Name & Surname: _____ Class: _____ Date: _____

PLATE DETECTIVES

Use fossils, rocks and seafloor to rebuild Pangaea



About 50 minutes Level ★★★☆☆

TASK A

Write a diamante contrasting divergence and convergence using the word bank.

separating | spreading | rising | creating | new crust forms here | destroying | sinking | melting | slow | wide | deep | narrow

Divergence

_____ _____ 2 adjectives

_____ _____ _____ 3 -ing verbs

_____ a 4-word phrase

_____ _____ _____ 3 -ing verbs

_____ _____ 2 adjectives

Convergence

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FOSSIL OCEAN MYSTERY

Sort clues to explain fossils found oceans apart.

KEY WORDS

fossil: hardened remains of a living thing preserved in rock

Pangaea: ancient supercontinent that broke apart about 200 million years ago

divergent boundary: place where plates separate and make new crust

tectonic plate: huge slab of Earth's hard shell that moves slowly

seafloor spreading: new crust forming at a ridge and moving outward

subduction: process where one plate slides under another at a trench

TASK B

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Sort the clue cards to answer the question. Ignore the red herring that does not help.

Why did matching fossils in Brazil and West Africa end up oceans apart?

Cut out the cards.

Rock layers of the same type and age also line up across the join.	Continents ride as passengers on tectonic plates moving over softer mantle.	The same type and age plant fossils form one belt when Brazil and West Africa are rejoined.
Magma rises at the ridge and hardens into basalt, forming new ocean crust.	Old ocean crust sinks and melts at deep trenches in subduction zones.	Rock is youngest at the ridge center and older farther away on both sides.
Plates move only 2 to 15 centimeters (1 to 6 inches) per year, but over millions of years this shifts continents thousands of kilometers.	The mid-ocean ridge runs between them, about 65,000 kilometers (40,390 miles) long.	South America and Africa fit like puzzle pieces along their continental shelves.
Ocean tides rise and fall twice a day due to the Moon's pull.		

Your answer, using the clues:

.....

.....

.....

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RIDGE OR TRENCH?

Sort seafloor clues into ridge and trench groups.

TASK C

Example done for you

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Color each box by group. Think where new crust forms and where old crust is destroyed.

● **Ridge - divergent**: color it blue or draw ●

▲ **Trench - convergent**: color it orange or draw ▲

Magma rises and hardens into basalt ●	**Youngest** rock at the center	**Plates** separate and new crust forms	Matching age **stripes** on both sides
Mid-ocean ridge, 1,500 kilometers wide	One **plate** slides under the other	Deep seafloor **trench** forms	Old **crust** melts back into mantle
Plates **collide** and buckle the edge	Ocean crust **destroyed** by subduction		

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BEST EVIDENCE RANK

Rank evidence and judge the rebuild method.

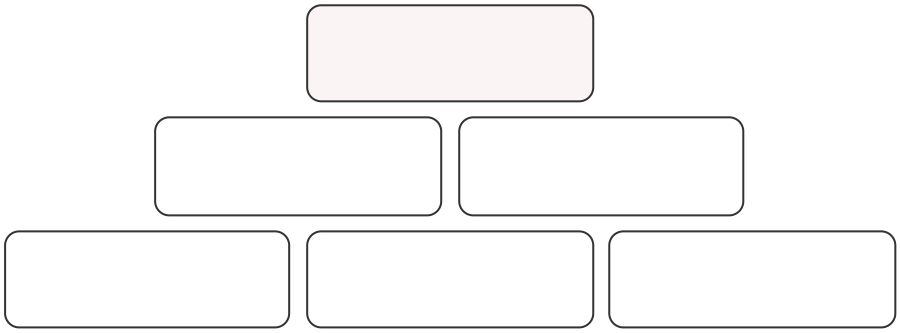
TASK D

Rank these evidence types from strongest to weakest for past motion. Then explain your top choice in 1-2 sentences.

rank motion evidence from most to least convincing

- Same age fossils across oceans
- Matching rock type and age
- Continental shelf puzzle fit
- Young rock at mid-ocean ridge
- Measured plate speed 2 to 15 cm per year
- Old crust destroyed at trenches

Most convincing



Why did you put your top choice at the top?

.....

.....

TASK E

Judge rebuilding Pangaea from paper clues using all four thinking hats.

Rebuilding Pangaea from paper fossil, rock, shape and seafloor clues

	Red hat: feelings	Yellow hat: good points	Black hat: bad points	Green hat: ideas to improve
Using shape fit alone	.....	.....	.....	.....
Using fossils, rocks, shape and seafloor together	.....	.....	.....	.....

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LINK AND CORRECT

Connect ideas in a chain and fix errors.

TASK F

Build a chain where each word links to the one before. Explain each link in a short phrase.

Pangaea	→ because…		→ because…		→ because…		
	→ because…						

TASK G

/2

Spot the mistake in each claim and write the correct science.



Student A

Continents **plow** through the ocean floor by themselves to move apart.

What mistake did Student A make? Write the correct fact.



Student B

New ocean **crust** forms at deep trenches where plates collide.

What mistake did Student B make? Write the correct fact.

HOW DID I DO?

Circle a face for each line.

I can match fossil and rock data to past positions.	☹	😐	☺
I can use shape fit and ridge data as motion evidence.	☹	😐	☺
I can explain how moving plates split Pangaea.	☹	😐	☺

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Answer sheet: Plate Detectives

Task A

Answers will vary.

Task B

Brazil and West Africa were once joined in Pangaea. New crust forming at the divergent ridge spread plates apart, carrying continents as passengers, so matching fossil and rock belts are now oceans apart.

Red herring: Ocean tides rise and fall twice a day due to the Moon's pull.

Task C

Ridge - divergent (blue ●): Magma rises and hardens into basalt, Youngest rock at the center, Plates separate and new crust forms, Matching age stripes on both sides, Mid-ocean ridge, 1,500 kilometers wide

Trench - convergent (orange ▲): One plate slides under the other, Deep seafloor trench forms, Old crust melts back into mantle, Plates collide and buckle the edge, Ocean crust destroyed by subduction

Task D

Answers will vary.

Task E

Answers will vary.

Task F

Answers will vary, e.g. Pangaea → fossil belt → mid-ocean ridge → new crust → plate motion

Task G

1. Student A: Wrong about how they move; they ride as passengers on tectonic plates over softer mantle, moved apart as new crust forms at the ridge.
2. Student B: Wrong location; new crust forms at the mid-ocean ridge at divergent boundaries, while old crust is destroyed at trenches by subduction.

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