Lesson Plan: Teaching Math Through Grant Sanderson (3Blue1Brown)

Course: Grow Your Own Educator Preparation Program

Grade Level: 9-12 (Future Educators)

Duration: 35-40 minutes

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Learning Objectives

By the end of this lesson, students will be able to:

1. Explain Sanderson's "concrete example first" approach to teaching math
2. Describe how visualization builds mathematical intuition
3. Plan how to adapt visual teaching methods for different grade levels

Standards Alignment

Texas TEKS (Education and Training Career Cluster):

- 130.122(c)(5)(A): Analyze methods for presenting subject matter effectively
- 130.122(c)(5)(B): Identify methods for enhancing student learning through multiple representations
- 130.122(c)(4)(A): Demonstrate techniques that foster student engagement and understanding

Connection to Educator Preparation:

- Develops skills in sequencing instruction (concrete to abstract)
- Emphasizes building conceptual understanding before procedural fluency
- Models use of visual and manipulative tools in math instruction

Materials Needed

- ■ Presentation slides (slides.yaml) - displayed via projector
- ■ Reading passage (reading.md) - displayed for students
- ■ Group discussion worksheet (worksheet.md) - on student devices
- ■ Paper and pencils for note-taking
- ■ Google Classroom quiz (from quiz.md)
- ■ Optional: Physical manipulatives (blocks, shapes) for demonstration

Lesson Sequence

Opening (5 minutes)

0:00 - 0:05

- Ask: "Think of a math concept that felt confusing. What made it hard?"
- Brief poll: "How many of you have watched a math video on YouTube?"
- Introduce Grant Sanderson: Stanford grad, 3Blue1Brown creator, millions of subscribers
- Frame: "Today we'll learn how he makes complex math make sense—and how you can use these ideas."

Direct Instruction (10 minutes)

0:05 - 0:15

- Present slides covering:
  - Who Sanderson is and what 3Blue1Brown does
  - His core principle: concrete before abstract
  - Traditional textbook order vs. his approach
  - Math as beauty, not just usefulness
  - What videos can and cannot do
- Read aloud the reading passage while students follow along
- Key check: "What does he mean by 'the formula isn't the lesson'?"

Guided Practice - Group Discussion (15 minutes)

0:15 - 0:30

- Organize students into groups of 3-4
- Direct students to worksheet on devices
- Circulate among groups to:
  - Ask: "What's a specific visual you'd use for that concept?"
  - Push for concrete details, not vague answers
  - Connect discussion to their future grade levels
- At 0:28, give 2-minute warning

Closure (5 minutes)

0:30 - 0:35

- Invite 2-3 groups to share specific visualizations they discussed
- Key takeaways:
  - Start with concrete examples, not abstractions
  - Visualization builds intuition—the mental picture
  - Seeing math as beautiful creates curiosity
  - Videos help, but students still need to DO the math
- Transition to quiz

Assessment (5-8 minutes)

0:35 - 0:40

- Students complete quiz on Google Classroom
- Remind: questions randomized, no retakes

Differentiation Strategies

For students needing additional support:

- Pair with peer who has positive math experiences
- Focus on Prompts 1 and 5 (most concrete)
- Provide examples: "For fractions, you might use pizza slices..."

For advanced students:

- Challenge: "How would you visualize a concept like probability or statistics?"
- Ask them to sketch a quick visual during discussion
- Explore Prompt 6 in depth (challenges of flipping the traditional order)

Assessment

Formative Assessment:

- Observation during group discussions
- Specificity of visualization ideas students generate
- Connections to grade levels they want to teach

Summative Assessment:

- Google Classroom quiz (8 questions)
- Focus on understanding Sanderson's approach, not technical math content

Reflection (Post-Lesson)

To be completed after teaching:

What worked well:

What needs adjustment:

Student engagement observations:

Notes for next time:

Appendix

Key Vocabulary:

- **Mathematical intuition**: An internal sense or mental picture of how math concepts work

- **Concrete to abstract**: Teaching sequence that starts with tangible examples before introducing symbols and formulas
- **Visualization**: Using images, diagrams, or animations to represent mathematical ideas

About Grant Sanderson:

Grant Sanderson (born 1988) is an American mathematician and creator of the YouTube channel 3Blue1Brown. He graduated from Stanford University in 2015 with a degree in mathematics. He worked briefly at Khan Academy before focusing full-time on his channel. He developed Manim, a Python library for creating mathematical animations. His "Essence of Linear Algebra" and "Essence of Calculus" series are widely used by students and teachers worldwide.

Additional Resources:

- 3Blue1Brown YouTube channel
- "Essence of Linear Algebra" series (free)
- "Essence of Calculus" series (free)
- Manim animation library (open source)