Three-week Regents prep series

Six practice sessions, three independent checks and a bridge rehearsal per course.

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Start with the route page, then complete both sessions on the corresponding weekly sheet.

A returning student can begin with the current week. Keep prompted and independent work separate.

Algebra I

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Two receipts + Read a function across representations

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A gym charges $9 plus $2 per visit. What does the intercept mean, and what is the cost at five visits?

Week 2 / Make the boundary count + Summarize a distribution

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

For $a(t)=t(10-t)$, find the zeros and explain what limits a physical time interval between them.

Week 3 / Find what a zero means + Choose and check a model

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A pair (4,3) is proposed for $x+y=7$ and $2x+y=12$. Decide and justify.

Bridge rehearsal

A van rental charges $16 plus $3 per hour. Compare its cost with $5 per hour and identify when the first is cheaper.

Algebra I

Name _____ Date _____

SESSION 1

Two receipts

Three coffees and two teas cost $12. Two coffees and four teas cost $16. Define variables, write both equations, and test a friend's claim that both drinks cost $2.50. Find the two prices and verify them.

Start here if you were away. Start with the first receipt. Circle both quantities and underline the total.

SESSION 2

Read a function across representations

A cart charges a setup fee plus a price per cup. For 0, 4 and 10 cups the costs are $14, $20 and $29. Write a cost function. A second cart charges $2 per cup with no fee. When do the two cost the same? Explain the intersection.

Start here if you were away. Locate the row for zero cups. Say what its cost pays for.

Algebra I

Name _____ Date _____

SESSION 3

Make the boundary count

A club has at most $48 for notebooks costing $4 and pens costing $2. It needs at least 15 items. Write two inequalities, including nonnegative whole-number restrictions. Which pair works: 8 notebooks and 7 pens, or 10 notebooks and 5 pens? Verify both constraints.

Start here if you were away. Underline “at most” and “at least.” Assign a variable to each item.

SESSION 4

Summarize a distribution

Delivery minutes for five orders are 3, 4, 4, 5, 9. A sixth order takes 23 minutes. Compute the mean and median before and after. Which better describes a typical order after the sixth? Defend your choice.

Start here if you were away. Order the times and mark the middle position or positions.

Algebra I

Name _____ Date _____

SESSION 5

Find what a zero means

A model gives a ball's height in meters as $h(t) = -t^2 + 6t$ for $0 \le t \le 6$ seconds. Find both zeros and the time and height of the maximum. Explain why two zeros make sense here.

Start here if you were away. Factor out t. Identify which variable describes time.

SESSION 6

Choose and check a model

A print shop charges $18 plus $0.40 per flyer. Another charges $6 plus $0.60 per flyer. A student says the first is cheaper for 40 flyers. Test the claim, find the break-even quantity, and explain when the first is cheaper.

Start here if you were away. Write a separate expression for each shop before substituting 40.

Geometry

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / A diagonal that proves something + From coordinates to a proof

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Two sides of a triangle are bisected. The third side is 14. Find the midsegment and justify.

Week 2 / Why the shadows tell us height + Turn an arc into a length

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A 6 m pole casts an 8 m shadow. Under matching conditions a tree casts a 20 m shadow. Justify its height.

Week 3 / Which measures scale? + Prove or disprove a classification

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A quadrilateral has four equal sides. Which extra property makes it a square? Defend.

Bridge rehearsal

Two similar sectors have radii 4 and 12. A student claims area and arc length both triple. Decide and justify.

Geometry

Name _____ Date _____

SESSION 1

A diagonal that proves something

In quadrilateral ABCD, AB is parallel to CD and AB = CD. Draw diagonal AC. Prove triangles BAC and DCA congruent and then show BC is parallel to AD. State why each step follows.

Start here if you were away. Draw the diagonal. Find one side shared by both triangles.

SESSION 2

From coordinates to a proof

Plot A(0,0), B(4,0), C(6,3), D(2,3). Prove ABCD is a parallelogram and decide whether it is a rectangle. Give a reason for both results.

Start here if you were away. Compare the directions of opposite sides first.

Geometry

Name _____ Date _____

SESSION 3

Why the shadows tell us height

At the same time on level ground a 1.5 m post casts a 2 m shadow and a tree casts an 8 m shadow. Both stand vertically. Draw and justify a proportion, find the height, and identify one condition that could invalidate the model.

Start here if you were away. Draw a right angle at each base. Mark the sunlight direction.

SESSION 4

Turn an arc into a length

A circular track has radius 12 m. A runner travels counterclockwise through a central angle of 150 degrees. Find the arc length exactly, and explain why it is shorter than half a lap. Compare it with the straight path between endpoints.

Start here if you were away. Write the fraction of a complete turn first.

Geometry

Name _____ Date _____

SESSION 5

Which measures scale?

A solid cylinder of radius 2 cm and height 5 cm is enlarged by a scale factor of 3 in every length. Compute the original and enlarged volumes. Explain why tripling only the original volume gives a different result.

Start here if you were away. Write $V = \pi r^2 h$. List the new radius and height.

SESSION 6

Prove or disprove a classification

For A(0,0), B(3,1), C(2,4), D(−1,3), decide whether ABCD is a square. Support both angle and side claims. Decide whether equal diagonals alone would have proved it.

Start here if you were away. Compute the direction and squared length of each side.

Algebra II

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Explain an interval rate + Read a periodic pattern

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

For q(t)=10+40(1/2)^t, interpret the 10 and calculate q(2).

Week 2 / Solve an exponential threshold + Keep the domain after canceling

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Independent trials have success probability 0.8. Find the chance of exactly one success in two trials.

Week 3 / What a simulation supports + Transfer the rate to a new family

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A sinusoid reaches the same maximum at 2 h and 10 h with no intervening maximum. Find period and angular frequency.

Bridge rehearsal

A 0.2-probability event is checked on two independent days. Compare exactly one occurrence with at least one.

Algebra II

Name _____ Date _____

SESSION 1

Explain an interval rate

A cooling model is T(t) = 20 + 60(0.5)^(t/10), where t is minutes and T is °C. Find average rate of change from 0 to 20 minutes. Interpret its sign and explain whether it represents the rate every minute.

Start here if you were away. Find T(0) and T(20) before subtracting.

SESSION 2

Read a periodic pattern

A wheel seat is 2, 10, 18, 10 and 2 meters high at t = 0, 3, 6, 9 and 12 seconds. Assume one full sinusoidal cycle. Find the midline, amplitude and period. Give a model and predict the height at 15 s.

Time (s)	0 / 3	6 / 9	12
Height (m)	2 / 10	18 / 10	2

Start here if you were away. Mark the minimum and maximum. Their midpoint is the midline.

Algebra II

Name _____ Date _____

SESSION 3

Solve an exponential threshold

A device retains 90% of its previous charge each hour, starting at 100 units. Solve for the first whole hour at which the charge is below 50. Show an inequality and verify adjacent whole hours.

Start here if you were away. Write charge after two hours as repeated multiplication.

SESSION 4

Keep the domain after canceling

For $f(x) = (x^2 - 9)/(x - 3)$, a student writes $f(x)=x+3$ for every real x. Evaluate the claim, give the domain, and describe the missing point on the graph.

Start here if you were away. Factor the numerator before canceling.

Algebra II

Name _____ Date _____

SESSION 5

What a simulation supports

A fair-coin model was used to simulate 20 tosses 200 times. Four simulations had 16 or more heads. An actual coin gave 16 heads in 20 tosses. Estimate the one-sided tail probability and explain the strength and limit of the evidence.

Start here if you were away. Underline the number of simulated experiments and the number in the tail.

SESSION 6

Transfer the rate to a new family

Water depth is d(t) = 5 + 2 sin(πt/6) meters, with hours t from 0 to 12 and radian argument. Find average rate from t=0 to t=3, and the first time the depth reaches 6 m. Explain why the rate from 0 to 6 alone could mislead.

Start here if you were away. Sketch the midline and calculate d(0) and d(3).

English Language Arts

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / When a word changes sides + Find the turn

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

"The lock swallowed the last click." What does the verb add beyond "made a click"?

Week 2 / Write a counterclaim that matters + Analyze a craft choice

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A survey of bus riders supports a bus extension. What can it establish and who might be missing?

Week 3 / Evaluate the reach of a claim + Build an argument across four voices

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Write a counterclaim about extending a library day when staffing is limited, then answer it with a conditional proposal.

Bridge rehearsal

A reporter counts sold tickets and claims everyone who wanted to attend was admitted. Identify the missing perspective and propose evidence.

English Language Arts

Name _____ Date _____

SESSION 1

When a word changes sides

Original passage: “By nine the block was quiet. By ten the quiet had teeth. Mara turned the radio on, then off, and listened for the key.” Explain how the second use of quiet changes its meaning. Support an inference about Mara with two details.

Start here if you were away. Read the first two sentences aloud. Mark what the second adds.

SESSION 2

Find the turn

Original passage: “I kept Dad's directions folded in my pocket. At the fork I read them again. His penciled arrow pointed left. The bridge on the left was gone. I put the paper away and asked the girl on the steps where the road went now.” Explain how the ending develops an idea about relying on others.

Start here if you were away. Divide the passage at the missing bridge. Compare whom the speaker relies on.

English Language Arts

Name _____ Date _____

SESSION 3

Write a counterclaim that matters

Original practice sources about later library hours. A: 38 of 50 surveyed students wanted later access. B: staffing one extra hour costs $60. C: a pilot counted 14 visits during each added hour on average. Write a short argument using all three sources and answer a plausible objection. Identify one limitation of the evidence.

Start here if you were away. Choose a recommendation. Label each fact A, B or C before writing.

SESSION 4

Analyze a craft choice

Original passage: “The bakery sign came down on Tuesday. On Wednesday a pale rectangle hovered over the door. By Friday, whenever a stranger asked where the bakery was, I pointed at the shape of what was missing.” State a central idea and analyze how one writing strategy develops it using two details.

Start here if you were away. Underline the image that appears twice in different words.

English Language Arts

Name _____ Date _____

SESSION 5

Evaluate the reach of a claim

Original paragraph: “The trial route carried 80 riders on opening day. It therefore deserves permanent service. Riders got a free ticket that day, and half the registrations came from one club.” Identify the assumption, explain how the final sentence affects the reasoning, and rewrite the claim to fit the evidence.

Start here if you were away. Separate what happened from what the writer recommends.

SESSION 6

Build an argument across four voices

Original evidence on a late bus. A: 24 of 40 club members surveyed lack an after-school ride. B: one bus costs $180 per evening. C: a two-night trial carried 18 and 21 riders. D: a coach says some students stayed for the first time. Recommend a next step. Use at least three sources, address a counterclaim, and explain which evidence you would collect next.

Start here if you were away. Organize three source letters under need, cost and actual use.

Global History and Geography II

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Read the object in the cartoon + Turn a timeline into context

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Invent a caption that criticizes control of factory time. Explain which symbol would make your meaning clear.

Week 2 / Compare voices on industrialization + Read a map claim critically

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Why might a statute and an inspection report answer different historical questions?

Week 3 / Explain continuity across independence + Build an enduring-issue paragraph

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Which archives would help test whether independence changed trade dependence? Give a reason.

Bridge rehearsal

A colonial freight line links mines to one port. What would show whose interests it served beyond the route itself?

Global History and Geography II

Name _____ Date _____

SESSION 1

Read the object in the cartoon

An original cartoon brief shows an imperial official holding a key marked “ports.” A local trader stands outside a gate marked “trade rules.” Identify the cartoonist's position and explain how two details convey it. Name one question you would ask about its creator before using it as evidence.



Start here if you were away. Draw the gate and key or label them in the description.

SESSION 2

Turn a timeline into context

Historical summary: British colonial rule gave authorities control over salt production and taxation in India. In 1930 Gandhi and marchers challenged the salt laws by marching to the coast. Explain why choosing salt connected a daily need to a political challenge. Identify one additional source needed to judge participation.

Start here if you were away. Write “daily use” and “who sets the rule” in the margin.

Global History and Geography II

Name _____ Date _____

SESSION 3

Compare voices on industrialization

Two invented teaching voices from an industrializing city: A factory owner says coordinated shifts keep prices low. A worker's letter says the bell sets the pace of every meal. Identify one shared development, explain a difference in perspective, and state one question each source can answer.

Start here if you were away. Underline a detail about time in each voice.

SESSION 4

Read a map claim critically

A simplified, invented colonial rail network has three inland mining districts. Each has a rail line to the same export port; there are no direct lines between districts. Sketch it. Infer one possible economic priority. Identify an alternative explanation and evidence that would help distinguish the two.

Start here if you were away. Use one point for each district and another for the port.

Global History and Geography II

Name _____ Date _____

SESSION 5

Explain continuity across independence

Historical summary: India gained independence in 1947 and Ghana in 1957. An original classroom scenario describes a newly independent government still relying on one major export and on overseas buyers. Explain the difference between political sovereignty and economic dependence. Name one record needed to test the scenario in either country.

Start here if you were away. Mark which statements are historical dates and which describe a hypothetical economy.

SESSION 6

Build an enduring-issue paragraph

Three teaching summaries: imperial authorities control trade access; factory owners set the workday; colonial salt laws provoke organized protest. Choose an enduring issue, explain it using evidence from at least two summaries, and add a historically grounded outside example. Explain how the issue persisted or changed.

Start here if you were away. Choose a relationship visible in more than one summary. Name the groups involved.

U.S. History and Government

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / What did the law respond to? + Read a photograph as evidence

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

How does evidence of low household electricity access help contextualize a public power proposal?

Week 2 / Compare two responses to voting barriers + Source purpose and reliability

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

An organizer wrote a flyer about a march. State one inquiry for which it is useful and one needing corroboration.

Week 3 / Follow a civic issue through time + Write a document-based civic judgment

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A law grants federal oversight. Name one practical outcome measure and one limit.

Bridge rehearsal

A law promises equal access to a service. Choose one record proving authorization and another helping evaluate actual access.

U.S. History and Government

Name _____ Date _____

SESSION 1

What did the law respond to?

Historical summary of the Interstate Commerce Act (1887): Congress created a commission to oversee interstate railroads and required reasonable rates. An invented farmer's petition complains that one railroad controls the only economical route to market. Give context and explain a cause-and-effect relationship. Identify the source that can establish what Congress enacted.

Start here if you were away. Mark the statute summary and the simulated petition separately.

SESSION 2

Read a photograph as evidence

An invented photograph description shows marchers carrying “Votes for Women” signs outside a government building. A newspaper selected the image for its front page. Identify an inference supported by the scene and one claim it cannot support. Explain why the editor's choice matters.

Start here if you were away. Separate what the camera could show from what a reader might infer.

U.S. History and Government

Name _____ Date _____

SESSION 3

Compare two responses to voting barriers

Source summaries: the Fifteenth Amendment prohibited denying the vote on the basis of race, color or previous servitude. The Voting Rights Act of 1965 authorized federal enforcement measures against discriminatory voting practices. Describe a continuity and a change in the federal response. Explain one context for the later act.

Start here if you were away. Identify what the constitutional amendment states and what the later law adds.

SESSION 4

Source purpose and reliability

Historical summary: the Eighteenth Amendment prohibited manufacture, sale and transportation of beverage alcohol. An invented campaign leaflet promises that Prohibition will end family hardship. What can the leaflet reveal about reformers' appeals? What additional record is needed to evaluate its promise?

Start here if you were away. Label the leaflet's prediction and the amendment's action.

U.S. History and Government

Name _____ Date _____

SESSION 5

Follow a civic issue through time

Historical summaries: organized suffragists campaigned for decades; the Nineteenth Amendment prohibited denying voting rights on account of sex in 1920; other voting barriers persisted afterward. Build a short civic-literacy outline with circumstance, action, and extent of success. Supply one accurate outside detail.

Start here if you were away. Write one sentence for the problem, then one for the response.

SESSION 6

Write a document-based civic judgment

Three summaries: railroad shippers challenged unequal rates; Congress created the Interstate Commerce Commission in 1887; later legislation expanded federal rate-setting power. Argue how far federal action addressed rail regulation. Use two summaries and one relevant outside detail. Identify one missing measure of actual impact.

Start here if you were away. Order the evidence as grievance, response and later change.

Life Science: Biology

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Which way did carbon move? + A model with a missing arrow

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

In light, dissolved oxygen rises from 4 to 6 units. What can and cannot be inferred about plant activity?

Week 2 / Trace an inherited difference + Explain selection with a counterexample

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A purple carrier Pp is crossed with pp. Predict the phenotype ratio under complete dominance and explain.

Week 3 / Test a feedback model + Separate association and mechanism

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A trait is inherited but has no measured effect on offspring number. Which extra evidence would support selection?

Bridge rehearsal

A closed light jar gains 2 mg/L oxygen while a dark jar loses 1 mg/L. Does the dark jar alone determine respiration in light?

Life Science: Biology

Name _____ Date _____

SESSION 1

Which way did carbon move?

In a simplified closed, illuminated chamber, carbon dioxide measured 500, 460 and 420 ppm at 0, 10 and 20 min with a leafy plant. A matching chamber without a plant stayed at 500 ppm. Propose a process, cite two readings and describe where some carbon atoms could end up.

Time (min)	Plant (ppm)	Control (ppm)
0	500	500
10	460	500
20	420	500

Start here if you were away. Identify what changed and what stayed the same in the comparison chamber.

SESSION 2

A model with a missing arrow

A student's ecosystem model has Sun → grass → rabbit → fox and says “all matter and energy cycle back to the Sun.” Correct the model by adding a decomposer and CO_2. Explain how energy and carbon move differently.

Start here if you were away. Trace one carbon atom and one transfer of energy separately.

Life Science: Biology

Name _____ Date _____

SESSION 3

Trace an inherited difference

Assume a single gene with two alleles and complete dominance. Two unaffected parents each carry one recessive allele for a fictional seed trait. For Aa × Aa, represent possible offspring, calculate the chance of aa, and evaluate “exactly one of the next four will be aa.”

Start here if you were away. List A and a as possible contributions from each parent.

SESSION 4

Explain selection with a counterexample

In two fictional insect populations the dark-color trait is inherited. On dark bark, its frequency changes from 20% to 45% to 62% across three generations. On pale bark it stays near 20%. Propose a selection explanation and one observation that would test it.

Start here if you were away. Underline that the measurements span generations.

Life Science: Biology

Name _____ Date _____

SESSION 5

Test a feedback model

In an illustrative mammal, a rise above usual body temperature increases heat loss at the skin. Measurements after exercise are 38.6, 38.0 and 37.4 °C over 20 minutes. Draw a feedback loop, use the data and predict what happens to the heat-loss response near baseline.

Start here if you were away. Write “temperature rises” as the first box.

SESSION 6

Separate association and mechanism

Across matched ponds, pools with more floating plants have average light of 30 units below the surface and submerged plant growth of 2 cm/week. Comparison pools average 70 units and 5 cm/week. Make a mechanistic claim, cite values, and design a comparison to test light as the cause.

Start here if you were away. Circle the two variables measured below the surface.

Earth and Space Sciences

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Read a stream record + Decode a contour crossing

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A stream peaks two hours after rain stops. Explain one plausible transport delay.

Week 2 / Use relative time evidence + Explain a seasonal difference

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A dike cuts a lava flow but ends at an erosion surface below a sediment bed. Order the events.

Week 3 / Infer motion from paired locations + Make a watershed decision

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Dips occur on days 1, 6 and 11 and last 2 h. Predict the next dip and distinguish period from duration.

Bridge rehearsal

A ridge spreads 1.5 cm/year on each side for 2 million years. How far apart are the two matching rocks?

Earth and Space Sciences

Name _____ Date _____

SESSION 1

Read a stream record

At a stream gauge, discharge was 3, 4, 12 and 8 m³/s at 8, 9, 10 and 11 a.m. Rain began upstream before 8. Identify the peak, explain a possible lag, and give one reason a paved watershed might respond differently.

Time	8 a.m.	9 a.m.	10 a.m.	11 a.m.
Flow (m³/s)	3	4	12	8

Start here if you were away. Locate the largest value and its time.

SESSION 2

Decode a contour crossing

Along a straight west-to-east path on a map the labeled elevations are 200, 220, 240, 240, 220 and 200 m. The first three contours are closely spaced, the last three far apart. Sketch a plausible profile, identify the steeper flank, and explain what the map leaves unknown about the summit.

Start here if you were away. Mark west and east. Check what one contour interval represents.

Earth and Space Sciences

Name _____ Date _____

SESSION 3

Use relative time evidence

An undisturbed sedimentary sequence has layers A, B, C from bottom to top. An igneous dike cuts A and B. Both the dike and B are truncated by an erosion surface beneath C. Put deposition, intrusion and erosion in order, and explain two relationships.

Start here if you were away. Draw the layers, then draw only the cuts the prompt describes.

SESSION 4

Explain a seasonal difference

At 43°N, a dataset gives about 15 hours of daylight near June solstice and 9 near December solstice. Explain the day-length difference using Earth's tilt and orbit, and predict the reversed season for 43°S in June.

Start here if you were away. Sketch a tilted axis and mark the Northern Hemisphere.

Earth and Space Sciences

Name _____ Date _____

SESSION 5

Infer motion from paired locations

In an idealized ocean basin, sea-floor rocks are 0 million years old at a ridge, 2 million years old 60 km east and west, and 4 million years old 120 km on both sides. Estimate one plate's average speed and explain the paired pattern.

Start here if you were away. Follow one side outward and compare distance with age.

SESSION 6

Make a watershed decision

Two sites are compared under the same modeled storm. Site A sends 60% of rain quickly to a stream and peaks at 18 m³/s. Site B sends 35% quickly and peaks at 10 m³/s. Recommend a change to reduce A's peak, explain the mechanism, and identify one limitation.

Site	Rapid runoff	Peak (m³/s)
A	60%	18
B	35%	10

Start here if you were away. List one observation, then one inference about the surface.

Physical Science: Chemistry

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Follow atoms through a model + Temperature and the system boundary

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

In a closed model, $2H_2$ combines with $1O_2$. How many H and O atoms must appear among the products?

Week 2 / Link a model to conductivity + Interpret a reaction-rate curve

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Equal amounts react in 80 s or 50 s to the same endpoint. Why does the shorter time indicate a higher average rate?

Week 3 / Read a reversible change + Choose a model with evidence

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A solid conducts and bends easily. Give a particle model consistent with each observation.

Bridge rehearsal

Two materials each absorb 100 J but provide different temperature drops in different water masses. Can drop alone reveal the better material?

Physical Science: Chemistry

Name _____ Date _____

SESSION 1

Follow atoms through a model

A closed model begins with four H_2 molecules and two O_2 molecules. Every available molecule reacts to form H_2O. Draw or describe the before and after particles. Identify the conserved quantities and one quantity that changes.

Start here if you were away. Count H and O atoms separately before drawing.

SESSION 2

Temperature and the system boundary

Two solutions initially at 20 °C are mixed in an insulated cup. The mixture rises to 27 °C. Mixing the same volumes of water as a comparison stays near 20 °C. Define the reacting chemicals as the system. Explain the direction of energy transfer and the role of the comparison.

Start here if you were away. Draw the system boundary around the reacting chemicals and label the surroundings.

Physical Science: Chemistry

Name _____ Date _____

SESSION 3

Link a model to conductivity

Samples X and Y are each tested as a solid and dissolved in water. X conducts only when dissolved. Y conducts in neither condition. Assume both dissolve. Propose a particle model for X, compare it with a possible model for Y, and name an observation that would strengthen your explanation.

Sample	Solid	In water
X	No conduction	Conducts
Y	No conduction	No conduction

Start here if you were away. Ask whether charged particles can move in each condition.

SESSION 4

Interpret a reaction-rate curve

Each gas collector starts at 0 mL and finishes at 40 mL. At 20 seconds a room-temperature trial has 14 mL and a warmer trial has 25 mL. Reactant amounts are equal. Compare initial-interval average rates and explain the difference using collisions.

Start here if you were away. Compute each change from 0 mL during the same 20 seconds.

Physical Science: Chemistry

Name _____ Date _____

SESSION 5

Read a reversible change

At constant temperature a closed mixture has $N_2O_4(g) \rightleftharpoons 2NO_2(g)$. At equilibrium more NO_2 is suddenly added without changing volume. Predict the initial net direction after addition and what is true of the two rates once a new equilibrium is reached.

Start here if you were away. Identify which side just gained particles.

SESSION 6

Choose a model with evidence

A sealed sample of solid goes from ordered particles at −2 °C to mobile particles in contact at +3 °C. During heating its temperature pauses near 0 °C while both phases are present. Classify the change and explain where added energy goes during the pause. Identify an observation that would challenge your model.

Start here if you were away. Compare particle identity, spacing and movement across the change.

Physical Science: Physics

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Two force curves, one change in motion + Where the energy went

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Compare a 4 N rectangular pulse lasting 3 s with a 6 N pulse lasting 2 s.

Week 2 / Use evidence from a wave + Test a lens claim

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A wave travels at 30 m/s with a frequency of 10 Hz. Predict wavelength if frequency doubles at the same speed.

Week 3 / Read electrical power as evidence + Choose a design under two constraints

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Two devices have the same output of 0.6 W but inputs of 2 W and 3 W. Compare efficiencies.

Bridge rehearsal

An ideal 4 W device is used for 15 s. Only 12 J becomes useful light. Find input energy and efficiency.

Physical Science: Physics

Name _____ Date _____

SESSION 1

Two force curves, one change in motion

A padded cart and a rigid cart carry the same mass and strike identical barriers at the same speed. For a simplified comparison, force pulses are rectangular: 120 N for 0.06 s and 240 N for 0.03 s. Compare impulses and peak forces. Explain what this model predicts about padding.

Pulse	Force (N)	Time (s)
Long	120	0.06
Short	240	0.03

Start here if you were away. Calculate the area under each force-time pulse.

SESSION 2

Where the energy went

A cart starts with 4 J of gravitational potential energy and zero kinetic energy. At the bottom it has 3.2 J of kinetic energy and zero gravitational potential energy using that reference. Account for the difference and propose a measurement that would test your explanation.

Start here if you were away. Draw an energy account before and after. Include the track and surroundings.

Physical Science: Physics

Name _____ Date _____

SESSION 3

Use evidence from a wave

Two sound pulses travel through the same air. Pulse A has frequency 500 Hz and pulse B has 1000 Hz. Take sound speed as 340 m/s. Compare wavelengths. If B is louder, what extra measurement is needed to connect loudness to its wave?

Start here if you were away. Write v = fλ and keep the speed fixed.

SESSION 4

Test a lens claim

A converging lens makes a sharp real image of a 4 cm arrow on a screen. Object distance is 30 cm and image distance 15 cm. Calculate magnification magnitude and image height. State its orientation and one observation that distinguishes a real image from a virtual one.

Start here if you were away. Use magnification magnitude = image distance / object distance.

Physical Science: Physics

Name _____ Date _____

SESSION 5

Read electrical power as evidence

A device operates at 6 V drawing 0.50 A for 20 s. A revised design uses 6 V and 0.35 A for the same time. Calculate the energy delivered to each. Can you conclude that the revision is more efficient? Explain what else to measure.

Start here if you were away. Find power VI, then multiply by time.

SESSION 6

Choose a design under two constraints

Two landing-pad models must keep peak force below 200 N and stop a cart within 0.08 s. A has a triangular force pulse, peak 180 N and duration 0.08 s. B has a triangular pulse, peak 240 N and duration 0.06 s. Each trial requires a 7.2 N·s impulse. Which design meets all constraints? Identify a needed repeat trial.

Start here if you were away. For a triangular pulse, area is one-half times base times height.

Physical Setting/Chemistry

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Use a small reference table + Use electron accounting

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Element Q has 15 protons and mass number 31. Give neutrons and electrons for Q^{3-}.

Week 2 / Track a redox change + Check a mole ratio

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

If 40 g dissolves per 100 g water, how much dissolves at saturation in 75 g water?

Week 3 / Connect neutralization to quantity + Read data before applying a rule

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Why do concentrations stay constant at dynamic equilibrium even with unequal amounts of reactant and product?

Bridge rehearsal

A salt dissolves to 30 g per 100 g water at room temperature. A warm solution contains 43 g in 100 g water. Find what crystallizes on cooling to room temperature.

Physical Setting/Chemistry

Name _____ Date _____

SESSION 1

Use a small reference table

Practice reference values at 1 atm: ethanol melts at −114 °C and boils at 78 °C. Water melts at 0 °C and boils at 100 °C. Compare their phases at 85 °C. Which has the higher normal boiling point, and what does that indicate about attractions in the liquid?

At 1 atm	Melting (°C)	Boiling (°C)
Ethanol	−114	78
Water	0	100

Start here if you were away. Locate 85 relative to each boiling point.

SESSION 2

Use electron accounting

A neutral chlorine atom has atomic number 17 and mass number 35. It gains one electron. Give protons, neutrons, and electrons before and after. Explain the charge without changing the isotope.

Start here if you were away. Atomic number counts protons. Subtract it from mass number for neutrons.

Physical Setting/Chemistry

Name _____ Date _____

SESSION 3

Track a redox change

For $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$, write both half-reactions, identify oxidation and reduction and show how electrons cancel. Name the reducing agent and explain the name.

Start here if you were away. Track charge on zinc and copper separately.

SESSION 4

Check a mole ratio

For $2H_2 + O_2 \rightarrow 2H_2O$, start with 3.0 mol H_2 and 2.0 mol O_2. Determine the limiting reactant, moles of water formed and moles of excess reactant remaining. Justify from the balanced equation.

Start here if you were away. Circle the 2:1 reactant ratio and compare with what is available.

Physical Setting/Chemistry

Name _____ Date _____

SESSION 5

Connect neutralization to quantity

An acid supplies one H^+ per molecule and a base supplies one OH^- per formula unit. A 25.0 mL acid sample of concentration 0.100 mol/L is exactly neutralized by 20.0 mL base. Find base molarity and write the net ionic equation.

Start here if you were away. Convert mL to L and find acid moles first.

SESSION 6

Read data before applying a rule

An original soluble-salt table gives maximum grams dissolved per 100 g water: 32 g at 20 °C and 50 g at 60 °C. A solution has 90 g salt dissolved in 200 g water at 60 °C. It cools to 20 °C and reaches equilibrium without evaporation. How much crystallizes? Explain and classify the original solution.

Start here if you were away. Rescale both maximum amounts to 200 g water.

Physical Setting/Physics

Two practice sessions per week, followed by one new retrieval check.

Name _____ **Date** _____

Week 1 / Get the slope and the area + Compare net and individual forces

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Velocity changes from +4 to +10 m/s in 2 s. Compare acceleration and displacement for uniform acceleration.

Week 2 / Use a parallel-circuit check + Follow light at a boundary

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

Across 12 V a branch draws 0.50 A. Find branch resistance and power.

Week 3 / Translate an energy-level change + Link graph, work and speed

Work the two exercises on the corresponding week's sheet. Then put your notes away and answer this check.

A photon carries 3.0 eV. Is that photon energy positive or negative when emitted? Explain.

Bridge rehearsal

A cart slows uniformly from 5 to 1 m/s in 2 s. Does negative acceleration imply negative displacement?

Physical Setting/Physics

Name _____ Date _____

SESSION 1

Get the slope and the area

A cart's velocity increases linearly from 2 to 8 m/s in 3 s. Draw a velocity-time graph. Find acceleration and displacement and show which feature of the graph gives each quantity.

Start here if you were away. Mark the two endpoints and include units on both axes.

SESSION 2

Compare net and individual forces

A 5 kg sled pulled horizontally has a 24 N pull and an opposing 9 N friction force on level ground. Draw its free-body diagram and find acceleration. Predict the acceleration if the pull stops while the sled still moves forward and friction stays at 9 N.

Start here if you were away. Set positive in the original direction of motion.

Physical Setting/Physics

Name _____ Date _____

SESSION 3

Use a parallel-circuit check

Two resistors of 6 Ω and 3 Ω are connected in parallel across an ideal 12 V source. Find branch currents and total current. Infer equivalent resistance and check whether its size is sensible.

Start here if you were away. In parallel, each branch has the source voltage.

SESSION 4

Follow light at a boundary

Light travels from air (n = 1.00) into glass (n = 1.50) at 30° to the normal. Use $n_1 \sin \theta_1 = n_2 \sin \theta_2$. Calculate the refracted angle and indicate whether the ray bends toward the normal. Explain the direction using speed.

Start here if you were away. Sketch and label the normal before any angles.

Physical Setting/Physics

Name _____ Date _____

SESSION 5

Translate an energy-level change

An atom changes from −2.0 eV to −5.0 eV. Is a photon emitted or absorbed? Find its energy in eV and J, then its frequency. Use 1 eV = 1.60×10^{-19} J and h = 6.63×10^{-34} J·s.

Start here if you were away. Place both levels on a vertical energy scale.

SESSION 6

Link graph, work and speed

A spring-force magnitude grows linearly from 0 to 12 N over compression of 0.20 m. Determine the energy stored. It launches a 0.40 kg cart on a level surface. Find ideal launch speed and explain a measured speed of 2.0 m/s.

Start here if you were away. Sketch force magnitude versus compression. Label the triangular area.