Math at Home

All kinds of play can help your child with math, in the same way as play helps her learn to talk and understand language.

Here are some things your child will do that will show he is learning math:

- puts small things inside big things, and tries to put big things into small things.
- guesses whether something will fit in a space.
- piles things up until the tower falls down.
- asks and understands "when?"

Kids don't need fancy toys to discover math—they need time to play and notice and try things out. You can help by letting them play.

Activity 2 How Much Does It Hold?

When your child can sit up in the bath tub

Put some empty plastic tubs into your child's bathtub. Use many different sizes and shapes—tubs that held chip dip, margarine, ice cream, yoghurt, for example. Watch what happens! Your child will use one tub to fill up another, will try to pour all the water in a big tub into a smaller one, will find out that many dips with a small tub

are needed to fill a big one, and will feel the difference between pouring a small tub over his head and pouring a big one. This is math learning.

When your child can pour without spilling

Get all the mugs and cups out and ask your child to find which one holds the most, so that a special person can have a really big cup of coffee.

Get all the glasses out and ask your child to find which ones hold the most, and the least, so you'll know next time you're having juice or pop.

If you're interested in baking

Get a set of measuring cups and ask some questions, like these:

How many halves in a whole cup? How many quarters? How many thirds? Which is bigger: a quarter or a half?

Later, ask your child to help you double a recipe for a crowd, or cut a recipe in half.

Bath Play is Math Play!

Activity 3 Numbers That Name Things

Sometimes a number is a name. For example, you might know someone who lives in apartment 205. We use the number 205 to name the apartment, but it is not a counting number. Usually there are not 205 apartments in one building. The "2" tells us the apartment is on the second floor, and the "5" tells us which apartment it is. 205 helps us name the apartment so it is different from any other apartment in the building.

Your child can get to know some numbers that name things long before he can count very far.

TV channels

What's the number of his favourite cartoon channel? Let him find the number on the remote and press it. When it's time for him to play quietly so YOU can have some quiet time, let him find the channel for your favourite show. Let him press the button on the remote and get everything fixed up for you.

Bus routes

What's the number of the bus you take home? Show her the number, and show her where to find it on the bus. Then let her watch all the buses come by until she finds the one that will take you home. This is an important job.

Floors of buildings

Are you waiting for an elevator? Watch the numbers above the elevator change as the elevator comes to get you. Count them down, or up. Once you're inside, let him press the button that will send the elevator to where you want to go. Watch the numbers above the door as you ride up or down, so you'll know when to get out.

Phone numbers

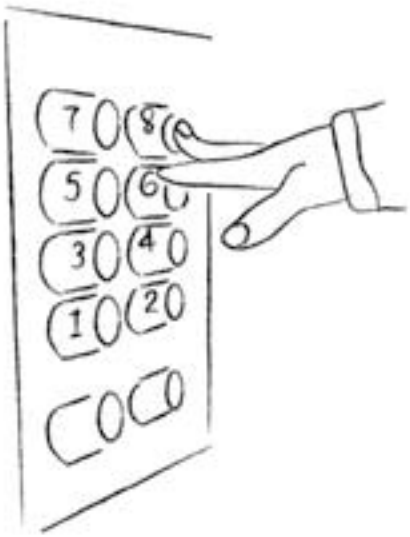
Who do you have on speed dial? Teach your child those numbers, and let her make the call when it's time to call. (Yes, you probably want to keep the phone out of

reach most of the time.) Teach her about 9-1-1. Who knows when she'll need it? Teach her to call home. When she's a teenager, you'll be glad she calls.

Addresses

Teach him his own address. If he's lost, or calling 9-1-1, he'll need it.

Sometimes a number is a name!



Activity 4 Learning the Numbers

Count everything

Count out loud as you go through the day with your child. Count the stairs as you climb up or down; count the knives and forks as you get them out or put them away; count the steps as you dance.

Hunt for a special number

Take a day to look for things that come in 1's—1 nose; 1 mouth; 1 kid named "Franny"; 1 clown at the mall; 1 eagle in the sky; and so on. Don't count anything else—just things that you only see 1 of. Another day, look for things that come in 2's—2 eyes; 2 hands; 2 shoes; 2 socks; 2 dogs; 2 cups of tea; 2 wheels on a bicycle. Don't count anything else—just things that you see 2 only of. Another day, look for things that come in 3's—3 wheels on a tricycle; 3 crows; 3 kids; 3 legs on a stool. Don't count anything else—just things that you only see 3 of. Another day, look for things that come in 4's—4 wheels on a car; 4 pieces of apple; 4 flowers on a stem; 4 people waiting for a bus; 4 legs on a table. Another day, look for things that come in 5's—5 fingers on a hand; 5 toes on a foot; 5 pennies; 5 ducks.

Read some of the counting books from the list on page 101.

Activity 5 Make a Counting Book

For some ideas about how to make a book, see Appendix A.

- Collect pictures, either from magazines or photos. If you are using magazines, look for many different pictures of the same thing (for example, dogs or cars or houses or leaves or shoes). You will need pictures of at least 10 different things, with many pictures of each thing.
- On the first page of your book, make a large "1." Let your child pick 1 picture to paste on this page.

- On the next page, make a large "2." Let your child pick 2 pictures of the same thing and paste both pictures on the page (for example, 2 dogs).
- On the next page, paste 3 pictures of the same thing (for example, 3 salmon) and so on up to 10. Use the back of the previous page to give you more room for pictures if you need it.

You can write the name of the things if you like (i.e., 2 dogs) or just the number (2).

You can make the same kind of counting book using photographs. They are more difficult to use, but more meaningful. You will need photos with 1 person in it, with 2, 3, or more. Help your child with picking out the right category for each number. For example, 1 baby, 2 brothers, 3 aunties, 4 cousins, 5 uncles, etc.

An older child learning to read and write numbers could make this book for a younger sibling just learning to count to 10.

Activity 6 Laundry: The Math of Sets

Do the wash

- Little kids can help sort the clothes before the wash.
- Someone can measure the soap and put it in.
- After everything is dry, kids can help sort things into piles—all the socks, all the towels, all the T-shirts.
- Bigger kids can match the socks and put them into pairs and make piles of the clothes after they've been folded, so Peter's T-shirts are all together and separate from Mary's.
- Anyone can help fold. Lots of math there—when you fold a towel, does it matter if you make the first fold crosswise or lengthwise? Can you make a triangle? How many times do you fold a sheet in half to make it fit on the shelf?

Math at the Laundry

Kids can sort, measure, and fold!

- When things are all folded, the sets can be sorted so that the things that are going to the kitchen are together, the things going to the bathroom are somewhere else, and the things going to different bedrooms are sorted to make it easy to put everything away.

The T-shirt that folds itself

Lay the T-shirt flat and face up. Pinch it with your left hand at point A and with your right hand at point B. Holding on to the T-shirt, move your right hand over the left hand to grab the hem of the T-shirt at point C. Keep pinching with your right hand. Lift up the T-shirt, and pull your hand out. (Uncross your hands). Shake it out a little, then lay it face down, still holding it with both hands. Lift both hands and fold it back so the neckline is in the centre. Here are some videos that show you how:

http://www.youtube.com/watch?v=eZ7Lawiw84g&NR=1
(very clear American boy)

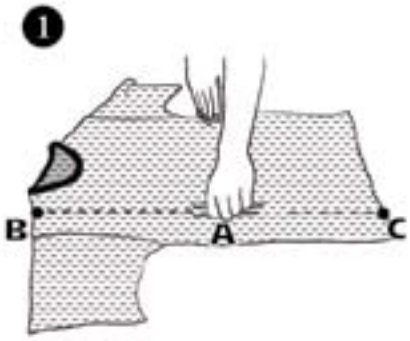
http://www.youtube.com/watch?v=vD6zs9j9QI4&feature=related
(good visuals, no English)

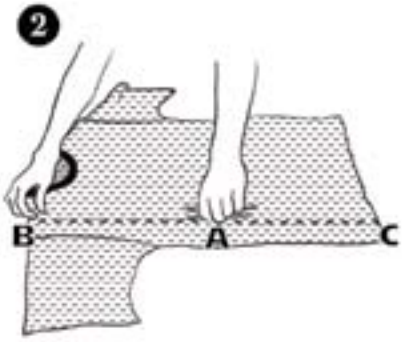
http://www.youtube.com/watch?v=fvNUdcDtTwo&NR=1
(good visuals, no English)

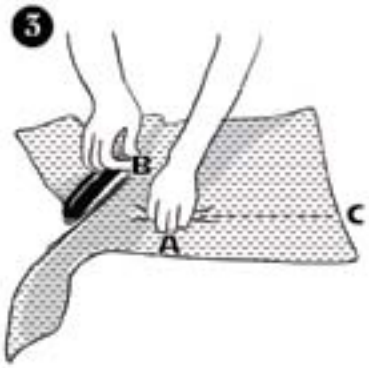
http://www.youtube.com/watch?v=wTPkSJR5i0U&NR=1
(Australian)

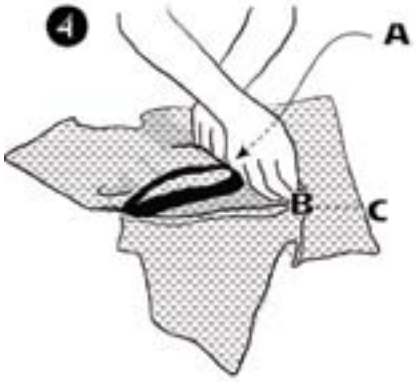
http://www.youtube.com/watch?v=kacQlt7zsQY
(good visuals, no English)

The T-shirt that folds itself!









Activity 7 Braiding

Some things to talk about while you are braiding:

- To make a good braid, you have to divide the hair into 3 even parts. Each part is one-third of the hair.
- If the 3 parts are not equal, then you don't have thirds.
- The better you are at dividing the hair into thirds, the more even the braid will be.
- If you are doing French braids, you have to add the same amount of hair to the braid each time. If you don't add equal amounts, the braid will not be even.
- As you move each strand into the middle, the pattern is "from the left, from the right, from the left, from the right," and so on. If you break the pattern, you will get a hole in your braid.

Teach kids to braid a doll's hair, or let them braid your hair.

There are many more complicated braids—ask someone to teach you, or ask for a book at the library.

Ask an elder to talk about traditional uses of braiding.

Braiding is math, too!

Activity 8 Buying Groceries

At the grocery store with little kids:

- Let them count items as you put them in the basket.
- Let them hold the bag open while you put potatoes, or apples, into the bag, and count them as they go in.

Let them get things off the shelf and put them in the basket, at your direction. Ask for the biggest box of cereal, or the smallest. Ask for the coffee in the green can, or the black bag. Ask for the crackers on the bottom shelf, or the middle shelf.

At the grocery store with kids in school:

- When your kid has an idea of how much a dollar is, and what is more than 50¢ and what is less than 50¢, there is a real job he can do at the supermarket—keeping track of how much the bill will be. Ask your kid to help you keep track of the total amount as you put the groceries in the cart.
- If you want to be sure you'll have enough money when you get to the till, round all the numbers up to the next dollar higher. When the first thing goes into the cart, ask how much it is, then ask how much is the next dollar higher. Then help figure out the price to the nearest dollar. For example, if the item is $1.79, ask, "What is the next dollar up?"

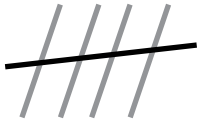
  Give him a piece of paper and a pencil. Ask him to make a mark for every dollar you put into the cart. If, for example, you put in something that costs $1.79, he will show that as $2.00, and make 2 marks on his page.

  Then you put something in the cart that costs $1.19. The next dollar higher is $2.00, so he will make 2 more marks.

  Then you buy something that costs 99¢; that is very close to $1.00, so he'll make another mark, but the fifth mark goes sideways. Every $5.00 you put in the cart will result in a mark like this.

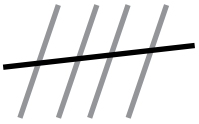
The next dollar you spend starts another set of marks. As you go along, he can count the crossed lines by 5's to give you a running total.

- If you want a closer estimate, you can round up or down to the nearest dollar. The estimate will be closer to the exact total, but it may be a little too low. If you have only $20 in your purse, the estimate might be $20, but the exact amount might be $20.17. Here's how it works:

  If, for example, you put something in the cart that costs $1.79, he will figure out that $1.79 is closer to $2.00 than to $1.00. He will show that as $2.00, and make 2 marks on his page.

  Then you put something in the cart that costs $2.49. That is closer to $2.00 than to $3.00, so he will make 2 more marks.

  Then you buy something that costs 99¢; that is very close to $1.00, so he'll make another mark, but the fifth mark goes sideways. Every $5.00 you put in the cart will result in a mark like this.



  The next dollar you spend starts another set of marks.

  As you go along, he can count the crossed lines by 5's to give you a running total. When you get to the cashier, you both will see how close his estimate was.

- If you have 2 kids, one can use this system and the other can keep a running total on a calculator. It is easy to make a mistake on the calculator, forgetting a decimal point or hitting the wrong key. The kid with the pencil and tally sheet can help keep the calculator honest.

a Older kids can pay and check the change.

Math at the Store

Kids can count, keep track, and pay!

Activity 9 Kitchen Chores

Clean it up, then mess it up, then clean it up again. Get it out, then put it away, then get it out again. That's life in the kitchen, and there is a richness for math learning in that pattern.

Setting the dishes out

Maybe you're handling the plates, and a little one can help with the forks and knives and spoons.

Very little ones won't count at all. You might ask, how many plates do we need? One for grandma, 1 for grandpa, 1 for brother, 1 for sister, and so on, pulling out a plate as you say each name. Then, how many forks? Let the little one get out a fork for each person as you name them again. Then, how many knives? The little one can pick out a knife for each name, again.

As they begin to count things, you could first count: How many people for supper? Name and count each one. Let's say 7, for example. You count out 7 plates. Then ask, how many forks? You may have to count the people again, or maybe count the plates, or maybe the kid will remember. Let the kid count out the forks. Again, how many knives? Let the kid count out the knives.

In any case, while everybody is eating, you'll get a chance to check that everybody has a fork and knife and plate, and congratulate yourselves on the counting.

Putting the dishes away

Time for sorting. Give a kid all the forks and knives and spoons and ask him to sort them and put the forks where they belong, the knives and the spoons in their places. Big spoons and little spoons. Maybe big forks and little forks each have their own place.

An older child can put away mugs and cups. What to do with the handles is an interesting problem, especially if there are lots of mugs and not very much space to put them in. How much space do things take up? How can I fit things into a tight space? Both these are problems that a kid can work on without even knowing that she is doing math.

Math in the Kitchen

Activity 10 Making Cookies

Find a couple of recipes for cookies, and try some of these ideas:

- Make the first recipe, and another day try the other recipe.
- Divide into teams. Each team uses a different recipe, and gives half its cookies to the other team.
- Try making the recipes slightly differently (add chocolate chips, different nuts, sugar substitute).
- Make a batch of cookies and divide it in half; keep half the cookies for the family and give the other half to someone special, with a card.
- Double the recipe.
- Make both kinds of cookies, and do a survey asking which kind people like better. Keep track of what people say, and graph your results.

Activity 11 Telling Time

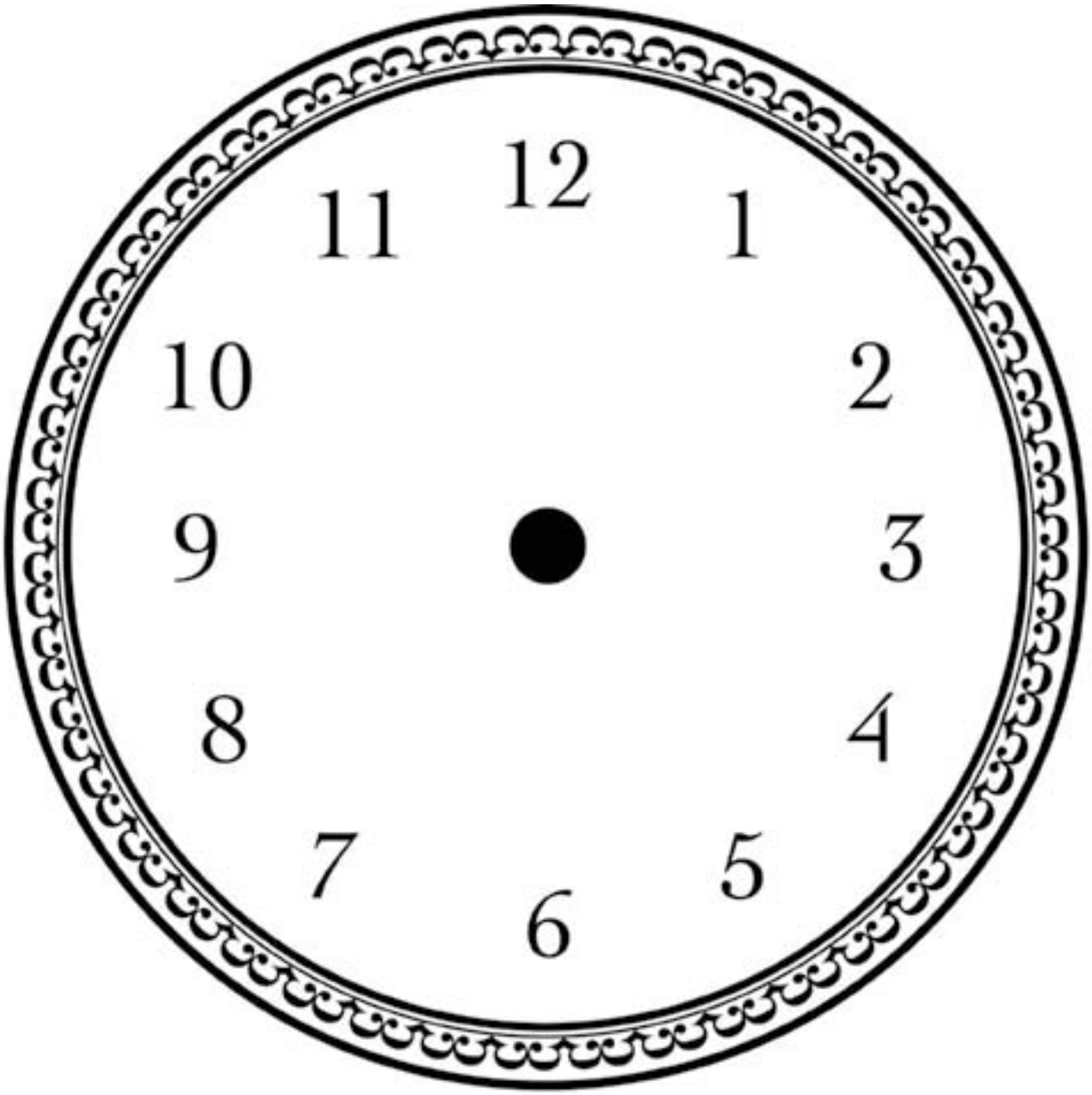
When can we go? When will Grandma get here? When does my show come on? Is it my birthday yet?

This kind of question tells you your child is ready to learn how to keep track of time, and ready to start using a clock and a calendar.

- Make the play clock on the next page. There are lots of things you can do with it.
- Set the play clock to show the time you will leave the house to go somewhere fun. Let your child keep track of the real clock until it looks the same as the play clock. Then it's time to go! You can set the play clock to show whatever your child is waiting for—a special TV show, or the time the older kids come home, or bedtime. Whenever he says, "When will...?" you can show him on the play clock, and wait for the real clock to match it.
- When your child is good at telling time with a face clock, start to use a digital clock or watch. Look at the digital time, then use the play clock to show the same time as

the digital. Help your child to see that the digital clock shows the hour first, then the minutes, but usually with the face clock we talk about minutes first, then the hour.

a Make a map of some special day, showing all the things your child does in the day, from morning to night. Draw some clocks to show the times. You could do this at the end of the day, to tell the story of what happened, or you could do it the night before, to get ready for the special day.



Cut along the dotted line. Glue the clock face to a piece of cardboard. Glue the hands to a piece of cardboard, then cut them out. Use a brad to pin the hands in the centre of the clock.

Activity 12 Calendars

Start with a calendar that shows a week. Later you can go on to use a calendar that shows a month, and then a whole year.

A week at a time

Make the weekly chart shown on the next page.

Before the week starts, sit with your child and talk about the week that is coming up. Talk about all the things that are planned for that week, and write, draw, or use a sticker to show what is happening on each day. Put the chart on the fridge or somewhere it is easy to see.

Then when your child asks, "How long until…?" you can use the chart to count the sleeps, or count the days, or name the days until the special day comes.

A month at a time

Use a page from a commercial calendar, or fill in the name and the numbers on the chart that follows. If you use the chart, your child will see that the month does not always start on the same day of the week.

Again, use stickers or drawings or writing to show the events of the month to come. Your child will begin to see the patterns—soccer game every Saturday, parents' group every Tuesday, and so on.

A whole year

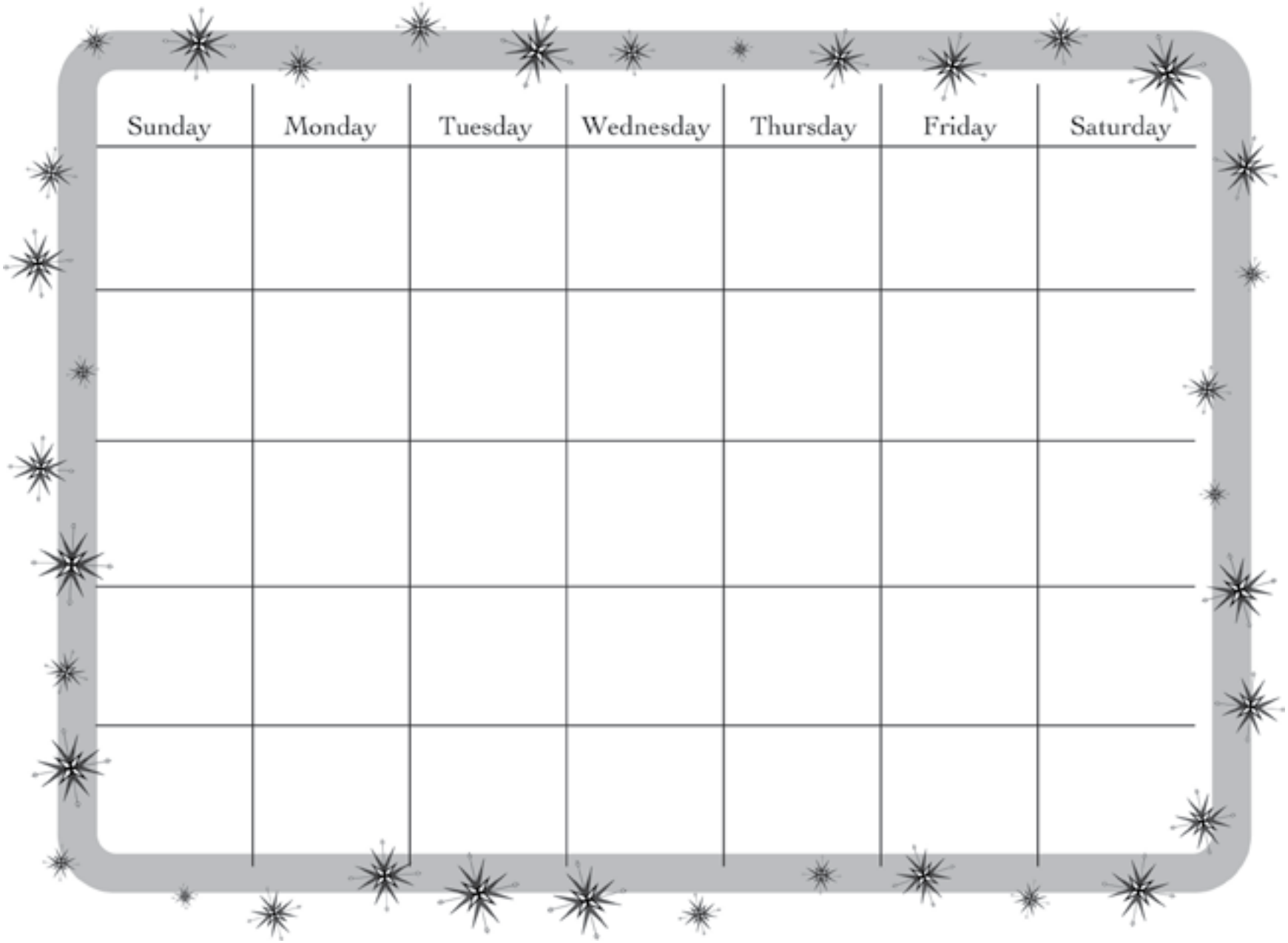
In December or early in January, get a calendar for the new year, and mark it with writing and stickers or drawings to show all the special dates that come every year. Start with the child's birthday. Help your child find the month and the day, and put a sticker in the square and write the child's name. Then do the same for each family member in turn, and go on to friends. Then think of other special days, such as holidays or anniversaries. Mark each of them in turn. Then hang the calendar where you can use it all year to keep track of special days.

Calendars marked in this way make lovely gifts for grandparents and aunts and uncles.

Sunday	Monday	Tuesday	Wednesday

Glue here and put this strip under Wednesday	Thursday	Friday	Saturday

Month _____


Sunday
Monday
Tuesday
Wednesday
Thursday
Friday
Saturday

Activity 13 Money

- You can use money to practice counting by 1's, 5's, 10's, and 25's.
- Let your kid pay for his own treats and get the change.

- ***Double your money!***

  When you want to give a gift of money, here's an offer a kid can't refuse:

  "I'll put a penny in a jar. The next day, I'll double it and put 2 pennies into the jar. The next day, I'll double that and put in 4 pennies, and so on, every day for a week. At the end of the week, you can have all the money in the jar, or I'll give you a dollar. Your choice."

  You can do this for any amount of time, but be careful or you will end up paying much more than you expected. You will start on day 1 and put 1 penny in a jar. The next day, you will put in double that much—2 pennies. The next day you will put in double again, 4 pennies, and the next day you will double the amount to 8 pennies, and so on, doubling every day. Say how many days you will double the money for, and say that at the end, the child can keep all the money in the jar, or you will trade the money in the jar for a certain amount. The child can choose.

  How long you go depends on how much you want to give. If you want to give about $10.00, offer to double for 10 days, and say you will buy the jar back for $8.00.

  If you want to give about $40, offer to double for 12 days, and say you will buy the jar back for $30.00.

  If you want to give about $80, offer to double for 13 days, and say you will buy the jar back for $75.00.

  If you want to give about $160, offer to double for 14 days, and say you will buy the jar back for $150.00.

Day	Amount to put in	Total to date
Day 1	1 cent	$.01
Day 2	2 cents	$.03
Day 3	4 cents	$.07
Day 4	8 cents	$.15
Day 5	16 cents	$.31
Day 6	32 cents	$.63
Day 7	64 cents	$1.27
Day 8	$1.28	$2.55
Day 9	$2.56	$5.11
Day 10	$5.12	$10.23
Day 11	$10.24	$20.47
Day 12	$20.48	$40.95
Day 13	$40.96	$81.91
Day 14	$81.92	$163.83

You have given the child an interesting problem, and have given many days for the child to think and talk about what is going on.

At school: If someone is going to donate some money to the school, ask the donor to help set up a similar problem, and come in every day to double the money. For example: Someone who wants to donate about $300 to the library, or the gym, or the band could come in every day to give double the amount of the day before. On day 15, she would have given a total of $327.65; she could offer the children the choice of keeping the money in the jar, or getting $300. If this seems like too many days to come in, she could start on the first day with $1.00 and by day 9 would have put about $250 in the jar.

Activity 14 Measuring

Before your child knows numbers...

Make a long strip of paper by pasting shorter pieces together. You can add more pieces if you need them later. Let your child measure whatever he wants (for example, the height of a teddy bear or doll). Your child can lay the paper strip along the toy, mark on the paper the height of the toy, and draw a picture of the toy beside the mark. Then he can use the same paper to measure another toy, or himself, or a table, or whatever. Don't worry about getting it right. Sometimes the paper strip will show the teddy is taller than the child. If your child notices, let him figure out what went wrong. If he doesn't notice, don't say anything. The lesson he is learning here is that you have to start each measurement from the same place on the tape if you want to compare the measurements. Give him lots of time and many tries to figure out that important lesson for himself.

It is fun to measure around things, too: around the teddy's waist; around a footstool; around a chair; around his own wrist or waist; around a coffee mug.

Start a height chart for him. Measure him against the door frame, so he can see how he is growing over the months and years. If you want a record you can take with you when you move, mark the measurements on a long strip of paper taped to the wall, or on a tall flat stick.

When your child is learning to read numbers...

Use the same kind of paper strip to measure some things, then use a tape measure on the strip to measure the thing in centimetres or inches; write down the number. Don't worry about fractions at first. The strip will keep a record of all the things measured, and it will be easy to see which is longest or biggest around.

Give your child a tape measure and let her measure whatever she wants. If she wants to remember the measurements, help her write them down. Talk about what surprises her as she is measuring, and about any patterns she sees.

A little more advanced...

Make some graphs to record the measurements that interest your child. Graph paper and felt pens are great. Kids can also make graphs online at

http://nces.ed.gov/nceskids/createagraph/

- Heights of family members and friends—whoever will stand up and be measured. Use 1 square on the graph paper for every 20 cm in height, or 1 square for every 10 cm in height.
- Show the height compared with the "wingspan" of a few people. Again, 1 square on the graph paper for every 10 or 20 cm.
- Show the length of the foot compared with the distance from the wrist to the inside of the elbow of a few people. Use 1 square for 1 cm.

Math and Measuring

- how big around?
- how much does it hold?
- how tall?