Girls to the Power of Math Manual

Introduction to Girls to the Power Of Math

Vision: Our vision is that early confidence in math will inspire a love of math and encourage more women to enter STEM related fields.

Mission: We aim to give young girls confidence in their mathematical abilities, making a difference to close the gender gap in STEM!

What is Girls to the Power of Math? (G^M)

G^M is a non-profit foundation founded in 2019. It is a free 10 week group program with the aim of inspiring confidence in math in girls. This program targets grade 3 girls, however it can include grade 2 and 4 girls as well. The program targets skip-counting and multiplication. As such, whenever girls need reinforcement with these skills, they could be a good candidate for the program. While they are learning skills we always keep the objective of having fun in mind. As one of the past participants said: " If you come into this program you are going to have a very good experience in math. It's fun and it pushes you but not hard!"(1) This is the take away that we want every student to have.

Teaching Methods and Integrating Indigenous Knowledge

At Girls to the Power of Math (G^M), we deeply respect and integrate Indigenous teaching methods into our program curriculum. We believe that each of these strategies fosters a rich learning environment that benefits our girls and mentors alike.

We aim to build strong, meaningful relationships with all our participants. G^M heavily emphasizes collaborative learning and we provide space for students to work together, building relationships while fostering a sense of community. Furthermore, we incorporate hands-on and experiential learning contexts into our sessions. We explore different strategies and ways of solving problems, encouraging our students to think outside the box.

Holistic learning is an integral part of our program. As part of our commitment to honor and value contributions from many cultures, we encourage our students to connect math to nature and the world around them. Through song, dance, and stories, we make math fun and relatable. This approach to teaching enables our students to connect mathematical concepts with their everyday lives, making learning more impactful and enjoyable.

Through our unique approach, we aim to create an inclusive, diverse, and respectful learning environment that integrates and values Indigenous ways of knowing. We hope to instil in all our students a love for math, bolster their confidence, and encourage them to consider careers in STEM fields.

Putting Evidence into Action

This project evolved from research that was done by Alexa Bailey who was inspired by her role as a math tutor to a neighbour. Through the use of fun games and activities the neighbour's grades went up and so did her confidence! This led Alexa to wonder whether confidence in math differs between boys and girls and if it could be playing a role in the gender gap we see in the pursuit of STEM related fields. Partnering with Dr. Toni Schmader, a Canada Research Chair in Social Psychology at the University of British Columbia, Alexa's study (2) showed that there was a statistically significant loss of confidence in math amongst elementary school girls through the grades. Girls, compared to boys, showed a distinct loss in confidence by about Grade 6. Girls did not show any loss of confidence in any of the other domains she tested. The findings replicate results found in other regions of the world (3) and show that this decline in confidence in math is a very real issue, here at home, in Vancouver, Canada.

From the research was born a program aiming to improve confidence in math: "Girls to the Power of Math". Alexa decided to target young girls in Grade 3 as this is when students are being introduced to skip counting and multiplication, both easy tasks to make fun and interactive.

Pilot Program

A pilot of the program was completed in autumn 2019 at David Livingstone Elementary school in Vancouver. Parents and students were delighted. Alexa found that the girls loved playing the games and parents were excited that their daughters were getting support while having fun in the program. Following the pilot, Alexa received a grant through Westcoast Women in Engineering Science and Technology to expand the program. https://www.sfu.ca/wwest.html. In recognition of her work in STEM within the community, Alexa was awarded the North American award of "Girls Living STEM".

Evaluation

An important part of this program is the evaluation. Dr. Andy Baron, a colleague of Dr. Schmader is assisting in the evaluation of this program. The participants complete a survey before and after the program. We want to gather evidence to see if this program can effectively boost math confidence in girls, and use the feedback to further develop the program. This feedback is invaluable. Mentors must send in the completed surveys at the beginning and end of the program.

REFERENCES

(1)https://www.cbc.ca/listen/live-radio/1-91-the-early-edition/clip/15752547-nice-list-a-student-becomes-a-teacher
(2)Bailey, A., & Schmader, T. (2020). Unpublished manuscript. Available: On the LBN website: http://learningbuddiesnetwork.com/
(3)Daigle, M., & Guyomard, R., (2011, January). Research on student achievement, 21st century skills: preparing students for the world beyond the classroom: linking EQAO assessments to 21st century skills. Retrieved from
(4)http://www.eqao.com/en/research_data/Research_Reports/Pages/student-achievement.aspx

Your Role As Mentor

You have a very important role as a mentor. Your own love of math will inspire these young girls. The participants will remember you and the fun that they had in Girls to the Power of Math. You are their role model.

A good mentor will have the following qualities:
-Good organization and punctuality
-Strong **communication** skills - with adults and with children
-Adaptability to think on your feet and react to the students' needs and levels of understanding
-A love of math

As a mentor, you will need to communicate with parents, teachers and students. You will need to be flexible and adapt the program to the levels of the girls in the group. You may find that the participants are at different levels. If this is the case, you may need to pair people so that the more advanced student helps the less advanced one. Lessons may run faster or slower than planned and, in this case, you will need to adapt.

What will you gain by being a Mentor with G^M?

You will gain …
• The satisfaction in knowing that you are making a positive difference in the life of a child
• Knowing you are contributing to addressing the gender gap in STEM
• Practical experience in working with elementary aged children
• Improved question asking and problem-solving skills
• Information about yourself which will help you in selecting a career path
• Leadership and teamwork skills
• Volunteer hours if you need them

Key Reminders!!
1. The **Slack Channel** is a place for you to share resources and share any problems and successful solutions. If you learned from the experience, share your experience so that others can learn or help you problem-solve.
2. We do not want you to spend your own money on the program. If you need to pay for photocopying or buying items for the store, just let us know. Keep your receipts and we will reimburse you!! Remember, you are not to buy snacks as it is a liability. We will reimburse any printing costs. If you are buying prizes for the store, there is a $20 maximum (per group).
3. The lesson plans are guidelines. Do teach the key concept but if you want to change up the games or give the students options for activities, please do that! Remember that we don't want to use any competitive games that may result in a loss of confidence. If you would like a game to include competition, have it be the girls versus the mentors and ensure that there is a component of cooperative helping to ensure no student is left behind.

4. If you run into a behavioural issue, please complete the incident report here. It is important that you talk to your Operations Manager about this and share the incident report right away. If a child is too disruptive for the program, we will ask them to leave.

5 Key Behaviour Management Tips:

1. **Model Ideal Behaviour**
    *   Show the students that you are having fun.
    *   Help your fellow mentors out. It puts forth an image of unity and teamwork. If you can model a good relationship between mentors, it encourages the girls to be friendlier with one another.
    *   **Turn your phone off** and do not use/look at it. Being on your phone shows the girls and the other mentors that you are not focussed and not prioritizing the participants. We want to give all participants the most optimal experience possible and we rely on you to give that!
    *   Include the girls when you need to talk about them. It is far better to talk about how a participant is doing with them present in the conversation.
    *   Please refrain from whispering or talking behind participants backs.
2. **Make a Visible List of Key Rules**
    *   Include the students in creating 3-5 key rules for ensuring you have a fun and safe program. Some examples could include: no leaving the class without asking and having a mentor accompanying you. No physical violence. No damaging of the class/materials on purpose.
    *   Ensure that your list of rules is always visible to the students.
    *   Let them know the process if someone breaks a rule: i.e.,
        o   First verbal warning (if minor)
        o   Second verbal warning (if minor). Let the student know that the next incident will result in a letter home to parents.
        o   Write up an **incident report** and send it to the operations manager who will then forward it to the parent.
3. **Try to use Positive Behaviour Supports in lieu of Punishment**
    *   When you work with children, know that rules will be broken. Try to use positive strategies when a student is talking or distracting students. For example, have one mentor come and sit beside that student. Call on the student to engage them or get them to help the mentor. Divide up the students so that one mentor sits with a group of them.
    *   Praise good behaviour instead of calling out disruptive behaviour. Eg., "Sophie, I love your listening skills! Well done!" When you write to parents to tell them how their students is doing, ensure you include positive comments. The focus is on improving confidence after all!
4. **Give Options**
    *   If the students seems disinterested in an activity or song, call it and change the activity. For example, if you are playing the 2 times table song and they hate it, say, "Looks like you think this song is lame. Do you think we could make up a

better song?" "Who would like to do that? Who would like to play a game instead?"

5. **Divide and Conquer**
   - Odds are that you will have one student who is learning slower than the others or who needs more support for behaviour management control. In this case, you want to provide more one-on-one support. It might mean assigning one mentor to work one-on-one with the child or having a 1:2 or 3 ratio. This is something to brainstorm with the Mentor Director.
6. If you have a particularly disruptive child, contact the Operations Manager right away. Make a plan for moving forward.

G^M's Leadership Model

The Leadership Model at G^M outlines the way we support Mentors to continue to grow and stay contributing members of the G^M community. Our four stages of Leadership in G^M are:

1. Meeting Primary Needs – knowing what is expected and having materials to mentor a group
   - We want our volunteers to feel comfortable leading a program and to be flexible in modifying the structure according to the needs of the students.
   - We will ensure our volunteers have the materials they need to do the job

1. Individual Contribution – opportunity to do your best and get some feedback
   - We encourage our mentors to problem solve during their session with their group.
   - We provide opportunities with online reporting to provide feedback and suggestions and receive support on their work with their group.

2. Community Belonging – you are committed to do quality work and contribute to the whole G^M Community
   - We will encourage our volunteers to be an active member of the network of volunteers to support each other in their work with ideas and suggestions
   - We will encourage our volunteers to help during fundraising activities and awareness activities

3. Innovation and Development – opportunities to learn, grow and innovate
   - We will encourage our volunteers to innovate in their work and share their perspectives on training, mentoring and organization structure
   - We want our volunteers to stay involved in the structure of the organization by joining our steering committee

   We hope you will stay and grow with us!

INDEX

Before the Start of the Program:

- If you are an organization with mentors trying to find a school to partner with please email info@girlstothepowerofmath and we will assist you.
- Assign a head mentor: someone who will send all emails and reply to parents and be in charge of prep and set up.
- Be sure to read through this manual at least one time.
- Be sure to send the email to yourself and copy the other volunteer mentors. The parents of the participants must all be **blind copied.**
- Be sure to fill in the **bold** portions of the email.

Send this email one week before the start date of the program.

Hello Parents,

My name is **(Name)**. I am the head mentor for the Girls to the Power of Math program at **(school)** this year. Girls to the Power of Math is a Charity foundation (girlstothepowerofmath.org). If you are receiving this email, you have signed your child up for our math program. I hope you have all had a chance to see what this program is about, if not, here is a link to our video: https://youtu.be/MQOLdZKpWQ8. Much has changed since the video first started. We have now been running groups for over 3 years. We are a Charity foundation with a board of governors and a steering committee. Our model of mentorship starts with participants who we hope will become future mentors who might then join the leadership team.

There are ten weeks of classes. We would like your child to attend every class as we will be building on the skills learned in the previous classes. Our program focuses on having fun and improving girls' confidence in math. Although skills will be learned in this class, it is not our focus. Our goal is that the participants enjoy themselves. If your child must be absent please let me know as soon as possible. It is important to a girls' self-esteem that they do not feel that they haven't learned what the other girls have learned. We may provide work to do at home that I will share with you via email.

Our first class is next week **(Date)** in the **(Location)** at **(Time)**. Please make sure to pack your child a snack to eat as this will be an hour-long class. Please arrange for pickup at **(insert time and place)**. You are welcome to stay and watch the class if you wish. If you have any questions or if there is anything you would like me to know about your child, please do not hesitate to contact me.

Thanks very much,
(Name)

Send this email the day before the start date of the program.

Hello Parents,

This is a reminder that the first class for Girls to the Power of Math is tomorrow at **(Time)** in **(Location)**.

Hope to see you all there!

Everyday Tasks

1. Arrive 15 minutes early to set up games and materials.

2. Make sure all consent forms have been obtained and you have the attendance sheet with emergency contacts available to you.

3. Ensure that you have read over the lesson plan and do not need to refer to the manual while running the group.

4. Ensure that you have planned an extra game or two in case the group takes less time than anticipated to complete the day's lesson. You can also start the homework/practice sheets found in Appendix B, if you have time.

5. Be flexible with the closing games. It is fine to go with the group's preference, as long as you have time.

6. Take attendance and for any unexcused absences, contact the parent/guardian (or alternative pick up person as relevant) with the phone number that was given to you on the attendance sheet.

7. Send parents the end of the day email. Remember that there is an optional homework sheet for every lesson. These can be found in Appendix B.

8. Remember that lessons may go longer or take less time. Be flexible. The goal is always to have fun.

9. All survey responses (beginning and ending) should be sent to info@girlstothepowerofmath.org. We do not need the Mindset Review as this is only to inform you on how each girl is feeling in terms of confidence on what was learned.

10. Please feel free to reach out if you have any questions or concerns while running the group. We are here to support you. If anything does not go according to plan, please let us know and we will brainstorm a solution. We would also love your feedback!

LESSON 1: Exploring Multiplication And the Terrific Two Times Tables

Prep:
- Print out surveys
- Print out homework sheet
- Materials needed: name tags, markers, computer, skip rope(s), whiteboard, paper, pencils, blocks for each child to use (or anything small that can be used for groups of 2's)

1. **Attendance (5m)**

2. **Getting to know you (making name tags) (10m)**

3. **[Survey](#) (15m). Please scan and send all completed surveys to: info@girlstothepowerofmath.org**

Making Name Tags:
Write your name and your favourite number.

Teaching Concept (mix up talking time with demonstrations or sharing)
Multiplication can be explained as a **fast way to count groups**. For example if we have two groups of five pencils. (demonstrate) Instead of counting each group of pencils we can use multiplication! If we know our multiplication facts, we can multiply 2 times 5 to get ten. A strategy to learn our multiplication facts is by skip counting.

Let's try this together. I want you to put your blocks/pencils into groups of 2. If you have an extra block/pencil, put it off to the side. Count up your groups (write these out on the board). Now we are going to see if we can count by 2's to figure out how many blocks are in each group.
First, let's count by 2's on the board together. If we skip count by 2 we start at 0 and add 2 each time. Let's do it together. As you skip count by two with them write down the skips on a large piece of paper or on a white board stopping at 24 (2X12). Next to the skips write the corresponding two times table question.

Ok, let's see how many groups you have and use multiplication to count them. (Ask each child and use the paper to figure out the total).

Optional: Watch video:
Teach them the Girls to the Power of Math 2 times table song. [Lyrics are here](#) and there is a YouTube video on the Girls to The Power of Math channel.
https://www.youtube.com/watch?v=_CpWDr3IGKU

Options: create your own song to the 2 times tables, sing the above song, play Stella Stella Ola, or use a bean bag to throw and count by 2's or use bean bags to ask a 2X table question and throw it to a friend who will answer.

The Pancake Rule: When my Dad makes pancakes at home, he does this awesome flip. I am going to teach you the Pancake Rule in multiplication. If you know that 2X3 is 6, you also know that the FLIP, 3X2 is also equal to 6. This works for all multiplication. So, if you know 2X5=10, or two groups of five what is 5X2 or five groups of two? Yes, also 10. (Draw two groups of 5 apples and 5 groups of two apples and get the girls to count both of them.) 2 and 5 are the factors and 10 is the product. So, the pancake rule can also be said like this: when you FLIP the factors of a multiplication question, it will give you the same product (the same answer) e.g., 2X6=12, or 6X2=12.

Kids might ask, "But how is this like a pancake?" You flip a pancake just like you flip the factors. Using a pancake as a visual will help you to remember the rule. (even better, you could draw a circle, and pretend it is a pancake. Write one version (eg 3X2=6) on one side and (2X3=6) on the other.

Closing Game: (10m) (see Appendix for descriptions)

Game Options to use during this lesson: Note, it is okay to give the students a choice of what they would like to do.

Stella Stella Ola,
Bean Bag game
Skip Rope Game

Lesson 1 Email to Parents: (send copy to each participant's parents):

Subject: Girls to the Power of Math, Lesson 1

Hi everyone,
Today in Girls to the Power of Math, we had lots of fun and learned the concept of multiplication and practiced skip counting by 2's.

We also learned the very important Pancake Rule. This will come up frequently and it will be useful when we are learning some of the later tables. Please go over it with your daughter. The Pancake Rule is when you FLIP the factors of a multiplication question, it will give you the same product   e.g., 2X6=12, or 6X2=12.

For those that were not able to make the first class, please complete the survey attached. See you next week. Feel free to email me if there are any questions. - **(only add this if there were people absent the first day)**

Here is a good site to practice two times tables.
https://www.topmarks.co.uk/maths-games/5-7-years/times-tables

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_a7bfc32a78ef4a3c841201d91e931d9c.pdf

In 4 weeks, we are going to be learning our ten times tables by shopping with dimes at a "store". If possible, please look around your house for any trinkets that we could use as items to be bought in the "store" and please bring it to one of our next sessions. We will store it on site. We will provide the 10c coins to use during the game. The kids will count out their ten cent coins that **we will provide** and then buy items that they will then keep. Examples include pencils, bouncy balls, stickers etc. More details to come at a later date.

Sincerely,
(Name)
Head Mentor
Girls to the Power of Math

General Review Exercise:

This can be used for any lesson from lesson 2 onwards:

Divide the girls into two groups and have each group line up at the white board. Each person at the front of the line is given a white board marker. The first girl writes the first number of the multiplication table we are reviewing and then passes the marker onto the next girl in line who writes the next number in the skip counting sequence down. For example, if we were practicing 3 times tables, the first girl would write 3, the next one would write 6, etc. If someone is struggling to think of the next number, everyone in the group skip-counts together to help the girl come up with the next number. The goal is to get all the way up to the twelve times table using teamwork instead of people just shouting out the answer. Afterwards, the mentor will go over how the answers they got correlated to multiplication problems. For instance, continuing with the 3 times table example, the mentor explains that when we skip count to 6, it's the same as 3 x 2.

LESSON 2: The Blooming 3 Times Tables

Prep:
- Bring Materials: Name Tags, white board, markers, art supplies for flower
- Take out basketballs for review game (if school has basketballs). If there are no basketballs, use another ball or the bean bags.
- Take out bean bags from kit and hula hoops (from school) for the Cops and Robbers closing game. If no hula hoops, use tape.
- Print out MINDSET and REVIEW face survey.

Mindset and Review (15m)
Give each girl a face survey. Ask the participants: "How comfortable are you with knowing the two times tables?"   Record for your reference.

Who can remind me of the Pancake Rule? (review it here with examples using the two times tables) Remind them of the language of factors and product. Eg., in 2X4=8, 2 and 4 are the factors and 8 is the product. The Pancake Rule says that when we FLIP the factors, the product is the same so 2X4=8 and 4X2=8

Review two times tables:
Skip count as a group
Basketball game (bottom of lesson)
Sing the two times tables song

Teaching Concept:
Today we are going to learn the 3 times tables. Multiplying by 3 is like adding a number 3 times. Let's skip count to find our 3 times tables. Go slowly and write each answer on the white board. Let them count on their fingers first to figure out the numbers. Then once all the multiples of 3 up to 36 are on the board, count faster all together.

Show the 3 times tables video:
 https://www.youtube.com/watch?v=9XzfQUXqiYY&list=PLYergFX6OKLjvdJabjTZzTDYm5x khTlZ2&index=2

Activity: Art: 3 times table Flower.You work from the centre and the answers are the pink petals. For example 3 X 12 = 36, or 3 groups of 12 gives us 36. Remember the Pancake Rule. If we know that 3X12=36, What is 12X3 (raise your hand when you know the answer). Example of Flower here. Blank flower template is available here (for anyone who struggles to draw).

Homework: Practice skip counting or learning the 3 times tables at home.

Closing Game sample options: Cops and Robbers, Basketball Game, What Times is it Mrs Wolf, etc (see more in Appendix A)

Cops and Robbers. Materials needed: small bean bags (or similar tokens and 3 hula hoops (or tape). **This requires some set up.** One hula hoop is the jail, one is home and one is where the bean bags are stored (put out about 15 bean bags). All hula hoops are safe zones. The mentor identifies each hula hoop as either Jail, Home or Store. Two or three girls are the cops and the rest of the girls are robbers. The robbers have to get the bean bags from the Store to Home without being tagged by the cops. If they are tagged, they must put the bean bag back in the Store and go to Jail. To be rescued from jail, one of the robbers has to come and tag their team mate in jail without being caught by the cop. When they tag their team mate in jail, the mentor will ask them each a multiplication question (they are safe at this point since they are in the hula hoop), which they must answer correctly before being escorted safely (no tagging allowed) to their home base. The goal is for the robbers to get all bean bags from the store to home. A robber can only bring one bean bag from the store to home at a time. If the cops tag everyone, the cops win and you can choose new cops and robbers.

Basketball Game: Materials Needed: 1 basketball per group of 4-5. Mentor says, "ready?" and then bounce passes the ball while asking a multiplication question to the child. The child catches the ball, answers the question and the bounce passes the ball back to the mentor. This game can be modified for a smaller space by using bean bags.

Lesson 2 Email to Parents:

Hello,

This is what we worked on this week:

1) Keep reviewing the two times tables.
2) We started three times tables this week. Everyone made their own three times table flower.([See attached](#))
3) Three times table song we looked at this week: https://youtu.be/9XzfQUXqiYY
4) We reviewed the Pancake Rule (3X6 gives the same answer as 6X3). Remind them of the language of factors and product. Eg., in 2X4=8, 2 and 4 are the factors and 8 is the product. The Pancake Rule says that when we FLIP the factors, the product is the same so 3X4=12 and 4X3=12

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_bbbea464f585426d910525efc6c51b46.pdf

***Reminder:** In a few weeks we are going to be learning our ten times tables by shopping with dimes at a "store". If possible could you look around your house for any trinkets that we could then use as items to be bought in the "store". The kids will count out their ten cent coins that **we will provide** and then buy items that they will then keep. Examples include pencils, bouncy balls, stickers etc. Note, you do not need to bring any money.

Thanks very much,
See you next week!
(Name)

LESSON 3: The City of 4 Times Tables

Prep: Make hopscotch, Print out [MINDSET and REVIEW] face survey.

Materials: building blocks, chalk or tape to create hopscotch, white board, scrap paper, crayons or blocks (4 of each colour, and 4 per group participant). It's ok to double up the colours.

Mindset and Review:
After attendance, ask the participants: "How comfortable are you with knowing the three times tables?"
Record for your reference.

Review 3 times tables:
Skip count as a group (Use the whiteboard as needed)
What Times is it Mrs. Wolf game: (Appendix A or below)
Hopscotch game. (Appendix A or below)

What Times Is It Mrs. Wolf? No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or any eating time and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

Hopscotch. Materials Needed: either chalk if drawing the hopscotches outside on the pavement or tape if doing them indoors. Create a hopscotch pattern from 1-12. There are a few versions of this game:

> A. Pick the table you are working on e.g., "4". The child throws a rock and hops to the number and then has to answer that multiplication question. For example, the child throws the rock on 6, so must hop to the 6 and answer the question 4X6=24

> B. The numbers on the hopscotch represent the table in skip counting form e.g., for the 4 times tables, the hopscotch numbers would be 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48. This requires getting creative with the look of the hopscotch (it doesn't matter what it looks like). Again, the girl throws the rock to a number and hops while skip counting the numbers.

C. The hopscotch is laid out as in number 2 and the mentor gives the multiplication question (the child does not throw the rock) and the child has to skip count and jump to the response. We frequently played version 2 followed by version 3. It consolidates skip counting and moves nicely to multiplication.

Teaching Concept:

Last week, you learned the 3 times tables. You learned to count 3 groups of a certain number of objects. This week, we are moving to counting 4 groups of a certain number of objects. If I know that 3 groups of 6 pencils (draw this) is equal to (anyone?), (if they are not getting this, get them to use manipulative (their blocks) and make 3 groups of 6 and then ask them how many.

How would I draw 4 groups of 6 pencils?

(yes, I would just add another group). So let's get you all to make another group of 6. How many pencils are there if I add the 4th group of 6 pencils? (yes, 24).

4 times tables is like adding the number up 4 times. But, that takes a REALLY long time.
Multiplying is just a fast way of counting.
Show on whiteboard 4X2= 2+2+2+2
That's 4 groups of 2.
The product, or answer, is 8

Another way to see this is if we take all of you (give 4 participants 10 things (crayons, etc):
How many people do we have?
How many crayons do you each have?
To represent this, we could write:
10+10+10+10
Or 4X10.
I want each of you to figure out how many crayons you all have as a group. When you have that number, write it on this piece of paper and come show me.
Who can remind me of the Pancake Rule? How would it apply to 4X10? Yes, 4X10=40 so, given the Pancake Rule, 10X4 is also 40. Remember, the factors are 10 and 4 and the product is 40.

Activity: City Array

Use building blocks to represent times table equations. For example 4X2 would be a building that is two blocks wide and four blocks high **or** four blocks wide and two blocks high. Let them design the building as they wish. Do a demonstration to get them to build a city array using blocks to represent the four time tables from 1X4 to 12X4. (Divide up multiplication questions between 2 groups of kids e.g., one group might have 2X4, 4X8, 3X4 and the other group would have other tables. An easy way to divide them up would be to give the odd numbers to one group and the even numbers to the other.)

Closing Game: Tag (Appendix A or below)

Tag. No materials needed. Pick one child who is It. The person who is It goes around and tries to tag people. When a person is tagged, they sit down. One of the mentors (the "Healer") goes and asks the person seated a multiplication question. If they get it right, they stand up and start running again. If they get it wrong, the mentor asks them to try again using skip counting. The mentor will help the child until she gets it right.

Lesson 3 Email to Parents:

Hello everyone,

This week we started working on our four times tables. The activity we did was city arrays. We used blocks to represent times table equations. Keep practicing the two to four times tables at home. Remind your daughter of the Pancake Rule and practice each question both ways. Next week we will be learning our 5 times tables using clocks. We are moving quickly and it is really helpful if you work with your child on the multiplication tables 2, 3, and 4.

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_bfee922892ed42f599031d730f8bf444.pdf

***Reminder: In two weeks we are going to be learning our ten times tables by shopping with dimes at a "store". If possible could you look around your house for any trinkets that we could then use as items to be bought in the "store"and will be stored on site. The kids will count out their ten cent coins that **we will provide** and then buy items that they will then keep. Examples include pencils, bouncy balls, stickers etc. Note, you do not have to bring any money but we will gladly accept donations of trinkets.

Sincerely,
(Name)

LESSON 4: The Five Times Tables Clock

Prep:
- Print clocks for everyone
- Take out beach ball from G^M kit and blow them up
- Print out MINDSET and REVIEW face survey.

Mindset and Review:
After attendance, ask the participants: "How comfortable are you about knowing the 4 times tables?"
Ask each participant to choose a face. Record for your reference.

Review 4 times tables:
Skip count as a group
Ask: In the question 4X6, what is the product? (24). What are the factors? (4 and 6)
Jackpot Game (Appendix A or below)

Jackpot. Materials needed: soft ball such as a dodge ball or beach ball. Dry erase marker to keep score. The number of points earned will be in sets of the times table that you are learning. For example, if you are learning the 3 times tables, then each time a child gets a correct answer, they get 3 points. They must skip count at the end to total their points. To ensure that each child gets a turn, you may need to name a child who will get the ball. The mentor throws the ball up in the air and says either "dead" or "alive". In the case of "alive", the child must catch the ball in the air. For "dead", the child can retrieve the ball once it has touched the ground. Each time a child gets the ball, the mentor asks that child a multiplication question and then the child gets the points. (Every time a child gets a question right, put a line under their name on the whiteboard to help them keep track of how many points they have.) At the end of the game, each child must count up their points (the slow way would be to add, faster is to skip count and fastest is to total the number of groups of points and multiply). Show them each of these three ways and voila, you have a great teaching moment.

Teaching Concept:
Skip counting by 5 is really easy because your answer is always going to end in either 5 or 0 (use white board to show). For example, we start with 5 then 10, then 15 then 20 (put the 5's and 0's in a different colour). Who can guess what comes after 20? Raise your hand. Yes, 25! Do you see the pattern? We have 5 then 0 then 5 then 0.

Practice skip counting by 5's as a group

Activity: Clock - First step is to circle all the groups of five. Find the 12 and start at the line after it. (Demo for people). Now we've got groups of five lines. Each line represents a minute. At the one we've got 5 minutes and the two we've got 10 minutes. See how we're skip counting just like before? Who can tell me how many minutes we've got at the 3? How about the 4? Take your clocks and skip count to finish the clock. When you have gone all the way around the clock you will have 1 hour. When you're done come tell me how many minutes are in an hour.

Closing Game: Beach ball (Appendix A or below)

Beach Ball. Materials needed: beach ball from G^M kit. There are 2 versions:
      1. Pass the ball to each other and whatever number your thumb lands on is the number you use to practice the table you are working on.
      2. Skip count every time you touch the ball and try to keep the ball in the air (keepy uppy). This is best done with tables that are easier to skip count since there is not a lot of time to figure out the answer.

Lesson 4 Email to Parents:

Hello Everyone,

We learned our five times tables today using a clock. We didn't focus on learning to tell time, instead, we focused on going round the clock and skip counting by 5. You could practice this by using your clock at home and asking the 5 times tables. Keep working on your 2-5 times tables this week. Please keep reinforcing the Pancake Rule.

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_fb3b0d568c8845288b6a2957007753b5.pdf

Next week we will be doing ten times tables by shopping with dimes at a "store". If possible could you look around your house for any trinkets that we could then use as items to be bought in the "store". We will store these on site. The kids will count out their ten cent coins that we will provide and then buy items that they will then keep. This is the last week I will be collecting items. include pencils, bouncy balls, stickers etc. Hint: Need to get rid of junk? Now's your time!

Sincerely,
(Name)

LESSON 5: Going to the 10 Times Table Store

Ensure that there are enough items for the store from the backup in the kit and from what was collected from kids. Price out the items in groups of 10 cents. For example, from 20c onwards to a maximum of 80c. Get out basketballs for the closing game. Print out PDF for MINDSET and REVIEW.

Mindset and Review:
How comfortable do I feel about knowing the 5 times tables?

Rank the tables starting with the one you feel most comfortable with to the one that you feel least comfortable with.

Practice game: What Times Is It Mrs. Wolf (Appendix A or below)

What Times Is It Mrs. Wolf? No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or "Dinner Time" and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

Teaching Concept:
When we learned the 5 times tables, we saw a pattern. Who can explain that pattern to me? That's right, see, when we skip count by 5's we see a pattern of 5 then 0 at the end of each of these numbers.

Who can tell me what 5 + 5 is? So, how do we represent this as a multiplication question? We have 2 groups of 5, so, this is represented by 2 X 5=10. Explain the relationship between 5 and 10 times tables.

Activity: Store: Set out the objects with their prices. Mentors will stand behind them and be the cashier. Students will have to take their ten cent coins and count by ten until they reach the price of the object, for example 30. Then they must count how many ten cent coins they used (3, ten cent coins). Finally ask them what the multiplication question would be(3X10=30). Once they have done all these steps they can add the item to their "shopping cart". At the end the kids can pick one item from their "shopping cart" to bring home with them. The rest of the items will go back into the kit.

Closing Game: Basketball

Basketball Game: Materials Needed: 1 basketball per group of 4-5. Mentor says, "ready?" and then bounce passes the ball while asking a multiplication question to the child. The child catches the ball, answers the question and the bounce passes the ball back to the mentor.

Lesson 5 Email to Parents:

Dear Parents,

This week we learned how our times tables can be applied in real world situations. We learnt our ten times tables by shopping with dimes at a 'store'. A big thank you to all the parents who donated some trinkets to be used in the store. Next week we will be learning our 0 and 1 times tables and doing a midway review of all the times tables we have learned so far. It will be helpful to review the tables we have done so far: 2, 3, 5 and 10. We are moving quickly and review at home will help your daughter feel more confident when we teach a new table.

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_d1a6011e63d14cfeb0b785be6ecf74a6.pdf

Thank-you for your support.

Sincerely,
(Name)

Lesson 6: Zero is My Hero and 1 is Fun!

Prep: Print out midpoint survey. MINDSET and REVIEW (Page 6)

Mindset and Review:

Complete midpoint survey:
How comfortable do I feel about knowing the 2 times tables?

☺ ☺ 😐 ☹ ☹

How comfortable do I feel about knowing 3 times tables?

☺ ☺ 😐 ☹ ☹

How comfortable do I feel about knowing 4 times tables?

☺ ☺ 😐 ☹ ☹

How comfortable do I feel about knowing 5 times tables?

☺ ☺ 😐 ☹ ☹

How comfortable do I feel about knowing the 10 times tables?

☺ ☺ 😐 ☹ ☹

Teaching Concept:
Zero is my hero because it is super easy to remember the 0 times tables. Anything times 0 is always 0. Because, if you have zero groups of 4, you have nothing. And with the Pancake Rule, have 4 groups of 0 cookies, how many cookies do you have?
0+0+0+0=0
4X0=0

Another way to think of this is if you have 0 groups of 3 cookies, you still have zero groups, zero groups of anything will be 0. Let's imagine if (name of one of the girls e.g., Tessa) has no cookies. Tessa is holding zero cookies. If we had 3 people or 3 groups of no cookies, how many cookies would there be? Still 0. Let's think of it another way. Let's think of all those cookies out there in the world that we could buy. That's a LOT of cookies. Let's say that we are allowed to buy ZERO groups of cookies. How many cookies would we have then? Zero.

If you have 1001 groups of 0 cookies, how many cookies will you have? Still 0.

Let's practice.
What is 12X0
What is 2 X 0
What is 987 X 0
What is 3 million X 0
What is 0 times anything?

One times tables are also really easy because if you multiply a group of objects by 1, you will still have that same group of objects. Let's say I have one pencil and three other people also have 1 pencil. (pick 3 kids to stand with you with a pencil each) Now we have 4 people that have 1 pencil (count out the people). 4 people with one pencil each. How many pencils do we have? That is 4 X1. We can look at it another way. Let's say we have only 1 person but they have 4 pencils. This is 1 group of 4 or 1 X 4. That equals 4. That's the Pancake Rule. 4X1 or 1X4 both give 4.

Let's practice:

What is 12 X 1
What is 2 X 1
What is 987 X 1
What is 3 trillion X 1

Activity:
Based on the responses to the survey, target the times tables where people feel least confident. Break into pairs to practice. Use the game, What times is it Ms. Wolf to give each kid a chance to practice what they need to practice. (Appendix A or below)
Play tag to review all times tables as well. (Appendix A or below)

What Times Is It Mrs. Wolf? No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or any eating time and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

Tag. No materials needed. Pick one child who is It. The person who is It goes around and tries to tag people. When a person is tagged, they sit down. One of the mentors (the "Healer") goes and asks the person seated a multiplication question. If they get it right, they stand up and start

running again. If they get it wrong, the mentor asks them to try again using skip counting. The mentor will help the child until she gets it right.

Lesson 6 Email to Parents (personalized for each girl and sent to only the relevant family):

Dear Parents,

Today we learned about 0 and 1 times tables and we did a review of times tables 2 through 5. From your child's feedback, they are feeling less confident about **XX** times tables and most confident about **XX** times tables. We encourage you to practice these times tables at home, using the games that we have suggested below. We also encourage you to review the Pancake Rule. Thank-you for your continued support.

Sincerely,
(Name)

Lesson Plan 7: 11 Times Blank is Blankety-Blank

Prep: Set up hopscotch (either with chalk outside or tape)

Teaching Concept: We all learned our ten times tables a couple weeks ago. Let's skip count those out. (Write them on the whiteboard.) Now instead of having ten groups we have eleven groups. Eleven is ten plus one. So eleven times two is ten times two plus one group of two. (Write 11X2= 10X2 plus one more group of 2= 20 +2 or 22). Let's try eleven times three. Ten times three is? Thirty, right! What is one time three? Three. Now we are going to add them together. 33. Does anyone notice a pattern? (give them time to figure out the pattern. If they don't notice the pattern, continue until they can define the pattern). When we multiply by eleven we repeat the number we are multiplying by. 11 times blank is blankety-blank. Whatever blank is, it's going to be repeated in the answer. Let's try 11 times 4. (write on the board 11 X blank, so blank is 4, is blankety (fourty) blank (four). Let's try another, 11X5. What is the blank? Right 5, then blankety-blank is fifty-five. Remember the Pancake Rule. If 11 times 4 is 44, then 4 X 11 is also….yes, 44. (Do this until you get to 11 X 10) Now wait. The trick doesn't work anymore. But for eleven times ten we know our ten times tables. Remember that 10 X 11 and 11 X 10 are the same thing. So what's the answer for this question? (110) For the next two questions we can skip count by adding eleven each time. This might be a little bit hard because eleven is a big number but remember that eleven is ten plus one. That means if you're having trouble you can add ten to the number then add one. So who can tell me what comes after 110? (Lead them by writing 10 X 12 would equal 110 + 10 +1.) (121) Get everyone to raise their hand when they have the answer and get consensus before writing the answer on the board.)

Activity: Hopscotch
Hopscotch. Materials Needed: either chalk if drawing the hopscotches outside on the pavement or tape if doing them indoors. Create a hopscotch pattern from 1-12. There are a few versions of this game:

> a) Pick the table you are working on e.g., "4". The child throws a rock and hops to the number and then has to answer that multiplication question. For example, the child throws the rock on 6, so must hop to the 6 and answer the question 4X6=24
>
> b) The numbers on the hopscotch represent the table in skip counting form e.g., for the 4 times tables, the hopscotch numbers would be 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48. This requires getting creative with the look of the hopscotch (it doesn't matter what it looks like). Again, the girl throws the rock to a number and hops while skip counting the numbers.
>
> c) The hopscotch is laid out as in number 2 and the mentor gives the multiplication question (the child does not throw the rock) and the child has to skip count and jump to the response. We frequently played version 2 followed by version 3. It consolidates skip counting and moves nicely to multiplication.

Closing Game: Tag

Tag. No materials needed. Pick one child who is It. The person who is It goes around and tries to tag people. When a person is tagged, they sit down. One of the mentors (the "Healer") goes and asks the person seated a multiplication question. If they get it right, they stand up and start running again. If they get it wrong, the mentor asks them to try again using skip counting. The mentor will help the child until she gets it right.

Lesson 7 Email to Parents:

Hello,

Today we learned the 11 times tables. Our helpful hint is "11 times blank equals blankety blank" so 11X9 equals 99. We encourage you to practice with your daughter. Keep practicing all the times tables. Feel free to reach out to us if you feel that your daughter is struggling with any particular concept. Next week, we will be going over the 9 times tables and then we need to decide what our review will look like, depending on the comfort level of the students. Your feedback will help us to cater the program to the needs of the participants. Again, when you practice, please ensure that you remind your daughter of the Pancake Rule, if 11X9=99 then 9X11 is also 99.

Here are a few optional homework sheets to practice: Package 1 & Package 2

Thank-you!
Sincerely,

(Name)

Lesson 8: The Nifty 9 Times Tables

Prep: Print <u>MINDSET and REVIEW</u>

Mindset and Review:
How comfortable do I feel about knowing the 11 times tables?

Review Game: What Times Is It Mrs. Wolf

What Times Is It Mrs. Wolf? No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or any eating time and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

Teaching Concept: Before we start, I want to make sure that we all understand the 10's column and the 1's column. Let's look at this number:
63
Let's say it together: sixty-three
The 6 represents the 60. As we know from our ten times tables 60 is 6 tens. That's why there is a six in the tens column. Then we have 3 in the one's column.
Let's try another 85
Let's say it together: eighty-five
Which number is in the 10's column and which is in the 1's column?

I want you to practice with the person beside you for the next numbers. What number is in the 10's column and what is in the 1's. When you and your partner have done all 3, please raise your hand.

71   58   18

Give them a few minutes until everyone seems ready. Review the answers.

Let's skip count by 9's together (write this on the white board in a column as they go and ensure that 9 is in the one's column and the rest follow underneath. Don't write the 0 before the 9 until you are coming back up - see below.)
09   18   27

"We start with 9" "Then.....18" (and so on. They will need help and encouragement. If they don't know, let them count on their fingers).
End with 90. (Now, you should have a column from 9 to 90)

"Let's put on our detective hats. Look over here at the 10's column starting with **9 in 90** (circle the numbers in the 10's column). Going **up** we start with 9, then 8, (keep going) until 1 and then, before the 9 we have 0 because there are no tens with the number 9, there are only 9 groups of 1, or 9 ones. Going **down** the ones column, what do you notice?" (hey, it's the same pattern.) Going **up** the 10's column, we count from 9 to 0 by 1's and going **down** the 1's column we do the same thing.). Ensure that everyone sees the pattern.

"Now, I'm going to show you a magic trick. Everyone put out their hands in front of them, palms up." Stand beside them facing the same way as everyone and show them the finger trick:

"If I ask you a 9 times table question, you can use your fingers to figure out the answer. Let's start with 9X3. We know, from the pancake rule that 9X3 is the same as…. YES, 3X9. Let's take 3 times 9 (write this on the board). Start with your thumb (ensure everyone is starting with their left hand). Count 3 fingers and put down that third finger. How many fingers are on the left (gesture) side of the finger that is down? One, two. This 2 goes in the 10's column. (write it on the board). Now let's count how many fingers are on the other side of the finger that's down. 1, 2, 3, 4, 5, 6, 7. There's 7. So 7 goes in the 1's column. So now we have 2 in the 10's column and 7 in the 1's column. That number is twenty-seven. Twenty-seven is the product of (answer to) 3 times 9. Or, by the Pancake Rule, 9X3. (do several examples until they understand. If anyone is struggling, it might help to write the numbers on their fingers, starting with 1 on the thumb.)

"This trick works for all of the numbers that we wrote on the board. It does not work for 11X9 and 12X9. But, hey, we already know our 11 times tables. Who can tell me what 11X9 is? Remember 11 times blank is blankety blank. Raise your hand when you know the answer. Let's say it all together." Yes, 99! That one was easy. Now, we know what 11 groups of 9 are. That's 11X9=99 and by the pancake rule, we also know what 9X11 is, yes, 99. How would we find out what 12 groups of 9 are? We count up another 9. Let's do that together. Starting at 99, 100..108. The product of 12X9 is 108. And, by the pancake rule, the product of 9X12 is also 108.

Activity: Break into pairs. One person is the magician and the other is asking the 9X table question. The magician will figure out the answer. Play this for about 10-15 minutes. You are working on the 1-10 times 9 but if the girls are getting it, mentors can go around asking 9X11 and 9X12.

Closing Game: Tag or What Times Is It Mrs. Wolf

Tag. No materials needed. Pick one child who is It. The person who is It goes around and tries to tag people. When a person is tagged, they sit down. One of the mentors (the "Healer") goes

and asks the person seated a multiplication question. If they get it right, they stand up and start running again. If they get it wrong, the mentor asks them to try again using skip counting. The mentor will help the child until she gets it right.

What Times Is It Mrs. Wolf? No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or any eating time and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

Lesson 8 Email to Parents:

Hello Everyone,

Today we covered the 9 times tables and reviewed the 10 and 1's columns. Ask your child to show you the 9 times table magic trick. You will ask them a nine times table question from 1X9 to 10X9. They will be using their fingers to figure this one out. Once they have this down, you can ask them 11X9 (a cue to remind them is: 11 times blank is blankety blank) and 12X9, which is just one more group of 9, counting from 99. Keep practicing all the tables. We have 2 classes left and these will be review classes. It will be really helpful to go over the times tables with your daughters. Remember that they have been taught the tables 0-5, and 9-11.

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_56ea5598a2b4449e9fa23cf37204b5e9.pdf

Thanks for your continued support!
Sincerely,
(Name)

**Note to Mentors:
At this point you will have to evaluate if the girls are confident in what they have learned so far and ready to progress to the other tables or if you need to review the ones that have been taught so far. I have provided teaching lessons for tables 6-8 and 12 in the next two lessons. If you feel that the girls are not ready, use the games to review the tables that have been taught previously and skip the lessons.

LESSON 9: 6, 7, 8 Counting up is Really Great!

Prep: Print out Grid (**Hundreds Chart**).
If girls are learning the new tables, print homework sheets to take home.
Print MINDSET and REVIEW
Mission Possible

Mindset and review:

How comfortable do I feel about knowing the 9 times tables?

☺ ☺ 😐 ☹ ☹

Teaching Concept:
Who can tell me what the Pancake Rule is?
Ok, we have learned our one times tables. Who can tell me the answers to the following questions? When you have the answer, raise your hand (wait until all or most have raised their hands and say answer aloud).
1X6
Keep going in the same way with the following:
1X7
1X8
1X9

Ok, now let's write use the Pancake Rule to write the FLIP question and answer
Beside each question write the flipped equivalent e.g., 7X1=7

Repeat the same with the tables 2-5 and 9-11. You know all but a handful of questions to know the 6, 7 and 8 times tables. Look at this chart. You know all of these and all of these. Let's review what we do not know in the 6 times tables:
6X6
6X7
6X8
6X12

Here is my trick for remembering that 6X6 is 36. It rhymes and it ends in 6. 6X6 is thirty-six
6X8 is 48. It also rhymes and it ends in 8 (the number we are multiplying 6 by).
6X7=42 is tricky. One way to think about it is to know that 5X7 is… (let's skip count 5, 10, 15, 20, 25, 30, 35). So, 5 groups of 7 is 35. How do we find 6 groups of 7? (yes, add another group of 7 - draw this out to show the students and show that 6X7= 5X7 plus 7 or 35 plus 7=42). Do the same for Practice this one until you remember it. 6X12 is the same as 6X10 plus 6X2 or 60 plus 12=72

The good news is that 6X7 is the same as 7X? YES! 7X6. So, if 6X7 is 42 then 7X6 is ….yes, 42.

So, for the 7 times tables, the only ones you do not know are:

7X7=49

7X8=56

7X12=7X10 plus 7X2=70+14=84

I don't have any tricks for you. You have to practice these ones.

But, remember the pancake rule.

6X8=48 so 8X6=? YES, 48

and 7X8=56 so 8X7=? YES, 56

Guess what? You only have two new 8 times table and that is 8X8=64 and 8X12, which is the same as 8X10 plus 8X2=80+16=96

So, the questions that you need to try to remember by practicing a lot are:

6X6=36

6X7 or 7X6=42

6X8=48

6X12=72

7X7=49

7X8 or 8X7=56

7X12=84

8X8=64

8X12=96

These are only 9 questions. So, now we need to get them into our heads to remember them and to do that, we have a game called Mission Possible!

Activity: Mission Possible. (Warning - you should read this thoroughly before the lesson!)

PREP:

1. There are 6 cards that need to be placed around the room with tape: the waterfall, red balloon, and the candlestick. In addition to these answer cards, there are 3 decoy cards: a toothbrush, a tall tree, and a cave. There is also a pitfall card and a clue card that goes with each picture that you will need to read to the group to figure out the answer. Read the pitfall card first and then, once the girls have answered the questions, move on to the clue card. Each pitfall and clue card is behind the target picture.

2. There are 3 target answer cards (the waterfall, the red balloon and the candlestick). The other cards are decoy cards and if they choose one of these, they are given the following prompt (Ha ha ha. We have tricked you. You think that you're so clever, answer these ones, you will never!) and have to each answer 3 random questions from the flash cards.

3. You will need to get the flash cards from the kit.

4. Once they have each answered 3 questions correctly, give them the next clue. If they choose one of the target cards out of turn (i.e., it is not the correct answer for that clue), give them the prompt above and 3 flash card questions.

5. The girls should answer the multiplication questions as a team. Try to get them to work together.

6. Make sure that if a girl is struggling that you give her a question that she can answer.

Lesson 9 Email to Parents

Dear Girls to the Power of Math Parents,

Today's lesson was based on feedback from the girls and you about how confident they felt about what has been taught so far. From that feedback we felt that (pick one choice)
1. The girls were ready to learn the 6,7 and 8 times tables Here is an optional homework sheet to practice: https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_0d31a0fce8ef436c8bad6db3bc477618.pdf

2. The girls needed some review of what was previously taught.

We encourage you to practice the tables we have learned so far and remind your daughter of the pancake rule (e.g., 3X4 is also the same as 4X3).

Next week is the final class. We will be having a celebration. Your daughter should be proud. We covered a lot of material. We are committed to continuously improving the program. To do so, we need your feedback on Girls to the Power of Math. We remind you that the goal of Girls to the Power of Math is to increase confidence in math though mentorship and a fun, social environment, skill building is an added benefit. Please take a few minutes to fill out this form; it should take no more than 5 minutes. Please don't ask your daughter because they will be doing their own survey. https://forms.gle/j2ptLzbLobKZXLi66

We really enjoyed getting to know the girls in this program. It is important to us to instil a sense of confidence in girls around math. Our end aim is to keep more girls in higher level math. We witnessed how much fun the girls were having and we hope that one day, if they ever experience any math anxiety, they will remember this group and know that math can be fun.

Sincerely,
(Name) and Girls to the Power of Math team

LESSON 10: Introducing 12 (or Review)

**Note to Mentors: Remember that if the girls aren't feeling confident with what has been taught so far, you do not need to do the teaching concept part of this class.

Before starting the class do the <u>final survey</u> <mark>Please scan all completed surveys to: **info@girlstothepowerofmath.com**</mark>

Teaching Concept:
By now, everyone should know the Pancake Rule. Remember that 6X7 is the same as 7X6. Who can tell me the answer to those two questions? Raise your hand (wait until a few people have raised their hands).

Ok, we have learned all the times tables from 1-11 and now we only have 12 left. Guess what, you already know most of the 12 times tables.

Remember the Pancake Rule! Let's review. (ask each question and then write the answer on the white board).

We know that
0X12=0 or 12X0=0
1X12=12 or 12X1=12

Keep going until 11X12 or 12X11=132

This leaves one question: 12X12 and we can figure that answer out by counting another 12 from 132. (Put twelve marks on the board and cross them out as you count up as a group, to 144).

12X12=144. This is a good one to memorize. You have now learned all the tables from 0 to 12. Congratulations!

Activity: **Multiplication Olympics**

Prep:
-Set up 12 stations (If for the past two lessons you have been doing review, leave out the stations of the multiplication table you have not covered.
-make medals (print out <u>chart here</u>, paste them onto background medal (cut out of construction paper, provided) and thread with ribbon (provided)
-take flash cards out of your kit and have ready for each station.
-take index cards out for each station (in kit)

Instructions:
The goal is to get each girl to go through a station to win that times table. In order to win, they must answer 5 random questions correctly. They may try any station as many times as they

wish. They can only win 1 star per station. They can choose to answer the question while they are doing the task or afterwards. It doesn't matter.

1. Zero Times Tables: Spin until you feel dizzy

2. One Times Table: Stand on one leg with your other leg in the air behind you and arms out (airplane pose) for as long as possible. Once stopped, ask the questions.

3. Two Times Table: Basketball dribble to a designated end spot

4. Three times Table: Hula hoop circles as long as possible

5. Four Times Table: Lap around the room

6. Five Times Table: Jump on one leg, pat your head and rub your tummy

7. Six Times Table: Keeper uppies (this can be done with a beach ball or soccer ball on the knee). Do as many as you can.

8. Seven Times Table: A special talent (cartwheel, song, touching tongue to nose - anything is fine)

9. Eight Times Table: Trivia (name 3 fruits of 3 different colours)

10. Nine Times Table: Skip rope (skip as much as you can - up to a maximum of 15. If they are really good skippers, then they have to answer the questions at the same time as skipping)

11. Ten Times Table: Charades with sounds. Mentor has to act out an animal (be silly) and child has to guess the animal that the mentor is acting out (don't make it too hard).

12. 11 Times Table: Humdinger. The mentor hums a song (e.g., Twinkle, Jingle Bells etc), and the student has to guess the song.

13. 12 Times Table: Dance Move. Teach the mentor a dance move.

Podium Celebration: (take picture of girls and include this in the email)

Lesson 10 Email to Parents:

Hello!
Hooray! Your girls have now had 10 weeks of skip counting and learning the multiplication tables. Now, you have to keep up the practice. Please refer to the Girls to the Power of Math You Tube Channel and our instagram. If you enjoyed Girls to the Power of Math and feel that it is a worthwhile program, please give this feedback to the school principal and spread the word. We would love to host more programs and get Girls to the Power of Math to be a province wide program. ***Attach photo.***

Here is an optional homework sheet to practice:
https://b37d38a8-fff9-4f24-b540-528f1f8ff7b8.usrfiles.com/ugd/b37d38_2cbb3c06dd7f495eac3a4491b9d536a8.pdf

Sincerely,
(Name) and Girls to the Power of Math team

APPENDIX A: Games

1. **Skip Rope Game:** Materials Needed: skip rope(s). This is a simple skipping activity where either you can use one skip rope per student or use just one long skip rope and take turns skipping. The idea is to skip count by the target number as the child skips. If the child does not want to skip, they can just jump or skip around the room.

2. **Basketball/Bean Bag Game:** Materials Needed: 1 basketball per group of 4-5. Mentor says, "ready?" and then bounce passes the ball while asking a multiplication question to the child. The child catches the ball, answers the question and the bounce passes the ball back to the mentor. Note that this game can be played with bean bags or with the small ball provided in the kit.

3. **Stella Stella Ola:**
    Materials: none
    Time needed: about 15 minutes
    Directions: Many students will already know this song/game. Instead of the ending 1, 2, 3, 4, 5, you would skip count by the number you learning e.g., skip count by 2's or 3's etc.
    The song can be found on YouTube here:
    https://www.google.com/search?q=stella+stella+ola+game&oq=stell&aqs=chrome.0.69i59j6 9i57j0i433i512j46i175i199i512j46i433i512l2j46i175i199i512j69i61.1645j0j4&sourceid=chr ome&ie=UTF-8#fpstate=ive&vld=cid:7b564b62,vid:rb6bTANn6rs

4. **What Times Is It Mrs. Wolf?** No materials needed. This game is a variation of What Time is It Mr. Wolf? The mentor is Mrs. Wolf to start. The kids start at one end of the gym and ask, "What times is it Mrs. Wolf?" Mrs. Wolf responds with a time table question e.g., "3 times 4". All children must then skip count by 3 to the answer of 12, taking a step each time they skip count. For example, 3 (step), 6 (step), 9 (step), 12 (step). Mrs. Wolf must verify the correct response. Whenever Mrs. Wolf wants, she can respond, "Lunch time" or any eating time and turn around and chase the girls. Whoever is tagged gets to be Mrs. Wolf if they want. This game can be used for any table.

5. **Hopscotch**. Materials Needed: either chalk if drawing the hopscotches outside on the pavement or tape if doing them indoors. Create a hopscotch pattern from 1-12. There are a few versions of this game:
    A. Pick the table you are working on e.g., "4". The child throws a rock and hops to the number and then has to answer that multiplication question. For example, the child throws the rock on 6, so must hop to the 6 and answer the question 4X6=24
    B. The numbers on the hopscotch represent the table in skip counting form e.g., for the 4 times tables, the hopscotch numbers would be 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, 44, 48. This requires getting creative with the look of the hopscotch (it doesn't matter what it looks like). Again, the girl throws the rock to a number and hops while skip counting the numbers.

C. The hopscotch is laid out as in number 2 and the mentor gives the multiplication question (the child does not throw the rock) and the child has to skip count and jump to the response. We frequently played version 2 followed by version 3. It consolidates skip counting and moves nicely to multiplication.

6. **Jackpot.** Materials needed: soft ball such as a dodge ball or beach ball. Dry erase marker to keep score. The number of points earned will be in sets of the times table that you are learning. For example, if you are learning the 3 times tables, then each time a child gets a correct answer, they get 3 points. They must skip count at the end to total their points. To ensure that each child gets a turn, you may need to name a child who will get the ball. The mentor throws the ball up in the air and says either "dead" or "alive". In the case of "alive", the child must catch the ball in the air. For "dead", the child can retrieve the ball once it has touched the ground. Each time a child gets the ball, the mentor asks that child a multiplication question and then the child gets the points. (Every time a child gets a question right put a line under their name on the whiteboard to help them keep track of how many points they have.) At the end of the game, each child must count up their points (the slow way would be to add, faster is to skip count and fastest is to total the number of groups of points and multiply). Show them each of these three ways and voila, you have a great teaching moment.

7. **Tag.** No materials needed. Pick one child who is It. The person who is It goes around and tries to tag people. When a person is tagged, they sit down. One of the mentors (the "Healer") goes and asks the person seated a multiplication question. If they get it right, they stand up and start running again. If they get it wrong, the mentor asks them to try again using skip counting. The mentor will help the child until she gets it right.

8. **Snakes and ladders.** Materials needed: This requires prep. Printout of this page on the day previous to the lesson and insert the questions on each square. This is a game for 2-3 people plus a mentor. PDF, and tokens for moving (use blocks or crayons), dice. The child rolls the dice and moves their token to the square where they must then answer the question.

9. **Cops and Robbers.** Materials needed: small bean bags (or similar tokens and 3 hula hoops (or tape). This requires some set up. One hula hoop is the jail, one is home and one is where the bean bags are stored (put out about 15 bean bags). All hula hoops are safe zones. The mentor identifies each hula hoop as either Jail, Home or Store. Two or three girls are the cops and the rest of the girls are robbers. The robbers have to get the bean bags from the Store to Home without being tagged by the cops. If they are tagged, they must put the bean bag back in the Store and go to Jail. To be rescued from jail, one of the robbers has to come and tag their team mate in jail without being caught by the cop. When they tag their team mate in jail, the mentor will ask them each a multiplication question (they are safe at this point since they are in the hula hoop), which they must answer correctly before being escorted safely (no tagging allowed) to their home base. The goal is for the robbers to get all bean bags from the store to home. A robber can only bring one bean bag from the store to home at a time. If the cops tag everyone, the cops win and you can choose new cops and

robbers.

10. **Beach Ball. Materials needed:** beach ball from G^M kit. There are 2 versions:
    1. Pass the ball to each other and whatever number your thumb lands on is the number you use to practice the table you are working on.
    2. Skip count every time you touch the ball and try to keep the ball in the air (keepy uppy). This is best done with tables that are easier to skip count since there is not a lot of time to figure out the answer.

11. **Dice Game:** Materials needed: dice sets from the G^M kit: Dice can be used as flash cards. Break the girls into pairs. Each girl will have one die. They roll their die and multiply the numbers together. For example, if one girl rolls 2 and the other rolls 6, they have to figure out 2X6 (or, by the pancake rule, 6X2).

12. **Trash bin basketball**: Materials needed (bean bag or crunched up paper ball), review multiplication questions (no answers). Trash bin (you can also use a square of tape and they must shoot it into the square)
    Space: classroom/small space
    Minimum time: 15 minutes
    Directions: Set questions from far to close to the trash bin. If the child answers the question correctly, they move on to the next question until they get one wrong and that's where they shoot from. See example on YouTube: https://www.youtube.com/watch?v=hhZOGM8rznE

13. **Zap (or zip-zap):** Materials needed: none
    A number (for example 3) is chosen, and this is the number of the game. The first person starts by counting "one", the next person says "two", etc. For every number that is a multiple of the chosen number, players must say "zap" instead of the number (if it was 3, it should go " one", "two", "zap", "four"...) If they hesitate, say the number instead of zap, or say zap when it is not a multiple, the circle starts over at 1 The goal is to count as high as possible as a team! To make it more complex, you can have multiple numbers with multiple sounds (multiples of 3 could be zap, multiples of 7 could be zip, and multiple of both could be zip zap)

14. **14 Multiplication War:** Materials: a pack of cards per 2 kids. If you have more players, add more packs of cards. Take out all the jokers, kings, queens and jacks. Use the Aces as 1's. Shuffle and create two piles, which you put face down. The game can be played two by two, tournament style. Each person flips a card at the same time (one from each deck). The first person to multiply the numbers and to get the product, gets the cards. There should be at least 2 referees checking the correct answers. The person who has the most cards at the end of the pile, wins a point.

15. **Multiplication Math Game:** Minimum: 2 players. Materials needed: 1 die per person, plus one score card per person and a pencil to write the score.
    Objective: To be the player with the highest total score after six rolls of the die.Everyone rolls a die. The player with the highest roll starts the game. Play moves clockwise. Player

one throws the die. She records her score for that roll by multiplying the number on the die by one of the numbers on the score card (1-6). Play passes to the next player.For each turn, the player multiplies the number on the die by a number from 1-6. Each number from 1-6 can only be used once. For example, if a player rolls a 6, she will probably want to multiply it by 6 (36) and enter it in the appropriate box. However, if she already filled the 6 box on a previous turn, she must choose a number from a vacant box and multiply 6 by that number. At the end of 6 turns per player, all the boxes will be filled in. Players then total the results of all 6 rounds. Highest score wins.
Variation: Included in the printable score card is an extended version of this multiplication dice game in which players roll the die a total of 12 times. It's a longer game but kids will practice higher number equations. Score Card

16. **Dice Game: 101:** Materials: 2 dice per team.
    To play this game, divide the students into two teams (or play in many small groups). Each team takes turns rolling a pair of dice. The goal of the game is to add up numbers to reach as close to 101 as possible, but without passing this number. Students can multiply the number on the dice together, or add them. For example, they might roll a five and a 2 and multiply them to equal 10 or add them to equal 7. Continue and see which team gets closer to 101 without passing it."

APPENDIX B:

Permission to photocopy these is granted.

1. <u>Incident Report</u>
11. <u>Starting survey</u> (please send copies to <u>info@girlstothepowerofmath.org</u>)
12. <u>Two times table song lyrics</u>
13. <u>Mindset and review surveys</u>
14. <u>Three times table flower example</u>
15. <u>Three times table flower blank</u>
16. <u>Clock print out</u>
17. <u>100's chart</u>
18. <u>Known tables highlighted on 100's chart</u>
19. Mission Possible <u>Instructions</u> and <u>Cards</u>
20. <u>Final survey</u> (please send copies to <u>info@girlstothepowerofmath.org</u>)
21. <u>Multiplication Olympics</u> and <u>Olympic medals</u>
22. <u>Snakes and Ladders</u>
23. <u>Multiplication Dice Game Score Card</u>

Homework sheets:
1. <u>General Sheets</u>
2. <u>2 Times Table Package</u>
3. <u>3 Times Table Package</u>
4. <u>4 Times Table Package</u>
5. <u>5 Times Table Package</u>
6. <u>6,7,8 Times Table Package</u>
7. <u>9 Times Table Package</u>
8. <u>0, 1, 11 Times Table Package</u>
9. <u>0, 1, 11 Time Table Package (2)</u>
10. <u>12 Times Table Package</u>
11. <u>Midpoint review</u>

APPENDIX C:

List of materials should you wish to replenish a kit or make your own. Note, many of these supplies can be substituted with other objects but this list might be helpful.

- 2 beach balls
- 1 roll of green painter's tape
- Pack of sidewalk chalk
- 400 interlocking centimetre unit cubes
- Multiplication flash cards
- Dry erase markers (4/kit)
- Pack of water-based washable non-toxic markers
- White erasers (2)
- Pre-sharpened #2 HB pencils (15)
- Name tags (50)
- Dice (5)
- Fabric Ribbon Satin Roll 500 Yards, (2)
- Metallic Gold Stars (at least 120)
- Coloured construction paper 40 pages
- Goodie Bag fillers (at least 20-30pcs)
- Black Fine Point Sharpie (1)
- Dry Erase board (not necessary if there is one in the room)
- Bean bags (at least 8)
- White printer Paper (for printing costs and drawing)
- Ten dollar bills (at least 120, they are paper cut outs)
- Box to hold everything