, each day talking about what they observed and recording this on the class calendar.
10. Wait a few months and repeat this activity.

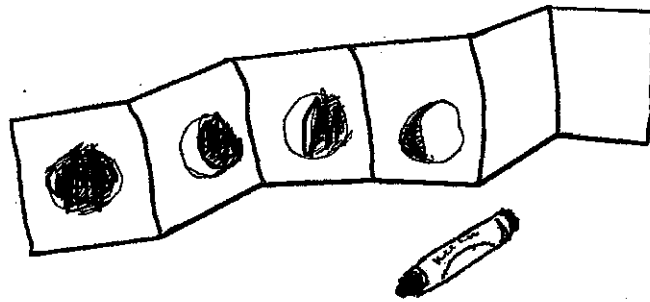
HOME/SCHOOL CONNECTION ACTIVITY FOR PARENTS:

Use the Home Connection provided in this lesson.

Parents will learn how to help their children become careful observers. They will help their children record what they observed about the changes in the moon.

ASSESSMENT/EVALUATION

Show students three pictures of the moon and have them order them from biggest to smallest. Give students three objects of varying sizes and have them order them from smallest to biggest.



ADULT EDUCATION COMPONENT:

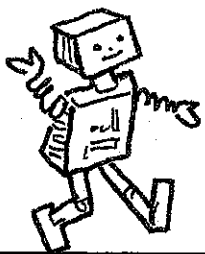
The Moon Seems to Change



PREPARATION:

1. Find a room which can be totally darkened. Position a 90 watt bulb so it will illuminate the room.
2. Find small styrofoam balls to replicate the moon. (one for each adult).
3. Take the strip of moon phases provided in this activity. Cut them up, placing each cut up strip in an envelope. Have parents work together in partners to try to sequence the moon phases into proper sequence. Discuss the names given for each phase.
4. Give each adult a styrofoam ball. Have them stick it on a pencil tip. Have them face straight forward toward the light.
5. Turn off the lights and have adults slowly turn counterclockwise. Have them stop every 90 degrees (quarter turn) to observe the shape of the model moon.
6. It should go from new (straight forward), to waxing quarter (first 90 degrees), to full (180 degrees), to waning quarter (270 degrees). Getting bigger on the right and, after full, smaller, moving to the left side of the moon. *
7. Have them do it again, this time trying to see the other phases-crescent, gibbous before and after each quarter.
8. Show families the Moon Journal which is the Home Connection, and encourage them to help their children observe the moon.

**Note: When trying to see the full moon you must raise the styrofoam ball up above your head or you create an eclipse.*



Getting the Measure of The Maze



This should not be the first time students have explored with magnets as the focus of this lesson is really measurement. It is best to allow a period of exploration before introducing the maze idea.

STANDARDS

- Describe measureable objects such as length.
- Directly compare two objects with a measureable attribute in Common.

MATERIALS

- Magnet
- Mazes on card stock
- Paper clip
- Critter template
- String
- Unifix cubes or one inch tiles

VOCABULARY

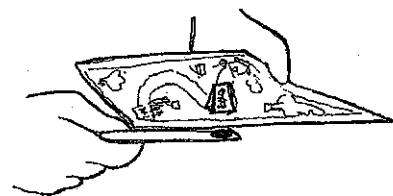
- Length
- Measurement
- Iterating
- Magnetic force
- Work

WHAT WILL STUDENTS ACTUALLY DO?

Students will first use a magnet to travel the maze's path. They will then measure the path with unifix cubes. In part II, they will make their own maze using indirect measurement. This indirect measurement will be done by comparing the string (paths length) to a train of unifix cubes. Example: My maze is this long (holding up string) and when I lay the string on a train of unifix cubes it is 14 cubes long.

STEPS FOR PART 1

1. Give the students time to use a magnet and paper clip to help their critter travel the path of the maze.
2. This free exploration time will allow them to learn more about magnets and how the magnetism can travel through other materials.
3. Ask them about the length of the path. How would they determine its length? After discussing this, give them unifix cubes and time to measure the path. Provide class time to discuss how long the path is and their methods of using the unifix cubes to measure.



Note: If students had other suggestions of how to measure other than using unifix, cubes let them explore their ideas.

STEPS FOR PART 2 - A MAZE OF YOUR OWN

1. Give the students the page with the start/finish line on it. Tell them they will be designing their own maze. Explain that in the end, they will be measuring the path and encourage them to not make it too complicated.
2. Provide time for the students to make their mazes and to add illustrations.
3. After making the maze, they need time to use the maze with their magnet, and paper clip. If there is time they can make their own maze traveler.
4. After they have explored using their maze, ask them about the length of the maze path. Let them compare the length of their maze with others by looking at them.
5. Tell them today they are going to use string to measure the path. Have them lay string on the path and cut it to represent the length of the path.
6. Demonstrate how they can determine the length of the maze's path in unifix cubes by laying the string on a train of unifix cubes. (This train should be made in groups of ten in different colors).
7. After they have used the indirect method of measuring, ask them to describe the length of their maze in terms of unifix cubes. Have them compare their path length (in cubes) with their friends.
8. Have small groups of students come forward with their string and seriate (order by length) their string which represents the length of their mazes.

THOUGHTFUL QUESTIONS:

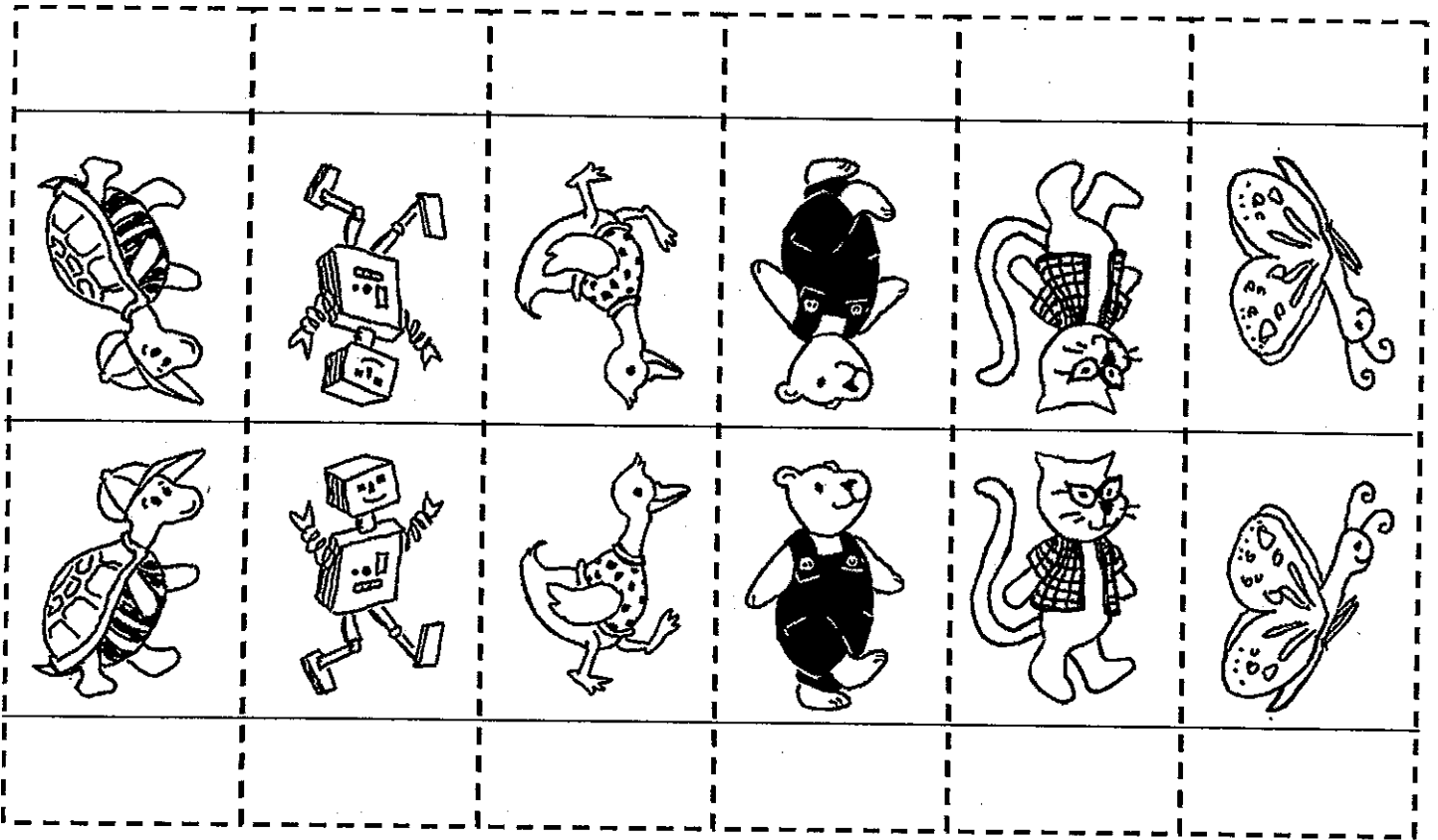
- What were the best ways to get the magnet through the maze? What strategies?
- Compare the time it takes to complete the maze and the different strategies for doing so.
- What other ways could you measure the path?

ASSESSMENT IDEAS:

- Have students measure other things using the indirect method of measurement.
- Ask them about why they were able to use a magnet to travel through the maze.

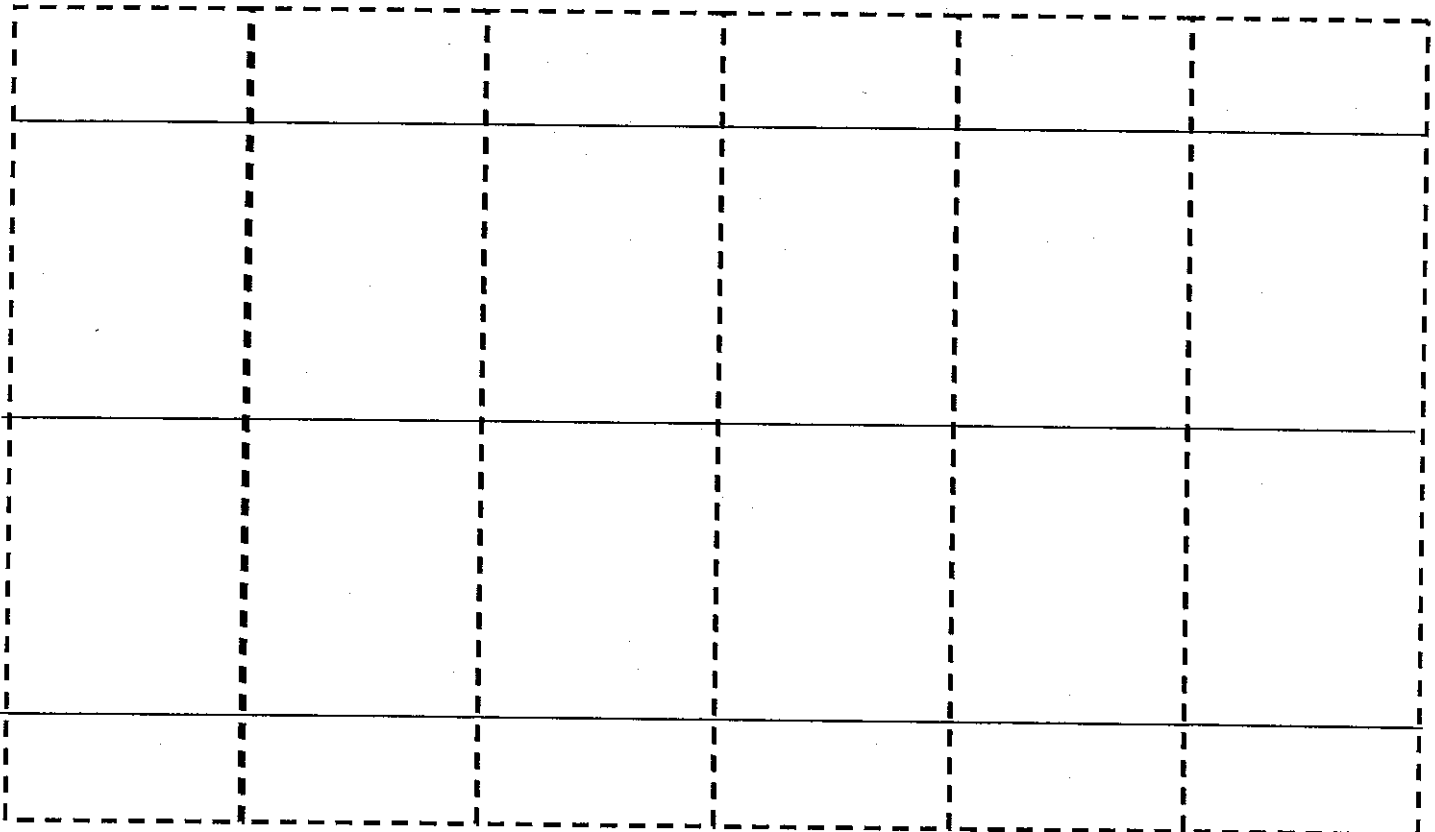
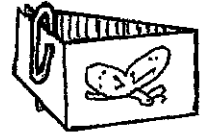


Critter templates

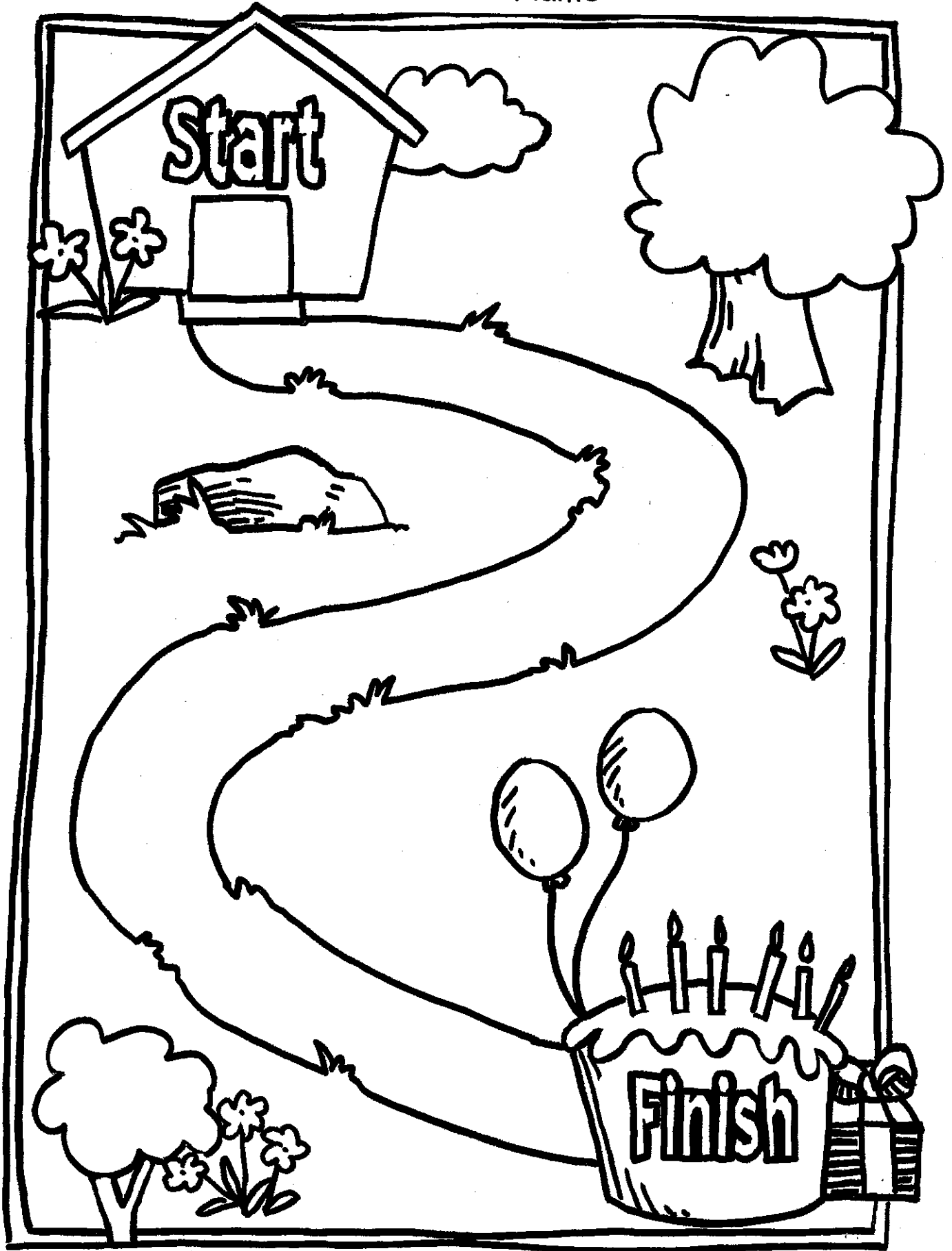


Cut out on dotted lines then fold on solid lines, use a paper clip to secure bottom.

Blank ones are for children to draw their own on they should fold it then unfold to draw figures



Name: _____



Name:

Start

Finish

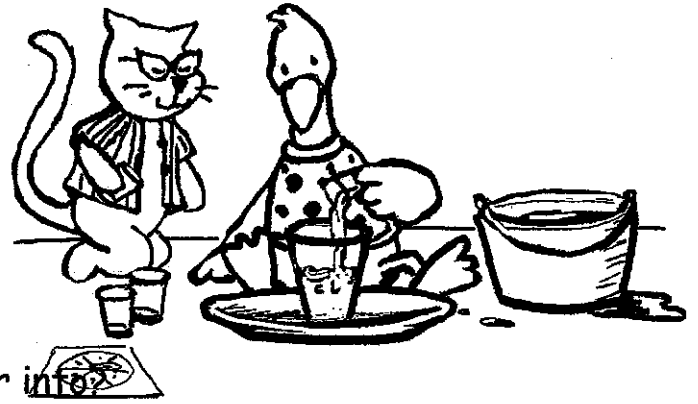
Spin to Fill Not to Spill

Purpose:

Learn about capacity (how much a container will hold)

Materials:

- Small 4 ounce plastic cups How many?
- Plastic plate
- Spinner (provided)
- Brad and Paper clip
- Large bottle or pitcher of water
- What size large cup will they need to pour into?



Procedure:

1. Show children a small cup and a large cup.
2. Students place empty large cup on a plastic plate.
3. Each student spins the spinner and fills the large cup with the number of smaller cups spun.
4. The first student to fill the large cup without overflowing wins.
5. Students can choose to skip a turn by saying "pass" if they feel the number of cups spun would cause the cup to overflow.

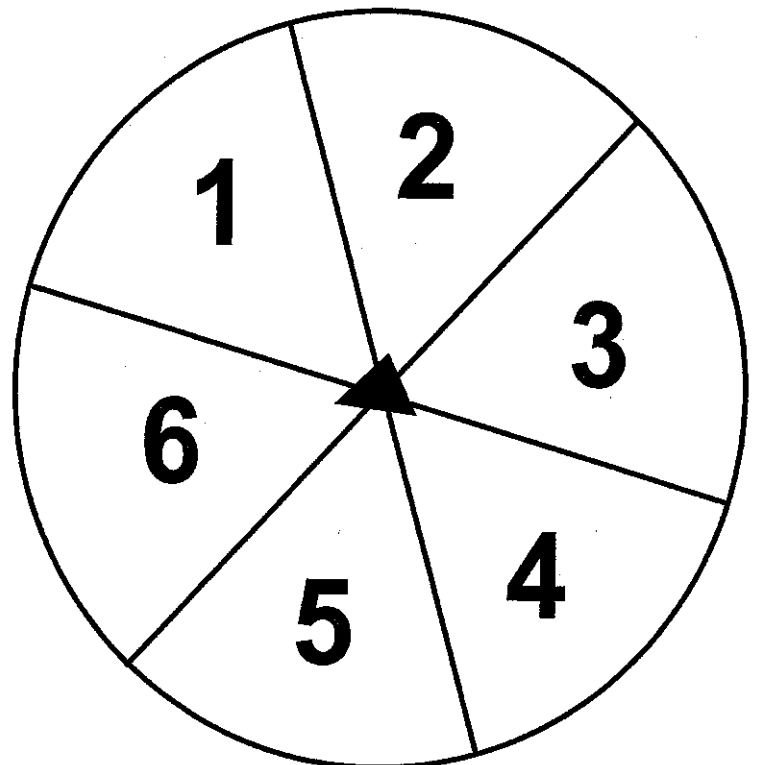
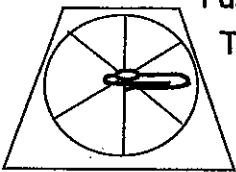
To Make Spinner:

Cut out spinner glue on cardstock.

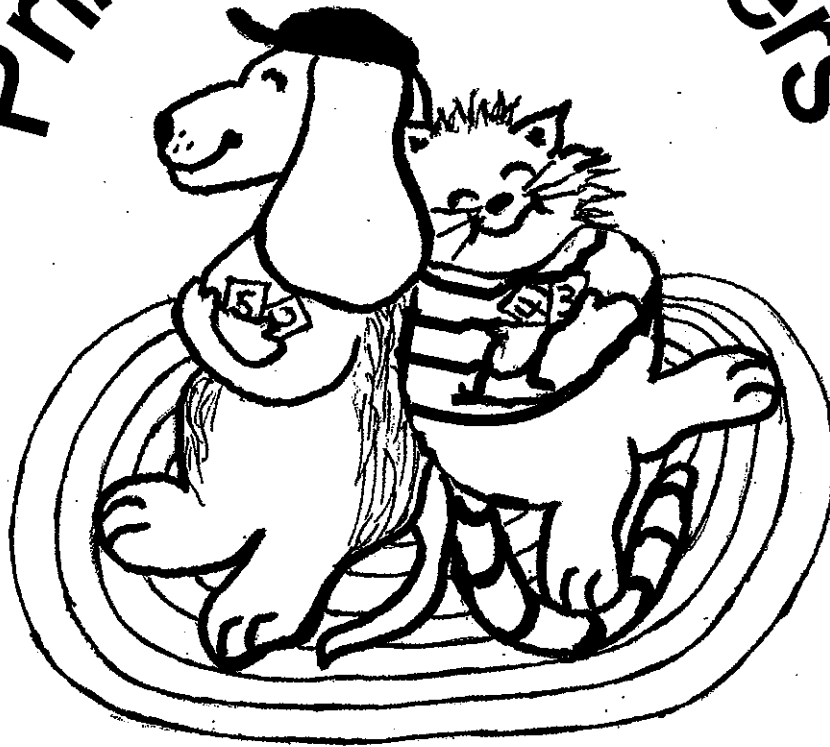
Use large paperclip as arrow.

Push brad through center

Too tight? Loosen the brad!



Primarily Partners



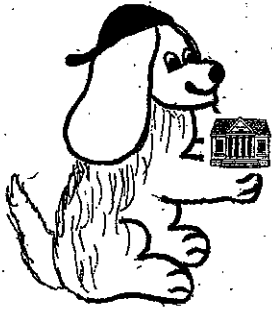
Partner 1

- Gets and returns materials
- Shares results

Partner 2

- Restates directions
- First person to use materials

Cooperative Groups



Materials Manager

- Gets and returns materials
- Posts results and data

Starter

- First person to put material into use
- Makes sure everyone has a turn



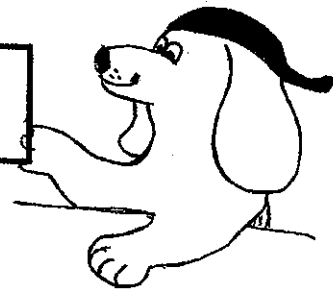
Group Facilitator

- Restates directions
- Reads directions

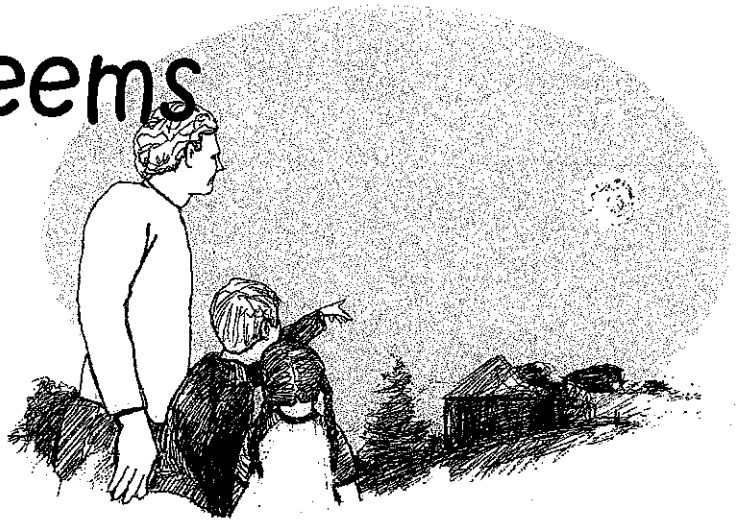
Encourager

- Notices and encourages group members
- Checks to see if work is complete

You
Can
Do it!



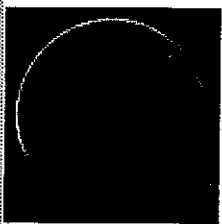
The Moon Seems to Change



We are learning about how the moon changes.

Let's observe the moon each night together!

1. Take your child out each night. Carefully look for the moon and talk about what you see. (Example: Is it big like a ball? Is it getting smaller?)
2. Pick a point of reference (the neighbor's house, a tree) and compare how it has moved in relation to that object.
3. Encourage them to use words like bigger, smaller. Introduce the words full, quarter or half. When no moon is visible it is the new moon.
4. Use the Moon Phase strip below to help you and your child see the changes.
5. Record your child's and your observations in the Moon Journal.
6. Send a small sketch back to school each day if possible.
7. Make this a family affair. It is wonderful and the moon is free!



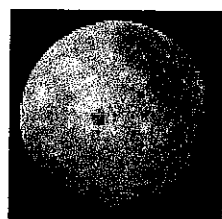
New



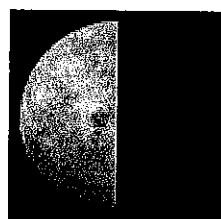
Waxing Crescent



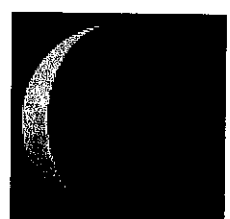
First Quarter



Full



Last Quarter



Waning Crescent