Shelley MOORE PH.D.

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Nexwlélexm (Bowen Island)

•The Islands Trust Council acknowledges that the lands and waters that encompass the Islands Trust Area have been home to Indigenous peoples since time immemorial and honours the rich history, stewardship, and cultural heritage that embody this place we all call home.

•The Islands Trust Council is committed to establishing and maintaining mutually respectful relationships between Indigenous and non-Indigenous peoples. Islands Trust states a commitment to Reconciliation with the understanding that this commitment is a long-term relationship-building and healing process.

•The Islands Trust Council will strive to create opportunities for knowledge-sharing and understanding as people come together to preserve and protect the special nature of the islands within the Salish

Shelley MOORE PH.D.

How can we inclusively plan for, teach, and assess all students in a diverse classroom?

Session 1: Determining Learning Standards using Backwards Design

Session 2: Developing asset based learning continuums

Session 3: Inclusive lesson design reflecting UDL

Session 4: Inclusive and standards based assessment

Shelley MOORE PH.D.

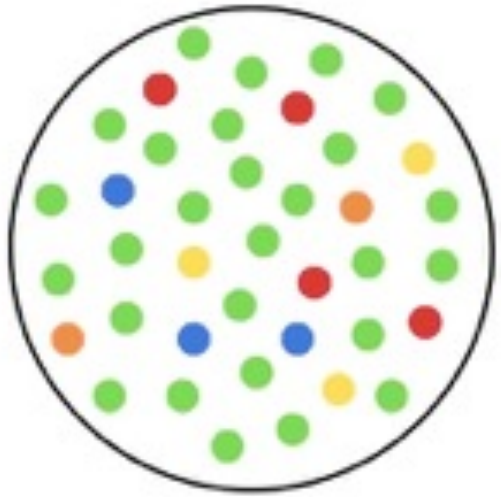
Series Guiding Question:

How can we inclusively plan for, teach, and assess all students in a diverse classroom?

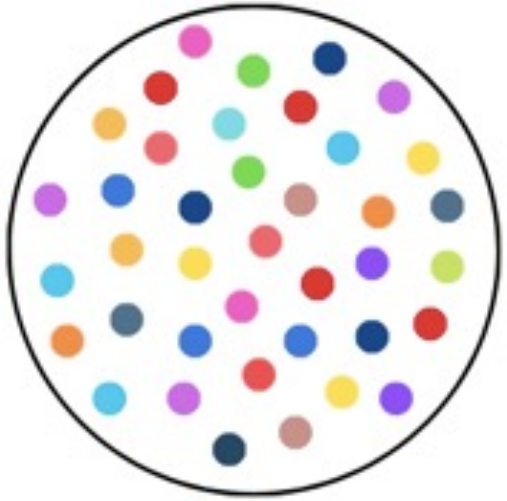
Session 1 goals:

- **I understand** that students are diverse and that planning for them requires anticipating variability rather than homogeneity
- **I know** that Backwards Design is an inclusive planning framework, connected to UDL that identifies learning standards and sub standards that allows for task differentiation which will increase opportunities for students to engage, understand, and show evidence of their learning
- **I can** identify the grade level learning standards and sub standards in a curricular unit
- **I am** inclusive and believe that ALL students, regardless of their ability, can access grade level curriculum

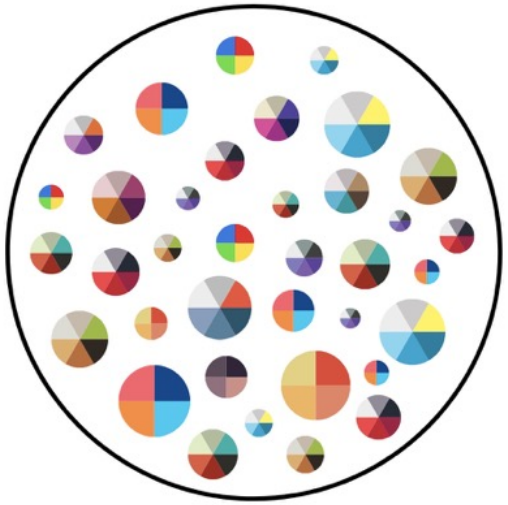
WHAT IS *inclusion*?



Including
'special needs' students into general education classrooms



Teaching and designing for
diversity
(that includes Disability)



Creating space for students to feel confident and safe to **identify**?
(that includes students who are Disabled)

Shelley MOORE PH.D.

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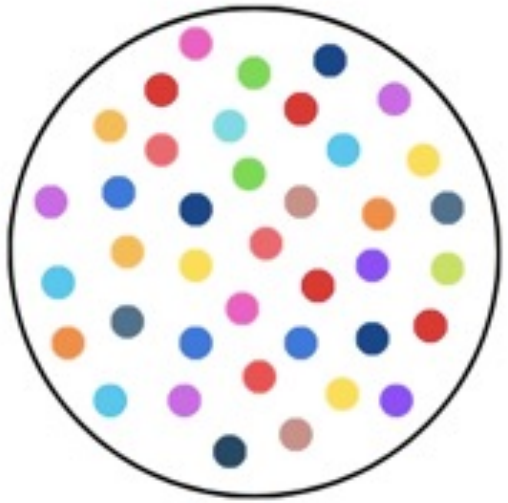

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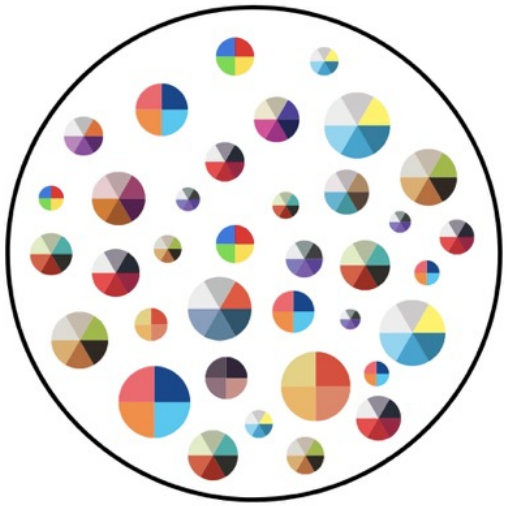


Creating space for students to feel confident and safe to ***identify***?

(that includes students who are Disabled)

Shelley MOORE PH.D.

The fewer the barriers in a place, the fewer individual supports a person needs.

The less barriers a person in a place, the more independence, safety, belonging and success a person feels

Shelley MOORE PH.D.

2023

Shelley MOORE PH.D.

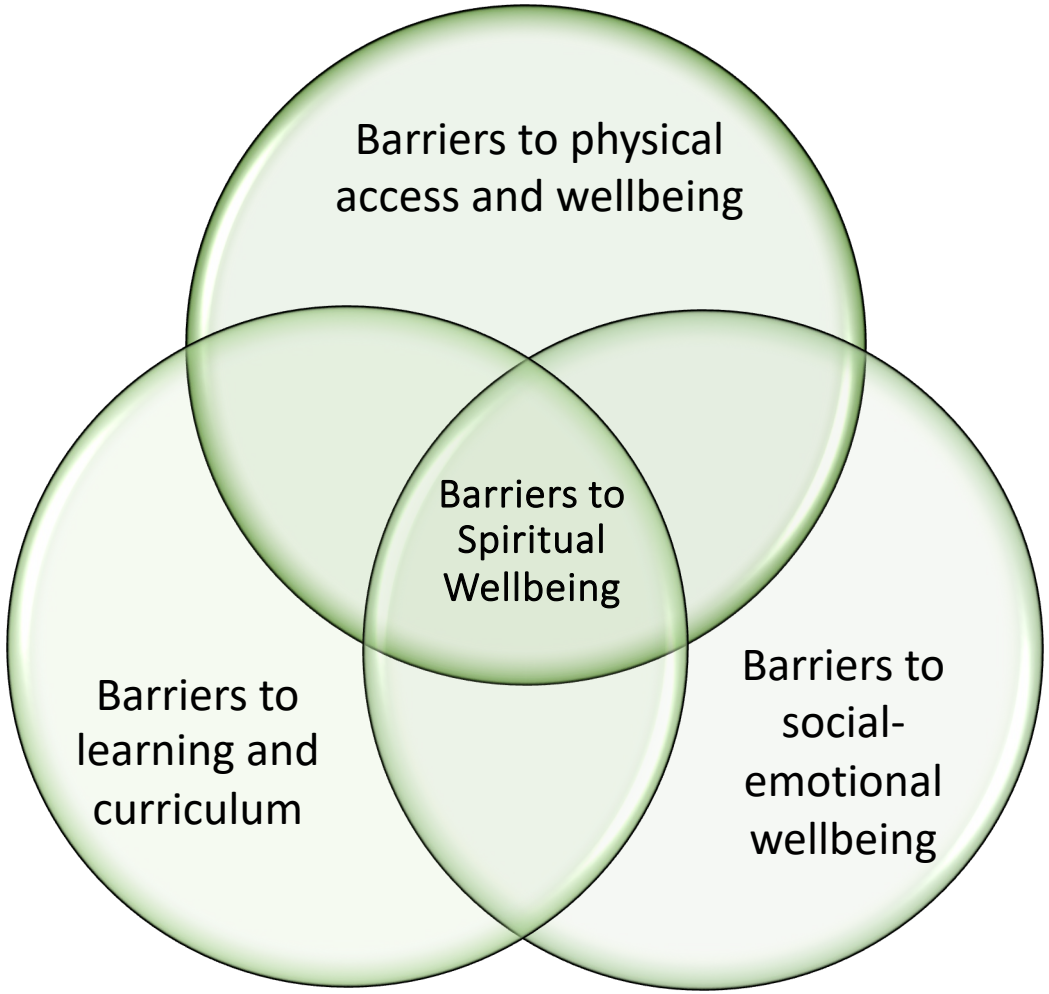
2023

What are barriers?

Shelley MOORE PH.D.

2023

Adding Ramps to Learning



Thank you Pat from Paradise Hill, SK

Examples of Initiatives that Reduce Barriers for ALL

Student Self Determination & Agency

Standards Based Assessment

Culturally Responsive Practices

Zones of Regulation

First Peoples' Principals of Learning

Needs Based Design

Trauma Informed Instruction

Inquiry

Positive Behaviour Supports

Student Voice

SEL

Backwards Design

Strength Based Perspectives

Universal Design for Learning

Learning Continuums

Accessible Playgrounds

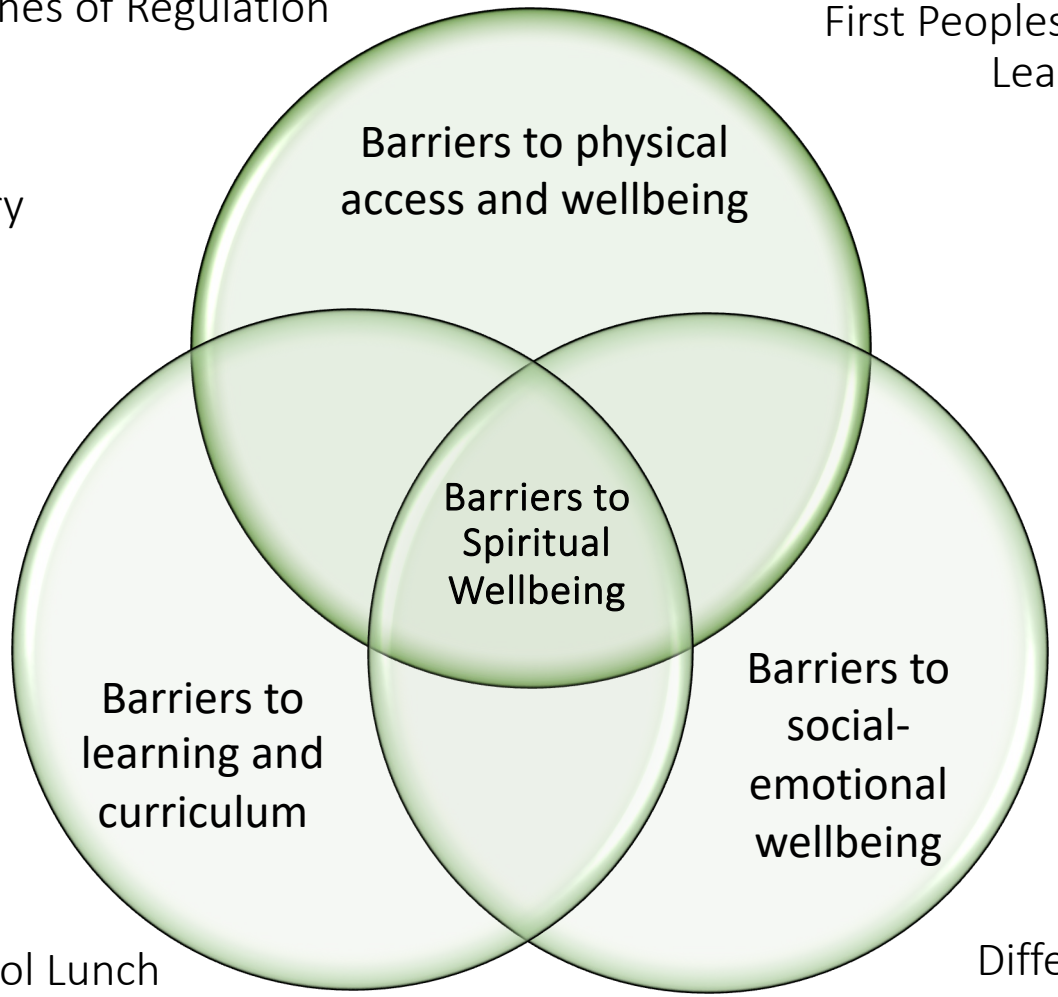
ICBIEP

Land-Based Learning

Restorative Justice Practices

School Lunch Programs

Differentiated Instruction & Curriculum



Examples of Initiatives that Reduce Barriers for ALL

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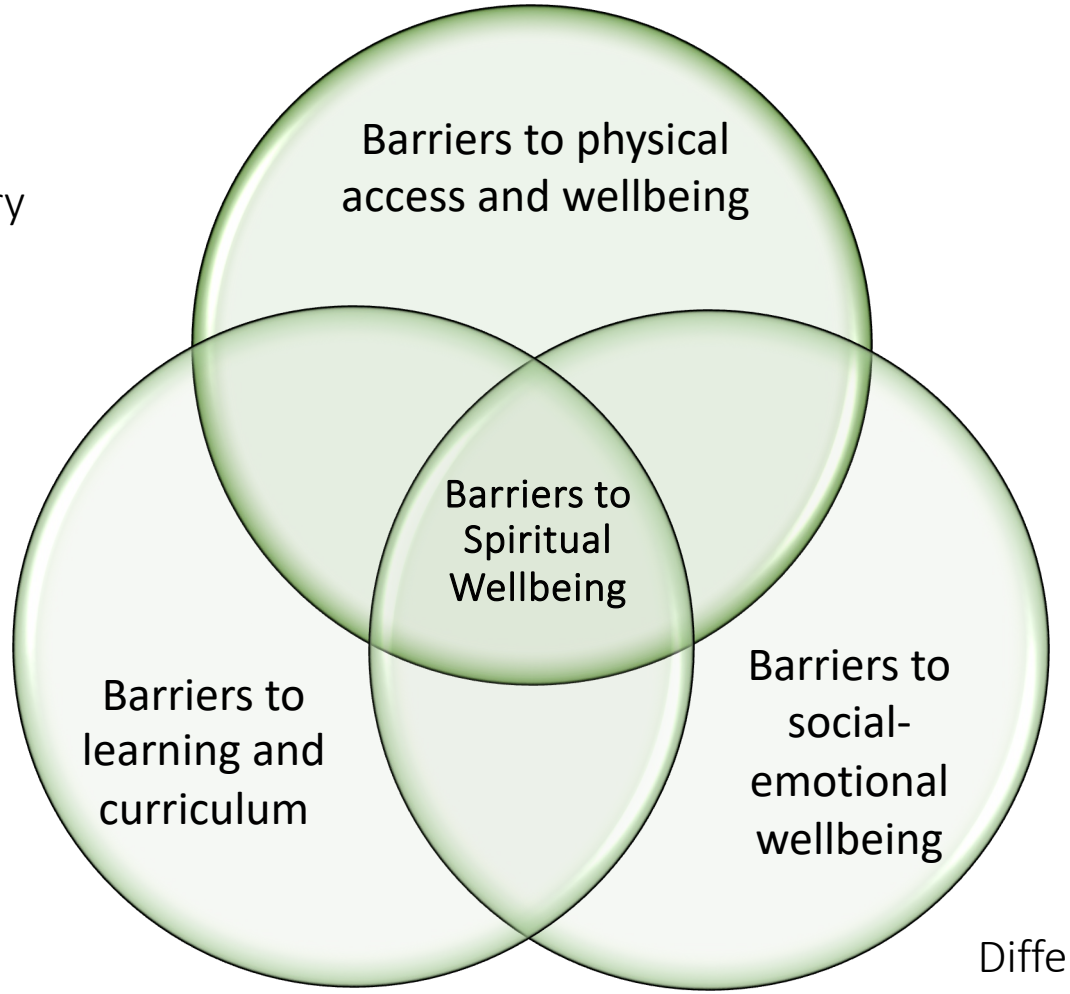
Standards Based Assessment

Inquiry

Backwards Design

Universal Design for Learning



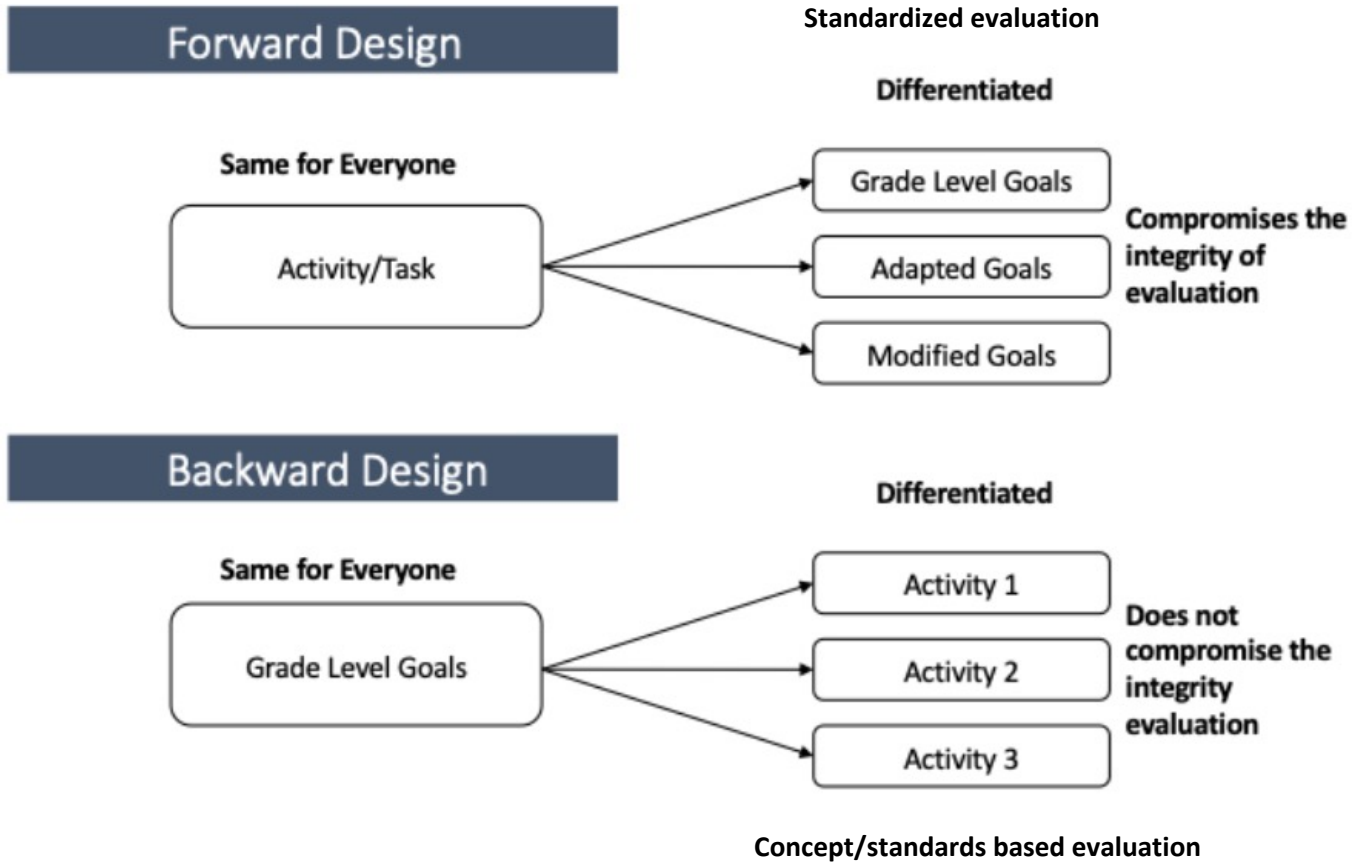
Learning Continuums

Differentiated Instruction & Curriculum

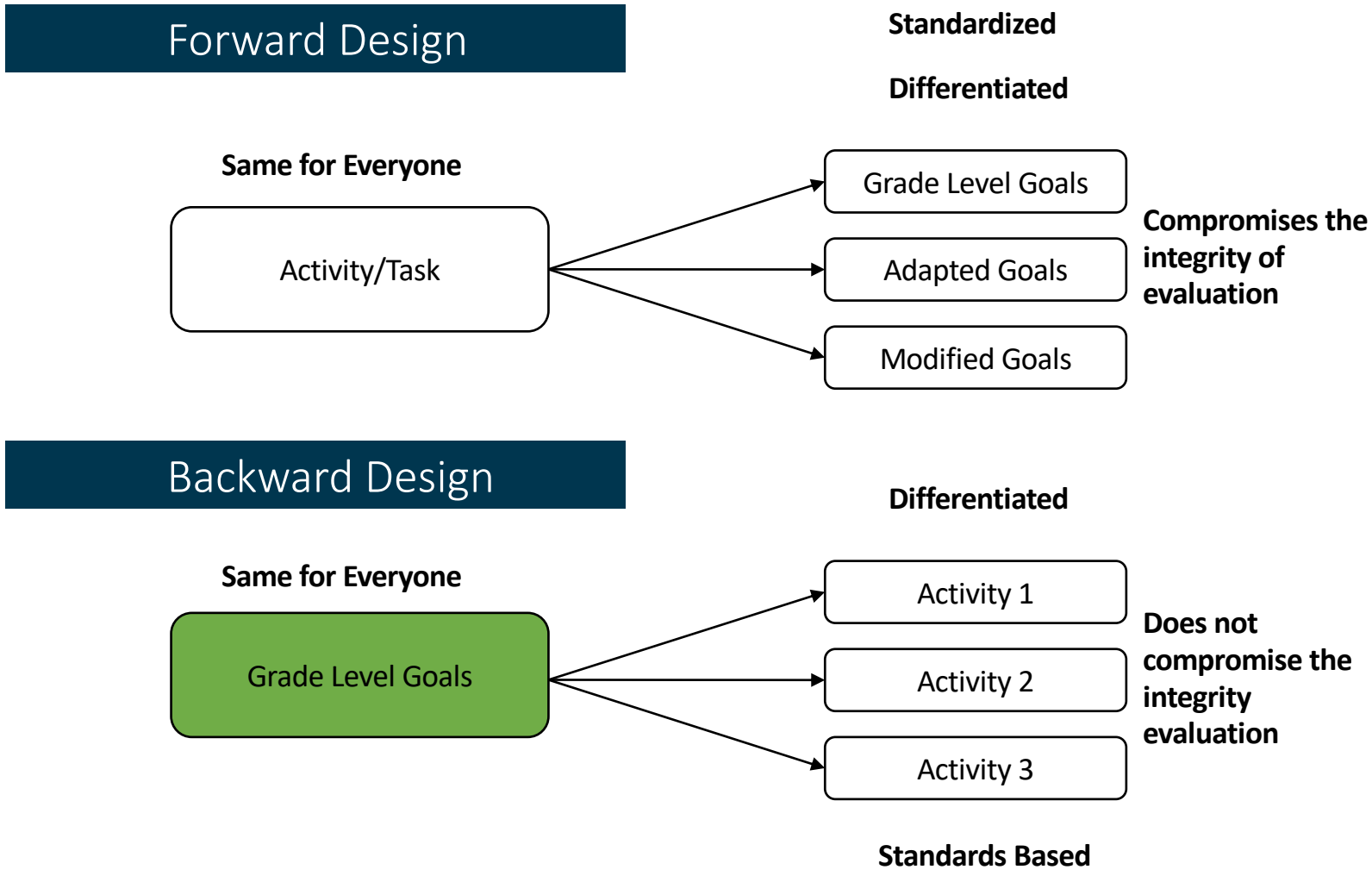
How I came to understand BACKWARDS DESIGN

Backwards Design

Adapted from McTigue, 2010



UBD: Determining the Learning Standard



McTigue, 2010

Backwards Design

What do we need to UNDERSTAND?

Big Ideas

What do we need to KNOW?

Knowledge

What do we need to DO?

Skills

Backwards Design Using Arizona Math Curriculum

Grade:	Subject Area:	Strand/Topic:	
Learning Standard:		Teacher Provocation Questions:	Student Generated Questions
Key Vocabulary:			

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
			What do students need to know? (I know…)	What to students need to do? (I can…)

Backwards Design – Arizona Curriculum

Backwards Design

What do we need to UNDERSTAND?

Big Ideas

What do we need to KNOW?

Knowledge

What do we need to DO?

Skills

Backwards Design – Arizona Curriculum

Math

What do we need to KNOW?

Knowledge

What do we need to DO?

Skills

Arizona Mathematics Standards– 5th Grade Standards Placemat

Grade level content emphasis indicated by: ● Major Cluster; ▲ Supporting Cluster

1. ***Develop competency in dividing and fluency in multiplying whole numbers through the application of understanding of place value and multiplication and division.***
   Students develop understanding of why division procedures work based on the meaning of base-ten numerals and properties of operations. They are fluent with multi-digit multiplication of whole numbers. Students are able to explain patterns associated with multiplication through application of their knowledge of place value such as explaining the pattern in the number of zeros in a product. Students apply their understanding of division to begin working with decimals. They understand and can explain the placement of the decimal point when multiplying or dividing. Students apply their understanding of addition and multiplication of whole numbers (NBT) to foundational understanding of volume (MD).
2. ***Develop understanding in performing operations with decimals to hundredths and estimating by rounding.***
   Students apply their understandings of models for decimals, decimal notation, and properties of operations to add and subtract decimals to hundredths. They develop fluency in these computations and make reasonable estimates (through rounding) of their results. Students use the relationship between decimals and fractions, as well as the relationship between finite decimals and whole numbers (e.g., a finite decimal multiplied by an appropriate power of 10 is a whole number), to understand and explain why the procedures for multiplying and dividing finite decimals make sense. They compute products and quotients of decimals to hundredths.
3. ***Develop understanding of multiplication of fractions and division of fractions in limited cases (unit fractions divided by whole numbers and whole numbers divided by unit fractions).***
   Students apply their understanding of fractions and fraction models to efficiently and accurately add and subtract fractions with unlike denominators. Students use their understanding of fractions; make connections to their understanding of multiplication and division, to explain the "why" of multiplying and dividing fractions. (Note: Division of fractions is limited to dividing unit fractions by whole numbers and whole numbers by unit fractions.)

Operations and Algebraic Thinking (OA)

▲5.OA.A Write and interpret numerical expressions.

5.OA.A.1: Use parentheses and brackets in numerical expressions, and evaluate expressions with these symbols (Order of Operations).

5.OA.A.2: Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them (e.g., express the calculation "add 8 and 7, then multiply by 2" as 2 x (8 + 7). Recognize that 3 x (18,932 + 921) is three times as large as 18,932 + 921, without having to calculate the indicated sum or product).

▲5.OA.B Analyze patterns and relationships.

5.OA.B.3: Generate two numerical patterns using two given rules (e.g., generate terms in the resulting sequences). Identify and explain the apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane (e.g., given the rule "add 3" and the starting number 0, and given the rule "add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence).

5.OA.B.4: Understand primes have only two factors and decompose numbers into prime factors.

Number and Operations in Base Ten (NBT)

●5.NBT.A Understand the place value system.

5.NBT.A.1: Apply concepts of place value, multiplication, and division to understand that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

5.NBT.A.2: Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.

5.NBT.A.3: Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.

b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the

5.NBT.A.4: Use place value understanding to round decimals to any place.

●5.NBT.B Perform operations with multi-digit whole numbers and with decimals to hundredths.

5.NBT.B.5: Fluently multiply multi-digit whole numbers using a standard algorithm..

5.NBT.B.6: Apply and extend understanding of division to find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.

5.NBT.B.7: Add, subtract, multiply, and divide decimals to hundredths, connecting objects or drawings to strategies based on place value, properties of operations, and/or the relationship between operations. Relate the strategy to a written form.

Number and Operations – Fractions (NF)

●5.NF.A Use equivalent fractions to add and subtract fractions.

5.NF.A.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators (e.g., 2/3 + 5/4 = 8/12 + 15/12 = 23/12).

5.NF.A.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations, and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers (e.g. recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2).

●5.NF.B Use previous understandings of multiplication and division to multiply and divide fractions.

5.NF.B.3: Interpret a fraction as the number that results from dividing the whole number numerator by the whole number denominator (a/b = a ÷ b). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people, each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

5.NF.B.4: Apply and extend previous understandings of multiplication to multiply a fraction by a whole number and a fraction by a fraction.

a. Interpret the product (*a*/*b*) x *q* as a parts of a partition of *q* into *b* equal parts. *For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation.*

b. Interpret the product of a fraction multiplied by a fraction (*a*/*b*) x (*c*/*d*). Use a visual fraction model and create a story context for this equation. *For example, use a visual fraction model to show (2/3) x (4/5) = 8/15, and create a story context for this equation.* In general, (*a*/*b*) x (*c*/*d*) = *ac*/*bd*.

c. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.B.5: Interpret multiplication as scaling (resizing), by:

a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $\frac{a}{b} = \frac{n \times a}{n \times b}$ to the effect of multiplying $\frac{a}{b}$ by 1.

5.NF.B.6: Solve problems in real-world contexts involving multiplication of fractions, including mixed numbers, by using a variety of representations including equations and models.

5.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. Use the relationship between multiplication and division to justify conclusions.

b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient.* Use the relationship between multiplication and division to justify conclusions (e.g., 4 ÷ (1/5) = 20 because 20 x (1/5) = 4).

c. Solve problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using a variety of representations.

Measurement and Data (MD)

▲5.MD.A Convert like measurement units within a given measurement system.

5.MD.A.1: Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems.

▲5.MD.B Represent and interpret data.

5.MD.B.2: Make a line plot to display a data set of measurements in fractions of a unit (1/8, 1/2, 3/4). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

●5.MD.C Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition.

5.MD.C.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.

5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.C.5: Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume.

a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes (e.g., to represent the associative property of multiplication).

b. Understand and use the formulas *V* = *l* x *w* x *h* and *V* = *B* x *h*, where in this case *B* is the area of the base (*B* = *l* x *w*), for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths to solve mathematical problems and problems in real-world contexts.

c. Understand volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms, applying this technique to solve mathematical problems and problems in real-world contexts.

Geometry (G)

▲5.G.A Graph points on the coordinate plane to solve mathematical problems as well as problems in real-world context.

5.G.A.1: Understand and describe a coordinate system as perpendicular number lines, called axes, that intersect at the origin (0 , 0). Identify a given point in the first quadrant of the coordinate plane using an ordered pair of numbers, called coordinates. Understand that the first number (*x*) indicates the distance traveled on the horizontal axis, and the second number (*y*) indicates the distance traveled on the vertical axis.

5.G.A.2: Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

▲5.G.B Classify two-dimensional figures into categories based on their properties.

5.G.B.3: Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.

5.G.B.4: Classify two-dimensional figures in a hierarchy based on properties.

Mathematical Practices

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

1. **Make sense of problems and persevere in solving them.**
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
7. **Look for and make use of structure.**
8. **Look for and express regularity in repeated reasoning.**

Arizona is suggesting instructional time encompass a range of at least 65%-75% for Major Clusters and a range of 25%-35% for Supporting Cluster instruction.

Arizona Mathematics Standards– 5th Grade Standards Placemat

Grade level content emphasis indicated by: ● Major Cluster; ▲ Supporting Cluster

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c. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

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b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number; explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $\frac{a}{b} = \frac{n \times a}{n \times b}$ to the effect of multiplying $\frac{a}{b}$ by 1.

5.NF.B.6: Solve problems in real-world contexts involving multiplication of fractions, including mixed numbers, by using a variety of representations including equations and models.

5.NF.B.7: Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions.

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. Use the relationship between multiplication and division to justify conclusions.

b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5), and use a visual fraction model to show the quotient.* Use the relationship between multiplication and division to justify conclusions (e.g., 4 ÷ (1/5) = 20 because 20 x (1/5) = 4).

c. Solve problems in real-world context involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, using a variety of representations.

Measurement and Data (MD)

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5.MD.A.1: Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems.

▲5.MD.B Represent and interpret data.

5.MD.B.2: Make a line plot to display a data set of measurements in fractions of a unit (1/8, 1/2, 3/4). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

●5.MD.C Geometric measurement: Understand concepts of volume and relate volume to multiplication and to addition.

5.MD.C.3: Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.

5.MD.C.4: Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.C.5: Relate volume to the operations of multiplication and addition and solve mathematical problems and problems in real-world contexts involving volume.

a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes (e.g., to represent the associative property of multiplication).

b. Understand and use the formulas *V* = *l* x *w* x *h* and *V* = *B* x *h*, where in this case *B* is the area of the base (*B* = *l* x *w*), for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths to solve mathematical problems and problems in real-world contexts.

c. Understand volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms, applying this technique to solve mathematical problems and problems in real-world contexts.

Geometry (G)

▲5.G.A Graph points on the coordinate plane to solve mathematical problems as well as problems in real-world context.

5.G.A.1: Understand and describe a coordinate system as perpendicular number lines, called axes, that intersect at the origin (0 , 0). Identify a given point in the first quadrant of the coordinate plane using an ordered pair of numbers, called coordinates. Understand that the first number (*x*) indicates the distance traveled on the horizontal axis, and the second number (*y*) indicates the distance traveled on the vertical axis.

5.G.A.2: Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

▲5.G.B Classify two-dimensional figures into categories based on their properties.

5.G.B.3: Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category.

5.G.B.4: Classify two-dimensional figures in a hierarchy based on properties.

Mathematical Practices

The Standards for Mathematical Practice complement the content standards so that students increasingly engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle, and high school years.

1. **Make sense of problems and persevere in solving them.**
2. **Reason abstractly and quantitatively.**
3. **Construct viable arguments and critique the reasoning of others.**
4. **Model with mathematics.**
5. **Use appropriate tools strategically.**
6. **Attend to precision.**
7. **Look for and make use of structure.**
8. **Look for and express regularity in repeated reasoning.**

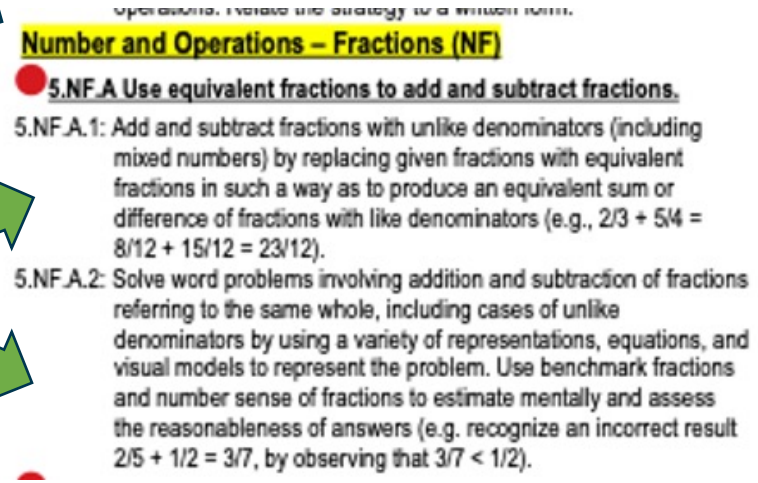
Arizona is suggesting instructional time encompass a range of at least 65%-75% for Major Clusters and a range of 25%-35% for Supporting Cluster instruction.

Backwards Design Using Arizona Math Curriculum

Strand

Learning Standard

Learning Goals



Number and Operations – Fractions (NF)

5.NF.A Use equivalent fractions to add and subtract fractions.

5.NF.A.1: Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators (e.g., 2/3 + 5/4 = 8/12 + 15/12 = 23/12).

5.NF.A.2: Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations, and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers (e.g. recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2).

What students need to know and do

Backwards Design Using Arizona Math Curriculum

Grade:	**Subject Area:**	**Strand/Topic:**	
Learning Standard:		**Teacher Provocation Questions:**	**Student Generated Questions**
Key Vocabulary:			

Learning Goals	**Possible Access Points** (accessible version of grade level)	**Curricular Language**	**Student Friendly Language**	
			What do students need to know? (I know…)	**What to students need to do? (I can…)**

Backwards Design Using Arizona Math Curriculum

Grade:	**Subject Area:**	**Strand/Topic:**	
Learning Standard:		**Teacher Provocation Questions:**	**Student Generated Questions**
Key Vocabulary:			

Learning Goals	**Possible Access Points** (accessible version of grade level)	**Curricular Language**	**Student Friendly Language**	
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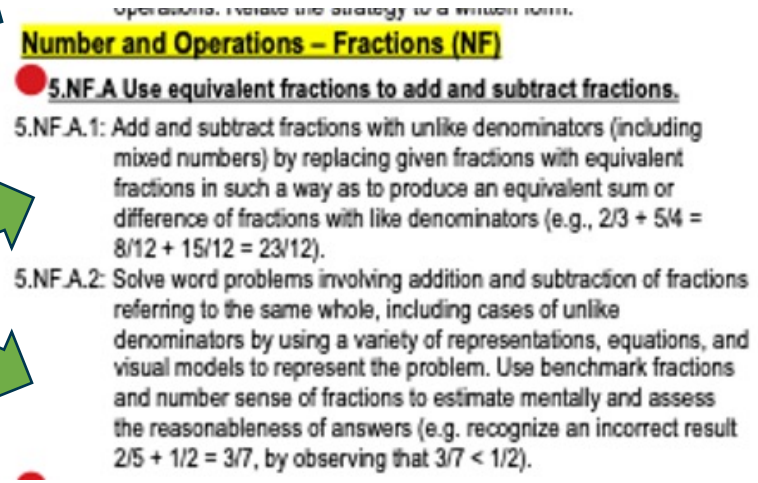
Backwards Design Using Arizona Math Curriculum

Strand

Learning Standard

Learning Goals



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What students need to know and do

Backwards Design Using Arizona Math Curriculum

Grade: 5	Subject Area: Math	Strand/Topic: Number and Operations - Fractions	
Learning Standard: 5.NF.A Use equivalent fractions to add and subtract fraction		**Unit Guiding Question(s):**	**Student Generated Questions**
Key Vocabulary:			

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
			What do students need to know? (I know…)	What to students need to do? (I can…)
5.NF.A.1		Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators		
5.NF.A.2		Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers		

Backwards Design Using Arizona Math Curriculum

Grade: 5	Subject Area: Math	Strand/Topic: Number and Operations - Fractions	
Learning Standard: 5.NF.A Use equivalent fractions to add and subtract fraction		**Unit Guiding Question(s):**	**Student Generated Questions:**
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5.NF.A.2		Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers		

Backwards Design Using Arizona Math Curriculum

Grade: 5	Subject Area: Math	Strand/Topic: Number and Operations - Fractions	
Learning Standard: 5.NF.A Use equivalent fractions to add and subtract fraction		**Unit Guiding Question(s):** **What is an equivalent fraction?** **How can we use equivalent fractions to add and subtract fractions?**	**Student Generated Questions:**
Key Vocabulary:			

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
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			What do students need to know? (I know…)	**What to students need to do? (I can…)**
5.NF.A.1		Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators	I know what a fraction is I know what a denominator is I know what an equivalent fraction is I know how to find an equivalent fraction I know why equivalent fractions can help me add and subtract fractions I know what a mixed number is I know how to turn a mixed number into a fraction	I can find an equivalent fraction I can use an equivalent fraction to add and subtract fractions when the denominators are not the same I can add and subtract fractions with there are mixed numbers
5.NF.A.2		Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers	I know some strategies to help me understand word problems I know how to show my thinking in different ways I know what it means to estimate and how estimation help me understand and solve problems I know if a solution makes sense	I can solve word problems where I need to add and subtract fractions and the denominators are not the same I can show how I solve problems in different ways (pictorial, abstract, concrete) I can estimate to help me make sense of word problems I can think about the problem to see if a solution makes sense

Backwards Design Using Arizona Math Curriculum

Grade: 5	Subject Area: Math	Strand/Topic: Number and Operations - Fractions	
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Key Vocabulary:			

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
			What do students need to know? (I know…)	What to students need to do? (I can…)
5.NF.A.1	• Adding • Subtracting • Sharing • Fractions with like denominators • Benchmark fractions ½, ¼	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators	I know what a fraction is I know what a denominator is I know what an equivalent fraction is I know how to find an equivalent fraction I know why equivalent fractions can help me add and subtract fractions I know what a mixed number is I know how to turn a mixed number into a fraction	I can find an equivalent fraction I can use an equivalent fraction to add and subtract fractions when the denominators are not the same I can add and subtract fractions with there are mixed numbers
5.NF.A.2	• Visual problems (not word based) • Word problem that use indicators above	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators by using a variety of representations, equations and visual models to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers	I know some strategies to help me understand word problems I know how to show my thinking in different ways I know what it means to estimate and how estimation help me understand and solve problems I know if a solution makes sense	I can solve word problems where I need to add and subtract fractions and the denominators are not the same I can show how I solve problems in different ways (pictorial, abstract, concrete) I can estimate to help me make sense of word problems I can think about the problem to see if a solution makes sense

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Learning Standard: 5.NF.A Use equivalent fractions to add and subtract fraction		**Unit Guiding Question(s):** **What is an equivalent fraction?** **How can we use equivalent fractions to add and subtract fractions?**	**Student Generated Questions:**

Key Vocabulary:

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
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5.NF.A.1	• Adding • Subtracting • Sharing • Fractions with like denominators • Benchmark fractions ½, ¼	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators	I know what a fraction is I know what a denominator is I know what an equivalent fraction is I know how to find an equivalent fraction I know why equivalent fractions can help me add and subtract fractions I know what a mixed number is I know how to turn a mixed number into a fraction	I can find an equivalent fraction I can use an equivalent fraction to add and subtract fractions when the denominators are not the same I can add and subtract fractions with there are mixed numbers
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Backwards Design Using Arizona Math Curriculum

Grade: 5	Subject Area: Math	Strand/Topic: Number and Operations - Fractions	
Learning Standard: 5.NF.A Use equivalent fractions to add and subtract fraction		**Unit Guiding Question(s):** **What is an equivalent fraction?** **How can we use equivalent fractions to add and subtract fractions?**	**Student Generated Questions:**

Key Vocabulary: fraction, equivalent fraction, add, subtract, denominator, mixed number, strategies, understand, word problem, problem, solution, show my thinking, estimate, solve, pictorial, abstract, concrete

Learning Goals	Possible Access Points (accessible version of grade level)	Curricular Language	Student Friendly Language	
			What do students need to know? (I know…)	What to students need to do? (I can…)
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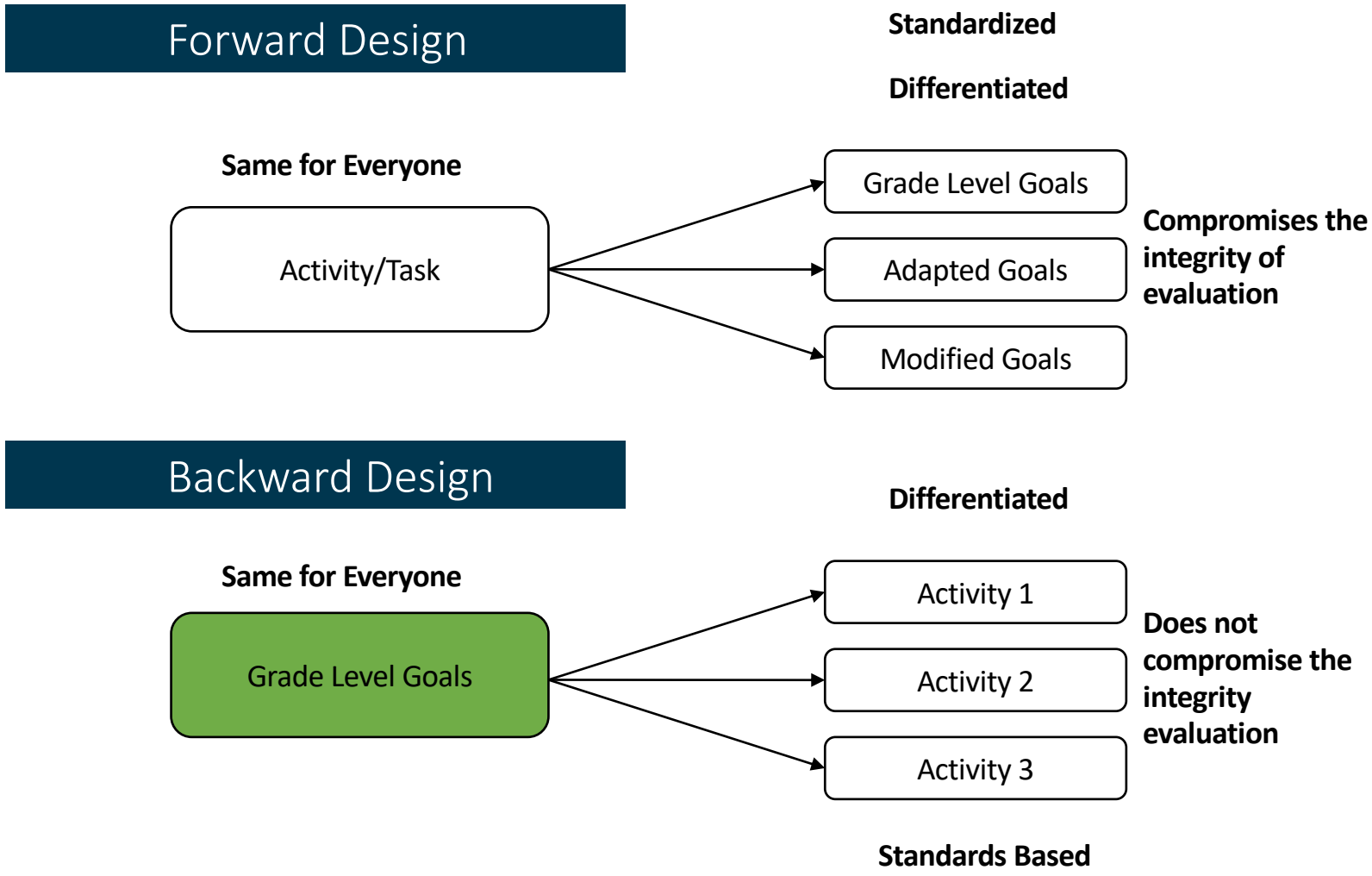
UBD: Determining the Learning Standard



McTigue, 2010

Backwards Design – Arizona Curriculum

Science

What do we need to UNDERSTAND?

Big Ideas

What do we need to KNOW?

Knowledge

What do we need to DO?

Skills

Backwards Design Using Arizona Science Curriculum

Grade:	**Subject Area:**	**Strand/Topic:**	
Learning Standard:		**Teacher Provocation Questions:**	**Student Generated Questions**
Key Vocabulary:			

Learning Goals	**Possible Access Points** (accessible version of grade level)	**Curricular Language**	**Student Friendly Language**
Understandings			
Knowledge			
Skills			

Learning Standard

Learning Goals (skills)

Learning Goals (skills)

Arizona Science Standards

Physical Sciences: Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials.

Physical Science Standards	Crosscutting Concepts & Background Information for Educators
2.P1U1.1 Plan and carry out an investigation to determine that matter has mass, takes up space, and is recognized by its observable properties; use the collected evidence to develop and support an explanation.	**Crosscutting Concepts:** Patterns; Cause and Effect; Scale, Proportion and Quantity; **Systems and System Models**; **Energy and Matter**; Structure and Function; Stability and Change[4] **Background Information:** All the 'stuff' encountered in everyday life, including **air,** water and different kinds of **solid substances**, is called **matter** because it has **mass**, and therefore **weight** on Earth, and takes up space. Different materials are recognizable by their **properties**, some of which are used to classify them as being in the **solid**, **liquid** or **gas state**.[2 (p. 20)] Different kinds of matter exist (e.g., wood, metal, water), and many of them can be either solid or liquid, depending on temperature.[4 (p. 108)] Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible (e.g., melting and freezing), and sometimes they are not (e.g., baking a cake, burning fuel). [4 (p. 110)]
2.P1U1.2 Plan and carry out investigations to gather evidence to support an explanation on how heating or cooling can cause a phase change in matter.	
2.P4U1.3	**Crosscutting Concepts & Background Information for Educators**
Obtain, evaluate and communicate information about ways heat energy can cause change in objects or materials.	**Crosscutting Concepts:** Patterns; Cause and Effect; Scale, Proportion and Quantity; **Systems and System Models**; **Energy and Matter**; Structure and Function; Stability and Change[4] **Background Information:** There are various ways of causing an event or bringing about change in objects or materials. Heating can cause **change**, as in cooking, **melting solids** or changing water to **vapor.**[2 (p. 23)] Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible (e.g., melting and freezing), and sometimes they are not (e.g., baking a cake, burning fuel).[4 (p. 110)]

Second Grade: Focus on Systems and System Models; Energy and Matter

By the end of second grade, students understand the basic concept that energy can change the phase of matter and is necessary for life. Students begin to understand energy and matter, the formation of Earth's surface features, water cycles and energy flow, changes in the environment, patterns in the sky, and the conditions necessary for life on Earth. Student investigations focus on collecting and making sense of observational data and simple measurements using the science and engineering practices: ask questions and define problems, develop and use models, plan and carry out investigations, analyze and interpret data, use mathematics and computational thinking, construct explanations and design solutions, engage in argument from evidence, and obtain, evaluate, and communicate information. While individual lessons may include connections to any of the crosscutting concepts, the standards in second grade focus on helping students understand phenomena through systems and system models and energy and matter.

Strand

Learning Goals (knowledge)

Learning Goals (understandings)

Core Ideas for Knowing Science*	Core Ideas for Using Science*
Physical Science P1: All matter in the Universe is made of very small particles. P2: Objects can affect other objects at a distance. P3: Changing the movement of an object requires a net force to be acting on it. P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event. **Earth and Space Science** E1: The composition of the Earth and its atmosphere and the natural and human processes occurring within them shape the Earth's surface and its climate. E2: The Earth and our solar system are a very small part of one of many galaxies within the Universe. **Life Science** L1: Organisms are organized on a cellular basis and have a finite life span. L2: Organisms require a supply of energy and materials for which they often depend on, or compete with, other organisms. L3: Genetic information is passed down from one generation of organisms to another. L4: The unity and diversity of organisms, living and extinct, is the result of evolution.	U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products. U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.

*Adapted from *Working with Big Ideas in Science Education*[1]

Backwards Design Using Arizona Science Curriculum

Grade:	**Subject Area:**	**Strand/Topic:**	
Learning Standard:		**Teacher Provocation Questions:**	**Student Generated Questions**
Key Vocabulary:			

Learning Goals	**Possible Access Points** (accessible version of grade level)	**Curricular Language**	**Student Friendly Language**
Understandings			
Knowledge			
Skills			

Backwards Design Using Arizona Science Curriculum

Grade: 2	**Subject Area: Science**	**Strand/Topic: Physical Science**	
Learning Standard: Students develop an understanding of observable properties of matter and how changes in energy (heating or cooling) can affect matter or materials		**Teacher Provocation Questions: What is matter? How does energy change matter?**	**Student Generated Questions**
Key Vocabulary: matter, energy, change, heating, cooling, materials, affect, particles, move, object, force, closed system, transfer, scientists, observations, collect evidence, understand, theory, models, explain, science, solve problems, products, conversations, questions, positive, negative, gather, share, information, heat energy			

Learning Goals	**Possible Access Points** (accessible version of grade level)	**Curricular Language**	**Student Friendly Language**
Knowledge	• Solid, liquid, gas • Fall, push, pull	• P1: All matter in the Universe is made of very small particles • P2: Objects can affect other objects at a distance. • P3: Changing the movement of an object requires a net force to be acting on it. • P4: The total amount of energy in a closed system is always the same but can be transferred from one energy store to another during an event.	• I know that matter is made up of very tiny particles that are too small to see • I know that objects affect each other, even if they are far away from each other • I know that force changes how an object moves • I know that the amount of energy in a closed system is always the same; I know that energy can be transferred
Understandings	• Using senses, experiencing, drawing what you see	• U1: Scientists explain phenomena using evidence obtained from observations and or scientific investigations. Evidence may lead to developing models and or theories to make sense of phenomena. As new evidence is discovered, models and theories can be revised. • U2: The knowledge produced by science is used in engineering and technologies to solve problems and/or create products. • U3: Applications of science often have both positive and negative ethical, social, economic, and/or political implications.	• I understand that scientists make observations in the world and collect evidence to help them understand what is happening • I understand that evidence helps develop theories and models to explain what is happening • I understand that science is used to solve problems and create new products for the world • I understand that science can lead to many conversations and questions about how it is used in both good (positive) and bad (negative)ways
Skills	• Observe, participate, show	• 2.P1U1.1 Plan and carry out an investigation to determine that matter has mass, takes up space, and is recognized by its observable properties; use the collected evidence to develop and support an explanation. • 2.P1U1.2 Plan and carry out investigations to gather evidence to support an explanation on how heating or cooling can cause a phase change in matter. • 2.P4U1.3 Obtain, evaluate and communicate information about ways heat energy can cause change in objects or materials	• I can observe and collect evidence to learn more about matter; I can use my evidence to explain what I am learning • I can collect evidence to explain how heating and cooling matter can change it • I can gather and share information about how heat energy can change matter

Shelley MOORE PH.D.

Choose your Challenge

2024

Inclusive Lesson Task Scaffolding Strategy

Goal: Connected to a grade level learning standard

Task: What evidence of learning is being created		Time: Allotted work time
Title	**Description**	**Purpose**
I NEED to…	- Everyone starts together, describes what students need to do to get ready for the task, this is the most accessible part of the task, no/low barriers, an interesting hook or provocation, collaborative, 5-10 min	- Builds confidence and success early, the most accessible entry point to make sure everyone can participate in some way, builds/ activates prior knowledge
I MUST…	- Ensure the "must" part of the task has been modelled and taught to all during the mini lesson stage, this is the most important part of the task, all students show evidence of learning in class/school, this is not homework, the activity can end when all students get here, if not all students get here at the end of the allotted time, another lesson is needed, draw on UDL strategies to make sure students can express their learning in many ways	- Ensures students are showing evidence of learning in class at the essential level of a grade level goal, maintains high expectations for all students, reduces gaps in knowledge, positive impact on future learning opportunities
I CAN…	- A more complex step in the same task, this step does not need to be modelled to all, but can be taught to students as they get here, this step can connect to information that will be taught in the future, can be assigned as optional homework, once students get here, this step can also be used as small group/ explicit instruction/conferencing opportunities, or additional options for students to choose (WIN time, supporting others, assigned centers/stations)	- Allows students to go beyond the essential without waiting, allows explicit teaching without students missing grade level instructional opportunities, allows flexibility for students to take breaks, receive explicit instruction and skill building opportunities, gives students agency and builds self regulation of learning skills, builds ownership and increases engagement, does not punish students for not doing or not being able to do homework
I COULD…		
I can TRY to…	- Make this step challenging enough so that it cannot be completed in the time allowed, extended beyond the goal, an extension of the task that is completed over time	

Start Here

Go as far as you can in the time allotted

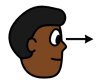
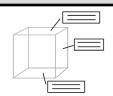
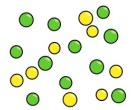
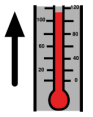
Guiding Question: How can I use a model to help me understand that some matter is made up of particles that are too small to see?

Learning Goal: I know that matter can be broken apart into tiny particles that are too small to see

Task: Observe a science demonstration

Everyone starts together

Go as far as you can!

I **NEED** to:	• Watch the science demonstration • Create a diagram that shows the science demonstration that you watched	 watch
I **MUST**:	• Label your diagram with vocabulary words	 label
I **CAN**:	• For each state of matter, draw the tiny particles that are too small to see	 draw
I **COULD**:	• Show on your drawing, how the tiny particles move	
I can **TRY** to:	• Using words and drawings, show what made the break down the tiny particles	

Evidence of Learning: Choose your Challenge

Start Here

Go as far as you can in the time allotted

Series Guiding Question: How can we inclusively plan for, teach and assess students in a diverse classroom?

- **I understand** that students are diverse and that planning for them requires anticipating variability rather than homogeneity
- **I know** that Backwards Design is an inclusive planning framework, connected to UDL that identifies learning standards and sub standards that allows for task differentiation which will increase opportunities for students to engage, understand, and show evidence of their learning
- **I can** identify the grade level learning standards and sub standards in a curricular unit
- **I am** inclusive and believe that ALL students, regardless of their ability, can access grade level curriculum

Task: Backwards Design Unit Planning		**Time: Before the next session (Nov. 6, 2024)**	**Supports & Strategies**
I NEED to…	• Find one person to collaborate with and choose a curricular unit that you will be teaching/supporting this fall		• Choice of collaborative partner/group • Choice of curricular area to use • Choice of task challenge On Series Dashboard • Access to session handouts • Access to examples • Access to planning template
I MUST…	• Identify the learning standards/ sub standard in the unit you have chosen by looking at the curricular documents • Highlight the important words that students will need to know and use in this unit • Underline the words that could be substituted for a more student friendly option		
I CAN…	• Practice translating the learning standards/ sub standards into student friendly learning statements using the stems (I know…, I can…, I understand…, or I am…)		
I COULD…	• Develop some student friendly and provoking guiding questions that can organize the learning standard/sub standards into an inquiry		
I can TRY to…	• Identify corresponding literacy and/or numeracy standards that could be drawn into this unit		

Series Guiding Question:

How can we inclusively plan for, teach, and assess all students in a diverse classroom?

Session 1 goals:

- **I understand** that students are diverse and that planning for them requires anticipating variability rather than homogeneity
- **I know** that Backwards Design is an inclusive planning framework, connected to UDL that identifies learning standards and sub standards that allows for task differentiation which will increase opportunities for students to engage, understand, and show evidence of their learning
- **I can** identify the grade level learning standards and sub standards in a curricular unit
- **I am** inclusive and believe that ALL students, regardless of their ability, can access grade level curriculum

How can we inclusively plan for, teach, and assess all students in a diverse classroom?

Nov. 6: Developing asset based learning continuums

Bring your homework to the next session

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