ADST Lesson Template

ADDING LITERACY AND NUMERACY SUPPLEMENTS TO TINKERS LESSONS
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"Education is all a matter of building bridges." ~ Ralph Ellison

This unit is designed to supplement the String & Nail Art section of the 9 Applied Design, Skills and Technology (ADST) Lessons found at https://digmore.prn.bc.ca/helpful-resources/adst/. *ADST support exists for SD60 teachers, including materials, tools and training. Please contact your administrator if you'd like to access this support.*

LESSON TITLE

LEARNING INTENTIONS:

LESSON TITLE	LITERACY/ NUMERACY TASKS	BRIEF OVERVIEW OF LESSON
COMPLEMENTS THE "STRING & NAIL ART" ADST LESSON	**Numeracy Task: Play Base 10 game** decimals to thousandths Play Race to one or one-tenth game to reinforce the idea that Curricular Competency (Grade 6): Use logic and patterns to solve puzzles and play games	After creating string and nail art, students will play games that help them better decimals to thousandths

TARGET AUDIENCE: Grade 5 students (decimals to thousandths).
This lesson is adapted from "Well Played: Building Mathematical Thinking Through Games and Puzzles" (Dacey, Gartland & Lynch, 2015

PREP WORK:
- **Photocopy** the gameboards below on cardstock and laminate. Originals of the hundredths and thousandths game boards can be found in "*Well Played: Building Mathematical Thinking Through Games and Puzzles" (Dacey, Gartland & Lynch, 2015*). See pp. 37-41.
    - Adaptations for students who are not working at grade level in math – race to 100 and race to 10 000 – are also included below.
- **Photocopy** Recording Sheet @ one per person. Double side it so they can play more than one game.
- **Arrange** students into teams of 2. Students should be working at similar levels in math.

MATERIALS LIST:
- Race to 0.100 Gameboard
- Race to 1.0 Gameboard

- Race to 100 Gameboard
- Race to 10 000 Gameboard
- Dice (one die per team)
- Plastic chips or game tokens (one per team)
- Base 10 blocks (for kids who prefer a tactile experience)
- 1 Recording Sheet per person
- Optional: 1 Direction sheet per group

QUESTION:
How can counting to 100 using a one-hundred chart help us learn how to count by hundredths, tenths and thousandths?

GRADE 5 CURRICULUM:
- **Big Idea:** Identified regularities in number patterns can be expressed in tables.
- **Curricular Competency:**
  - Use reasoning to explore and make connections
  - Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- **Content:** decimals to thousandths

VOCABULARY: *(DON'T LET STUDENTS SAY "POINT ONE" WHEN THEY ARE READING 0.1 AND SO ON. INSIST THAT IT IS READ CORRECTLY; ONE-TENTH, TWO-TENTHS AND SO ON. YOU READ A DECIMAL THE SAME WAY YOU READ A FRACTION.)*

1 Whole
*1 whole = 10 **tenths** (10/10)*
*1 whole = 100 **hundredths** (100/100)*
*1 whole = 1000 **thousandths** (1000/1000)*

1 tenth = 0.1 = 1/10
1 hundredth = 0.01 = 1/100
1 thousandth = 0.001 = 1/1000

INTRODUCE THE LESSON:
We've been measuring the meters of string we need to do our nail & string art. We used hundreds of meters of string! We're pretty good at adding numbers. If I gave you all a one hundred chart right now, you wouldn't need it to help you count to 100, would you? But did you know we can also add up fractions and decimals? We're going to play a game that helps you practice correctly read, write and compare decimals.

TEACH THE LESSON:
1. Prompt: "Fractions and decimals are kind of like identical twins. They sound the same, they name the same amount, but they look slightly different. Let's look at 1/10 and 0.1

(say "Let's look at one-tenth and one-tenth") for example, [in this YouTube from Kahn Academy]."

2. Prompt: "It's really important when we read our decimals that we speak their names correctly. Let's practice. (Write 1/10 and 0.1 on the board) "We say one-tenth (point to 1/10) and one-tenth (point to 0.1). We DO NOT SAY zero point one. No one knows what zero point one is! No one can imagine what that looks like. Math needs to put a picture in your head. When you read 1/10, you can imagine one-tenth of a chocolate bar. When you read 0.1 (say "one-tenth") I also need you to imagine one-tenth of a chocolate bar or one slice of a pizza that has 10 pieces! How would you read 3/10 or 0.3? (answer = three tenths & three tenths)."

3. Pass out a laminated **hundredths** board and a chip to each team. What do you notice about this hundredths board? (Students should note that it's like a 100 board but with decimals; that instead of finishing at 100, they finish at 1, that instead of landing on a number like 0.34, they would say 34 hundredths, for example.

4. Review renaming between hundredths and tenths by asking questions like *Where would you be on the board if you started at zero and counted forward until you landed on a number equal to one-tenth?* And *What is another number name for forty-hundredths? (answer = four-tenths)*

5. Divide the team into two teams, based on where they are sitting. Designate a leader for each team, choosing students who have good collaboration skills and inclusive, empathetic mindsets. The oldest leader plays first.

6. Under the document camera, have the two leaders play the game.
    a. The goal is to move forward on the game board by tenths or hundredths to reach 1.00
    b. On each turn, the team's representative rolls the die and talks with the team about whether to have the number represent tenths or hundredths. That number is then counted on the hundredths board, starting at 0. Players can indicate their position by counting and placing a chip on the final number.
    c. Alternate turns, with each team counting on from its last number.
    d. If a team cannot fully complete a count, (For example, a team is on 0.97 and rolls a 4) the turn is lost.

e. The first team to reach 1.00 wins the game.

EXAMPLE:

Anshi rolls and the die shows 6 dots. She confers with her team.

Brody says, "I think we should move 6 tenths because we will move more than half way to the finish.

Lucy says, "But maybe we should do hundredths so we don't get stuck."

Anshi says, "Let's do a quick vote."

The team votes for tenths and Anshi asks a teammate to go to the document camera. Lee moves to 0.60, saying – "six tenths or 60 hundredths."

The teams alternate turns and excitement mounts as they near 1.00. Anshi's team is at 0.96 and Roland's Team is at 0.97. Anshi rolls 4, the team declares it should be 4 hundredths and Anshi's team wins. The other team takes their last turn and rolled a 2, almost tying the game but fulling short 1/100.

The teacher then gives pairs of students their own game boards and recording sheets so he can learn more about their thinking.

PRO TIPS:
- Have **base 10 blocks** for kids that need a more tactile experience
- **Students who aren't working at grade level can work on the 100s or 10 000s charts as a subtraction or addition game.** Have them play at your rainbow table and draw parallels between the 100s chart and the hundredths if/when possible.
- Students could decide to count forwards or backwards as they get more skillful with the game.
- Students could **start at 1.00 and count back to zero**, demonstrating skill with decimal subtraction!
- Students can **extend their thinking** by playing Race to One-Tenth, using the game board below. This time, they would have to decide if they want to move by thousandths or hundredths.

WHAT TO LOOK FOR:
- When students move forward by tenths do they count forward ten one-hundredths for each tenth or move down one row vertically for each tenth?
- What mathematical understandings do students demonstrate as they decide whether to choose hundredths or tenths?
- What level of confidence do students exhibit when choosing the value of the number? Do they make reasonable choices? Can they explain their choices?

END THE LESSON:

EXIT CARD CHOICES
1. List all the ways you could win the game in two turns.
2. What could you roll to get 1.00 (or 0.1 if you're playing Race to One-Tenth) in four turns? Write an equation to represent these moves.

EXTENSION

As a follow-up, students could investigate the following activity at a learning station, through an independent activity or on an interactive bulletin board.

Number of Rolls to Win	Is it Possible? Yes or No?	Write a Winning Equation
1		
2		
3		
4		
5		
6		
7		

Chart adapted from: *"Well Played: Building Mathematical Thinking Through Games and Puzzles" (Dacey, Gartland & Lynch, 2015).*

ASSESSMENT

INSTRUCTIONS: ANSWER "YES" OR "NO" TO THE BOXES THAT APPLY TO YOU.

	GAMEBOARD 100	GAMEBOARD 10000	GAMEBOARD 1	GAMEBOARD 0.10
Can play the game using addition and subtraction.				
Evidence that student counts by appropriate unit for the game (i.e. tenths and hundredths for Race to 1)				
Shows thinking on the recording sheet. The recording sheet is completed.				
Completed Exit Slip and showed work.				

TEACHER COMMENTS:

_____

_____

RACE TO One Hundred (100) Game Board

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

RACE TO 10 000 (TEN THOUSAND) GAME BOARD

100	200	300	400	500	600	700	800	900	1000
1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
3100	3200	3300	3400	3500	3600	3700	3800	3900	4000
4100	4200	4300	4400	4500	4600	4700	4800	4900	5000
5100	5200	5300	5400	5500	5600	5700	5800	5900	6000
6100	6200	6300	6400	6500	6600	6700	6800	6900	7000
7100	7200	7300	7400	7500	7600	7700	7800	7900	8000
8100	8200	8300	8400	8500	8600	8700	8800	8900	9000
9100	9200	9300	9400	9500	9600	9700	9800	9900	10000

RACE TO <u>ONE</u> (1) HUNDREDTHS GAME BOARD

0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
0.11	0.12	0.13	0.14	0.15	0.16	0.17	0.18	0.19	0.20
0.21	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
0.31	0.32	0.33	0.34	0.35	0.36	0.37	0.38	0.39	0.40
0.41	0.42	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50
0.51	0.52	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.60
0.61	0.62	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70
0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00

Chart adapted from: *"Well Played: Building Mathematical Thinking Through Games and Puzzles" (Dacey, Gartland & Lynch, 2015).*

RACE TO *ONE-TENTH* (0.10) THOUSANDTHS GAMEBOARD

0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009	0.010
0.011	0.012	0.013	0.014	0.015	0.016	0.017	0.018	0.019	0.020
0.021	0.022	0.023	0.024	0.025	0.026	0.027	0.028	0.029	0.030
0.031	0.032	0.033	0.034	0.035	0.036	0.037	0.038	0.039	0.040
0.041	0.042	0.043	0.044	0.045	0.046	0.047	0.048	0.049	0.050
0.051	0.052	0.053	0.054	0.055	0.056	0.057	0.058	0.059	0.060
0.061	0.062	0.063	0.064	0.065	0.066	0.067	0.068	0.069	0.070
0.071	0.072	0.073	0.074	0.075	0.076	0.077	0.078	0.079	0.080
0.081	0.082	0.083	0.084	0.085	0.086	0.087	0.088	0.089	0.090
0.091	0.092	0.093	0.094	0.095	0.096	0.097	0.098	0.099	0.100

RACE TO _____ RECORDING SHEET

NAME(S) _____

DATE: _____

We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at
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We rolled	We give it the value of	Now we are at
We rolled	We give it the value of	Now we are at

RACE TO ONE OR ONE-TENTH DIRECTIONS