4th Grade Math Lesson Transcript

- Okay, get your boards and your markers out.

- We're set.

- Yes, ma'am.

- Get your boards and your markers out. Uh-huh, go ahead and get one. All right, guys, we're starting something brand new. Number

- [All] Patterns.

- Have you heard of patterns?

- [Class] Yes.

- Okay, well my first question to you is, what is a pattern? I want you to write it on your whiteboard. What is a pattern? 30 seconds. What is a pattern? What is a pattern? Are you sharing, or do you have a question?

- [Student] Sharing.

- Gimme a thumbs-up when you're ready. What is a pattern? 15 seconds. 5. 4. 3. 2. 1, boards up. Lemme see what you got. Okay, I see, "A pattern is a repeat of something, like numbers." "A pattern is when they repeat." "Something that repeats." "Something that goes over and over again." "Repeats." "Over and over again." "Something in order." "Repeats." "Numbers or words that are in order."

- In order.

- Okay, so the things that I heard the most were, well, what did I hear the most?

- Repeat.

- Repeat. I heard

- Over.

- over and over, okay. What else did I hear the most? Over and over, repeat, and in a certain

- Order.

- order. Okay, let's see if you guys were right. Okay? But let's talk about exactly what our target is. Read with me.

- [All] "I can determine the rules for a given number pattern."

- Hmm. Is there a word in there that you don't know?

- Determine.

- Determine?

- Determine. What could determine mean? If I read it, I can determine the rule for a given number pattern. I can determine it. I can do, what?

- [Student] Repeat.

- Repeat it, I can do it, I can say it, I can...

- Show it? You can find the rule.

- I can find the rule. I can find out. Let's substitute "find," and see if it would make sense.

- [All] I can find the rule for a given number pattern.

- Does it make sense?

- Yes.

- So then that's what we're gonna use. Determine is just a big way to say find, or figure out. Okay, let's read the next one.

- [All] "I can generate a number pattern based on a given rule."

- Hmm. You see a word in there you're not familiar with?

- Generate.

- Generate. Have you heard generate?

- [Class] Yes.

- Where? Think of where you may have heard generate. What'd you say?

- Control.

- Control.

- A generator for your house.

- A generator for your house! Does anybody have a generator at their house or have heard of that? When do you use a generator?

- When the power goes out.

- The power goes out. Why do you use a generator, what does it do?

- To give you power?

- It keeps the power going.

- It gets power going. It makes something, right? So if I substitute "makes," let's see if that would work.

- [All] I can make a number pattern based on a given rule.

- That, guys, is how we figure out words that we don't know. Okay, so I've already asked you, what is a pattern?

- Is a pattern.

- You told me what you thought. Let's see if what you said matches. Read with me.

- [All] "A pattern is an order set of numbers or objects, called terms."

- What words are in here, in the actual definition, that you already said on your board?

- Order.

- Order, you did use order.

- Numbers?

- You did say numbers. Now, they can also be

- Be objects.

- objects.

- But today we're only talking about numbers.

- Numbers.

- Okay, now I see the word "terms." What does terms mean? Hmm.

- Hmm.

- Called terms. Let's read it again, and see if we can find some context clues.

- Context clues.

- [All] "A pattern is an ordered set of numbers or objects, called terms."

- So it's an ordered term.

- So what are they?

- An ordered-

- Ordered set of numbers or objects.

- Numbers or objects means terms.

- Terms.

- A pattern is also known as a sequence.

- Sequence. Where have you heard sequence?

- Sequence of an...

- Sequence.

- Tell me.

- Sequence of...

- Sequence of events.

- Sequence of events. And what is special about sequence of events?

- It's in order.

- They are in order. So that, again, reminds me that whatever the pattern is, it has to be in a certain order. So if I see the word "sequence," I know that they're really talking about a pattern.

- Pattern.

- All right, so here we go. Here's an example of a sequence. Here's an example of a sequence. Now, I know you probably know what number comes next. Write on your board what number you think comes next. What number do you think comes next? 5. 4. 3. 2. 1, boards up, lemme see. I see 11, I see 12. I see 17, I see 11, I see 12, I see 17. Guess what? I don't expect you to know which number comes next. I haven't taught it to you yet. What I want you to notice is that each one of these has a name. They're called a...

- [Class] 1st term.

- Well, okay, so let's see, 1st term, 2nd term, 3rd term, 4th term. Each one of those is called a term.

- Term. Remember I said a term. If I go back to the definition, a term was, let me write it over here. A term was what?

- A number or a object.

- A number or object.

- A term is a number or

- Number or

- an object.

- an object. Yes, okay. Now, you see the dot, dot, dot at the end?

- [Student] Yes, that means-

- You know how sometimes when I say, and da-dot, da-dot, da-dot, da-dot, it keeps going?

- Yes.

- That's what I mean when I put those 3 dots, okay? So this is a pattern, which is also called a sequence.

- Sequence.

- All right, here we go. Okay, here's an example. Here's an example of a pattern that's already been done for you. Look at the pattern. 2, 5, 8, 11, 14, 17, 20.

- 2, 5, 8, 11, 14, 17, 20.

- [Student] That is adding a 3.

- How do you know it's adding 3?

- Because 2 plus 3 equals 5.

- 2 plus 3.

- Well, because you already saw it. But you know, in your head, if I go from 2 to 5, I am adding 3.

- Adding 3.

- If I go from 5 to 8,

- 5 to 8.

- [All] I'm adding 3.

- 8 to 11.

- [All] Adding 3.

- 11 to 14. Add 3.

- Adding 3. And it keeps going on and on, forever, okay? A rule is used to describe a pattern.

- To describe a pattern.

- So here's a pattern. All these numbers, they follow a specific rule.

- Order.

- They are in order, but they're gonna have to follow a specific rule.

- Rule.

- Now, what's special about the rule? We're gonna set some criteria for a rule.

- [All] "It must contain at least one operation and a number."

- Number.

- And a number. What pops into your head when you hear the word "operation?"

- Add sign.

- Add, subtract.

- Add, subtract,

- Multiple.

- multiply and divide.

- Multiply, division.

- There's 4 operations: Add, subtract, multiply, and divide.

- No, we only know 3.

- Now, you already answered the question. What's the rule for this pattern? If the rule has to have an operation and a number,

- And a number.

- what is the rule for this pattern?

- [Student] To add to the end.

- Well, are these the rules? 2, 5, 8, 11, 14, 17?

- No.

- No, to add 3.

- Add 3.

- The rule is add 3, because add is the operation.

- Operation.

- [All] And 3 is the number.

- Now, I have a question for you. Are those numbers getting bigger, or are they getting smaller?

- [Class] Bigger.

- Is there a bigger, better math word I could use for

- Greater.

- something getting bigger? Okay, they are getting greater. In...

- Increasing.

- Increase.

- Increasing, yes! So, typically, the pattern is either going to increase, or what's the opposite?

- Or decrease.

- [All] Decrease.

- Yes! So "increase" means they're getting bigger, and "decrease" means they're getting smaller. That's gonna help me a lot when I try to determine which operation to use. Now, look at this one. This one's a little bit different. Write on your board if you notice something different about this pack.

- Hmm.

- 30 seconds. Take a look at it. If you notice anything different about this pattern. Do you notice anything different about this pattern? Gimme a thumbs up when you have it. I'm not looking for complete sentences, just jot your thoughts down. 5. 4. 3. 2. 1. I want you to share at your table, compare answers, and see if you guys came up with something similar or something different. Did you share yours? Tell me again what you said.

- 8 minus 2.

- Interesting. So did y'all notice the same thing, or something different? Okay. What did y'all decide? Come up with something the same or something different?

- I have subtracting and, not adding, but, um,

- Multiplying.

- Yeah, multiplying. And then, so, minus 2. And then, ellipses,

- 8, 6, 4, and 2.

- multiply 2.

- Did you all come up with that? Okay. What about you guys, what did y'all decide?

- Danny and-

- Okay.

- Bigger and smaller.

- Okay. All right! I think you all noticed it. Was there only one operation here?

- No.

- No, there was 2. And what were they?

- [All] Subtraction and multiplication.

- So, a pattern can actually have

- [All] two operations.

- But what does it have to have? It has to have at least one.

- At least one.

- So for it to be a rule, it has to have at least one operation.

- At least one operation.

- And what else?

- A number.

- A number, yes. I can't say, "Well, the rule is just add." Well, add what? You have to have a rule, an operation, and a number. All right. How do we figure out the rule, though? Okay, let's look up here. Read with me.

- [All] "The first step to finding the rule for a pattern or sequence is to figure out how the terms are related." Hmm. How they're related, what does that mean? How they are

- Alike.

- The same.

- I heard "alike."

- Or.

- "Same."

- How they are

- Close.

- Close, or how they are c...

- Connected.

- Connected, okay. All right? Do you have a question?

- [Student] No, I-

- You see it?

- The comma-or.

- Oh, you see the comma-or! Who else saw it? And what does the comma-or tell me?

- It has the same meaning.

- Same meaning. So there it is again. Pattern and sequence mean the same thing.

- Thing.

- Okay, so here I wanna know, how are the terms in this sequence related? Remind me again what terms are.

- The term is a number-

- A number or object.

- The numbers or the objects. But in this situation, were we talking about numbers or objects?

- No.

- No.

- Are we talking about numbers or objects?

- Numbers.

- Pick one!

- Numbers.

- Numbers, okay. How are those terms related? Write it on your board. I wanna see what you come up with. 30 seconds. How are those terms related? 2, 4, 6, and 8. How are they related? You may have more than one thought. I don't need you to write the question. I just want you to write down how they are related. 5. 4. 3. 2. 1. Boards up. All right, I see "Skip count by 2s." Put your board down if you have something that I say. I hear "Skip count by 2s." I see "Add 2 every time." I see, John Rawls, lemme see yours. "They are all even numbers." Anybody have anything different? "Because when you get higher, they repeat the same digits at the end." So she sees a pattern within a pattern, very good. So "Repeated digits." Anything else? Let's see if you were right. We could say "Skip count by 2s." We said that one. Did we say "Add 2?"

- Yes.

- We did. Did anybody say this?

- I was.

- Multiples of 2. But when I say I'm "Skip counting by 2," if I start at 2

- That means the same thing.

- That means the same thing. Those are the multiple 2s. And we even said they are even numbers, okay? Now, I'm gonna give you a different set of numbers, a different number pattern. And I wanna do the same thing. I wanna see what you notice, okay? All right, try this one. I wanna know how these terms are related.

- [Student] Hmm.

- How are those terms related? What is the rule of this pattern? What is the rule of this pattern? Well, what does it have to have to be a rule?

- An operation and a number.

- An operation and a number. Well, since the numbers are decreasing, it can only be division or subtraction.

- Division or subtraction.

- By how much?

- 10.

- 10.

- How much is it going down each time?

- [Class] 10.

- So is it divided by 10 or subtract 10.

- Subtract.

- Subtract 10, very good. Do you know what number would come next?

- Yes, 10.

- 10.

- If the rule continues... I subtracted 10 here. Subtract 10, subtract 10.

- Subtract 10.

- If the rule continues, then it must be

- 10.

- 10, all right. Open your journals. Your notes are gonna start here.

- Ms. Davis?

- Yes?

- Can I go get my top-

- Yes. Open your journals. These notes, this is where yours are going to start. Okay? All right, read the first one with me. 30.

- [All] 27, 24, 21.

- What number would come next

- Next.

- in the number pattern?

- [Student] First, we gotta find out our operation.

- Okay, she says, first, she wants to find out the operation. Before I can figure out the operation, I wanna look at that set of numbers and decide whether it is

- Decreasing or increasing.

- Okay. So let's go ahead and make our list of did Is? So did I ask myself what? What did you say we were gonna ask ourselves first?

- [Student] Is it decreasing or increasing?

- Is it increasing or decreasing? Ask myself, is it increasing or decreasing?

- Decreasing.

- [Student] And also, what's the operation?

- Ask yourself that. And make that note on your paper. Is it increasing or decreasing? Put a big "I" for increasing, and a "D" for decreasing. Gimme a thumbs up when you have it? We're just looking at the pattern, and we're deciding if it's increasing or decreasing. I or D, what did you decide? Increasing or decreasing?

- [Class] Decreasing.

- Okay, you decided that it was decreasing. So then, it must be which 2 operations? Either...

- Subtraction or division.

- Now, you know we haven't spent any time on

- Division.

- division.

- So it's probably

- So it must be

- gonna be subtraction.

- Subtraction.

- For the purposes of today. All right, what would we do next? Now that I know that it's decreasing, I need to figure out, that's the operation, I need to figure out how much

- Much.

- it is decreasing by. So let's ask ourselves. Did I ask myself how much is it increasing or decreasing?

- Or decreasing.

- Ask yourself that question, and you figure out how much it is increasing or decreasing every time. Ask yourself, is it increasing or decreasing? We already decided that it was decreasing. By how much? Now, I wanna caution you. Do I just get to check one jump? Can I just look at 30 to 27, and say, "Oh, that's 3! The rule must be subtract 3."

- No, you have to-

- No, you have to look at every number.

- I have to check every time. The rule has to work for every situation. Because you learned on that, remember that second slide I showed you, where it was minus 2, times 2, minus 2, times 2? If you would've only checked the first one and got minus 2,

- You woulda got it wrong.

- you would have got it wrong. Yeah, so you need to make sure that rule works for every one.

And I love that Miguel is showing the jumps on his paper. How much from 30 to 27?

- 3.

- Minus 3.

- You can't just tell me the number. I need the

- Minus 3.

- Minus 3.

- Operation.

- Minus 3.

- Is minus an operation?

- [Class] Yes.

- No, no, subtract.

- Subtract!

- Minus is what I say, and minus is what I think, but subtract is the operation. I'm subtracting 3. Now, what about the next one?

- Subtract the 3.

- Subtract 3.

- Oh. So the rule must be subtract 3, I'm done.

- [Class] No.

- You need to keep-

- I have to check all of 'em, because the rule has to apply to all. So what about from 24 to 21?

- Minus 3.

- Subtract 3.

- Subtract 3, thank you. So now, is it safe to say that the rule is subtract 3?

- [Class] Yes.

- So then, can you figure out what comes next?

- Yes.

- Yes.

- What is it?

- 18.

- Prove it.

- [Student] 21 minus 3 is 18.

- You got it. Easy enough, right?

- Yes, ma'am.

- You ready to kick it up?

- Yeah.

- Okay. Here we go. All right, same one. Which would be the 6th term in this sequence.

- 6th term, sequence.

- There's that word "term" again. That's a new word for me. I need to remember what that means. What is the term? What are they talking about?

- A number or object.

- A number or an object. Are we working with numbers, or are we working with objects?

- Numbers.

- Objects.

- We're working with numbers, okay. But they're asking me for the 6th one. So here's what I do. I say 83, 73, 63, 53, 43, done. I'm done.

- No.

- Why?

- You gotta check all them

- Check them. and make sure that-

- You have to check it to 6.

- They're not wrong.

- To 6? What term did I just find?

- 5.

- [Student] The 5th term.

- The 5th term. Does anybody have a strategy that we could use to make sure that I'm actually finding the right term? JC, what do you think?

- [JC] Put 6 underlined.

- Say it louder.

- [JC] Put 6 underlined. And then, when you get to 6, you need to circle it, so you know that that's 6.

- Okay, remember last week, when we were doing multiples, and I asked you to find the 7th multiple, what did you go ahead and do?

- On the 7th one.

- Underline 7.

- You put your underline, so you knew you were finding the right one. So 1, 2, 3, 4, 5, 6. This is the one they're asking me for. I'm gonna take it a step further, and I'm actually gonna number them. What term is this?

- 1.

- The 1st?

- The 1st one. This is the

- [Class] 2nd, 3rd, 4th, 5th, 6th.

- All right. Let's say what we decided. Let's go back to our rules. What's the first question I'm gonna ask myself? Is it increasing or decreasing?

- Increasing or decreasing?

- What you think?

- Decreasing.

- Decreasing, okay. By how much?

- 10.

- 10.

- You sure? Did you check for 10 every time?

- [Student] By 13, I guess.

- You guess? How could I figure out?

- Subtract.

- Count.

- I need to subtract. 83 minus 73 is what?

- 10.

- If you don't know, I better see you subtracting on your paper to figure it out.

- 10.

- 10.

- Or I could think to myself, "Well, the digit in the 1s place is staying the same. The digit in the 10s place

- 10s place.

- is going down 1 time. So that's 8 10s, 7 10s, 6 10s, 5 10s, 4 10s, 3 10s

- 5 10s, 4, 3.

- must be next, okay. 3 10s, and what digit is in the 1s place every time?

- 3.

- 3.

- 3. Now, I know what I think it is, but I'm still gonna prove it. How much did you decide it was here?

- Minus 10.

- Minus 10.

- Subtract 10.

- Subtract 10, you got it! What about the next one?

- Subtract 10.

- Subtract 10, also. And the next?

- [Class] Subtract 10.

- What do I think the rule is?

- [Class] Subtract 10.

- Am I finished?

- No.

- No. You have to check all of them. I promise you, once we move on to bigger numbers, the pattern is going to start alternating. What does "alternate" mean?

- Changing.

- Very good. It is gonna start changing, okay. So, what's from 53 to 43?

- Subtract 10.

- Minus 10.

- Subtract 10. I know I hear minus, and I'll accept minus in your brain, but on the paper, if I follow the rules, it's got to have

- Subtract.

- Subtract, okay. And so, subtract 10 here. So our final answer is

- 33.

- 33. What is the rule? Tell me in 2 words what the rule is.

- Min...

- Subtract 10.

- Subtract 10. Okay, let's go to the next one. Okay, look at this pattern. Which number will complete the number sequence? What's different about this one?

- It's telling you to fill-

- You're missing a number somewhere in the middle. It's not at the end. Okay, what's the first question I'm gonna ask myself?

- [Class] Is it increasing or decreasing?

- Just by looking at it, gimme a thumbs up for increasing, a thumbs down for decreasing. Thumbs up for increasing, thumbs down for decreasing. How many of you do not know how to decide? Put your hands down. How many of you do not know how to decide if it's increasing or decreasing? Be honest. Anybody? Okay, so we decided that it was increasing.

- Increasing.

- So then, what operation could it be?

- [Class] Addition or multiplication.

- It's either gonna be multiplication or addition. You wanna try this one with a partner?

- Yeah.

- Go. Okay, good, I see a RICE strategy and I love that. Tell me what you're thinking.

- [Student] It could be 6. Pattern could be 6.

- [Ms. Davis] Tell me what your thinking.

- Pattern could be 6. 8. 8 and add the, 8 and add, add. Add, add. It's increasing.

- Increasing.

- It's I.

- [Ms. Davis] What question did you ask yourself first?

- [Student 1] Not all of them are I.

- [Student 2] I know.

- [Ms. Davis] Look back on the board. What is the first question I ask myself? If it is...

- [Carlos] Increasing.

- [Ms. Davis] And what did you decide?

- [Student] So, only D is decreasing.

- [Ms. Davis] How do you know that it's increasing? I don't see just one pattern.

- [Student] Only 3 are increasing, and 1 is decreasing.

- Yeah, 1, A is-

- Okay. So A is increasing. So if A is increasing, then I know that the number that comes after 20, do you think it will be more than 20, or less than 20?

- [Student] B, C and D are decreasing.

- [Ms. Davis] If the pattern is increasing, are the numbers getting bigger or smaller?

- [Carlos] Smaller?

- [Ms. Davis] A, look. When you go from 8 to 12, the number gets larger or smaller? Okay, from 12 to 16.

- B, C, and D.

- [Ms. Davis] From 16 to 20.

- [Student] And A is increasing.

- Huh?

- 9?

- Okay, so then, the next number is gonna have to be...

- It's 12.

- Larger or smaller?

- 4.

- Okay. They're asking you for which one could 6 be-

- Not 6, 12?

- Could 6 possibly go there?

- 12.

- Why not?

- [Student] 1, 2, 3, 4. Add 4 more-

- Okay, so then guess what? It's not A. Try the same strategy for B.

- You gotta do it all. We gotta add them all.

- Guys, I have a question for you. Something to think about. Do I need to check and find the rule on every one of these questions?

- No, first you have to-

- Yes.

- Nyla, say it again.

- [Nyla] First, you gotta see if it's increasing or decreasing.

- Well, Nyla said, first, I wanna check and see if it's increasing or decreasing. What number am I looking for to go in the blank? What number do they want to go in the blank?

- 6.

- A 6.

- 6. They want 6.

- So even if it's increasing, it's not gonna be right.

- Why?

- Because if you increase,

- Because.

- you will not add that little number.

- That is where your test taking strategies come in. I don't have to check every one of these. I can look at A right away.

- And say it's wrong.

- And say...

- Nope.

- Why? Why would this not be A?

- It already passed up 6.

- Because it's increasing. I heard it already passed up 6. Whatever comes after 20 is gonna have to be

- And I could-

- more than 20, so I know it can't be A.

- I could tell you it ain't gonna be D.

- Why would it not be D?

- 'Cause it's subtracting 10.

- Subtract 10s.

- 'Cause those are all by 10s. Those are all multiples of 10. Now, is B increasing or decreasing?

- [Class] Decreasing.

- And what about C?

- [Class] Decreasing.

- So then, it could possibly be 6. Now, I really only have to check 2. Keep working. Now, I only have to check 2.

- [Student 1] Wait, 16 is minus 4, that would be 12.

- [Student 2] Yeah, 12.

- [Student 1] 16 and 2 does not, the 12 does not check, so-

- Still need to check.

- [Student] 'Cause 10 minus 4 equals 6.

- [Ms. Davis] All right, Carlos, tell me what you're thinking.

- [Student 1] This, uh, adding.

- [Student 2] No, not this one, I'm not doing this one. I'm doing this one, on B.

- [Carlos] Uh, subtracting 4?

- How did I show when I jumped from one number to the next? Did I write something? Well, you need to write something, too. Show me how you know. When jumped from 22 to 18, what did you just tell me happened?

- [Carlos] Subtracting 3?

- [Ms. Davis] You sure? how do you know that it was subtraction?

- Let's check C.

- Okay.

- Because the 22, and then-

- 22.

- [Ms. Davis] So the number was increasing or decreasing?

- It's decreasing.

- Increasing or decreasing? If you don't remember... I'm gonna write it up here for you. I had it, and I erased it. Carlos, if it's increasing, they're going up. If it's decreasing, they're going down. So is it increasing or decreasing? Huh?

- [Student] Decreasing.

- Okay, by how much?

- [Student] 1, 2, 3, 4.

- [Carlos] 3.

- How do you know it's 3? Show me where you worked to figure out that it was 3.

- It's C.

- C.

- Why don't you go ahead with your group, once you all come to the same answer, go ahead and move to the next problem.

- [Student] Okay. So which one, that one?

- [Ms. Davis] What are you doing right here? Okay.

- It's C.

- Yup.

- [Student] Which of the number patterns below follows the rule to subtracting 7 to get to the next number?

- [Ms. Davis] Okay, when you subtract, lemme show you a better strategy. Start at 18, hold 18 in your hand. Hold 18 in your hand and count up to 22.

- 18, 19.

- Nope. Hold 18 in your hand. Count up to 22.

- 18, 19, 20.

- Count up to 22.

- 18.

- Hold 18 in your hand. We're starting at 18, let's count up. 19...

- 19, 20, 21, 22.

- [Ms. Davis] How many is that?

- [Carlos] 3.

- [Ms. Davis] How many is that? How many is that? Count my fingers, baby!

- We're supposed to subtract.

- Okay. If we're subtracting 4, let's check and see if it works from 18 to 14. Grab the smaller number. 14? Count up to 18.

- 15...

- A is decreasing.

- [Carlos] 15?

- And B decreasing.

- Start at 14.

- All of these are decreasing.

- How many is that?

- 4?

- Okay. So what happened there?

- They're all decreasing.

- [Carlos] Subtracting 4.

- [Ms. Davis] And then what happened there?

- [Carlos] Subtracting 4.

- Keep going and make sure that pattern works. What math are doing, what strategy are you using? What math? What are you doing?

- Subtracting.

- You're subtracting, yeah. What happens when you subtracted 3 from 60?

- You're decreasing?

- You are decreasing. So I know that my number better be

- Smaller.

- smaller. What did you get?

- 56.

- 56.

- Okay, am I done?

- No.

- No. Which one am I looking for?

- The 5th.

- The 5th one. So what's the 3rd term?

- [Class] 54.

- Prove it.

- [Class] 57 minus 3 equals 54.

- What's the 4th term?

- [Class] 51.

- How do you know?

- [Class] 'Cause 54 minus 3 equals 51.

- Why are you doing minus 3?

- Because, because

- 'Cause

- [All] That is the the rule!

- We have to follow the rule, yes. Okay, so 50, what'd you say, 51?

- Yes.

- And what's next?

- [Class] 48.

- 48. I have one question for you. Is there any 2 of those choices I coulda marked off right away?

- [Student] B and A. 'Cause that's bigger than when I started with.

- A and B, 'cause that's big-

- That's bigger. The pattern would have had to been increasing

- Increasing

- to get a bigger number, very good. Okay, let's go here. All right. Grab your whiteboard, I'm

gonna let you do this one on your board. We're just gonna do one at a time. This time, I've given you the rule.

- Ms. Davis?

- Yes?

- Do we have, is that the only steps to our I? Did I chart?

- Um, for now. For now. We're gonna add to it once we get, once we start mixing up our patterns. All right, here's the rule. The rule is subtract 7. Starting with 63, I want you to find the first 4 terms. I want you to find the first 4 terms. I see some people drawing blanks already. Why is that a good strategy? Why would they be drawing their blanks already?

- [Student] So you know where to stop.

- Mm-hmm. 'Cause this pattern could keep going on and on, forever. But I only want the first 4 terms. All right, did you agree?

- [Class] Yes.

- Okay. So, we started with 63. What was the 2nd term?

- [Class] 56.

- 3rd term?

- [Class] 49.

- And the 4th term?

- 42.

- 42, so which one of these is my answer?

- [Class] 42.

- 42. All right, let's move on. We're gonna actually skip the other 2. Let's go...

- [Student] In our notes?

- Let's go... We'll go here. We'll go here.

- [Student] Do in our notes, Ms. Davis?

- Yup, do this one in your notes. Do this one in your notes. Now, look at this one. What are asking me for here?

- [Student] What is the rule?

- I need to make sure that when I give the rule, what must it have?

- Numbers.

- Numbers.

- What does it have to have?

- Numbers, operations.

- Operations.

- Operation and numbers. I wanna see how quick you can do this one. How quick can you do this one? What questions are you asking yourself first? Malaya, I want, mm-mm. Gimme your board. I want you to go back and do this. Ahead and do that. What number did you end up with?

- This.

- Okay. 3, there's already 3 there. How many have do I have?

- 2.

- Mm-hmm. So write it. Write that down. 'Cause now, I'm not subtracting 3 minus 7. 20 minus 7 is 13. Why don't you compare answers with your shoulder partner? And let's practice giving

- Feedback.

- feedback, yes. Let's practice giving feedback.

- [Student 1] What did you get? I got, for the 1st term, I got.

- No, I got 3.

- Don't know how to explain it? Well, what does it have for a rule?

- Then 6 plus 6 gimme 12.

- And 12 plus 2.

- Are you adding the same thing every time?

- No.

- Mmm.

- Every time you add to a different number, you're adding that number to this number. And this number to that number.

- So then, maybe that's a hint that it may not be addition. Are those numbers increasing or decreasing?

- Increasing? It's multiples.

- Yeah, 'cause

- Lemme see.

- 6 times 2 equals 12.

- Very good.

- 12 times 2 equals 24. And 3 times 2 equals 6.

- So what did you just say every time you jumped to the next number?

- It was multiples?

- Not multiples, but what operation were you doing?

- Addition.

- You added 2 every time.

- No, oh. Multiplication.

- Multiplication of what? You multiplied by what?

- 2s?

- Check it and make sure it works. How many of you got stumped right away? How many of you tried to add right away? Did you figure out that it wasn't addition?

- No.

- Yes.

- Oh, yeah.

- It's multiplication.

- It looked like addition. You said from 3 to 6 is... You said that's plus 3. And then, you said 6 to 12 is

- 6.

- plus 6. And then, here is plus 12. And then, you said, "But wait a minute, I know that the rule has to repeat.

- Repeat.

- So that's when I looked at it, and I figured out that it wasn't actually addition. What is it?

- It was multiples of 2.

- It is not multiples of 2. If it were multiples of 2, they would all be even.

- Even.

- I am multiplying by 2. So what's the rule?

- [All] Multiply by 2. Do you have any questions?

- [Student] Whenever I was listing up, first, I saw 3, 6, 12. But whenever I listed 3, 6, 9, 12, I saw that 12 came after 9.

- Mm-hmm. Any other questions? Anybody? Y'all ready?

- Mm-hmm.

- Ready?

- Mm-hmm.

- Clear your desk. ♪ Clear your desk ♪ ♪ Clear your desk ♪ ♪ Put your magic to the test ♪ ♪ Put your magic to the test ♪

- All right, let's do it.

- Exit ticket?

- It is exit ticket, yup. Where's my marker? I have the lid. I have your lid.

- [Student] Ms. Davis?

- This is 7. I'm gonna go down to get this. I mean, this. I mean, the next number.

- So this was your strategy for what?

- [Student] To find the answer. Here. For the next number down.

- This is representing something. What is it representing?

- Counting down?

- Which is what operation?

- [Student] Decrease.

- What operation?

- Subtraction.

- Mm-hmm. You're right, I just wanted to know if you could explain to me what you did. So far so good?

- Yes, ma'am.

- Okay. Mm-hmm.

- [Student] All the multiples of 7, just turned around?

- Excellent connection, you're right. So then, what strategy could I have used to check and make sure that I've done it right?

- Multiplying 7.

- Mm-hmm. I could have done it backwards, very good. I need you to make sure your answers are covered. Focused, Kelsey? Let me see. Are you stuck, Malaya, or are you good?

- I'm good.

- Okay. Can you identify for me? Can you show me what your answer is? Circle your answer.

- Did I circle my answer?

- Mm-hmm. Yeah, on part A, circle your answer, so I know exactly which one you're talking about, okay?

- [Student] Yes, ma'am. How you doing, Carlos? What is the next number? Show me how you knew that it was minus 6. What did you know?

- [Carlos] 4 plus 2.

- [Ms. Davis] Multiples of 2? If it were multiples of 2, they would all be even.

- Even.