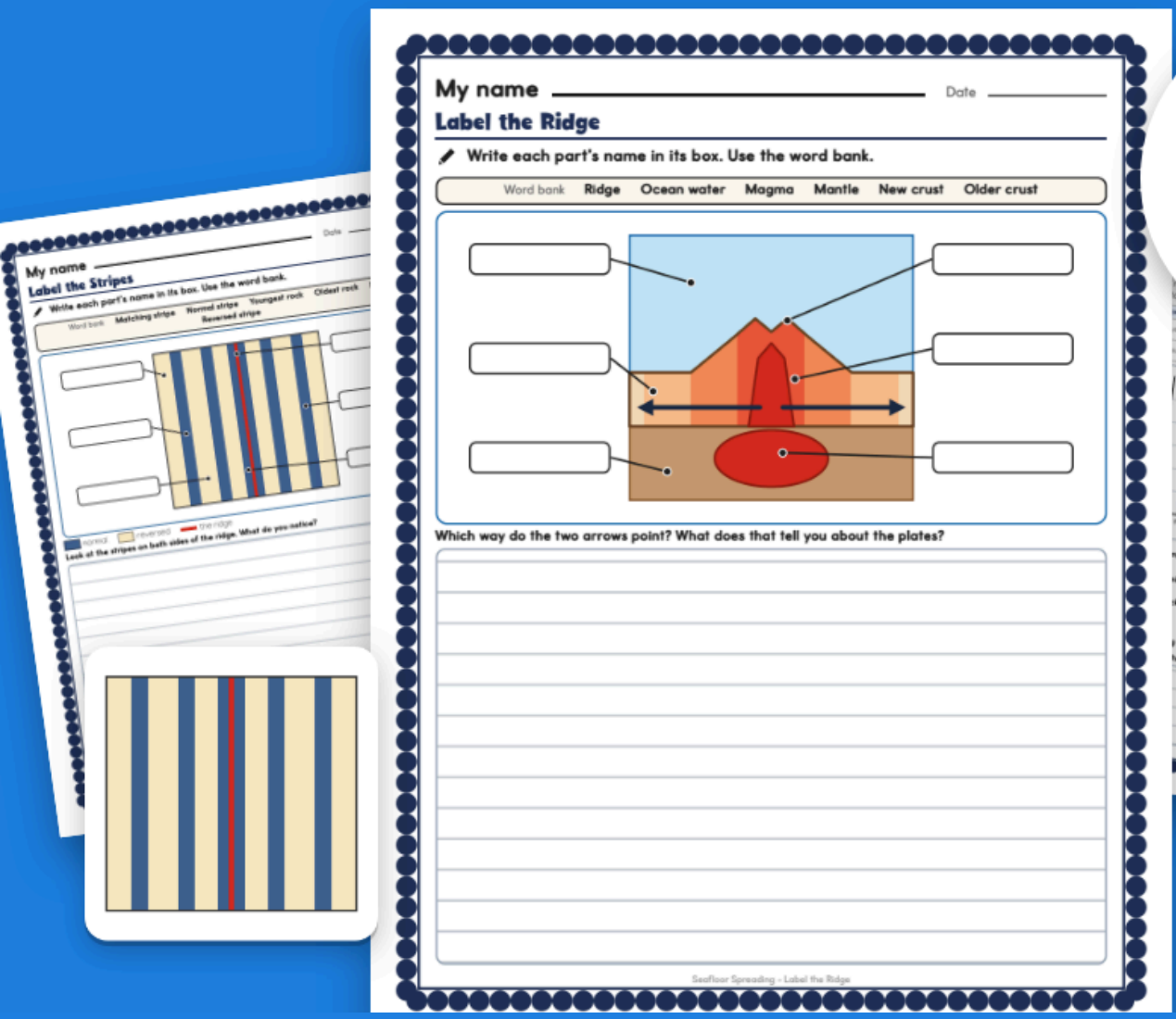
SEAFLOOR SPREADING

READING, DIAGRAM, QUESTIONS - GRADES 6-8



16 STUDENT PAGES

Bright Path Sped

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- Every name line, answer box, check box and ruled box on the student pages is a type-in field, and so are the tracker and the other record pages. You can also print any page and write by hand. Print the graph page to plot the points in pencil.
- It works offline, with no account needed.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. The stripes are dark for normal and light for reversed, and every one is also named on the page, so a black and white copy reads too.

Student work

A filled-in tracker or class grid carries a real student's name. Keep it in the data folder.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. A fix to the file ships as a free update from My Purchases.

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PREVIEW

Teacher Notes

The parts of a student page, the page types in order, and a few teaching notes.

The parts of a page

- **The color code.** On the ridge pictures, new crust is red and older crust is lighter. On the stripe picture, normal is dark and reversed is light. On the sort mats, Ridge is red-orange, Moving away is green and Trench is purple.
- **The answer box.** A bordered box. Click it to type, or print and write in it.
- **The check box.** True or false, Ridge A or Ridge B, and the choices in the readings and the quiz.
- **The ruled work box.** Lines 0.34 inch apart, one idea to a line.
- **The cut lines.** Mat 1: 6 pieces in 3 across by 2 down, each 2.4 by 1.46 inches. Mat 2: 10 pieces, 5 across by 2 down, each 1.46 by 1.15 inches. Edge to edge.

Page type	What it looks like	What the student does
At a Glance; Words	2 pages, 6 items	A reference page with two printed diagrams, then six words to match.
Read: three short readings	3 pages, 15 items	Mid-ocean ridges, magnetic stripes, the age of the ocean floor.
Label the Ridge; Label the Stripes	2 pages, 12 items	Write each part's name in a box joined to the part by a line.
Read the Rock Age Table	1 page, 10 items	Divide distance by age; predict a distance and an age.
Graph the Rock Ages	1 page, 5 items	Plot two ridges on one grid; compare the lines.
The Spreading Chain	1 page, 6 items	Six steps in order, a missing word in each.
Fix It	1 page, 5 items	True or false; rewrite each false statement.
Claim, Evidence, Reasoning	1 page, 6 items	Two short scenarios with invented numbers.
Quiz, Short Answer	2 pages, 15 items	Ten choices, then five written answers.

Teaching notes

- Say the whole chain aloud: plates move apart, magma rises, it cools into new crust, the crust moves away and gets older, and old crust sinks at a trench.
- Students often think the ocean floor is one old, still sheet. The age table and the graph show it is youngest at the ridge and older farther away.
- The picture of the stripes is a simplified model: six stripes, mirrored. Real maps are less tidy, so use your own words for the details your class needs.
- Plate tectonics has other pieces, such as plate boundaries and trenches. This set covers the ridge and the evidence around it.
- All numbers are invented for practice. No lab procedure is included, and nothing here is health information.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Seafloor Spreading at a Glance

Read about seafloor spreading. Keep this page next to you.

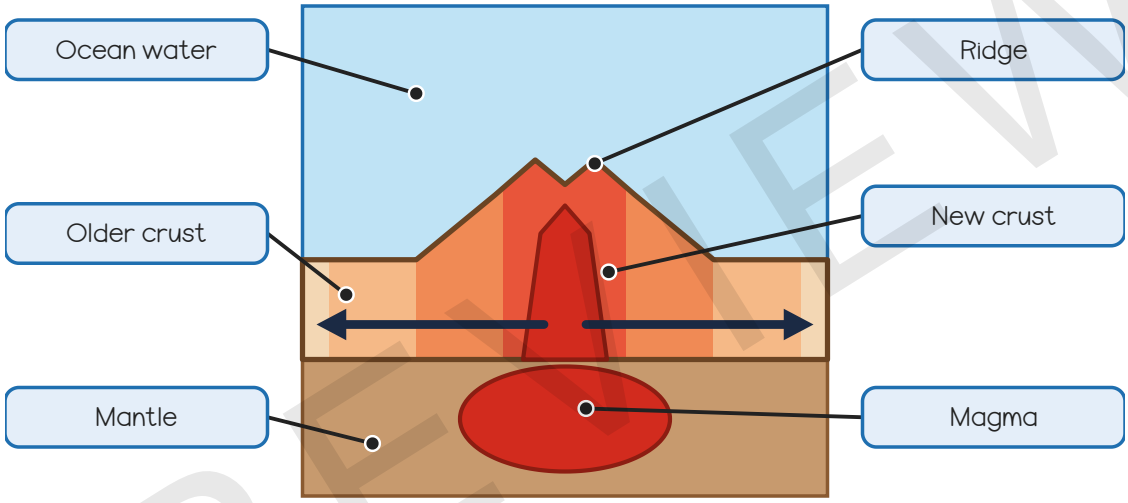
New ocean floor forms at a ridge and slowly moves away. The two pictures show the ridge from the side and the stripes from above.

Ridge
Plates move apart. Magma rises, cools and makes new crust.

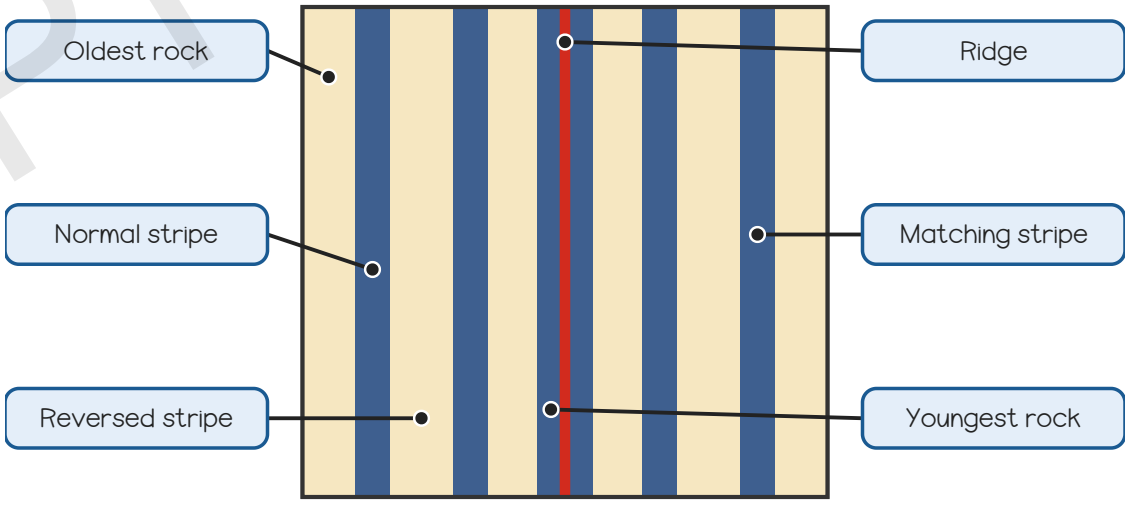
Moving away
The new crust is pushed away on both sides. The rock gets older.

Trench
Old crust sinks back into Earth at a deep valley.

A ridge from the side: new crust is red, older crust is lighter



The ocean floor from above: dark is normal, light is reversed



PREVIEW

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My name _____ Date _____

Read: Mid-Ocean Ridges

Read. Then answer the questions.

A **mid-ocean ridge** is a long chain of underwater mountains in the middle of an ocean. At a ridge, two plates of Earth's **crust** move apart. **Magma** from below rises into the gap. The magma cools and hardens into new ocean floor. Then the plates move apart a little more, and more magma rises. This slow, steady process is called **seafloor spreading**. Think of two conveyor belts that start at the ridge and carry new rock away in opposite directions.

Key words

mid-ocean ridge
underwater mountains

magma
melted rock

crust
outer layer of Earth

1 A mid-ocean ridge is...

☐ **a chain of underwater mountains** ☐ **a deep valley** ☐ **a beach**

2 At a ridge, the two plates...

☐ **crash together** ☐ **move apart** ☐ **stay still**

3 What rises into the gap and cools?

☐ **sand** ☐ **ice** ☐ **magma**

4 What is the slow process that makes new ocean floor called?

_____

5 Why is the ocean floor right at a ridge the newest?

_____

PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

Read: The Age of the Ocean Floor

Read. Then answer the questions.

Scientists take rock samples from the ocean floor and find out how old each one is. The youngest rock is at the ridge. The distance from the ridge matters: the farther away the sample, the older it is, on both sides. This fits the idea that rock is made at the ridge and then carried away. Sediment, the loose mud and sand that settles on the ocean floor, piles up over time, so it is thin near the ridge and thicker farther away. The ocean floor is also shallow near the ridge and deeper farther away, because the rock cools and sinks as it ages. Dividing the distance by the age gives the rate. In this set, a rock 100 km from an invented ridge is 5 million years old, so the rate is 20 km per million years. Old ocean floor does not last forever. It sinks back into Earth at a deep valley called a trench.

Key words

sample
a piece of rock

distance
how far away

trench
where old crust sinks

1. Where is the youngest ocean rock?

☐ **far from the ridge** ☐ **at the ridge** ☐ **at a trench**

2. The farther a sample is from the ridge, the...

☐ **older it is** ☐ **younger it is** ☐ **wetter it is**

3. A rock 100 km away is 5 million years old. The rate is...

☐ **10 km per million years** ☐ **50 km per million years** ☐ **20 km per million years**

4. What happens to old ocean floor at a trench?

_____

5. How does rock age give evidence for seafloor spreading?

_____

PREVIEW

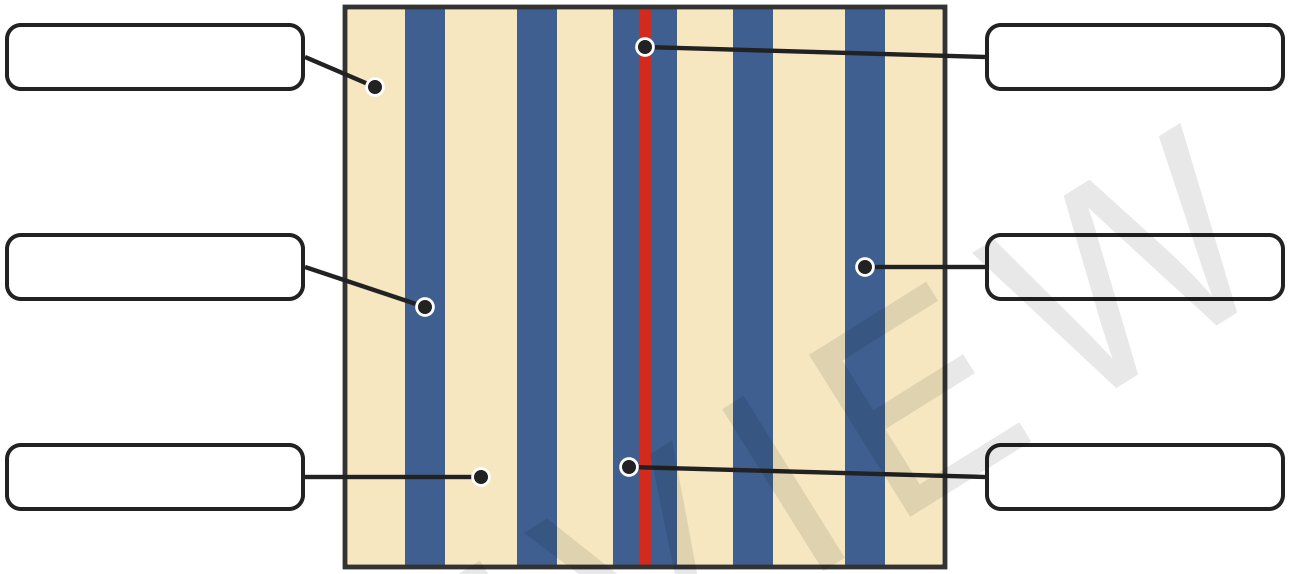
Preview - Bright Path Sped

My name _____ Date _____

Label the Stripes

Write each part's name in its box. Use the word bank.

Word bank **Matching stripe** **Normal stripe** **Youngest rock** **Oldest rock** **Ridge** **Reversed stripe**



normal reversed the ridge

Look at the stripes on both sides of the ridge. What do you notice?

PREVIEW

Preview - Bright Path Shed

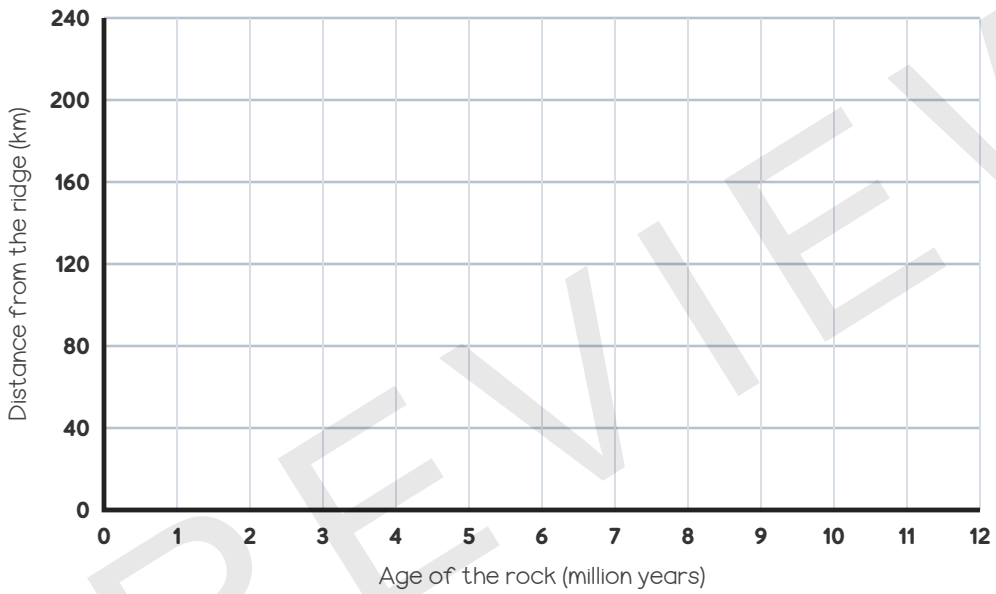
My name _____ Date _____

Graph the Rock Ages

Plot each point. Draw a line. Then answer.

Two invented ridges. Plot a point for each age and distance. Use one color for Ridge A and another for Ridge B. Start each line at 0. Then join the points.

Distance from the ridge (km)	40	80	120	160	200	240
Ridge A age (million years)	2	4	6	8	10	12
Ridge B age (million years)	1	2	3	4	5	6



1. Ridge A rock after 5 million years is how far (km)? ☐

2. Ridge B rock after 5 million years is how far (km)? ☐

3. Which ridge moved rock farther in 4 million years? ☐ Ridge A ☐ Ridge B

4. Which line is steeper? ☐ Ridge A ☐ Ridge B

5. Which ridge is spreading faster? ☐ Ridge A ☐ Ridge B

How does the graph show which ridge is spreading faster?

PREVIEW

My name _____ Date _____

Fix It

Is it true or false? Fix each false one.

Some of these are true. Some have a mistake. Rewrite each false one so it is true.

1. Seafloor spreading happens at a mid-ocean ridge. ☐ true ☐ false

   If false, fix it: _____

2. The oldest ocean floor is right at the ridge. ☐ true ☐ false

   If false, fix it: _____

3. The magnetic stripes on one side of a ridge match the stripes on the other side. ☐ true ☐ false

   If false, fix it: _____

4. New crust forms when ocean water freezes at the ridge. ☐ true ☐ false

   If false, fix it: _____

5. The ocean floor keeps growing and is never destroyed. ☐ true ☐ false

   If false, fix it: _____

PREVIEW

Preview - Not for Sale

My name _____ Date _____

Quiz

Check the best answer for each one.

1. New ocean floor forms at...

   ☐ **a mid-ocean ridge** ☐ **a trench** ☐ **a coast**

2. What rises at a ridge and cools into new crust?

   ☐ **sand** ☐ **magma** ☐ **ice**

3. Ocean rock is oldest...

   ☐ **at the ridge** ☐ **in the middle** ☐ **far from the ridge**

4. The magnetic stripes on the two sides of a ridge are...

   ☐ **different** ☐ **matching** ☐ **missing**

5. When magma cools, iron grains line up with...

   ☐ **Earth's magnetic field** ☐ **the ocean current** ☐ **the Moon**

6. Old ocean floor sinks back into Earth at...

   ☐ **a ridge** ☐ **a beach** ☐ **a trench**

7. The youngest ocean crust is...

   ☐ **right at the ridge** ☐ **far from the ridge** ☐ **at a trench**

8. A rock 100 km from the ridge is 5 million years old. The rate is...

   ☐ **10 km per million years** ☐ **20 km per million years** ☐ **50 km per million years**

9. At that rate, rock 8 million years old is how far from the ridge?

   ☐ **40 km** ☐ **80 km** ☐ **160 km**

10. Stripes and rock ages are evidence that...

    ☐ **the ocean floor spreads** ☐ **the ocean gets saltier** ☐ **volcanoes are on land**

PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

Cut and Sort 1

Cut out the pieces. Paste each one in its box.

Where does it happen? Paste two pieces in each box.

Ridge where new crust forms	**Moving away** from the ridge	**Trench** where old crust sinks

PREVIEW

Cut on the dashed lines: one cut across and two down.

old crust sinks	rock gets older	magma rises and cools
crust goes back into Earth	stripes match on both sides	plates move apart

Answer Key: Words, Readings and Labels

Accept any answer that says the same thing in a student's own words. Boxes are named left or right of the picture, top to bottom.

Ocean Floor Words page 6

Word	Letter
Mid-ocean ridge	B
Seafloor spreading	E
Magma	F
Crust	A
Reversal	D
Trench	C

Read: Mid-Ocean Ridges page 7

#	Answer
1	a chain of underwater mountains
2	move apart
3	magma
4	Seafloor spreading.
5	The magma has only just cooled and hardened there.

Read: Magnetic Stripes page 8

#	Answer
1	Earth's magnetic field
2	reversed
3	a mirror image
4	New rock forms at the ridge and splits in two, so both sides record the same field.
5	Matching stripes on both sides show that new crust forms at the ridge and moves away.

Read: The Age of the Ocean Floor page 9

#	Answer
1	at the ridge
2	older it is
3	20 km per million years
4	It sinks back into Earth.
5	The rock gets older the farther it is from the ridge, as it would if it was made there and carried away.

Label the Ridge page 10

Box	Name	What it is
left, top	Ocean water	the water above the ocean floor
left, middle	Older crust	crust far from the ridge; it is cooler and older
left, bottom	Mantle	the hot rock layer under the crust
right, top	Ridge	the underwater mountain chain where plates move apart
right, middle	New crust	crust that just formed from cooled magma
right, bottom	Magma	melted rock rising into the gap

Label the Stripes page 11

Box	Name	What it is
left, top	Oldest rock	the stripe farthest from the ridge
left, middle	Normal stripe	rock that formed when the field was like today's
left, bottom	Reversed stripe	rock that formed when the field pointed the opposite way
right, top	Ridge	the underwater mountain chain where plates move apart
right, middle	Matching stripe	the same stripe on the other side of the ridge
right, bottom	Youngest rock	the stripe right at the ridge

PREVIEW

Answer Key: Claims, Short Answer, Quiz and Sorts

Accept any answer that says the same thing in a student's own words. In the sort keys, r1 c1 is the top left piece.

Claim, Evidence, Reasoning page 16

Panel	Claim	Evidence	Reasoning
Stripes on both sides	Yes. The matching stripes fit seafloor spreading.	Each side has 4 stripes in the same order: normal, reversed, normal, reversed.	New crust forms at the ridge and splits in two. Both sides record the same changes in the magnetic field, so the stripes match.
Rock ages	The ocean floor moved away at about 20 km per million years.	Site 3: 200 km divided by 10 million years is 20. Site 1: 40 km divided by 2 million years is also 20.	The answer is the same at every site, so the rock moved away at a steady rate. The older the rock, the farther it traveled.

Short Answer page 18

#	Sample answer
1	Plates move apart. Magma rises, cools and hardens into new crust.
2	New rock forms at the ridge and splits in two, so both sides record the same field.
3	It gets older the farther it is from the ridge, on both sides.
4	It sinks back into Earth.
5	Any two: matching stripes, rock that gets older away from the ridge, new crust at the ridge.

Quiz page 17

#	Answer
1	a mid-ocean ridge
2	magma
3	far from the ridge
4	matching
5	Earth's magnetic field
6	a trench
7	right at the ridge
8	20 km per million years
9	160 km
10	the ocean floor spreads

Cut and Sort 1 page 19

Piece	Piece shows	Box
r1 c1	old crust sinks	Trench
r1 c2	rock gets older	Moving away
r1 c3	magma rises and cools	Ridge
r2 c1	crust goes back into Earth	Trench
r2 c2	stripes match on both sides	Moving away
r2 c3	plates move apart	Ridge

Cut and Sort 2 page 20

Piece	Piece shows	Box
r1 c1	oldest rock	Far from the ridge
r1 c2	thin sediment	Near the ridge
r1 c3	hot new crust	Near the ridge
r1 c4	deeper ocean floor	Far from the ridge
r1 c5	youngest rock	Near the ridge
r2 c1	cool old crust	Far from the ridge
r2 c2	magma close below	Near the ridge
r2 c3	thick sediment	Far from the ridge
r2 c4	shallow ocean floor	Near the ridge
r2 c5	far from the magma	Far from the ridge

Where to go after the quiz

- Missed the ridge and the chain: reread page 7 and sort again on page 19.
- Missed the stripes: reread page 8 and label page 11 again.
- Missed the numbers: work page 12 again, then plot page 13.

PREVIEW

Class Progress Grid

Every student on one grid: items right by page type.

Class or group _____ Month _____

Student	Words, readings (of 21)	Labels (of 12)	Data, chain (of 21)	Fix it, claims (of 11)	Quiz, short (of 15)	Sorts (of 16)

PREVIEW

How to fill this in

For each column, add up how many items that student has right with no prompt (the tracker rows). One glance across a row shows which kind of work is easiest and which is next.

Grouping for small-group time

Students low on the words and readings need the reference page (page 5) and the chain (page 14). Students low on the labels need the sort on page 19. Students near full marks can move to the graph (page 13) and the claims (page 16).

Jordan's Tracker (Invented Student)

Jordan P. is invented; nothing on this page describes a real student. The blank tracker is on page 24.

Student: Jordan P. (an invented student)

Teacher: Ms. Alvarez (invented)

Month: November

Page	Page type and set	Items	Right	Date	Notes
6	Ocean Floor Words	6	5	11/3	Mixed up crust and magma
7	Read: Mid-Ocean Ridges	5	5	11/4	-
8	Read: Magnetic Stripes	5	-	-	-
9	Read: The Age of the Ocean Floor	5	-	-	-
10	Label the Ridge	6	5	11/5	Swapped older crust and new crust
11	Label the Stripes	6	-	-	-
12	Read the Rock Age Table	10	8	11/10	Added instead of dividing in two boxes
13	Graph the Rock Ages	5	-	-	-
14	The Spreading Chain	6	5	11/12	Wrote trench for the first step
15	Fix It	5	-	-	-
16	Claim, Evidence, Reasoning	6	-	-	-
17	Quiz	10	-	-	-
18	Short Answer	5	-	-	-
19	Cut and Sort 1	6	-	-	-
20	Cut and Sort 2	10	-	-	-

PREVIEW

How to read it

Jordan P. has done **5 of 15** scored pages and got **28 of 33** items right with no prompt. **1** page was all right and **4** carry a note. Every number comes from the table.

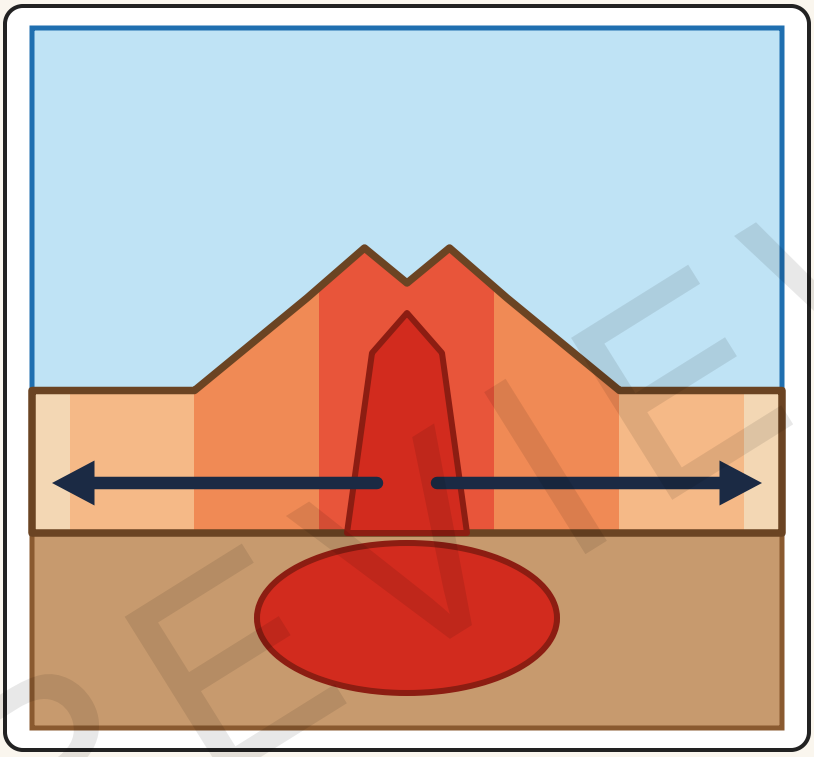
What the table points to

The lowest page is Read the Rock Age Table (8 of 10). That is where the next practice goes. The 10 pages left blank are not tried yet, never wrong.

Binder Cover

Slide this into the front of a binder. The divider tabs and a spine label to cut out are on the next page (page 30).

Science - Earth Science



SEAFLOOR SPREADING

Ridges, Stripes and Rock Ages

Learn	Practice	Check

Teacher _____

Class or student _____

PREVIEW