SciQuest — Flashcards

A Spark & Anvil printable flashcard deck. Quiz yourself on the SciQuest cast's curriculum — one card at a time.

How to use these cards

Fold each sheet down the middle line so the answers are hidden. Read the **question** on the left, say your answer out loud, then **unfold** to check the right side. Testing yourself — then checking — is one of the most powerful ways to remember. Get one wrong? That's the best kind of practice: try it again tomorrow.

Want real flashcards? Cut along the fold line and the rows into cards — question on one side, answer on the other.

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1. Push, Pull, Balance

✂ Question (fold →)	Answer
Two kids push a crate on the ramp with EQUAL strength from opposite sides. What happens to the crate?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the crate does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
One kid pushes a box on the floor HARDER than the kid on the other side. Which way does the box move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the box changes its motion. The stronger push wins, so the box moves away from it (toward the weaker side). Unequal force IS the change in motion.
One kid pushes a crate on the ramp HARDER than the kid on the other side. Which way does the crate move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the crate changes its motion. The stronger push wins, so the crate moves away from it (toward the weaker side). Unequal force IS the change in motion.
Two kids push a book on the desk with EQUAL strength from opposite sides. What happens to the book?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the book does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Two kids push a box on the floor with EQUAL strength from opposite sides. What happens to the box?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the box does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
One kid pushes a ball on the grass HARDER than the kid on the other side. Which way does the ball move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the ball changes its motion. The stronger push wins, so the ball moves away from it (toward the weaker side). Unequal force IS the change in motion.
One kid pushes a wagon on the path HARDER than the kid on the other side. Which way does the wagon move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the wagon changes its motion. The stronger push wins, so the wagon moves away from it (toward the weaker side). Unequal force IS the change in motion.
One kid pushes a scooter on the sidewalk HARDER than the kid on the other side. Which way does the scooter move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the scooter changes its motion. The stronger push wins, so the scooter moves away from it (toward the weaker side). Unequal force IS the change in motion.
Two kids push a puck on the ice with EQUAL strength from opposite sides. What happens to the puck?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the puck does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Two kids push a scooter on the sidewalk with EQUAL strength from opposite sides. What happens to the scooter?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the scooter does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
One kid pushes a toy car on the ramp HARDER than the kid on the other side. Which way does the toy car move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the toy car changes its motion. The stronger push wins, so the toy car moves away from it (toward the weaker side). Unequal force IS the change in motion.

One kid pushes a puck on the ice HARDER than the kid on the other side. Which way does the puck move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the puck changes its motion. The stronger push wins, so the puck moves away from it (toward the weaker side). Unequal force IS the change in motion.
One kid pushes a book on the desk HARDER than the kid on the other side. Which way does the book move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the book changes its motion. The stronger push wins, so the book moves away from it (toward the weaker side). Unequal force IS the change in motion.
Two kids push a ball on the grass with EQUAL strength from opposite sides. What happens to the ball?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the ball does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
One kid pushes a cart on the track HARDER than the kid on the other side. Which way does the cart move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the cart changes its motion. The stronger push wins, so the cart moves away from it (toward the weaker side). Unequal force IS the change in motion.
One kid pushes a sled on the snow HARDER than the kid on the other side. Which way does the sled move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the sled changes its motion. The stronger push wins, so the sled moves away from it (toward the weaker side). Unequal force IS the change in motion.
Two kids push a toy car on the ramp with EQUAL strength from opposite sides. What happens to the toy car?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the toy car does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Two kids push a wagon on the path with EQUAL strength from opposite sides. What happens to the wagon?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the wagon does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Two kids push a sled on the snow with EQUAL strength from opposite sides. What happens to the sled?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the sled does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Two kids push a cart on the track with EQUAL strength from opposite sides. What happens to the cart?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the cart does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.

2. Read the Pattern

✂ Question (fold →)	Answer
A yo-yo repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the yo-yo repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A ball rolls down the same ramp the same way every time and always lands in the cup. Predict the next roll:	**It lands in the cup again.** — Because the motion has been the SAME every time, the pattern predicts the same result — it lands in the cup. Patterns of motion can be used to predict future motion.
A metronome clicks left-right-left-right at a steady beat. Predict the click AFTER a 'left':	**Right.** — The steady alternating pattern (left-right) predicts that after a 'left' comes a 'right'. Regular patterns make the next motion predictable.
A paper plane repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the paper plane repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A fan blade is marked with one white tip, spinning fast and steady. Predict the tip's spot a full turn later:	**Right back where it is now.** — One complete, steady turn brings the marked tip back to the same spot — the pattern predicts it. Regular motion predicts future position.
A pendulum takes the same time for each swing (a steady tick). If you start it higher, predict its swing TIME:	**About the same time per swing.** — A pendulum keeps a steady swing time — the pattern predicts about the same time per swing. (Predict, then observe to confirm.)
A hoop repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the hoop repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A top repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the top repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A roller repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the roller repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A kite repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the kite repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
Ripples spread from a dropped pebble in even rings. Predict the next ring compared to the last:	**A little bigger, farther out.** — The even outward pattern predicts each new ring is a bit bigger and farther out. Regular patterns let you predict what happens next.
A domino chain repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the domino chain repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A jump rope turns in a steady circle. Predict where the rope will be a half-turn from the top:	**At the bottom.** — Steady circular motion is a pattern: a half-turn from the top is the bottom. Regular motion lets you predict the position ahead of time.

A swing goes back and forth in a steady, repeating pattern. Predict: where will it be after one more full swing?	**Back where it started the swing.** — A regular, repeating motion lets you PREDICT the future position: after one full swing the swing returns to where that swing began. Predict, then watch to check.
A skateboarder pumps the half-pipe, rising to the same height each time. Predict the next rise:	**About the same height.** — A steady repeating pattern (same rise) predicts about the same height next time. Patterns of motion predict future motion.
A carousel spins at a steady speed. A red horse passes you every 10 seconds. Predict when it passes next:	**About 10 seconds later.** — A steady repeating pattern (every 10 s) predicts the red horse passes again about 10 s later. Timing a pattern predicts future motion.
A toy train loops the same track. It's at the station now; last loop took 30 seconds. Predict when it returns:	**In about 30 seconds.** — Because each loop takes the same time, the pattern predicts the train returns in about 30 s. Measured patterns predict motion.
A bouncing ball bounces a little LOWER each bounce, in a steady pattern. Predict the next bounce:	**A little lower than the last one.** — The observed pattern (each bounce lower) predicts the next bounce is lower still. A measured pattern predicts future motion.
A marble repeats the exact same motion each try. Predict the next try:	**The same motion as before.** — Because the marble repeats the same motion, the pattern predicts the same result next time. Patterns of motion predict future motion.
A wind-up toy walks forward, turns, walks, turns — the same loop each time. Predict where it ends its next loop:	**The same spot it ended last loop.** — A repeating loop of motion predicts the same ending spot each time. Observing the pattern once lets you predict the next cycle.

3. Pull Without Touching

✂ Question (fold →)	Answer
Will a magnet attract this steel paperclip without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this steel paperclip (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Will a magnet attract this iron key without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this iron key (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Does a magnet attract a aluminum can?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a aluminum can. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Does a magnet attract a brass button?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a brass button. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Does a magnet attract a gold ring?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a gold ring. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
A magnet moves a paperclip through a thin sheet of paper without touching it. This shows magnetism can act…	**through some materials, across a gap.** — The clip moves even with paper between — magnetic force acts across a gap and through some materials. That's the 'at a distance' idea.
Will a magnet attract this iron horseshoe without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this iron horseshoe (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Will a magnet attract this iron bolt without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this iron bolt (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Does a magnet attract a glass marble?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a glass marble. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Will a magnet attract this iron nail without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this iron nail (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Two magnets: a NORTH pole faces a SOUTH pole. Predict what they do.	**They pull together (attract).** — Opposite poles (N–S) ATTRACT — they pull together across a gap. The interaction happens without contact.
Design idea: you want a fridge note-holder to grip a steel door. Which part must be magnetic?	**A magnet in the holder.** — A steel door is magnetic, so the holder needs a MAGNET to grip it at a distance. Rubber, plastic, and wood are not attracted to the door.
Two magnets: a NORTH pole faces another NORTH pole. Predict what they do.	**They push apart (repel).** — Like poles (N–N) REPEL — they push apart, and you feel the push before they touch. Magnetic force acts at a distance.
	Yes — it can pull it from a small distance. — A magnet pulls this nickel

Will a magnet attract this nickel coin without touching it?	coin (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Does a magnet attract a copper wire?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a copper wire. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Does a magnet attract a wooden peg?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a wooden peg. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Does a magnet attract a rubber band?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a rubber band. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
Will a magnet attract this steel scissors without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this steel scissors (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Will a magnet attract this steel spoon without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this steel spoon (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
Does a magnet attract a plastic block?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a plastic block. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).

4. Round and Round

✂ Question (fold →)	Answer
A seed will not grow into a plant unless it has water, air, and warmth. A seed is...	**a living stage that begins the plant's life cycle.** — A seed is a LIVING beginning stage — it can grow into a plant that makes new seeds. (A common mix-up is thinking seeds/eggs are nonliving; they begin the life cycle.)
In a bean plant, what comes right AFTER the sprout?	**young plant** — After the sprout comes the young plant, then the flowering plant. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
In a dog, what comes right AFTER the puppy?	**young dog** — After the puppy comes the young dog, then the adult dog. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
In a chicken, what comes right AFTER the chick?	**young hen** — After the chick comes the young hen, then the adult hen. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
Which comes FIRST in a frog's life cycle?	**egg** — A frog's life cycle begins with the egg, then it grows through tadpole and young frog to the adult frog, which can reproduce — then the cycle begins again.
In a frog, what comes right AFTER the tadpole?	**young frog** — After the tadpole comes the young frog, then the adult frog. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
Which comes FIRST in a sunflower's life cycle?	**seed** — A sunflower's life cycle begins with the seed, then it grows through seedling and young plant to the flowering sunflower, which can reproduce — then the cycle begins again.
Which comes FIRST in a ladybug's life cycle?	**egg** — A ladybug's life cycle begins with the egg, then it grows through larva and pupa to the adult ladybug, which can reproduce — then the cycle begins again.
Why does a butterfly's life cycle 'start over' after the adult stage?	**The adult reproduces, laying eggs that begin new cycles.** — The cycle repeats because the ADULT reproduces — it lays eggs that begin brand-new cycles in its offspring. The same butterfly does not turn back into an egg.
In a butterfly, what comes right AFTER the caterpillar?	**chrysalis** — After the caterpillar comes the chrysalis, then the butterfly. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
Which comes FIRST in a bean plant's life cycle?	**seed** — A bean plant's life cycle begins with the seed, then it grows through sprout and young plant to the flowering plant, which can reproduce — then the cycle begins again.
Which comes FIRST in a sea turtle's life cycle?	**egg** — A sea turtle's life cycle begins with the egg, then it grows through hatchling and young turtle to the adult turtle, which can reproduce — then the cycle begins again.
What do ALL animal and plant life cycles have in common?	**Birth, growth, reproduction, and death.** — Life cycles look DIFFERENT (a frog vs a bean plant), but ALL share birth, growth, reproduction, and death. The details vary; the big pattern is the same.
In a salmon, what comes right AFTER the fry?	**young salmon** — After the fry comes the young salmon, then the adult salmon. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
Which comes FIRST in a chicken's life cycle?	**egg** — A chicken's life cycle begins with the egg, then it grows through chick and young hen to the adult hen, which can reproduce — then the cycle begins again.

Which comes FIRST in a butterfly's life cycle?	**egg** — A butterfly's life cycle begins with the egg, then it grows through caterpillar and chrysalis to the butterfly, which can reproduce — then the cycle begins again.
Which comes FIRST in a dog's life cycle?	**newborn pup** — A dog's life cycle begins with the newborn pup, then it grows through puppy and young dog to the adult dog, which can reproduce — then the cycle begins again.
In a ladybug, what comes right AFTER the larva?	**pupa** — After the larva comes the pupa, then the adult ladybug. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
In a sunflower, what comes right AFTER the seedling?	**young plant** — After the seedling comes the young plant, then the flowering sunflower. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.
In a sea turtle, what comes right AFTER the hatchling?	**young turtle** — After the hatchling comes the young turtle, then the adult turtle. Organisms grow through ordered stages — all include birth, growth, reproduction, and death.

5. Passed Down or Learned

✂ Question (fold →)	Answer
Is 'a dog's trained trick' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'A dog's trained trick' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)
Is 'spot pattern' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Spot pattern' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Why a bigger dog because it ate more food? Inherited or caused by the environment?	**Caused by the environment (more food).** — This is caused by the ENVIRONMENT (more food), not inheritance. The environment can influence traits during an organism's life — and those changes are not passed to offspring.
Is 'riding a bike' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'Riding a bike' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)
Is 'fur color' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Fur color' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Why a tree bent by strong wind? Inherited or caused by the environment?	**Caused by the environment (the wind).** — This is caused by the ENVIRONMENT (the wind), not inheritance. The environment can influence traits during an organism's life — and those changes are not passed to offspring.
Why a plant grown in the dark is pale? Inherited or caused by the environment?	**Caused by the environment (less sunlight).** — This is caused by the ENVIRONMENT (less sunlight), not inheritance. The environment can influence traits during an organism's life — and those changes are not passed to offspring.
Is 'eye color' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Eye color' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Why a scar from a scrape? Inherited or caused by the environment?	**Caused by the environment (an injury).** — This is caused by the ENVIRONMENT (an injury), not inheritance. The environment can influence traits during an organism's life — and those changes are not passed to offspring.
Is 'tying shoes' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'Tying shoes' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)
Is 'speaking a language' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'Speaking a language' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)
Is 'leaf shape' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Leaf shape' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Is 'reading words' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'Reading words' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)

Two red flowers have offspring that are mostly red but a few are pink. This shows...	**variation — offspring differ a little from parents and each other.** — The color is inherited, but there is VARIATION — offspring differ a little from parents and from each other. Variation is normal; a different color is not 'better' by itself.
Is 'tail length' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Tail length' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Is 'flower color' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Flower color' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Is 'a parrot's taught phrase' something passed down from parents, or LEARNED?	**Learned — not inherited.** — 'A parrot's taught phrase' is LEARNED through practice — it is NOT inherited. (A very common mix-up is thinking a skill a parent learned gets passed to the baby; it doesn't.)
Is 'number of petals' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Number of petals' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Is 'beak shape' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Beak shape' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Is 'wing shape' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Wing shape' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.

6. Blend In, Survive

✂ Question (fold →)	Answer
Predict: over many years on dark cave, will there be MORE pale fishs or MORE bright fishs?	**More pale fishs.** — The pale fish survives better on dark cave, so it has more offspring with that coloring. Over time there are MORE pale fishs — helpful variations spread. (Predict, then run the sim to check.)
Predict: over many years on sandy beach, will there be MORE tan crabs or MORE red crabs?	**More tan crabs.** — The tan crab survives better on sandy beach, so it has more offspring with that coloring. Over time there are MORE tan crabs — helpful variations spread. (Predict, then run the sim to check.)
Predict: over many years on dark tree bark, will there be MORE dark moths or MORE light moths?	**More dark moths.** — The dark moth survives better on dark tree bark, so it has more offspring with that coloring. Over time there are MORE dark moths — helpful variations spread. (Predict, then run the sim to check.)
Predict: over many years on green leaves, will there be MORE green bugs or MORE yellow bugs?	**More green bugs.** — The green bug survives better on green leaves, so it has more offspring with that coloring. Over time there are MORE green bugs — helpful variations spread. (Predict, then run the sim to check.)
On gray rocks, which coloring helps an animal survive by hiding from predators?	**The gray moth.** — On gray rocks, the gray moth blends in and hides from birds, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
Predict: over many years on snowy ground, will there be MORE white hares or MORE brown hares?	**More white hares.** — The white hare survives better on snowy ground, so it has more offspring with that coloring. Over time there are MORE white hares — helpful variations spread. (Predict, then run the sim to check.)
Some birds have beaks that crack big seeds; some have thin beaks for insects. In a place with only big seeds, which survives better?	**The big-seed-cracking beak.** — Where only big seeds are available, the seed-cracking beak feeds better, so those birds survive and reproduce more. A trait's advantage depends on the environment.
On dark tree bark, which coloring helps an animal survive by hiding from predators?	**The dark moth.** — On dark tree bark, the dark moth blends in and hides from birds, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
On sandy beach, which coloring helps an animal survive by hiding from predators?	**The tan crab.** — On sandy beach, the tan crab blends in and hides from gulls, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
On green leaves, which coloring helps an animal survive by hiding from predators?	**The green bug.** — On green leaves, the green bug blends in and hides from lizards, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
On green pond weeds, which coloring helps an animal survive by hiding from predators?	**The green turtle.** — On green pond weeds, the green turtle blends in and hides from herons, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.

Predict: over many years on brown desert, will there be MORE tan lizards or MORE green lizards?	**More tan lizards.** — The tan lizard survives better on brown desert, so it has more offspring with that coloring. Over time there are MORE tan lizards — helpful variations spread. (Predict, then run the sim to check.)
Predict: over many years on autumn leaves, will there be MORE orange frogs or MORE blue frogs?	**More orange frogs.** — The orange frog survives better on autumn leaves, so it has more offspring with that coloring. Over time there are MORE orange frogs — helpful variations spread. (Predict, then run the sim to check.)
On snowy ground, which coloring helps an animal survive by hiding from predators?	**The white hare.** — On snowy ground, the white hare blends in and hides from foxes, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
Predict: over many years on gray rocks, will there be MORE gray moths or MORE orange moths?	**More gray moths.** — The gray moth survives better on gray rocks, so it has more offspring with that coloring. Over time there are MORE gray moths — helpful variations spread. (Predict, then run the sim to check.)
On dark cave, which coloring helps an animal survive by hiding from predators?	**The pale fish.** — On dark cave, the pale fish blends in and is hard to spot, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
On autumn leaves, which coloring helps an animal survive by hiding from predators?	**The orange frog.** — On autumn leaves, the orange frog blends in and hides from snakes, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
A trait helps an animal FIND A MATE (like a bright song). How can that help the species?	**More mating means more offspring with that trait.** — A trait that helps find a mate leads to more offspring carrying that trait. Advantages help with surviving AND with finding mates and reproducing.
On brown desert, which coloring helps an animal survive by hiding from predators?	**The tan lizard.** — On brown desert, the tan lizard blends in and hides from hawks, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
Predict: over many years on green pond weeds, will there be MORE green turtles or MORE pink turtles?	**More green turtles.** — The green turtle survives better on green pond weeds, so it has more offspring with that coloring. Over time there are MORE green turtles — helpful variations spread. (Predict, then run the sim to check.)

7. Today vs Usually

✂ Question (fold →)	Answer
Windgap's weather chart shows cool, windy, falling-leaves days. Which season does the DATA point to?	**Fall** — A chart of cool, windy, falling-leaves days points to fall — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
What is the difference between WEATHER and CLIMATE?	**Weather is today; climate is the usual pattern over many years.** — WEATHER is what's happening now (today's rain or sun); CLIMATE is the usual pattern of weather over many years in a place. A single cold day doesn't change a warm climate.
Predict the CLIMATE (usual year-round weather) of a desert:	**Very hot days, little rain** — The climate of a desert is very hot days, little rain — climate is the TYPICAL weather of a place over many years, different from a single day's weather.
A season's weather chart shows many cool days. Which season is it most likely?	**Fall** — Fall is typically cool and windy, so a chart full of those days points to fall. Weather DATA over a season reveals the typical pattern.
Pine Valley's weather chart shows cool, windy, falling-leaves days. Which season does the DATA point to?	**Fall** — A chart of cool, windy, falling-leaves days points to fall — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
Predict the CLIMATE (usual year-round weather) of a mountain top:	**Cold and snowy even in summer** — The climate of a mountain top is cold and snowy even in summer — climate is the TYPICAL weather of a place over many years, different from a single day's weather.
It is a HOT summer day in a place with a cold climate. Is that possible?	**Yes — one hot day doesn't change the cold climate.** — Yes — a single hot day is WEATHER; the CLIMATE (many years of usually-cold weather) stays cold. One day doesn't define the climate.
A season's weather chart shows many mild with rain showers days. Which season is it most likely?	**Spring** — Spring is typically mild with rain showers, so a chart full of those days points to spring. Weather DATA over a season reveals the typical pattern.
Predict the CLIMATE (usual year-round weather) of a rainforest near the equator:	**Hot and wet all year** — The climate of a rainforest near the equator is hot and wet all year — climate is the TYPICAL weather of a place over many years, different from a single day's weather.
Sunhill's weather chart shows rain showers and new buds. Which season does the DATA point to?	**Spring** — A chart of rain showers and new buds points to spring — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
Bayside's weather chart shows mostly hot, sunny days. Which season does the DATA point to?	**Summer** — A chart of mostly hot, sunny days points to summer — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
Predict the CLIMATE (usual year-round weather) of the far north	**Very cold most of the year** — The climate of the far north (polar) is very cold most of the year — climate is the TYPICAL weather of a place over many years,

(polar):	different from a single day's weather.
Maple Town's weather chart shows mostly hot, sunny days. Which season does the DATA point to?	**Summer** — A chart of mostly hot, sunny days points to summer — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
Predict: which season likely has the chart with the MOST daylight hours?	**Summer.** — Summer has the most daylight hours — a pattern the seasonal data shows. (This is about the season's pattern, not Earth being 'closer to the sun'.)
Fern Hollow's weather chart shows many snowy, freezing days. Which season does the DATA point to?	**Winter** — A chart of many snowy, freezing days points to winter — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
A season's weather chart shows many hot days. Which season is it most likely?	**Summer** — Summer is typically hot and often dry, so a chart full of those days points to summer. Weather DATA over a season reveals the typical pattern.
Clearwater's weather chart shows rain showers and new buds. Which season does the DATA point to?	**Spring** — A chart of rain showers and new buds points to spring — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
River City's weather chart shows many snowy, freezing days. Which season does the DATA point to?	**Winter** — A chart of many snowy, freezing days points to winter — reading weather DATA over time reveals a season's typical pattern (3-ESS2-1).
A season's weather chart shows many cold, sometimes snowy days. Which season is it most likely?	**Winter** — Winter is typically cold, sometimes snowy, so a chart full of those days points to winter. Weather DATA over a season reveals the typical pattern.
Rain puddles dry up on a warm day. Where did the water GO?	**It evaporated into the air as water vapor.** — The water EVAPORATED — it became invisible water vapor in the air. It didn't disappear; matter is still there, just in a form you can't see.

8. Read the Layers

✂ Question (fold →)	Answer
A sea urchin fossil is found in a rock layer. It is evidence the area once had…	**a shallow sea floor.** — A sea urchin fossil is evidence the area was once a shallow sea floor. Fossils tell us about the organisms AND the environments of long ago.
A mangrove root fossil is found in a rock layer. It is evidence the area once had…	**a warm coastal swamp.** — A mangrove root fossil is evidence the area was once a warm coastal swamp. Fossils tell us about the organisms AND the environments of long ago.
A fossil FISH is found in rock on a dry hill far from any water. What does it tell us?	**Long ago, this place was underwater.** — A fish fossil is evidence that this dry place was once UNDERWATER long ago. Fossils tell us about the environments of the past, not just the animals.
A fossil footprint (a track) with no bones — is it a fossil?	**Yes — a preserved trace like a track is a fossil.** — A footprint is a TRACE fossil — evidence an animal walked here long ago. Fossils are not only bones; tracks, burrows, and imprints are fossils too.
In flat rock layers, which fossil is OLDEST?	**The one in the deepest (bottom) layer.** — In undisturbed flat layers, the DEEPEST layer formed first, so its fossil is oldest. Layers stack oldest-on-bottom, newest-on-top.
A shark tooth fossil is found in a rock layer. It is evidence the area once had…	**the ocean.** — A shark tooth fossil is evidence the area was once the ocean. Fossils tell us about the organisms AND the environments of long ago.
A ammonite fossil is found in a rock layer. It is evidence the area once had…	**an ancient sea.** — A ammonite fossil is evidence the area was once an ancient sea. Fossils tell us about the organisms AND the environments of long ago.
A fern fossil is found in a rock layer. It is evidence the area once had…	**a warm swamp.** — A fern fossil is evidence the area was once a warm swamp. Fossils tell us about the organisms AND the environments of long ago.
Can a soft animal (like a jellyfish or a worm) ever leave a fossil?	**Yes — soft parts and their traces can fossilize too.** — Yes — soft-bodied animals can leave fossils as imprints or traces (like a leaf print). A common mix-up is thinking only bony animals fossilize.
A snail shell fossil is found in a rock layer. It is evidence the area once had…	**a damp land or pond.** — A snail shell fossil is evidence the area was once a damp land or pond. Fossils tell us about the organisms AND the environments of long ago.
A fossil animal looks a little like a lizard but is not alive anywhere today. This is evidence that…	**some kinds of living things lived long ago and are no longer here.** — Fossils show that some organisms lived long ago and are no longer here. They are evidence of past life and how living things and places have changed.
A crinoid fossil is found in a rock layer. It is evidence the area once had…	**a deep ancient sea.** — A crinoid fossil is evidence the area was once a deep ancient sea. Fossils tell us about the organisms AND the environments of long ago.
A leaf fossil is found in a rock layer. It is evidence the area once had…	**a forest.** — A leaf fossil is evidence the area was once a forest. Fossils tell us about the organisms AND the environments of long ago.

A fish scale fossil is found in a rock layer. It is evidence the area once had...	**water.** — A fish scale fossil is evidence the area was once water. Fossils tell us about the organisms AND the environments of long ago.
Fossil ferns and palm leaves are found in rock in a cold, icy place today. Long ago it was probably...	**warm and wet (like where ferns and palms grow).** — Ferns and palms grow in warm, wet places, so this now-cold place was once warm and wet. Fossils are evidence of past environments — environments change over long times.
A coral fossil is found in a rock layer. It is evidence the area once had...	**a warm ocean reef.** — A coral fossil is evidence the area was once a warm ocean reef. Fossils tell us about the organisms AND the environments of long ago.
A dragonfly fossil is found in a rock layer. It is evidence the area once had...	**a wet forest.** — A dragonfly fossil is evidence the area was once a wet forest. Fossils tell us about the organisms AND the environments of long ago.
A clam shell fossil is found in a rock layer. It is evidence the area once had...	**shallow water.** — A clam shell fossil is evidence the area was once shallow water. Fossils tell us about the organisms AND the environments of long ago.
A palm frond fossil is found in a rock layer. It is evidence the area once had...	**a warm, wet place.** — A palm frond fossil is evidence the area was once a warm, wet place. Fossils tell us about the organisms AND the environments of long ago.
A trilobite fossil is found in a rock layer. It is evidence the area once had...	**an ancient sea.** — A trilobite fossil is evidence the area was once an ancient sea. Fossils tell us about the organisms AND the environments of long ago.

9. Lab Mix

✂ Question (fold →)	Answer
Is 'number of petals' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Number of petals' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
On dark tree bark, which coloring helps an animal survive by hiding from predators?	**The dark moth.** — On dark tree bark, the dark moth blends in and hides from birds, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
Does a magnet attract a glass marble?	**No — it is not made of iron, cobalt, or nickel.** — A magnet does NOT attract a glass marble. Only iron, cobalt, and nickel are magnetic — NOT all metals (aluminum, copper, gold are metals but not magnetic).
A sea urchin fossil is found in a rock layer. It is evidence the area once had...	**a shallow sea floor.** — A sea urchin fossil is evidence the area was once a shallow sea floor. Fossils tell us about the organisms AND the environments of long ago.
Two kids push a wagon on the path with EQUAL strength from opposite sides. What happens to the wagon?	**It stays still — the forces balance.** — Equal, opposite pushes are BALANCED, so they cancel and the wagon does not change its motion — it stays still. A force is an interaction between two things, not something stored inside the object.
Which comes FIRST in a sea turtle's life cycle?	**egg** — A sea turtle's life cycle begins with the egg, then it grows through hatchling and young turtle to the adult turtle, which can reproduce — then the cycle begins again.
Is 'eye color' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Eye color' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
Two magnets: a NORTH pole faces a SOUTH pole. Predict what they do.	**They pull together (attract).** — Opposite poles (N–S) ATTRACT — they pull together across a gap. The interaction happens without contact.
Is 'tail length' a trait passed down from parents (inherited)?	**Yes — it is inherited.** — 'Tail length' is INHERITED — offspring get it from their parents. Inherited traits are passed down; they are not learned or caused by the weather.
It is a HOT summer day in a place with a cold climate. Is that possible?	**Yes — one hot day doesn't change the cold climate.** — Yes — a single hot day is WEATHER; the CLIMATE (many years of usually-cold weather) stays cold. One day doesn't define the climate.
On snowy ground, which coloring helps an animal survive by hiding from predators?	**The white hare.** — On snowy ground, the white hare blends in and hides from foxes, so it is more likely to survive and reproduce. That trait variation gives a survival advantage — this is how helpful variations become common.
One kid pushes a ball on the grass HARDER than the kid on the other side. Which way does the ball move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the ball changes its motion. The stronger push wins, so the ball moves away from it (toward the weaker side). Unequal force IS the change in motion.
Which comes FIRST in a ladybug's	**egg** — A ladybug's life cycle begins with the egg, then it grows through larva and pupa to the adult ladybug, which can reproduce — then the cycle begins

life cycle?	again.
Predict: over many years on dark tree bark, will there be MORE dark moths or MORE light moths?	**More dark moths.** — The dark moth survives better on dark tree bark, so it has more offspring with that coloring. Over time there are MORE dark moths — helpful variations spread. (Predict, then run the sim to check.)
Can a soft animal (like a jellyfish or a worm) ever leave a fossil?	**Yes — soft parts and their traces can fossilize too.** — Yes — soft-bodied animals can leave fossils as imprints or traces (like a leaf print). A common mix-up is thinking only bony animals fossilize.
Will a magnet attract this iron bolt without touching it?	**Yes — it can pull it from a small distance.** — A magnet pulls this iron bolt (iron/steel) even without touching — magnetic force acts AT A DISTANCE. The pull IS the force; no contact is needed.
One kid pushes a crate on the ramp HARDER than the kid on the other side. Which way does the crate move?	**Toward the weaker push (the stronger push wins).** — When forces are UNBALANCED, the crate changes its motion. The stronger push wins, so the crate moves away from it (toward the weaker side). Unequal force IS the change in motion.
A season's weather chart shows many cold, sometimes snowy days. Which season is it most likely?	**Winter** — Winter is typically cold, sometimes snowy, so a chart full of those days points to winter. Weather DATA over a season reveals the typical pattern.
A season's weather chart shows many hot days. Which season is it most likely?	**Summer** — Summer is typically hot and often dry, so a chart full of those days points to summer. Weather DATA over a season reveals the typical pattern.
Which comes FIRST in a salmon's life cycle?	**egg** — A salmon's life cycle begins with the egg, then it grows through fry and young salmon to the adult salmon, which can reproduce — then the cycle begins again.

10. Weather Hazards

✂ Question (fold →)	Answer
A heavy storm with strong spinning wind that can lift things is a…	**tornado** — A tornado is a strong, spinning windstorm that can lift objects.
Why do weather forecasters give WARNINGS before big storms?	**so people have time to prepare** — Warnings give people time to prepare, which reduces harm from the storm.
A lightning rod on a tall building keeps people safer by…	**guiding lightning safely to the ground** — A lightning rod guides a strike safely to the ground instead of harming the building.
A family makes a plan for where to meet if a storm comes. Making a plan ahead of time…	**helps everyone stay safe** — A safety plan made ahead of time helps everyone stay safe during a storm.
During a drought, a town might reduce impact by…	**saving and storing water** — Saving and storing water helps a town get through a drought (a dry period).
A hurricane brings both strong wind AND heavy rain. This means it can cause…	**more than one kind of damage** — A hurricane's wind and rain can each cause damage, so it brings more than one hazard.
Sandbags are stacked along a river before a flood. Their job is to…	**block water from spreading** — Sandbags form a barrier that blocks flood water from spreading.
A town near a river that floods builds its houses UP on tall stilts. This design helps by…	**keeping homes above the flood water** — Stilts raise homes above flood water, reducing flood damage.
A weather forecast warns of a big snowstorm tomorrow. A good way to prepare is to…	**get warm supplies ready before it hits** — Getting warm supplies ready ahead of time reduces the storm's impact.
A community keeps sandbags and supplies ready every storm season. This shows they use…	**past experience to prepare** — Keeping supplies ready shows the community uses past experience to prepare for hazards.
A weather map shows a big storm moving toward a town in two days. The town should…	**start preparing now** — Seeing the storm coming, the town should prepare now to reduce its impact.
Which is the SAFEST place during a tornado warning?	**a small inside room with no windows** — A small inside room away from windows is safest during a tornado.
What can people NOT do about the weather?	**stop a storm from happening** — People can prepare, warn, and stay safe, but they cannot stop the weather from happening.
Storm shutters go over windows before a big wind storm to…	**stop windows from breaking** — Storm shutters protect windows from breaking in high winds — reducing damage.
To stay safe in a lightning storm, the BEST choice is to…	**go inside a building** — Going inside protects you; tall trees, kites, and water are dangerous in lightning.
Which action would BEST reduce damage from a flood?	**build a wall (levee) along the river** — A levee (river wall) holds back water and best reduces flood damage.
A house in a very snowy place has a steep, pointed roof so that…	**snow slides off instead of piling up** — A steep roof lets snow slide off so it doesn't pile up and crush the roof.
Which weather is a HAZARD (can be dangerous)?	**a hurricane** — A hurricane is a hazard — a powerful storm that can cause serious damage.

A drought means a long time with…	**very little rain** — A drought is a long period with very little rain.
Scientists study past storms to…	**predict and prepare for future ones** — Studying past storms helps scientists predict future ones so people can prepare.

11. Habitats & Survival

✂ Question (fold →)	Answer
A cactus stores water in its thick stem. This helps it survive in the...	**desert** — Storing water lets a cactus survive in the dry desert.
Why might MANY animals of one kind live together in a herd?	**to protect each other from predators** — A herd lets animals protect one another from predators — more watchers and defenders.
Which is a benefit of fish swimming in a big group (a school)?	**it is harder for a predator to catch one** — A school makes it harder for a predator to single out one fish — safety in numbers.
If a habitat changes so an animal's needs are NO LONGER met, one thing the animal might do is...	**move to a new place that meets its needs** — When a habitat can't meet its needs, an animal may move to a new place that can.
A snowshoe hare turns white in winter. This helps it survive by...	**hiding in the snow from predators** — Turning white lets the hare blend into the snow and hide from predators.
An animal with traits that FIT its habitat is more likely to...	**survive and have young** — Animals whose traits fit their habitat are more likely to survive and reproduce.
Bees live in a hive with thousands of other bees. One reason to live in a group is to...	**share work like gathering food** — In a hive, bees share work such as gathering food — a benefit of group living.
Which animal is best suited to survive in the OCEAN?	**a dolphin** — A dolphin's body suits ocean life; camels, squirrels, and worms live on land.
If a pond a frog lives in dries up, the frog will MOST likely...	**have to move or struggle to survive** — When its habitat changes (the pond dries up), the frog must move or it may not survive.
Ducks fly south together in winter. Traveling in a group helps them...	**find the way and stay safe** — Flying together in a flock helps ducks find their way and stay safer.
Ants work together to carry food much bigger than one ant. This shows a group can...	**do more than one alone** — Working together, a group of ants can move food that a single ant could not — a group benefit.
A polar bear has thick fur and fat. These traits help it survive in a...	**cold, snowy place** — Thick fur and fat keep a polar bear warm in a cold, snowy habitat.
A duck has webbed feet. Webbed feet are BEST for...	**swimming in water** — Webbed feet work like paddles, best suited for swimming.
A fish has gills and fins. It is best able to survive in a...	**pond or lake** — Gills and fins suit a fish for living in water, like a pond or lake.
A forest is cut down and turned into a parking lot. Animals that lived there will...	**lose their homes and food** — Destroying the forest habitat means those animals lose their homes and food.
A camel can go a long time without water and has wide feet for sand. It is built for the...	**desert** — A camel's water-saving body and wide feet suit it for the sandy desert.
A new kind of bird arrives that eats the same seeds as another bird. The two birds now...	**compete for the same food** — When two kinds of animals need the same limited food, they compete for it.

Meerkats take turns standing guard while others eat. This group behavior helps them…	**watch for danger** — Taking turns as guard lets meerkats warn the group of danger — a survival benefit of groups.
Wolves hunt together in a pack. Living in a group helps them…	**catch bigger prey and stay safe** — Living in a group (a pack) helps wolves catch bigger prey and stay safe.
Plants grow toward light. A plant in a dark corner will MOST likely…	**struggle to grow well** — Without enough light a plant struggles, because plants need light to make food.

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