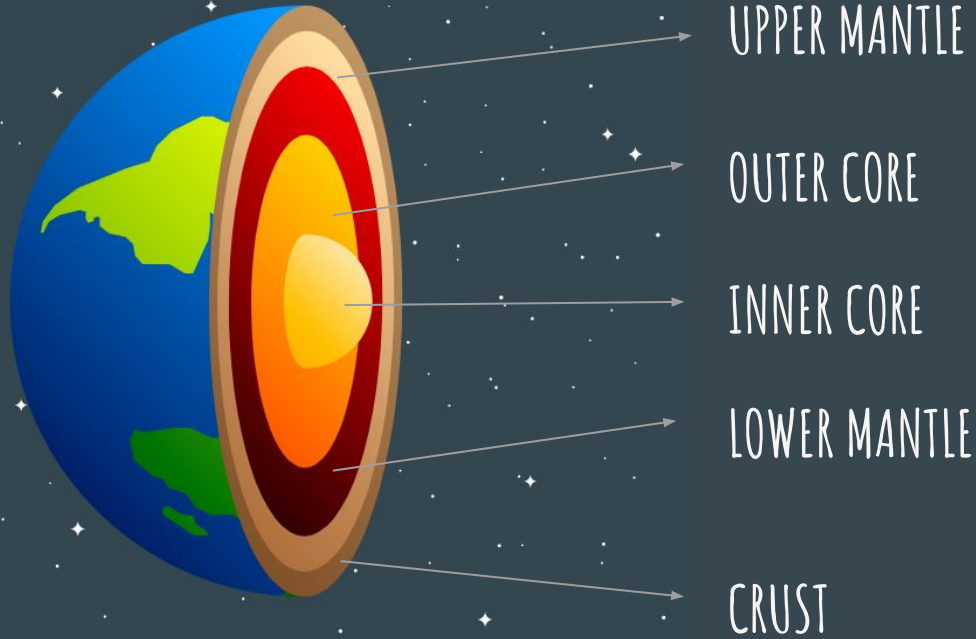


STRUCTURE OF THE EARTH

3.1.1.2 SECTION A: TECTONIC HAZARDS



1. WHAT'S INSIDE THE EARTH?



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1. WHAT'S INSIDE THE EARTH?



CRUST

- THE LAYER OF ROCK ON THE SURFACE OF THE PLANET.
- RELATIVELY THIN (BETWEEN 5 AND 70 KILOMETRES OR 3.1 AND 43.5 MILES). LESS THAN 1% OF EARTH'S VOLUME.
- THE TEMPERATURE OF THE CRUST INCREASES WITH DEPTH, REACHING UP TO 400 °C AT THE BOUNDARY WITH THE MANTLE.
- THERE ARE TWO TYPES OF CRUST - OCEANIC AND CONTINENTAL. THESE WERE FORMED THROUGH DIFFERENT GEOLOGICAL PROCESSES AND HAVE DIFFERENT CHEMICAL COMPOSITIONS AND PHYSICAL PROPERTIES.
- THE THINNEST AND DENSEST PARTS ARE OCEANIC CRUST (CARRYING WATER).
- THE CONTINENTAL CRUST, WHICH CARRIES LAND, IS THICKER AND LESS DENSE.

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1. WHAT'S INSIDE THE EARTH?



THE MANTLE IS THE THICKEST LAYER OF THE EARTH, GOING TO A DEPTH OF 2,890 KM, AND IS FORMED OF TWO DISTINCT PARTS.

UPPER MANTLE

- STARTS UNDERNEATH THE CRUST AND ENDS AT THE TOP OF THE LOWER MANTLE (APPROX. 670 KM DEPTH)
- DENSER THAN THE CRUST, MADE UP OF HARD MAGMA.
- TEMPERATURES RANGE FROM APPROXIMATELY 200 °C TO 900 °C AT THE BOUNDARY WITH THE LOWER MANTLE

LOWER MANTLE

- FROM 660 TO 2900 KM BELOW THE EARTH'S SURFACE.
- APPROX. 56% OF THE EARTH'S VOLUME
- MADE UP OF SOFT MAGMA.
- TEMPERATURE RANGE 1900-2600 K (KELVIN)

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1. WHAT'S INSIDE THE EARTH?



OUTER CORE

- A LIQUID LAYER.
- STARTS 2,890 KM (1,800 MI) BENEATH EARTH'S SURFACE.
- ABOUT 2,400 KM (1,500 MI) THICK.
- MADE MOSTLY OF IRON AND NICKEL.
- EXTREMELY HOT (ESTIMATED 3,000 TO 8,000 K).
- IT IS THOUGHT THAT CONVECTION IN THE OUTER CORE IS PART OF THE REASON FOR THE EARTH'S MAGNETIC FIELD.



1. WHAT'S INSIDE THE EARTH?



INNER CORE

- THE VERY CENTRE OF THE EARTH.
- SOLID.
- MADE OF IRON AND NICKEL.
- HAS A RADIUS OF ABOUT 1,220 KILOMETRES (760 MILES).
- ESTIMATED TEMPERATURE OF 5,700 K (5,430 °C), WHICH IS ABOUT THE SAME TEMPERATURE AS THE SURFACE OF THE SUN!



1. WHAT'S INSIDE THE EARTH? WORKSHEET

TASK

WHAT IS INSIDE THE EARTH?

THE EARTH IS MADE UP OF DISTINCT LAYERS.

LABEL THE DIAGRAM AND ANSWER THE QUESTIONS ABOUT THE LAYERS.



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1. WHAT'S INSIDE THE EARTH? ANSWERS



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UPPER MANTLE

OUTER CORE

INNER CORE

LOWER MANTLE

CRUST

- WHICH IS THE HOTTEST LAYER OF THE EARTH? **THE INNER CORE AT AN ESTIMATED 5,700 K (5,430 °C)**
- WHICH IS THE THINNEST LAYER OF THE EARTH? **THE CRUST**
- WHICH TYPE OF CRUST IS DENSER? **OCEANIC CRUST IS DENSER THAN CONTINENTAL CRUST**
- WHAT IS THE INNER CORE MADE OF? **SOLID IRON AND NICKEL**
- IS THE OUTER CORE LIQUID OR SOLID? **THE OUTER CORE IS LIQUID**
- HOW MUCH OF THE EARTH'S VOLUME IS THE CRUST? **THE CRUST MAKES UP LESS THAN 1% OF THE EARTH'S VOLUME**
- WHAT IS THE MANTLE MADE OF? **MAGMA (SOFT IN THE LOWER MANTLE AND HARD IN THE UPPER MANTLE)**



RESOURCEFUL

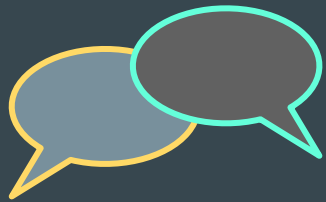
2. TECTONIC PLATES: DISCUSS

TASK

TECTONIC PLATES ARE MADE UP OF PIECES OF THE CRUST AND THE VERY TOP LAYER OF MANTLE, TOGETHER REFERRED TO AS THE LITHOSPHERE.

THE PLATES ARE AROUND 100 KM (62 MI) THICK.

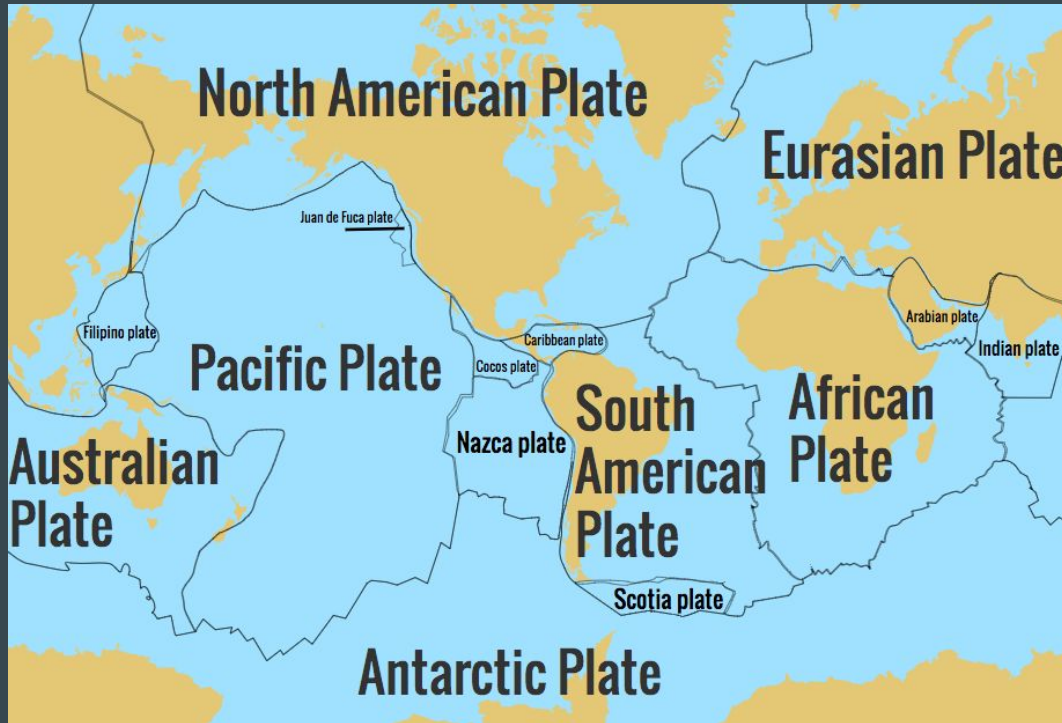
IN PAIRS AND USING YOUR TEXTBOOKS, SEE IF YOU CAN NAME THE PLATES.



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RESOURCEFUL

2. TECTONIC PLATES: ANSWERS



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3. MANTLE CONVECTION: WORKSHEET

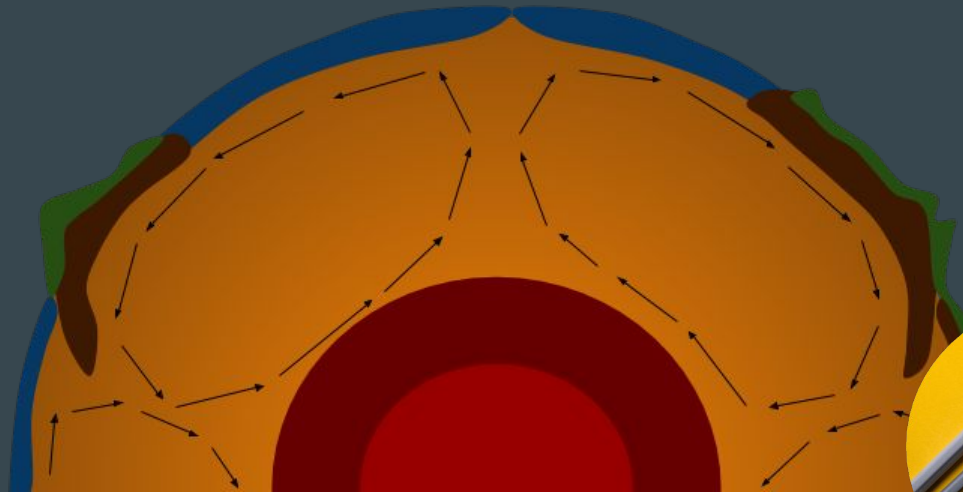
TASK

TECTONIC PLATES MOVE (VERY SLOWLY).

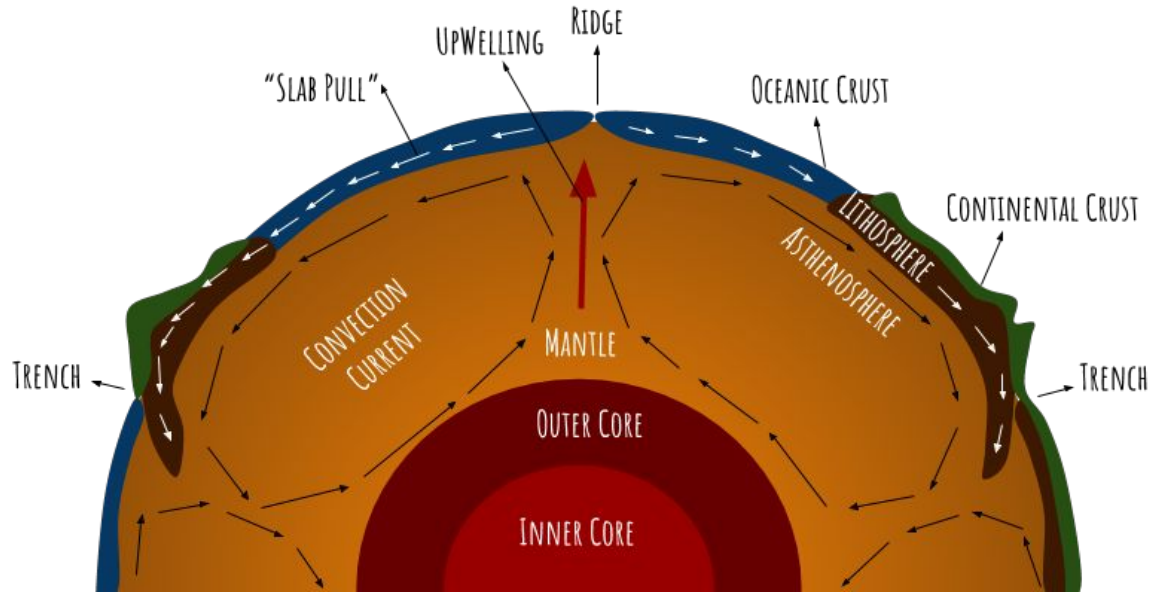
HEAT FROM THE CORE WARMS UP THE MANTLE.

HEAT RISING AND FALLING INSIDE THE MANTLE CREATES CONVECTION CURRENTS.

USE YOUR TEXTBOOKS TO LABEL THE DIAGRAM.



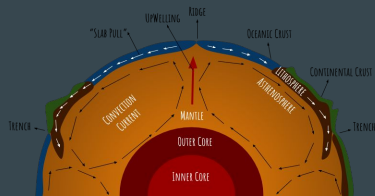
3. MANTLE CONVECTION: ANSWERS



3. MANTLE CONVECTION: ANSWERS

TASK

COMPLETE THE SENTENCES TO EXPLAIN WHAT IS HAPPENING IN THE DIAGRAM.



TECTONIC PLATES ARE MADE UP OF PIECES OF THE CRUST AND THE VERY TOP LAYER OF _____, TOGETHER REFERRED TO AS THE _____.

BECAUSE THE EARTH'S CRUST IS LESS _____ THAN THE UPPER MANTLE, IT IS ESSENTIALLY FLOATING ON TOP.

HEAT FROM THE _____ WARMS UP THE _____. HEAT RISING AND FALLING INSIDE THE MANTLE CREATES _____ (LIKE WHEN YOU BOIL A PAN OF WATER).

THAT'S WHY THE LOWER MANTLE IS MADE OF _____ MAGMA, AND THE UPPER MANTLE TENDS TO BE _____ MORE SOLID MAGMA.

THESE CURRENTS SLOWLY MOVE THE _____ PLATES (LITHOSPHERE).

WHEN THERE ARE TWO CURRENTS NEXT TO EACH OTHER BOTH MOVING TOWARDS THE SURFACE OF THE EARTH THIS CREATES AN _____, AND MAKES A RIDGE BETWEEN THE TWO PLATES.

WHEN THERE ARE TWO CURRENTS NEXT TO EACH OTHER BOTH MOVING TOWARDS THE CENTRE OF THE EARTH, THIS MAKES A _____ BETWEEN THE TWO PLATES.

IN SOME PLACES THIS RESULTS IN _____ BEING DESTROYED, IN OTHERS NEW _____ IS FORMED.

THE PLATE MOVEMENT, AND THE ACTIVITY INSIDE THE EARTH, IS KNOWN AS PLATE TECTONICS.



3. MANTLE CONVECTION: ANSWERS

TECTONIC PLATES ARE MADE UP OF PIECES OF THE CRUST AND THE VERY TOP LAYER OF UPPER MANTLE, TOGETHER REFERRED TO AS THE LITHOSPHERE.

BECAUSE THE EARTH'S CRUST IS LESS DENSE THAN THE UPPER MANTLE, IT IS ESSENTIALLY FLOATING ON TOP.

HEAT FROM THE CORE WARMS UP THE LOWER MANTLE. HEAT RISING AND FALLING INSIDE THE MANTLE CREATES CONVECTION CURRENTS (LIKE WHEN YOU BOIL A PAN OF WATER).

THAT'S WHY THE LOWER MANTLE IS MADE OF SOFTER MAGMA, AND THE UPPER MANTLE TENDS TO BE HARDER MORE SOLID MAGMA.

THESE CURRENTS SLOWLY MOVE THE TECTONIC PLATES (LITHOSPHERE).

WHEN THERE ARE TWO CURRENTS NEXT TO EACH OTHER BOTH MOVING TOWARDS THE SURFACE OF THE EARTH THIS CREATES AN UPWELLING, AND MAKES A RIDGE BETWEEN THE TWO PLATES.

WHEN THERE ARE TWO CURRENTS NEXT TO EACH OTHER BOTH MOVING TOWARDS THE CENTRE OF THE EARTH, THIS MAKES A TRENCH BETWEEN THE TWO PLATES.

IN SOME PLACES THIS RESULTS IN CRUST BEING DESTROYED, IN OTHERS NEW CRUST IS FORMED.

THE PLATE MOVEMENT, AND THE ACTIVITY INSIDE THE EARTH, IS KNOWN AS PLATE TECTONICS.



4. RECAP: QUIZ

CAN YOU REMEMBER THE ANSWERS TO THESE QUESTIONS?

- WHAT ARE THE 5 DIFFERENT LAYERS INSIDE THE EARTH CALLED?
- HOW THICK IS THE EARTH'S CRUST?
- THERE ARE TWO TYPES OF CRUST ON THE EARTH, WHAT ARE THEY CALLED? WHAT IS THE DIFFERENCE BETWEEN THEM?
- WHAT IS THE THICKEST LAYER OF THE EARTH?
- WHAT IS THE VERY TOP LAYER OF UPPER MANTLE KNOWN AS?
- WHAT CAUSES TECTONIC PLATES TO MOVE?



4. RECAP: ANSWERS

- WHAT ARE THE 5 DIFFERENT LAYERS INSIDE THE EARTH CALLED?
INNER CORE, OUTER CORE, LOWER MANTLE, UPPER MANTLE AND CRUST.
- HOW THICK IS THE EARTH'S CRUST?
BETWEEN 5 AND 70 KILOMETRES OR 3.1 AND 43.5 MILES
- THERE ARE TWO TYPES OF CRUST ON THE EARTH, WHAT ARE THEY CALLED? WHAT IS THE DIFFERENCE BETWEEN THEM?
OCEANIC CRUST CARRIES WATER AND IS THINNER AND DENSER, CONTINENTAL CRUST CARRIES LAND AND IS THICKER AND LIGHTER.
- WHAT IS THE THICKEST LAYER OF THE EARTH?
THE MANTLE (2,890 KM DEPTH)
- WHAT IS THE VERY TOP LAYER OF THE UPPER MANTLE KNOWN AS?
THE LITHOSPHERE.
- WHAT CAUSES TECTONIC PLATES TO MOVE?
THE CONVECTION CURRENTS IN THE MANTLE.



NEXT: PLATE BOUNDARIES

3.1.1.2 SECTION A: TECTONIC HAZARDS

