

Middle School Science Maternity Leave Sub Plans, 6 Weeks

Six complete week binders of middle school science, grades 6 to 8. One topic a day on paper, solo work and a team task, a "say this" script for every task.

PREVIEW

What is included

- Six week binders (68, 66, 66, 66, 65, 64 pages): 395 pages
- 78 front pages: binder cover, important information, note to the sub, the week plan filled in, schedule, set index, class list, how it went, Monday opener
- 60 solo blocks (30 science sets, 30 calm blocks) and 30 team tasks for groups of four
- A "say this to the class" script for all 126 tasks: 2 or 3 sentences the sub reads out
- A core task and a ★ challenge in every science set and team task
- Every science set lists the NGSS standards it practices
- 30 optional games, each on that day's lessons (Day 30: on all six weeks)
- Answer keys for everything; color and ink-saver B&W, US Letter and A4

How it works

1. Leave the six binders out. Each has its own filled-in plan with page numbers.
2. The sub reads the "say this" box out, then runs the day's science set in every period. Everyone does the core task, early finishers go on to the ★ challenge.
3. The calm block fits any gap, the team task fills a block period or extra time, the game the last 15 minutes.
4. No prep and no tech: paper and pencil, print and go.

The 30 days: a science set, a team task and a game

- **Week 1, days 1 to 5. Science:** Density and Why Things Float; States of Matter; Food Chains and Webs; Forces and Motion; The Water Cycle. **Team:** The Size Scale Hallway, The Lab Week Plan, Paper Helicopter Test, Trout Stream Council, The Mars Crew Debate.
- **Week 2, days 6 to 10. Science:** Atoms and Molecules; Cells; Rocks and the Rock Cycle; Kinetic and Potential Energy; Engineering Design: Criteria and Constraints. **Team:** The Mystery Molecule Files, Is It Alive? The Museum Card Sort, The Quartz Grain's Journey, The Energy Olympics, The Paper Tower Challenge.
- **Week 3, days 11 to 15. Science:** Chemical Reactions; Body Systems; Plate Tectonics; Waves: Sound and Light; Ecosystem Interactions. **Team:** Kitchen Chemistry Sort, The Oxygen Trip, The Plate Boundary Map, Quiet Room Design, Ripple Effects.
- **Week 4, days 16 to 20. Science:** The Periodic Table and Properties; Genetics and Heredity; Weather and Climate; Electricity and Magnetism; Photosynthesis and Respiration. **Team:** The Mixed-Up Sample Jars, The Dragon Egg Hatchery, The Forecast Desk, The Maglev Model, The Sealed Jar Habitat.
- **Week 5, days 21 to 25. Science:** Heat and Thermal Energy; Natural Selection and Adaptation; Gravity and the Solar System; Moon Phases and Seasons; Natural Resources and Human Impact. **Team:** The Ice Pop Rescue Box, The Field Guide Mix-Up, The Four Mystery Worlds, Postcards from Odessa, The Classroom Power Cut.
- **Week 6, days 26 to 30. Science:** Experiment Design; Graphing and Analyzing Data; Fossils and Earth's History; Engineering Challenge: Design and Test; Big Review of Six Weeks. **Team:** Four Experiments, Sixteen Clues, Graph Doctors, The Yellow Fork Bluff Dig, The Footbridge Budget, The Six Lock Lab Escape.

Optional game every day, on that day's lessons (Day 30, the big review day: its game reviews all six weeks): Mon **Whiteboard Quiz Game** Tue **Paper Password** Wed **Class Feud** Thu **Classroom Millionaire** Fri **Mystery Box**

What this preview shows: the note to the substitute, the Week 1 plan, more front pages, one page of every daily part, a full science set with its key, a calm block, a team task, the game types and one ink-saver page. Every product page is watermarked. The full product has 395 pages.
What the sub gets: a note that explains the routine, a "say this" script for every task (126 in all), a sub script for every Monday opener, a "Read this out" box on most games, and every answer in the key.



Note to the Substitute

Grades 6 to 8 · five days · every set runs from the printout alone

Thank you for covering my classes this week

Everything you need is in this binder. The weekly plan is filled in for you; the important information page and the class list are for the teacher (or you) to fill in. After the binder pages come the five days in order, Monday to Friday. Monday starts with a short opener (about 15 minutes), then each day has its work sets: **Science 1** is Monday's set, **Science 2** is Tuesday's, and so on to **Science 5** on Friday. Run the day's set in every period you teach that day. Each set is one period (45 to 55 minutes), stands alone, and has its own answer key at the back of the binder, so you never have to make anything up or know the subject. Every task starts with a short **Say this to the class** box under its title: read it out, and the class knows what to do and how to start.

Every science and team page has a core task first, then a ☆ challenge. Every student does the core task. Students who finish early go on to the ☆ challenge; it fills a few extra minutes, and nobody has to finish it.

Each day's work set is followed by that day's calm block, team task and game. The **calm block** is always allowed: for time left at the end, a loud class, or anyone who finishes early. The **team task** fills a period on its own. The **game** is optional: a fun way to end the class, or something for extra time. Fifteen minutes, from the script; items marked (calm) or (team) can be skipped if the class did not do that part.

Every science set names the Next Generation Science Standards (NGSS) middle school performance expectations it practices, on a small line under its title (for you, not the students). A sub plan set practices part of a performance expectation; it is review and practice, not a full assessment of it.

Each day has

- One Science set (one period, core task + ☆ challenge on every page)
- A calm and quiet block: learn 8 terms from the day's topic, then a quiet self-test
- A team task for groups of four
- A paper game from the script

If the class is loud

- Set a voice level with a number, 0 to 3, and use it all week (the Day 1 opener explains it).
- Switch to the calm block. Nobody needs to move.
- If a set is not working, stop it and use the calm block or the team task. Every set starts cold.

At the end of each day

Please fill in that day's line on the "How it went" page. It takes two minutes and I read every word.

For the teacher who bought this kit: if it worked well for your class, leaving a review on TpT helps other teachers find it and gives you credits toward future purchases. Thank you!

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This Week's Plan

Filled in for you: run the day's set in every period you teach. Keep it as it is, or use the blank schedule on the next page for your own order.

WHEN	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Start of class	**Meet Your Sub** p. 11 · 15 min, every period	Attendance, voice level	Attendance, voice level	Attendance, voice level	Attendance, voice level
Main work, every period	**Science 1** Density and Why Things Float p. 14	**Science 2** States of Matter p. 23	**Science 3** Food Chains and Webs p. 32	**Science 4** Forces and Motion p. 42	**Science 5** The Water Cycle p. 52
Early finishers or a loud moment	**Learn and Test: Matter Property Terms** p. 17	**Learn and Test: Heat and Matter Terms** p. 26	**Learn and Test: Ecosystem Terms** p. 35	**Learn and Test: Motion Terms** p. 45	**Learn and Test: Water in Nature Terms** p. 55
Block period or extra time	**The Size Scale Hallway** p. 19	**The Lab Week Plan** p. 28	**Paper Helicopter Test** p. 37	**Trout Stream Council** p. 47	**The Mars Crew Debate** p. 57
Last 15 minutes (optional): a fun way to end the class, or for extra time	**Whiteboard Quiz Game** p. 21	**Paper Password** p. 30	**Class Feud** p. 40	**Classroom Millionaire** p. 50	**Mystery Box** p. 59

How to use this plan

- Page numbers point to the first page of each set. Copy work sets and calm blocks one per student. Team tasks: one copy per group, plus any extra copies, cards or sheets the pages ask for. Copy any page that gets torn apart (field reports, templates, cards) one-sided, on its own sheet, so the page on its back stays whole. Game scripts are for you only (do not copy them); copy game boards and cards as their pages say.
- The calm block is always allowed: time left at the end, a loud class, or anyone who finishes early.
- On Monday the opener takes the first 15 minutes, so stop the set where the bell falls; finish page 3 as early-finisher work on Tuesday or leave it for another day.
- The game is optional: a fun way to end the class, or something for extra time.

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MS SCIENCE SUB PLANS WEEK 1

Middle School Science, 5 Days of Print and Go Work

Teacher _____

Room _____

Grade and classes _____

Week of _____

Everything a sub needs for five days is in this binder: a filled-in weekly plan, a blank schedule, the class list, and for every day one Science set, a calm block, a team task and a paper game. Each set is one period, stands alone, and has its own answer key. Nothing needs subject knowledge, a login or a projector.



Important Information

The page the sub reads first. Fill it in once and keep it current.

People to call

Office _____

Teacher next door _____

Nurse _____

Principal / admin _____

Tech help _____

Emergency procedures

Fire: exit and meeting point _____

Lockdown _____

Severe weather _____

Medical _____

Where the first aid kit is _____

Helpful students

_____

_____

_____

Students who need extra support

_____

_____

_____

Where things are

Attendance / how to take it _____

Paper, pencils, supplies _____

Hall passes _____

Copier, if the sub may use it _____

Class routines

Start of class _____

Bathroom _____

Phones _____

End of class _____

Weekly Schedule (Blank)

Your own order: write the set for each period (Monday: Science 1, Tuesday: Science 2, and so on) and the class next to each period. Cross out or rename periods to match the school day.

PERIOD / CLASS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1 ____ – ____ Class: _____					
Period 2 ____ – ____ Class: _____					
Period 3 ____ – ____ Class: _____					
Period 4 ____ – ____ Class: _____					
Period 5 ____ – ____ Class: _____					
Period 6 ____ – ____ Class: _____					
Period 7 ____ – ____ Class: _____					

How to fill it in

- One set per period. Each set runs 45 to 55 minutes; if a period runs longer, the ☆ challenges fill a few minutes, or add that day's team task.
- Same subject all day? Write the day's set in every period you teach. Planning, lunch and duty periods: cross them out.
- On Monday the opener (15 minutes) comes first in every period, then the set.
- The game is optional: put it in the last 15 minutes of any period as a fun way to end the class, or use it for extra time. The calm block goes in any gap.

Set naming

Sets are named by subject and day: **Science 1** is Monday's set, **Science 2** is Tuesday's, and so on to **Science 5** on Friday. The set index lists every set with its minutes and page.

Set Index (1 of 3)

Every set in the binder with its length and page. Day = the weekday it is written for. Any science set works on any day; each game reviews its own day's set.

DAY	SET	WHAT IT IS	MINUTES	PAGE
SCIENCE, DAYS 1 TO 5				
1	**Science 1: Density and Why Things Float**	**Reviews:** density as mass divided by volume, why objects float or sink in water, and using density to identify a material. Reading and a worked example, an 8 row density table, 5 questions, a density lower, a star challenge on every page. Key included.	50	p. 14
2	**Science 2: States of Matter**	**Reviews:** the particle model of solids, liquids and gases, melting and boiling points, and reading a heating curve. Particle model reading and drawing, a melting and boiling point table, a heating curve with 6 questions, a star on every page. Key included.	50	p. 23
3	**Science 3: Food Chains and Webs**	**Reviews:** producers, consumers and decomposers, reading a food web, energy flow at about 10 percent per level, and what happens when a species disappears. Reading and vocabulary, a printed meadow food web to classify, 8 web questions, an energy flow table, a star on every page. Key included.	50	p. 32
4	**Science 4: Forces and Motion**	**Reviews:** balanced and unbalanced forces, finding the net force, speed equals distance divided by time, and reading a distance and time graph. Reading on forces and speed, 6 net force diagrams, an 8 row speed table, a distance and time graph, a star on every page. Key included.	50	p. 42
5	**Science 5: The Water Cycle**	**Reviews:** evaporation, transpiration, condensation, precipitation, runoff and infiltration, the roles of the sun and gravity, and rainfall data. Reading and a term match, a water cycle diagram to label, a rainfall table with 6 questions and a bar graph, a star on every page. Key included.	50	p. 52
MONDAY OPENER				
1	**Meet Your Sub**	Fifteen minutes at the start of every period on Monday: sub sheet, three questions, the agreement and voice levels. Spare: a keyed Science Myth or Fact.	15	p. 11

Class List and Dismissal

Names, what a sub must know, and how every student goes home. Copy one per class.

(B) bus (write the number) (W) walks (P) picked up (write who) (A) after-school program (O) other

☆ in the notes: a student who finds the core task easy may start with the challenge

#	STUDENT NAME	NOTES (ALLERGIES, NEEDS, HELPFUL, LEAVES EARLY)	HOME	BUS # / PICKED UP BY / PROGRAM
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				

How It Went

For the substitute. One line per day, two minutes at the end of each day. Check the boxes and go.

Monday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes

Notes / stars of the day: _____

Tuesday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes

Notes / stars of the day: _____

Wednesday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes

Notes / stars of the day: _____

Thursday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes

Notes / stars of the day: _____

Friday

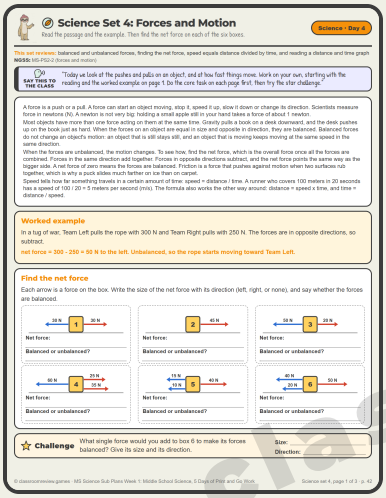
Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes

Notes / stars of the day: _____

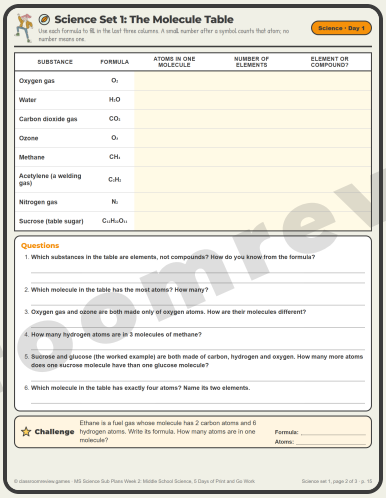
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Binder cover, important information, schedule, set index, class list, how it went

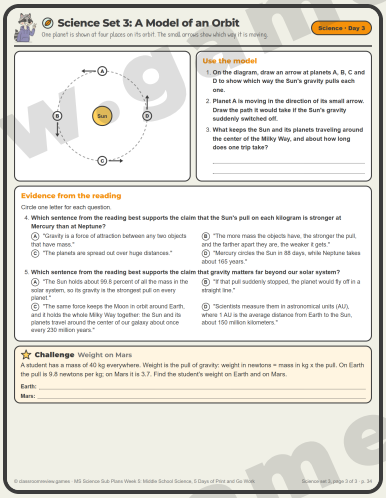
ONE PAGE OF EVERY DAILY PART



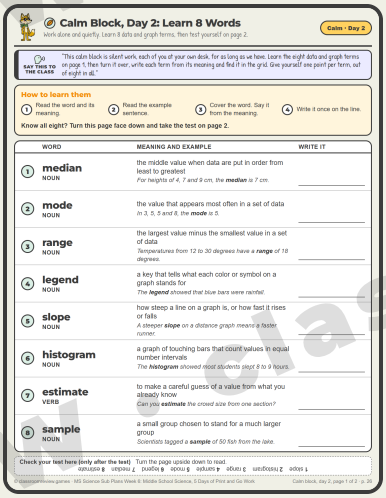
Science set: the lesson, Week 1 (solo)



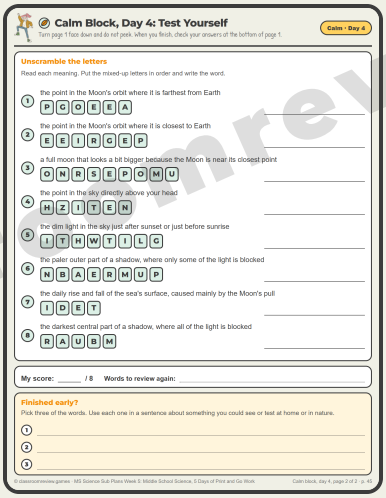
Science set: practice, Week 2 (solo)



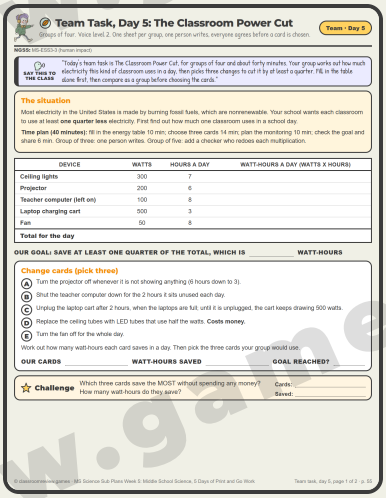
Science set: the third page (solo)



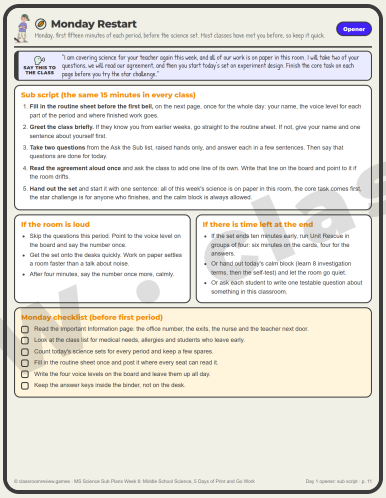
Calm block: learn 8 terms (solo)



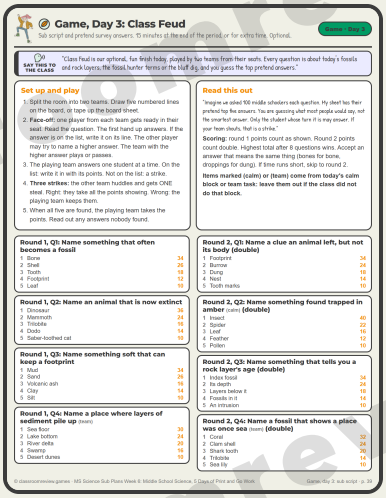
Calm block: test yourself (solo)



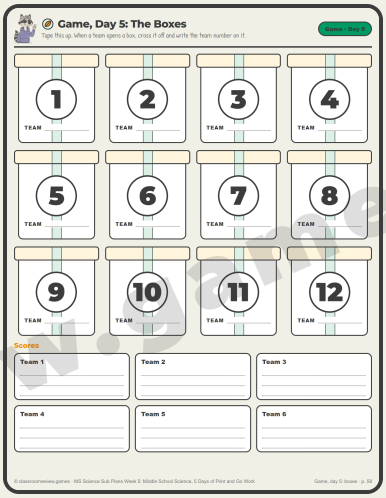
Team task (groups of four)



Monday opener (whole class)



Game: Class Feud (whole class)



Game: Mystery Box (whole class)

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Science Set 1: Experiment Design

Read the passage and Selma's procedure, then name the parts of her investigation.

Science · Day 1

This set reviews: testable questions, hypotheses, independent, dependent and controlled variables, trials and averages in a motion investigation

NGSS: MS-PS2-2 (forces and motion)

SAY THIS TO THE CLASS "Today you learn how scientists design a fair test, using a cart investigation about force and mass. Work on your own, starting with the reading on page 1. Do the core task on each page first, then the star challenge when you finish."

A good experiment starts with a testable question: a question you can answer by measuring something. A question about whether a heavier cart rolls a shorter distance is testable, because a tape measure can settle it. A question about which cart looks coolest is not. Next comes a hypothesis, a prediction that can be checked, often written with if and then: if the cart has more mass, then it will roll a shorter distance after the same push.

In a fair test, a scientist changes only one thing on purpose. That one thing is the independent variable. The result she measures is the dependent variable. Everything else is kept the same, and those are the controlled variables. If two things change at once, nobody can tell which one caused the result.

One try is never enough. A floor can have a bump, and a person can read a tape measure wrong. Scientists repeat each test several times, and each repeat is called a trial. They then find the average by adding the results and dividing by the number of trials. Repeating trials makes a result more reliable, and a trial that is far from the others can be a sign that something went wrong.

Motion experiments follow the same rules. A push or a pull is a force. When the same force acts on two objects, the object with more mass speeds up less. Newton's second law of motion describes this: how much an object's motion changes depends on both the force on it and its mass.

Selma's procedure

Selma sets a toy cart against a rubber band launcher on the gym floor, pulls the band back 10 cm and lets go. She measures how far the cart rolls before it stops. She tests the empty cart (100 g), then presses clay onto it to make it 200 g, 300 g and 400 g. She does three trials at each mass, with the same cart, the same launcher, the same floor and the same 10 cm pull.

Name the parts of Selma's investigation

1. **Selma's testable question:**

2. **The independent variable (what she changes):**

3. **The dependent variable (what she measures):**

4. **Two controlled variables (kept the same):**

☆ Challenge

Selma's friend wants to test a heavier cart AND a smoother floor in the same trial. Use the reading to explain the problem.

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Science Set 1: Selma's Data

Find the average of the three trials for each mass: add them, then divide by 3. Every average is a whole number.

Science · Day 1

MASS OF CART (g)	TRIAL 1 (cm)	TRIAL 2 (cm)	TRIAL 3 (cm)	AVERAGE DISTANCE (cm)
100	238	244	241	
200	122	118	120	
300	79	83	81	
400	61	58	61	

Questions

1. **Which mass rolled the farthest on average? Give its average.**

2. **The mass doubled from 100 g to 200 g. What happened to the average distance?**

3. **Selma's partner adds a fourth trial at 200 g: 152 cm. Should Selma trust it? Use the reading.**

4. **Write Selma's conclusion: a claim plus two numbers from the table as evidence.**

Evidence from the reading (circle one letter)

1. **Which sentence from the reading best explains why Selma did three trials at each mass?**
   - (A) "If two things change at once, nobody can tell which one caused the result."
   - (B) "Repeating trials makes a result more reliable, and a trial that is far from the others can be a sign that something went wrong."
   - (C) "A push or a pull is a force."
   - (D) "Everything else is kept the same, and those are the controlled variables."
2. **Which sentence from the reading best supports the claim that the 400 g cart should roll the shortest distance?**
   - (A) "In a fair test, a scientist changes only one thing on purpose."
   - (B) "The result she measures is the dependent variable."
   - (C) "When the same force acts on two objects, the object with more mass speeds up less."
   - (D) "A floor can have a bump, and a person can read a tape measure wrong."

Challenge

For each row, multiply the mass by the average distance. The answers are all close to one number. Use it to predict the average distance for a 500 g cart.

The close number:

Distance for 500 g:

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Science Set 1: Three Plans, One Question

Three groups planned a test for the question: Does a bigger pull on the launcher make the cart roll farther? Check each plan against the four criteria.

Science · Day 1

Plan A
Pull back 5 cm, 10 cm and 15 cm with the 200 g cart on the gym floor. One trial each. Measure each distance with a tape measure and write it in a table.

Plan B
Pull back 5 cm with the 200 g cart, 10 cm with the 300 g cart and 15 cm with the 400 g cart. Three trials each, measured with a tape measure. Call out each number to the class.

Plan C
Pull back 5 cm, 10 cm and 15 cm with the 200 g cart on the gym floor. Three trials each. Watch each roll and say whether it went far or not very far.

CRITERION	PLAN A (YES OR NO)	PLAN B (YES OR NO)	PLAN C (YES OR NO)
Changes only one variable			
Measures the result with a number			
Repeats each test at least 3 times			
Records the results in a table			

Questions

1. **Which plan meets the most criteria? How many of the four?**

2. **Plan B uses tape measures and three trials. Why can nobody trust its results anyway?**

3. **Write a new plan that keeps the best features of all three.**

Challenge Plan A with the 400 g cart instead of the 200 g cart: would the distances be longer or shorter? Would a bigger pull still make it roll farther?

Longer or shorter: .....

Still farther? .....

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Answer Keys (1 of 6)

Day 1. Teacher copy. Keep these pages out of the student sets.

Day 1 opener: Unit Rescue, answers

1. m/s (speed). Speed is distance divided by time: about 30 meters every second. **2. g** (mass). Mass is measured in grams; 200 grams is a bit less than half a pound. **3. N** (force). Forces are measured in newtons, named after the scientist Newton. **4. °C** (temperature). On the Celsius scale water freezes at 0 and boils at 100 at sea level. **5. g/cm³** (density). Density is mass divided by volume: grams in every cubic centimeter. **6. m** (length). Length is measured in meters; 12 meters is almost the length of three cars in a row. **7. mL** (volume). Volume is measured in milliliters; a calm breath is about half a liter. **8. minutes** (time). Sunlight takes a little over 8 minutes to cross the 150 million km to Earth.

One point for each right unit and one more for the right kind of measurement. Score: 16 points at most.

Science Set 1: Experiment Design

Name the parts: Selma's testable question: Does a cart with more mass roll a shorter distance after the same push? (any wording that names mass and distance); The independent variable (what she changes): the mass of the cart; The dependent variable (what she measures): how far the cart rolls (the distance); Two controlled variables (kept the same): any two of: the same cart, the same launcher, the same floor, the same 10 cm pull. **Page 1 star challenge:** two things would change at once (the mass and the floor), so nobody could tell which one caused a change in distance; change only one.

Averages: 100 g: (238 + 244 + 241) / 3 = 241 cm; 200 g: (122 + 118 + 120) / 3 = 120 cm; 300 g: (79 + 83 + 81) / 3 = 81 cm; 400 g: (61 + 58 + 61) / 3 = 60 cm.

Questions: 1. 100 g, 241 cm; 2. It dropped from 241 cm to 120 cm, to about half; 3. No: it is far from the other three (122, 118, 120 cm), which can be a sign that something went wrong; she should repeat it; 4. The more mass the cart has, the shorter it rolls after the same push: 100 g rolled 241 cm on average, 400 g rolled only 60 cm. **Page 2 star challenge:** 100 x 241 = 24,100; 200 x 120 = 24,000; 300 x 81 = 24,300; 400 x 60 = 24,000; all close to 24,000, so 500 g: about 24,000 / 500 = 48 cm (accept 46 to 50).

Criteria table: Plan A: yes, yes, no, yes (3 of 4); Plan B: no, yes, yes, no (2 of 4); Plan C: yes, no, yes, no (2 of 4). **Questions:** 1. Plan A, 3 of 4; 2. It changes two variables at once (the pull and the cart's mass), so nobody can tell which one caused the result; 3. One cart (200 g) on one floor, pulls of 5, 10 and 15 cm, three trials each, every distance measured with a tape measure and written in a table with averages.

Evidence: 1. B; 2. C. **Page 3 star challenge:** shorter (more mass speeds up less with the same push); yes, a bigger pull should still make it roll farther, because only the pull changes between the tests.

Calm block, Day 1: Learn and Test: Investigation Terms

Match: 1. qualitative; 2. quantitative; 3. precision; 4. outlier; 5. inference; 6. observation; 7. replicate; 8. accuracy.

Students check their own test with the upside-down answers at the bottom of page 1 and write a score out of 8. Finished early sentences: answers vary; accept any sentence about something students could see or test at home or in nature that uses the word with its page 1 meaning.

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Calm Block, Day 1: Learn 8 Words

Work alone and quietly. Learn 8 thermal energy terms, then test yourself on page 2.

Calm · Day 1

SAY THIS TO THE CLASS "This calm block is quiet work on your own, with voices at zero, and it can fill any time left over. Learn the eight thermal energy terms on page 1, then turn it over and match each meaning to its term on page 2. Then mark your own test with the upside down answers on page 1."

How to learn them

1. Read the word and its meaning.
2. Read the example sentence.
3. Cover the word. Say it from the meaning.
4. Write it once on the line.

Know all eight? Turn this page face down and take the test on page 2.

	WORD	MEANING AND EXAMPLE	WRITE IT
1	**thermostat** NOUN	a device that switches heating or cooling on and off to hold a set temperature *The **thermostat** turns the furnace off when the room reaches 21 degrees C.*	
2	**calorie** NOUN	a unit of energy: the amount that warms 1 gram of water by 1 degree Celsius *One **calorie** is about 4.2 joules of energy.*	
3	**infrared** ADJECTIVE	describes invisible light given off by warm objects, which we feel as warmth *An **infrared** camera shows a warm dog glowing bright against a cold yard.*	
4	**equilibrium** NOUN	the state two objects reach when they touch long enough to share one temperature *Once the cocoa and the room reach **equilibrium**, the cocoa stops cooling.*	
5	**vacuum** NOUN	a space with almost no particles of matter, so energy cannot pass by conduction *A **vacuum** between the two walls of a travel bottle keeps soup warm for hours.*	
6	**kelvin** NOUN	a temperature unit that starts at absolute zero, the lowest possible temperature *Water freezes at about 273 **kelvin**.*	
7	**calorimeter** NOUN	an insulated container scientists use to measure energy given off or taken in *The water in the **calorimeter** warmed by 3 degrees as the metal cooled.*	
8	**thermogram** NOUN	a picture from a heat camera that shows warm areas in bright colors *The **thermogram** showed warm air leaking around the window frame.*	

Check your test here (only after the test) Turn the page upside down to read.

1 kelvin 2 thermostat 3 calorimeter 4 vacuum 5 infrared 6 thermogram 7 equilibrium 8 calorie

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Team Task, Day 2: The Field Guide Mix-Up

Groups of four. Voice level 2. One sheet per group, one person writes, everyone agrees before a letter goes in a box.

Team · Day 2

SAY THIS TO THE CLASS "Today's team task is The Field Guide Mix-Up, for groups of four and about forty minutes. A museum mixed up its field guide, and your group pairs each animal with the habitat its adaptations fit. Read the cards alone first, then agree as a group before anyone writes a letter."

The situation

A nature museum printed its new field guide, and the animal pages and the habitat pages got shuffled. Each animal card describes an **adaptation**: an inherited trait that helps it survive and reproduce. Match every animal to the one habitat where that trait helps most. Each habitat letter is used once.

Time plan (40 minutes): read the cards alone 6 min; match as a group 14 min; the fox population 12 min; the moved animal 8 min. Group of three: one person writes. Group of five: add a reader for the cards.

Animal cards

1. **Arctic fox**: Thick fur that turns white in winter, and short ears and legs that lose little heat. ☐
2. **Fennec fox**: Huge ears that give off body heat, and fur on the soles of its feet. ☐
3. **Three-toed sloth**: Long curved claws for hanging from branches, and green algae growing in its fur. ☐
4. **Anglerfish**: A glowing lure on its head that draws prey toward its mouth in total darkness. ☐
5. **Clownfish**: A slimy coating that keeps it from being stung by the sea anemone it lives in. ☐
6. **Mallard duck**: Webbed feet for paddling, and oily feathers that shed water. ☐
7. **Cheetah**: Long legs and a bendy spine for short, very fast chases across open ground. ☐
8. **Mountain goat**: Split hooves with rough pads that grip steep, rocky ledges. ☐

Write the habitat letter in each box.

Habitat cards

- **A** Freshwater pond: still water with reeds and plants along the edges.
- **B** Mountain cliffs: steep rock faces high above the valleys.
- **C** Hot desert: blazing days on loose sand, with very little water.
- **D** Coral reef: warm, shallow sea water full of stinging animals.
- **E** Arctic tundra: snow covers the treeless ground for most of the year.
- **F** Grassland savanna: wide open grass with few trees to hide behind.
- **G** Deep ocean: no sunlight at all, cold water, and very little food.
- **H** Rainforest treetops: warm and wet all year, life high in the branches.

☆ Challenge Big ears, small ears

The two foxes have very different ears. Explain how each ear size helps its fox in its own habitat.

Arctic fox: .....

Fennec fox: .....

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Game, Day 1: The Board

Tape this to the whiteboard or copy it. Cross squares off as they are played.

Game · Day 1

VARIABLES	TRIALS	CART TEST	LAB TERMS	CARD SORT
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Scores

Team 1	Team 2	Team 3

Team 4	Team 5	Team 6

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Game, Day 2: Paper Password

Sub script and science word list. 15 minutes at the end of the period, or for extra time. Optional.

Game · Day 2

SAY THIS TO THE CLASS "To finish, we can play Password, an optional and fun game for pairs. The secret words come from today's natural selection set, the survival terms and the field guide task, and one partner gives one-word clues."

Set up (2 minutes)

1. Before class, copy the card page one-sided and fold and tear it into four round cards. Hand each pair only the current round's card; pairs keep each used card and add the four round totals at the end.
2. Partner A is the clue giver in rounds 1 and 3, Partner B in rounds 2 and 4. The guesser never sees the card.
3. Rounds last 2 minutes, with 30 seconds between them to swap roles. One-word clue, then ONE guess; wrong means another clue.
4. After five clues without a right guess, the word scores 0. Say "Go" and "Stop" for each round.

Read this out

"Your clue is one word only. You may not say the secret word or any part of it. If the word is snowman, you cannot say snow or man. No gestures, no spelling, no rhymes. Break a rule and that word scores zero."

Scoring: guessed on clue 1 = 5 points, clue 2 = 4, clue 3 = 3, clue 4 = 2, clue 5 = 1. The clue giver circles the number on the card. After round 4, pairs add their round totals. Highest total wins.

Words marked (calm) or (team), here and on the cards, come from today's calm block or team task. If the class skipped that block, pairs leave them out (and any round left empty).

Referee calls

Two words glued together ("hotdog") count as one clue only if they make a real word. No plurals or "-ing" forms of the secret word. If a pair disagrees about a clue, the word scores zero. Each example clue below is allowed, and a good first clue.

Timing (15 minutes)

0:00	2:00	4:30	7:00	9:30	12:00
Set up, rules	Round 1, Partner A	Round 2, Partner B	Round 3, Partner A	Round 4, Partner B	Add totals, winners

Round 1: Partner A gives clues

TRAIT	example clue: feature
INHERITED	example clue: parents
VARIATION	example clue: differences
OFFSPRING	example clue: babies
SURVIVE	example clue: live

Round 2: Partner B gives clues

BEETLE	example clue: insect
LAVA	example clue: volcano
SELECTION	example clue: natural
REPRODUCE	example clue: breed
ADAPT	example clue: adjust

Round 3: Partner A gives clues

MUTATION (calm)	example clue: change
MIMICRY (calm)	example clue: copycat
EXTINCT (calm)	example clue: dodo
NOCTURNAL (calm)	example clue: night
MIGRATION (calm)	example clue: geese

Round 4: Partner B gives clues

TUNDRA (team)	example clue: Arctic
SLOTH (team)	example clue: slow
CLOWNFISH (team)	example clue: anemone
HIBERNATE (calm)	example clue: winter
HOOVES (team)	example clue: goat

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Game, Day 4: Classroom Millionaire

Sub script and the 12 questions. 15 minutes at the end of the period, or for extra time. Optional.

Game · Day 4

SAY THIS TO THE CLASS

"To finish, we can play Classroom Millionaire, an optional and fun game where the whole class climbs twelve questions as one team. The questions come from today's design and test work, the new terms and the footbridge, and the class shares three lifelines."

How it works

1. Tape up the ladder sheet. The whole class is one player. Pick a student for the hot seat (a new student for every question).
2. Read the question and the four options, then read the options again. The hot seat may listen to quiet advice, then says "final answer" and a letter.
3. Right: the class climbs one rung. Before hearing the next question, the class may vote to walk away and keep what it has.
4. Wrong: the climb ends. Rungs 4 and 8 are safe: the class keeps the last safe amount it passed.
5. Time left over? Play the questions again as a team quiz.

Three lifelines (one use each)

Ask the class: everyone shows 1, 2, 3 or 4 fingers at once for A, B, C or D. The hot seat looks, then decides.

50/50: read out the two wrong options listed under the question. Cross them off.

Phone a friend: the hot seat picks one classmate, who has 30 seconds to say what they think out loud.

"Only the hot seat's final answer counts. Shout an answer and the class loses a lifeline."

Items marked (calm) or (team) come from today's calm block or team task: leave them out if the class did not do that block.

Rungs 1 to 4, rung 4 is safe

1. $100 A limit a design must stay within?
A. Criterion B. Constraint C. Model D. Weight
Answer: B. Constraint (50/50 removes C and D)

2. $250 Something a design must do to succeed?
A. Weight B. Trial C. Criterion D. Limit
Answer: C. Criterion (50/50 removes A and B)

3. $500 Drawing of how a system's parts connect? (calm)
A. Patent B. Schematic C. Matrix D. Gear
Answer: B. Schematic (50/50 removes A and C)

4. $1,000 One round of testing and changing?
A. Iteration B. Weight C. Criterion D. Average
Answer: A. Iteration (50/50 removes B and D)

Rungs 5 to 8, rung 8 is safe

5. $2,500 Lander B: top Egg Team total. Why was it out?
A. Too heavy B. Cracked C. Too slow D. Too costly
Answer: D. Too costly (50/50 removes B and C)

6. $5,000 4 points on a criterion weighted x 3?
A. 7 B. 1 C. 12 D. 43
Answer: C. 12 (50/50 removes B and D)

7. $10,000 Which judged footbridge passed every rule? (team)
A. Team 1 B. Team 2 C. Team 3 D. Team 4
Answer: C. Team 3 (50/50 removes A and D)

8. $25,000 Strongly built, will not wobble or break? (calm)
A. Efficient B. Patent C. Sturdy D. Fragile
Answer: C. Sturdy (50/50 removes A and D)

Rungs 9 to 12

9. $50,000 Trials of 1.6, 1.5 and 1.7 s. The average?
A. 1.5 B. 4.8 C. 1.7 D. 1.6
Answer: D. 1.6 (50/50 removes A and B)

10. $100,000 Two washers made the parachute fall how?
A. Faster B. Slower C. The same D. Upward
Answer: A. Faster (50/50 removes C and D)

11. $500,000 Why did Team 4's footbridge fail? (team)
A. Too heavy B. Too weak C. Too costly D. No deck
Answer: D. No deck (50/50 removes A and C)

12. $1 MILLION Best design possible within the limits?
A. Prototype B. Optimal C. First try D. Sketch
Answer: B. Optimal (50/50 removes C and D)

If the class misses

Wrong on rung 1 to 4	**class keeps $0**
Wrong on rung 5 to 8	**class keeps $1,000**
Wrong on rung 9 to 12	**class keeps $25,000**
Walk away after rung n	**class keeps rung n**

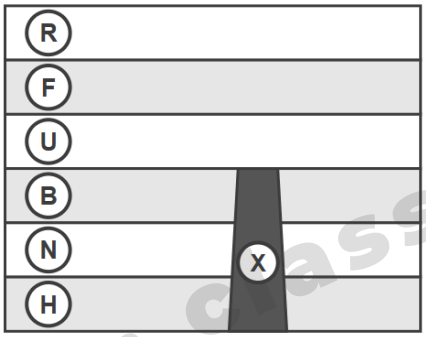
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Science Set 3: Read the Canyon Wall

This drawing shows the layers of one canyon wall. The layers have not been folded or flipped.

Science · Day 3



R: sandstone, with mammal teeth and flowering plant pollen

F: mudstone, with dinosaur bones and ferns

U: siltstone, with ferns and reptile footprints

B: limestone, with fish and brachiopod shells

N: shale, with trilobites and brachiopod shells

H: limestone, with trilobites and sponges

X: intrusion (once melted rock that pushed up and hardened). Its top was worn flat before layer U was laid down on it.

Questions

1. **Which layer is the oldest? Which is the youngest?**

2. **List all six layers from the oldest to the youngest.**

3. **Intrusion X cuts some layers but not others. Which layers is it younger than? Which layers is it older than?**

4. **Trilobites appear in some layers and in none above them. What does this pattern suggest?**

5. **Suppose the trilobite in layer N is an index fossil that lived only from 260 to 252 million years ago. How old is layer N? Is layer B older or younger than 260 million years?**

Evidence from the reading (circle one letter)

Which sentence from the reading explains how you know layer H is the oldest?

(A) "Hard parts such as shells, bones and teeth are the most likely to become fossils."
(B) "In layers that have not been disturbed, each layer is younger than the layer below it and older than the layer above it."
(C) "A species that has disappeared forever is extinct."
(D) "It is divided into eons, eras and periods."

☆ Challenge

In another place, a geologist finds dinosaur bones in a layer BELOW a layer with trilobites. Trilobites lived long before dinosaurs. What could explain it?

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Thank you! If this works for your class, a quick review helps other teachers find it and gives you TpT credits.



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