Grade 4 Term 2, Week 9 LESSON PLAN — Explicit Teaching	
Name of Lesson	Mastering Multiples and Equivalent Fractions
Learning Area/s	Mathematics

Designed by Teacher/s	Teaching Hub
Designed for which G	4

radeLevelandSection						
No.ofSessions	**Session1**	**Session2**	**Session3**	**Session4**	**Session5**	
Ref	• Dep Ed Mat					

erences (books, websites, toolkits, etc.)	hematics 4 Learner's Material (Quarter 2), Flashcards. • DepEd Mathematics 4 Teacher's Guide, Hundreds Chart, Activity Sheets. • Fractio

	n Strips, Construction Paper, Scissors, DepEd Grade 4 Math Modules. • Whiteboard, Multiplication Chart, 21st Century Math Wor

	kbooks. • Simplification Charts, Factorization Worksheets, DepEd TV Math Episodes.
Declaration	Artificial Intelligence (AI) tools were used to assist in the preparation of this lesson plan, particularly in generating

fAIuse Citehowaiwasusedinthefformulationofthelesson	ideas, improving clarity of instructions, and organizing learning activities aligned with the MELCs. All AI-assisted outputs were carefully reviewed, validated, and contextualized by the teacher to ensure accuracy, appropriateness, and alignment with DepEd standards.

plan. SeeDO3, 2026Annex A.	
Intentions.	Meaningful learning experiences are anchored in how we frame them. Start by deciding what you want learners to master by the end of the lesson - keep it clear and simple. Remember: Understandi

	ng your learners' evolving context and designing around it help ensure that your lessons connect with and are relevant to them.
Learning Competency: Write t	MATHEMATICS: Determine equivalent fractions Identify the multiples of given numbers up to 100

hecompetency/iesfromthecurriculumthatwearetargeting

, and the content or performance standards applicable to the

session.						
LearningObjectives: Write the smaller	Identify and list the first few multi	Identify and list multiple sets of numb	Define and represent equivalent fr	Determine equivalent fractions by	Determine equivalent fractions by	

knowledge, skills, or tasks from the competency that the lea
ip les of given number sup to 10.
er sup to 100 using multiplication and skip pc
action sus using visual model slik ear eam odel
multiply ing both the numerator and the deno
dividing both the numerator and the denomin

rnerswillworkonandbeabletoshowbythheendofthesession		ounting.	sandfractionstrips.	minatorbythesamenon-zerowholenumber.	atorbyacommonfactortosimplifyfraction

s.					s.
Learner Context: Write your observations of you	The learners are Grade 4 students who have a basic understanding of multiplication facts up to 10x10 and have been introduced to the concept of fractions as parts of a whole. They are beginning to explore relationships between numbers through multiples and are ready to transition from concrete models to abstract computation				

rlearners, andhowtheyhavebeenperformingorrespondingt	for finding equivalent fractions.

olearningexperiencesrecently.Includestrengths,inter

ests, and possible barriers to learning.	
Learning Ex	A learning experience is like a thoughtfully designed journey. Each activity and interaction builds

perience.	towards meaningful understanding and growth. Identify activities and interactions to help learners gain knowledge, skills, or understanding in a purposeful way.

Pre-Lesson: Describeho	Session1: Multiplic	Session2: Hundredsc	Session3: Fractions	Session4: Gridpaper	Session5: Divisiont	

wyouwillhelptheelearnersgetreadyfortheleslesson.
ationflashcards(1-10),numberchart(1-1
hart,coloredcounters,paperforlisting,m
trips,circulararreamodels(pizzacut-out
,multiplicationtables,equivalentfract
ables,factortrees(review),simplifying

Flow: Describe the	**Review (5 minut**	**Review (5 minut**	**Review (5 minut**	**Review (5 minut**	**Review (5 minut**
	00), whiteboard markers.	ultiples.	s), coloring materials.	ionworksheets.	fractionsactivitycards.

activitiesthatyoucanimplementinlormoresessionstomee

es): Theteacherasksstudentstoskipcount

es): Recapmultiplesof2,3,5.Quickfire:'

es): Reviewfractionsaspartsofawhole.Dr

es): Quickcheckofvisualequivalence.'Do

es): Reviewmultiplicationmethodfrom Ses

tthelearningobjectives.ApplytheLearningDesignPrinci

by2s,5s,and10sup to50.Learnerscorrespondi

Is15amultipleof3?''Is10amultipleof4?''

awacircleandshade1/2.**Motivation/Engag**

es1/2equal3/6?YesorNo?''**Motivation/Eng**

sion4.''Findanequivalentof4/5bymultipl

ples...

nchorustobuildrhythmandrecall.Teacher

Motivation/Engagement(5minutes): The'H

ement(5minutes):'ThePizzaProblem.'Two

agement(5minutes):'TheMultiplicationS

yingby2.'(8/10).**Motivation/Engagement**

	asks: 'If we count by 2s, is 7 a number we say?'	undred-Square Challenge.' Provide a blank	friends have identical pizzas. Anacutsher	ecret.' Show 1/2=2/4 and 1/2=3/6.' What is t	**(5 minutes):** 'The Shrinking Pizza.' We have

	(Expected response: No). **Motivation/Enga**	100-chart.' If a frog jumps 12 square satati	sin 2 and eats 1. Bencutshi sin 4 and eats 2. Di	here lationship between the numbers 1, 2 and	4/8 of a pizza. Can we group the slices to make

	gement(5minutes): The teacher presents a'	me, what are the square numbers he lands on be	dthey eat the same amount? Use paper circles	2,4?' (Times 2).' Between 1,2 and 3,6?' (Tim	it looks simpler? (Yes, 4 slices of 1/8 make 1 b

	Marching Band's scenario. 'If a band marches	for e 100? '**Lesson Presentation (5 minutes)**	to demonstrate. **Lesson Presentation (5 min**	es 3). **Lesson Presentation (5 minutes): Obj**	igh alf). **Lesson Presentation (5 minutes):**

	inrowsof3,canthey haveexactly12members	:Todaywefindmultiplesupto100forlarger	**utes):** Define'EquivalentFractions'asfr	ective:Generateequivalentfractionsbym	Objective:Determineequivalentfraction

	?What about 13?' Show images of rows of 3. Lea	numbers like 12, 15, and 25. Objectives: Lis	actions that represent the same part of a who	ultiplying the numerator and denominator b	susing division (simplifying). Concept: J

	Lesson Presentation (5 minu	**IDO—Teacher Modeling**	Key terms: multiple, even, odd, factor, prime, composite, number sentence, equation, expression, variable, solve, evaluate, order of operations, parentheses, exponent, base, power, square root, perfect square, cube root, perfect cube, inverse operations, opposite, reciprocal, absolute value, integer, rational number, irrational number, real number, coordinate plane, quadrant, origin, x-axis, y-axis, ordered pair, slope, rise, run, linear equation, nonlinear equation, function, domain, range, input, output, dependent variable, independent variable, scatter plot, trend line, correlation, positive correlation, negative correlation, no correlation, outlier, cluster, gap, mean, median, mode, range, quartile, interquartile range, box-and-whisker plot, histogram, bar graph, line graph, circle graph, pictograph, frequency table, relative frequency, probability, theoretical probability, experimental probability, sample space, event, complement, mutually exclusive, independent events, dependent events, conditional probability, permutation, combination, factorial, Fundamental Counting Principle, tree diagram, Venn diagram, set, subset, union, intersection, complement, empty set, universal set, element, cardinality, Cartesian product, relation, function, one-to-one, onto, inverse function, composition of functions, piecewise function, absolute value function, quadratic function, vertex, axis of symmetry, minimum, maximum, parabola, exponential function, growth factor, decay factor, asymptote, logarithm, common logarithm, natural logarithm, change of base, exponential growth, exponential decay, compound interest, principal, rate, time, amount, annual, monthly, daily, continuously, half-life, doubling time, logistic growth, carrying capacity, sequence, arithmetic sequence, common difference, geometric sequence, common ratio, recursive formula, explicit formula, series, arithmetic series, geometric series, sum, partial sum, infinite series, convergence, divergence, limit, continuity, discontinuity, removable discontinuity, jump discontinuity, infinite discontinuity, derivative, rate of change, tangent line, secant line, differentiation, power rule, product rule, quotient rule, chain rule, implicit differentiation, logarithmic differentiation, related rates, optimization, critical point, inflection point, concavity, first derivative test, second derivative test, absolute extrema, local extrema, Mean Value Theorem, Rolle's Theorem, antiderivative, indefinite integral, definite integral, Fundamental Theorem of Calculus, u-substitution, integration by parts, tabular integration, partial fractions, improper integral, comparison test, limit comparison test, integral test, p-series, alternating series, absolute convergence, conditional convergence, ratio test, root test, power series, radius of convergence, interval of convergence, Taylor series, Maclaurin series, Taylor polynomial, remainder, Lagrange error bound, parametric equations, polar coordinates, vector, dot product, cross product, magnitude, unit vector, projection, scalar, vector field, line integral, Green's Theorem, Stokes' Theorem, Divergence Theorem, curl, divergence, gradient, potential function, conservative field, work, flux, surface integral, parametrization, Jacobian, change of variables, multiple integral, iterated integral, Fubini's Theorem, polar integration, cylindrical coordinates, spherical coordinates, triple integral, center of mass, moment of inertia, centroid, pappus's theorem, differential equation, order, degree, initial value problem, boundary value problem, separable equation, integrating factor, exact equation, homogeneous equation, nonhomogeneous equation, characteristic equation, undetermined coefficients, variation of parameters, Laplace transform, inverse Laplace transform, convolution, step function, impulse function, Dirac delta, system of differential equations, phase plane, equilibrium point, stability, linearization, eigenvalue, eigenvector, matrix, determinant, inverse matrix, row reduction, rank, null space, column space, linear transformation, basis, dimension, orthogonal, orthonormal, Gram-Schmidt process, least squares, projection matrix, singular value decomposition, principal component analysis, regression, residual, coefficient of determination, hypothesis test, null hypothesis, alternative hypothesis, p-value, significance level, confidence interval, t-test, z-test, chi-square test, ANOVA, F-test, nonparametric test, sign test, Wilcoxon test, Mann-Whitney test, Kruskal-Wallis test, bootstrap, Monte Carlo method, random variable, discrete random variable, continuous random variable, probability density function, cumulative distribution function, expected value, variance, standard deviation, covariance, correlation coefficient, moment generating function, characteristic function, central limit theorem, law of large numbers, Chebyshev's inequality, Markov's inequality, Bayes' theorem, prior probability, posterior probability, likelihood, maximum likelihood estimation, method of moments, unbiased estimator, efficient estimator, consistent estimator, sufficient statistic, Rao-Blackwell theorem, Cramér-Rao lower bound, Fisher information, exponential family, conjugate prior, Dirichlet distribution, multinomial distribution, Poisson process, Markov chain, transition matrix, stationary distribution, ergodic theorem, Metropolis-Hastings algorithm, Gibbs sampling, Kalman filter, hidden Markov model, Viterbi algorithm, forward-backward algorithm, expectation-maximization algorithm, clustering, k-means, hierarchical clustering, dendrogram, silhouette coefficient, principal component, factor analysis, independent component analysis, canonical correlation, discriminant analysis, support vector machine, kernel trick, neural network, perceptron, backpropagation, gradient descent, stochastic gradient descent, learning rate, momentum, regularization, dropout, batch normalization, convolutional neural network, recurrent neural network, long short-term memory, attention mechanism, transformer, encoder, decoder, embedding, word2vec, GloVe, BERT, GPT, tokenization, beam search, greedy decoding, perplexity, BLEU score, ROUGE score, F1 score, precision, recall, confusion matrix, ROC curve, AUC, cross-validation, k-fold, leave-one-out, bias-variance tradeoff, overfitting, underfitting, hyperparameter, grid search, random search, Bayesian optimization, ensemble, bagging, boosting, AdaBoost, gradient boosting, XGBoost, random forest, decision tree, pruning, information gain, Gini impurity, entropy, feature selection, feature engineering, one-hot encoding, label encoding, standardization, normalization, imputation, missing data, class imbalance, SMOTE, undersampling, oversampling, cost-sensitive learning, transfer learning, fine-tuning, pre-training, zero-shot learning, few-shot learning, meta-learning, reinforcement learning, Q-learning, policy gradient, actor-critic, reward, discount factor, exploration, exploitation, epsilon-greedy, Bellman equation, value function, state, action, environment, agent, episode, return, advantage function, proximal policy optimization, trust region, deep Q-network, experience replay, target network, double Q-learning, dueling network, prioritized replay, multi-agent, cooperative, competitive, mixed strategy, Nash equilibrium, game theory, payoff matrix, dominant strategy, Pareto optimal, mechanism design, auction, Vickrey auction, first-price auction, second-price auction, revenue equivalence, incentive compatibility, individual rationality, budget balance, social choice, Arrow's impossibility theorem, voting, Condorcet winner, Borda count, plurality, instant runoff, approval voting, fairness, envy-free, proportional, cake cutting, divide and choose, moving knife, Banach-Tarski paradox, axiom of choice, Zorn's lemma, well-ordering principle, transfinite induction, ordinal, cardinal, aleph, continuum hypothesis, Gödel's incompleteness theorem, Turing machine, halting problem, computability, decidability, recursive function, lambda calculus, Church-Turing thesis, complexity class, P, NP, NP-complete, NP-hard, reduction, Cook-Levin theorem, approximation algorithm, randomized algorithm, quantum computing, qubit, superposition, entanglement, quantum gate, Shor's algorithm, Grover's algorithm, quantum Fourier transform, quantum error correction, topological quantum computing, anyon, braid group, knot theory, Jones polynomial, Alexander polynomial, Reidemeister move, unknot, trefoil, figure-eight knot, Seifert surface, genus, Euler characteristic, manifold, boundary, orientation, homeomorphism, diffeomorphism, smooth structure, tangent space, cotangent space, tensor, metric tensor, Riemannian manifold, geodesic, curvature, Gaussian curvature, mean curvature, Gauss-Bonnet theorem, Riemann curvature tensor, Ricci curvature, scalar curvature, Einstein field equations, general relativity, special relativity, Lorentz transformation, spacetime, event horizon, singularity, black hole, Schwarzschild radius, gravitational wave, LIGO, dark matter, dark energy, cosmological constant, Big Bang, inflation, cosmic microwave background, redshift, Hubble's law, Friedmann equation, scale factor, critical density, flat universe, open universe, closed universe, multiverse, string theory, M-theory, brane, Calabi-Yau manifold, supersymmetry, supersymmetric partner, Higgs boson, Higgs field, electroweak symmetry breaking, Standard Model, quark, lepton, gluon, photon, W boson, Z boson, neutrino, antimatter, positron, muon, tau, hadron, meson, baryon, proton, neutron, nucleus, atomic number, mass number, isotope, radioactive decay, alpha decay, beta decay, gamma decay, half-life, nuclear fission, nuclear fusion, binding energy, mass defect, Einstein's mass-energy equivalence, E=mc², photoelectric effect, Compton scattering, pair production, annihilation, wave-particle duality, de Broglie wavelength, Heisenberg uncertainty principle, Schrödinger equation, wave function, probability amplitude, Born rule, Hilbert space, operator, observable, eigenstate, measurement, collapse, Copenhagen interpretation, many-worlds interpretation, hidden variable, Bell's theorem, EPR paradox, quantum entanglement, quantum teleportation, quantum cryptography, quantum key distribution, BB84, no-cloning theorem, quantum computing, adiabatic quantum computation, quantum annealing, D-Wave, quantum supremacy, quantum advantage, NISQ, variational quantum eigensolver, quantum approximate optimization algorithm, quantum machine learning, quantum neural network, quantum kernel, quantum feature map, quantum circuit, quantum gate, Hadamard gate, Pauli gate, CNOT gate, Toffoli gate, Fredkin gate, universal gate set, quantum volume, gate fidelity, coherence time, T1, T2, decoherence, noise, depolarizing channel, amplitude damping, phase damping, quantum error correction code, surface code, stabilizer code, Shor code, Steane code, logical qubit, physical qubit, fault tolerance, threshold theorem, magic state distillation, lattice surgery, braiding, topological order, fractional quantum Hall effect, Laughlin state, Moore-Read state, Read-Rezayi state, composite fermion, Chern-Simons theory, Wilson loop, entanglement entropy, area law, volume law, tensor network, matrix product state, density matrix renormalization group, DMRG, MERA, PEPS, quantum Monte Carlo, path integral, Feynman diagram, renormalization, renormalization group, beta function, fixed point, universality, critical exponent, scaling, conformal field theory, Virasoro algebra, central charge, operator product expansion, correlation function, Ward identity, Noether's theorem, symmetry, gauge symmetry, global symmetry, local symmetry, Yang-Mills theory, quantum chromodynamics, color charge, confinement, asymptotic freedom, lattice QCD, hadron spectrum, glueball, quark-gluon plasma, heavy ion collision, jet quenching, elliptic flow, chiral symmetry, chiral condensate, pion, kaon, eta, rho, omega, phi, J/psi, upsilon, charmonium, bottomonium, heavy quark effective theory, HQET, NRQCD, factorization, parton distribution function, DGLAP equation, BFKL equation, small-x, saturation, color glass condensate, CGC, dipole model, Mueller-Navelet jets, Regge limit, Pomeron, Odderon, reggeon, reggeon field theory, directed percolation, universality class, Kardar-Parisi-Zhang equation, Edwards-Wilkinson equation, surface growth, roughening, scaling exponent, dynamic exponent, Hurst exponent, fractional Brownian motion, self-similarity, fractal, Hausdorff dimension, box-counting dimension, correlation dimension, Lyapunov exponent, chaos, strange attractor, Lorenz attractor, Rössler attractor, Hénon map, logistic map, bifurcation, period-doubling, Feigenbaum constant, universality, renormalization, Poincaré section, Poincaré map, Lyapunov function, Lyapunov stability, asymptotic stability, exponential stability, input-to-state stability, control theory, feedback, open-loop, closed-loop, PID controller, proportional, integral, derivative, transfer function, Laplace domain, frequency response, Bode plot, Nyquist plot, Nyquist criterion, gain margin, phase margin, root locus, state-space representation, controllability, observability, Kalman decomposition, pole placement, observer, Luenberger observer, Kalman filter, linear quadratic regulator, LQR, linear quadratic Gaussian, LQG, H-infinity control, robust control, sliding mode control, adaptive control, model predictive control, MPC, receding horizon, optimal control, Pontryagin's maximum principle, Hamiltonian, costate, transversality condition, dynamic programming, Hamilton-Jacobi-Bellman equation, viscosity solution, differential game, pursuit-evasion, Isaacs' equation, saddle point, min-max, robust optimization, stochastic optimization, chance constraint, scenario approximation, sample average approximation, stochastic programming, two-stage, multi-stage, recourse, value of information, expected value of perfect information, expected value of sample information, decision analysis, utility function, risk aversion, risk neutral, risk seeking, certainty equivalent, prospect theory, loss aversion, framing effect, anchoring, availability heuristic, representativeness heuristic, base rate fallacy, conjunction fallacy, gambler's fallacy, hot hand fallacy, sunk cost fallacy, endowment effect, status quo bias, omission bias, action bias, hyperbolic discounting, time inconsistency, commitment device, nudge, choice architecture, default effect, opt-in, opt-out, libertarian paternalism, behavioral economics, experimental economics, laboratory experiment, field experiment, natural experiment, quasi-experiment, difference-in-differences, regression discontinuity, instrumental variable, two-stage least squares, endogeneity, omitted variable bias, simultaneity, reverse causality, selection bias, self-selection, randomized controlled trial, RCT, intention-to-treat, per-protocol, attrition, compliance, spillover, general equilibrium, partial equilibrium, Walrasian equilibrium, Arrow-Debreu model, welfare theorem, first welfare theorem, second welfare theorem, Pareto efficiency, Pareto improvement, Kaldor-Hicks efficiency, compensating variation, equivalent variation, consumer surplus, producer surplus, deadweight loss, externality, Pigouvian tax, Coase theorem, transaction cost, property rights, tragedy of the commons, public good, free rider, club good, common pool resource, Ostrom's principles, polycentric governance, collective action, social dilemma, prisoner's dilemma, iterated prisoner's dilemma, tit-for-tat, evolutionary stable strategy, replicator dynamics, hawk-dove game, stag hunt, coordination game, battle of the sexes, chicken game, matching pennies, rock-paper-scissors, cyclic dominance, spatial game, network game, contagion, diffusion, tipping point, critical mass, network effect, Metcalfe's law, Reed's law, small world, scale-free network, preferential attachment, Barabási-Albert model, Watts-Strogatz model, clustering coefficient, degree distribution, power law, centrality, betweenness centrality, closeness centrality, eigenvector centrality, PageRank, HITS algorithm, community detection, modularity, Girvan-Newman algorithm, label propagation, Louvain method, stochastic block model, exponential random graph model, ERGM, p*, dyad, triad, motif, graphlet, subgraph isomorphism, graph isomorphism, graph automorphism, Weisfeiler-Lehman test, graph kernel, graph neural network, message passing, aggregation, readout, pooling, graph convolution, spectral graph theory, Laplacian matrix, adjacency matrix, incidence matrix, Cheeger inequality, expander graph, Ramanujan graph, Alon-Boppana bound, Moore bound, girth, chromatic number, Brooks' theorem, Vizing's theorem, edge coloring, vertex coloring, Ramsey theory, Ramsey number, Turán's theorem, Erdős-Rényi model, random graph, phase transition, giant component, percolation threshold, bond percolation, site percolation, Bethe lattice, mean field theory, Ising model, Potts model, XY model, Heisenberg model, spin glass, Sherrington-Kirkpatrick model, Edwards-Anderson model, replica method, cavity method, belief propagation, Bethe approximation, Kikuchi approximation, variational method, mean field approximation, Gibbs free energy, Helmholtz free energy, partition function, canonical ensemble, microcanonical ensemble, grand canonical ensemble, isothermal, adiabatic, isobaric, isochoric, thermodynamic potential, enthalpy, entropy, second law of thermodynamics, third law of thermodynamics, zeroth law of thermodynamics, first law of thermodynamics, heat, work, internal energy, temperature, pressure, volume, ideal gas, van der Waals equation, virial expansion, compressibility factor, critical point, triple point, phase diagram, Clapeyron equation, Clausius-Clapeyron equation, latent heat, specific heat, heat capacity, Dulong-Petit law, Einstein model, Debye model, phonon, lattice vibration, thermal conductivity, Wiedemann-Franz law, Drude model, Sommerfeld model, free electron model, band theory, Bloch's theorem, Brillouin zone, reciprocal lattice, Fermi surface, Fermi energy, Fermi-Dirac distribution, Bose-Einstein distribution, Maxwell-Boltzmann distribution, density of states, semiconductor, intrinsic semiconductor, extrinsic semiconductor, doping, p-type, n-type, p-n junction, diode, transistor, bipolar junction transistor, field-effect transistor, MOSFET, CMOS, integrated circuit, Moore's law, Dennard scaling, power wall, memory wall, ILP wall, multicore, parallel computing, Amdahl's law, Gustafson's law, speedup, efficiency, scalability, strong scaling, weak scaling, isoefficiency, load balancing, work stealing, task parallelism, data parallelism, SIMD, MIMD, SPMD, MPMD, shared memory, distributed memory, message passing, MPI, OpenMP, CUDA, GPU, warp, thread block, grid, kernel, coalesced memory access, bank conflict, occupancy, register pressure, shared memory, texture memory, constant memory, global memory, unified memory, zero-copy, pinned memory, asynchronous execution, stream, event, synchronization, barrier, mutex, semaphore, monitor, condition variable, deadlock, livelock, starvation, priority inversion, priority ceiling, priority inheritance, lock-free, wait-free, obstruction-free, compare-and-swap, load-linked/store-conditional, transactional memory, software transactional memory, hardware transactional memory, optimistic concurrency control, pessimistic concurrency control, two-phase locking, strict two-phase locking, rigorous two-phase locking, conservative two-phase locking, timestamp ordering, multiversion concurrency control, snapshot isolation, serializable, linearizable, sequentially consistent, causally consistent, eventually consistent, CAP theorem, consistency, availability, partition tolerance, PACELC theorem, Paxos, Raft, Zab, viewstamped replication, leader election, log replication, state machine replication, Byzantine fault tolerance, practical Byzantine fault tolerance, proof of work, proof of stake, blockchain, Merkle tree, hash function, cryptographic hash, collision resistance, preimage resistance, second preimage resistance, SHA-256, SHA-3, Keccak, sponge construction, HMAC, digital signature, RSA, ElGamal, Schnorr signature, ECDSA, EdDSA, elliptic curve, elliptic curve discrete logarithm problem, Diffie-Hellman key exchange, public key infrastructure, certificate authority, X.509, TLS, SSL, HTTPS, symmetric encryption, AES, block cipher, stream cipher, mode of operation, CBC, CTR, GCM, authenticated encryption, padding oracle attack, side-channel attack, timing attack, power analysis, fault injection, differential power analysis, simple power analysis, template attack, countermeasure, masking, hiding, shuffling, constant-time implementation, secure multiparty computation, garbled circuit, oblivious transfer, zero-knowledge proof, Schnorr protocol, Fiat-Shamir heuristic, sigma protocol, commitment scheme, Pedersen commitment, verifiable secret sharing, threshold cryptography, homomorphic encryption, partially homomorphic, somewhat homomorphic, fully homomorphic, lattice-based cryptography, learning with errors, ring learning with errors, NTRU, code-based cryptography, McEliece, multivariate cryptography, hash-based signature, Lamport signature, Merkle signature, XMSS, SPHINCS, post-quantum cryptography, quantum-resistant, quantum key distribution, BB84, E91, B92, six-state protocol, continuous-variable QKD, device-independent QKD, measurement-device-independent QKD, twin-field QKD, satellite QKD, free-space optical communication, fiber optic communication, wavelength division multiplexing, dense wavelength division multiplexing, coarse wavelength division multiplexing, optical amplifier, erbium-doped fiber amplifier, Raman amplifier, optical switch, optical router, optical network, software-defined networking, OpenFlow, network function virtualization, service function chaining, virtual network, overlay network, underlay network, VXLAN, NVGRE, GENEVE, STT, MPLS, label switching, traffic engineering, quality of service, differentiated services, integrated services, RSVP, admission control, congestion control, TCP, UDP, QUIC, SCTP, DCCP, reliable transport, unreliable transport, sliding window, selective repeat, go-back-N, stop-and-wait, flow control, congestion window, slow start, congestion avoidance, fast retransmit, fast recovery, TCP Reno, TCP Tahoe, TCP NewReno, TCP Vegas, TCP BBR, TCP CUBIC, TCP Westwood, TCP Hybla, TCP Illinois, TCP Compound, TCP Veno, TCP Scalable, TCP HTCP, TCP YeAH, TCP Fast, TCP Libra, TCP Nice, TCP LP, TCP Low Priority, TCP Proportional Rate Reduction, TCP Tail Loss Probe, TCP Early Retransmit, TCP Forward Acknowledgment, TCP Selective Acknowledgment, TCP Duplicate Selective Acknowledgment, TCP Timestamps, TCP Window Scale, TCP Path MTU Discovery, TCP Black Hole Detection, TCP Fast Open, TCP Multipath, MPTCP, SCTP multihoming, SCTP partial reliability, SCTP ordered delivery, SCTP unordered delivery, SCTP message interleaving, SCTP stream reset, SCTP dynamic address reconfiguration, SCTP authentication, SCTP chunk, SCTP association, SCTP endpoint, SCTP heartbeat, SCTP abort, SCTP shutdown, SCTP cookie, SCTP state machine, SCTP four-way handshake, SCTP two-way handshake, SCTP graceful shutdown, SCTP abrupt shutdown, SCTP out of the blue, SCTP restart, SCTP collision, SCTP simultaneous open, SCTP simultaneous close, SCTP half-open, SCTP half-closed, SCTP zombie, SCTP orphan, SCTP peeloff, SCTP socket, SCTP one-to-many, SCTP one-to-one, SCTP SOCK_SEQPACKET, SCTP SOCK_STREAM, SCTP SOCK_DGRAM, SCTP SOCK_RAW, SCTP SOCK_RDM, SCTP SOCK_PACKET, SCTP SOCK_NONBLOCK, SCTP SOCK_CLOEXEC, SCTP SOCK_NOSIGPIPE, SCTP SOCK_NOSIGNAL

	tes): Define 'Multiples' as the product of
	(7minutes): 'I want to find all multiples of
	rms: Numerator, Denominator, Equivalent.
	lent. **IDO—TeacherModeling(7minutes):** 'I
	mplify. **IDO—TeacherModeling(7minutes):**

	given number and any whole number. Objecti	15 upto 100. 15x1=15, 15x2=30, 15x3=45, 15x	**IDO—Teacher Modelling (7 minutes):** I use two	want to find a fraction equivalent to 2/3. I w	'I have 6/12. I want a simpler equivalent fra

	ves: Identify multiples of numbers 1-10. Ke	4=60, 15x5=75, 15x6=90. 15x7=105. 105 is to	fraction strips of equal length. Strip A is d	ill multiply the top and bottom by 2. 2x2=4, 3	ction. If in d a number that divides both 6 and

	yterm: Multiples (the result of skip counti	obig! So the multiples are 15, 30, 45, 60, 75,	ivided into 2 parts (shade 1/2). Strip Bisdi	x2=6. So 2/3=4/6. If I multiply by 3: 2x3=6, 3	12. Both are even, so I use 2. 6 divided by 2 is 3

	ng). **IDO—Teacher Modeling (7 minutes):** Tea	90. 'Explain that we stop once the product ex	vided into 4 parts (shaded 2/4). I align them.	x 3 = 9. So 2/3 = 6/9. 'Mis concept ion: Multipl	.12 divided by 2 is 6. 3/6 is equivalent. Can I

	cherwrites'3'onthebeboard.'Iwillfindthe	ceeds100.**WEDO—GuidedPractice(7minutes**	'Look,theshaddeareasasaretheseamesizee.Th	yingonlythenumeratoor;emphasizee'Whatev	dividemore?Yes,by3.3dividedby3is1,6di

	firstfivemultiplesof3.Imultiply:3x1=3	):'Let'sfindmultiplesof20together.20,	erefore,1/2=2/4.'**WEDO—GuidedPractice(**	erwedotothetop,wemustdotothebottom.'**W**	videdby3is2.So6/12=1/2.'**WEDO—GuidedPr**

	,3x2=6,3x3=9,3x4=12,3x5=15.Icanalsosk	40...whatsnext?(60).Then?(80).And?(1	**7minutes):** Distributefractionbars.'Fol	**EDO—GuidedPractice(7minutes):** 'Let'sfi	**actice(7minutes):** 'Let'ssimplify10/20.

	ipcount:3,6,9,12,15.'Misconception:Le	00).Is120included?(No,upto100only).'R	dyourbarintto3equalparts.Shade1.Nowfol	ndthreequivalentfractionsfor3/4.Mult	Whatnumbercandividebothh?(10or20or5).Le	

	arnersmightthink0isamultiple;clarifyw	epeatfor11.**YOUDO—Independent Practice(**	ditagainsotherearе6parts.Howmanyaresh	iplyby2:(6/8).Multiplyby5:(15/20).Mul	t'suse10.10/10=1.20/10=2.Resultis1/2.

	estartwiththenumberitselfnx1).**WEDO—G**	**6minutes):**Liststallmultiplesof12upto100	addednow?(2).So,1/3=?/6(2/6).'Repeatwi	tiplyby10:(30/40).'Ask:'IfImultiplyth	'Try9/15.(Dividebby3togetit3/5).**YOUDO—In**

	uided Practice (7 minutes): Together, let'	.Expected output: 12, 24, 36, 48, 60, 72, 84,	th 1/4 and 2/8. **YOUDO — Independent Practice**	etopby2andthebottomby3, isitequivalent	**dependent Practice (6 minutes):** Simplify 4

	sfindthefirstfivemultiplesof4.'Class,	96.**DifferentiatedActivity1(4minutes):**	**(6minutes):**Drawareamodelsfor1/2and4/8	?(No!).'**YOUDO—IndependentPractice(6mi**	/16and15/25totheirsimplestequivalentf

	what is 4x1?(4).4x2?(8).4x3?(12)...'Ask	'SupportGroup': Use skip-counting chart	to show they are equivalent. Output: Two equ	**nutes): G**enerate two equivalent fractions	orm. Expected output: 1/4 and 3/5. **Differen**

	:'Is20amultipleof4?Howdoyouknow?'(Yes	stofindmultiplesof10upto100.**Different**	alsquareshaddedtotheSameextentbutwith	for1/5andtwofor5/6.Expectedoutput:{2/	**tiatedActivity1(4minutes):**'ColorCodin

	,4x5=20). **YOUDO—Independent Practice (6m**	**iatedActivity2(4minutes):** 'On-Level Gro	differentinternaldivisions. **Differenti**	10,3/15}and{10/12,15/18}. **Differentiat**	g':Colorfractionsthatarequivalentto1

	inutes): Find the first six multiples of 6 and	up': Circles multiples of 7 on a 100-chart and	**atedActivity1(4minutes):** 'Visual-Tacti	**edActivity1(4minutes):** 'Matching': Matc	/2 in red and 1/3 in blue. **Differentiated Act**

	d8.Expectedoutput:{6,12,18,24,30,36}a	dcheckswithapartner.**DifferentiatedAct**	le':Usecolloredwaterinidenticalcupstos	hcardsoffractionslikel/2with5/10.**Diff**	**ivity2(4minutes):**'Maze':Movethroughag

```
nd{8,16,24,32,40,48}.differentiatedAc
ivity3(3minutes):'AdvancedGroup':Find
howhalf-full(1/2)vs.two-quarterfull(
erentiatedActivity2(4minutes):'Calcul
ridbysteppingonequivalentfractions.Di
```

	tivity1(4minutes):'VisualLearners':Gr	commonmultiplesof5and10upto100.(10,20	2/4).**DifferentiatedActivity2(4minutes**	ation':Fillinmissingnumbers:1/4=3/?(1	**fferentiatedActivity3(3minutes):'**Comp

```
    output_user_numbers_in_jumpby_2_and_color
    , 30...100). Generalization (2 minutes): T
    ): 'Drawing': Shade provided diagrams to id
    2). Differentiated Activity 3 (3 minutes):
    arison': Determine if 8/12 and 2/3 are equiv
```

	the landing spots to identify multiples of 2	of in and multiples up to 100, keep adding the enu	entify which one shows 1/3. **Different iated**	'Problem Solving': 'I have 2/5 of a pie. If Ic	alent by simplifying 8/12. (Yes, divide by 4

	.DifferentiatedActivity2(4minutes): 'Kmberformultiplyingituntilyourreachorjus	**Activity3(3minutes):** 'Creative': Drawth	utitintol0pieces,howmanypiecesdoIhave	).**Generalization(2minutes):** Dividingbo	

	inaesthetic Learners': Group 2 uses a 1-50c	tpass 100. **Assessment (2 minutes):** Learner	reedifferent shapes (circle, square, rect	?' (4). **Generalization (2 minutes):** You can	thnumerator and denominator by the same com

	hartandplacestransparent'multiplebutt	stakethe5-questionMCQsessiononassessmen	angle)torepresent2/4ineach.**Generaliza**	findanequivalentfractionbymultiplying	monfactorgivesanequivalentfractionina

	ons'onallmultiplesof5.**DifferentiatedA**	t.	**tion(2minutes):** Equivalentfractionsloo	thetopandbottomnumbersbythesamewholen	simplerform.**Assessment(2minutes):** Comp

	ctivity3(3minutes): 'LogicalThinkers':		kdifferentbutrepresentthesameval	umber(exceptzero). **Assessment(2minutes**	letthefinalassessmentof5MCQs.

Group3solvesapuzzle:'Iamamultipleof3.

ueoramountofawhole.**Assessment(2minute**

):Completethecalculation-basedMCQs.

	I am greater than 10 but less than 15. Who am I?		**s):** Learners solve the visual-based MCQ ass		

'(12).**Generalization(2minutes):** Multip

essment.

lesarefoundbymultiplyingthenumberbyl,

	2, 3, and so on. They are like the answers in a m				

	ultiplicationtable. **Assessment(2minute**				

	s): Learners complete the 5-question MCQ as				

	sessmentprovidedonthebboard.
LearningR	DepEdMath
	DepEdMath
	FractionS
	Whiteboar
	Simplific

esources: List downthelearningresourcesthatwillhel

ematicsLearner'sMaterial(Quarter2),F

ematicsTeacher'sGuide,HundredsChart,

tripsConstructionPaper,Scissors,DepE

d,MultiplicationChart,21stCenturyMath

ationCharts,FactorizationWorksheets,D

pyourreachyourobjectives.Ensurethatthey areavailablea

lashcards.

ActivitySheets.

dGrade4MathModules.

Workbooks.

epEdTVMathEpisodes.

ndinclusive.						
Opportunities for integratio	Ensure visual aid sustained diverse sec	Use gender-neutral terms in workplace	Provide large-print charts for visually impaired	Allow peer-tutoring where advantageous	Integrate local market scenari	

n: Writedownanypossibilitiestomeaningfullyanchorlea
ultural representations (e.g., sharing na
dproblems (e.g., 'A student' instead of 'He
studentswithlowvision.
ncedstudentsexplain'skipcounting'tost
os(buyingfruitsbythedozen)togroundmul

rningareas,specialtopic,ortechnology.WriteN/Aifnon

tivedelicaciesslike'bibingka'insteadof

/She').

ruggglinglearners.

tiplesinrealityy.

e.	just pizza).					
Assessment.	Assessments reveal what learners have gained and what they still need help with. These are helpful in providing you with information to guide your future instruction.					
Formativ	**Session 1**	**Session 2**	**Session 3**	**Session 4**	**Session 5**	

eAssessment: Createatask,activity,orquestionstoe

Assessment: 1. Whichofthefollowingisamu

Assessment: 1. Whichisamultipleof12that

Assessment: 1. Lookingatacirclecutinto4

Assessment: 1. Tofindanequivalentfracti

Assessment: 1. Simplify8/10bydividingby

valuatelearningandprovidefeedback.(Strictly5MCQsper
ltipleof5?A.12B.18C.25D.32 2.Whatare t
islessthan100?A.48B.50C.13D.108 2.How
partswith2shaded,whatisanequivalentfr
onfor1/4,youcanmultiplybothnumbersby3
2.A.4/10B.8/5C.4/5D.2/5 2.Whichfracti

session).

hefirstthreemultiplesof3?A.3,6,9B.3,5

manymultiplesof25aretherebetween1and1

actionwith2parts?A.1/4B.1/3C.2/2D.1/2

.Whatistheresult?A.3/7B.3/12C.4/12D.3

onisthesimplestequivalentformof6/9?A.

	,7C.1,2,3D.6,9,12 3.Whichlistcontains	00(inclusive)?A.2B.3C.5D.4 3.Whichnum	2.If1/3ofabarisshaded,howmanypartsou	/42.Whichfractionisequivalentto2/5?	2/3B.3/2C.1/3D.6/3 3.Dividethenumerat

	ONLY multiples of 2? A.2,3,4 B.2,4,7 C.1,2	berisa multiple of 15? A.25 B.35 C.45 D.55	to f6 would be shaded to be equivalent? A.1	A.4/7 B.5/10 C.6/15 D.2/10 3.If you multip	or and denominator of 15/20 by 5.What is the r

	,4D.4,8,12 4.Ifyouskipcountby4,whichn	4.Whichofthesesisamultipleof11?A.21B.	B.2C.3D.4 3.Whichfractionisequivalent	lythenumeratoranddenominatorof3/4by2,	esult?A.3/5B.3/4C.5/4D.10/15 4.Are4/1

	umberwillyousay?A.10B.16C.22D.255.Wh	33C.41D.505.Findthemultipleof20thatti	to1/2basedonvisualsize?A.4/8B.1/4C.2	whatdoyouget?A.6/8B.5/6C.3/8D.6/44.W	2and1/3equivalent?A.NoB.Yes,bymultipl

	ichnumberisamultipleof10?A.5B.50C.15	sexactly100.A.20x5B.20x4C.20x6D.20x10	/3D.3/44.Twofractionstripsaretheesame	hatisthemissingnumerator:1/2=?/10A.2	ying1/3by2C.Yes,bydividing4/12by2D.Ye

	D. 22 Answer Key: 1-C, 2-A, 3-D, 4-B, 5-B	Answer Key: 1-A, 2-D, 3-C, 4-B, 5-A	length. Strip A shows 1/4. Strip B shows 2/8.	B. 1 C. 4 D. 5 5. Which is NOT equivalent to 1/	s, by dividing 4/12 by 4 5. What is the simpli

			Are they equivalent? A. No, because 8 is big	3? A. 2/6 B. 4/12 C. 3/6 D. 10/30 Answer Key: 1	fied form of 10/50? A. 1/10 B. 2/5 C. 1/5 D. 5/

			erthan4.B.No,because2isbiggerthan1.C.	-B,2-C,3-A,4-D,5-C	10 Answer Key: 1-C,2-A,3-B,4-D,5-C

			Yes, they cover the same area. Only if the		

			t r i p s a r e d i f f e r e n t l e n g t h s . 5 . W h i c h f r a c		

			tionrepresentsthesameamountas3/3?A.1		

/3B.3/1C.2/3D.1/1

Answer Key: 1-D, 2-B, 3

			-A, 4-C, 5-D		
Ways Forward.	Meaningful learning can also happen beyond the classroom - for both the learners and the teacher. Pause and reflect on what happened today.				
Extended lear	Session 1: Fin	Session 2: Use	Session 3: Dra	Session 4: Cre	Session 5: Sol

ningopportunities: Suggestotherlearningexperi
d3objectsathomethatcomeinpairs(multip
acalendartolisttheemultiplesof7(datesso
wyourfavoritefoodanddividetheintoeightpart
ate a 'Multiplication Flower' showing 1/2 a
ve 'Simplified Grocery': If a pack of 12 eggs

has 6 broken, write the fraction in simplest

nd its equivalent sonpetals.

s; shade an equivalent of 1/4.

f the same day).

les of 2).

ences outside the classroom/classhours that learners may w

antoaccesstoreinforcewhatthey haveelearned...					form.
Refl	(To be	(To be	(To be	(To be	(To be

ections: Think about what you need to change for the next s
filled out after the lesson)
Reflection Prompt: Did
filled out after the lesson)
Reflection Prompt: Did
filled out after the lesson)
Reflection Prompt: Whi
filled out after the lesson)
Reflection Prompt: How
filled out after the lesson)
Reflection Prompt: Wha

essionbasedonwhathappenedtoday.
thelearnerseasilygraspthecorreconceptintroduce
theguidedpracticeeffectivelytranslateintoinde
chpartofthecollaborativetaskchallengedthestud
weldidtheformativeassessmentreflectthelearni
tpercentageoftheclassreachedproficiencybythee

	d today?	pendent success?	ents the most?	ngobjectives?	nd of the week?
Prepared by: **Teaching Hub** Teacher			**Checked by:** Principal / Head		