

**Question: What type of plate boundary is found in your assigned area of the globe?**

**Add Group member names:**

This is the first Data Study in the semester; less scaffolding is included in later Data Studies

**Learning Outcomes for the activity:**

Students will ...

- be *guided* to describe patterns in individual data sets
- be *guided* to describe overlapping patterns across data sets
- be *guided* to make a claim about what plate boundary type they have
- be *guided* to compose an explanation using sufficient and appropriate evidence and relevant science concepts

**Purpose:** students will use just introduced background knowledge (or assigned reading) to determine plate boundary type for region assigned to them

**Go to:** <https://datalab.marine.rutgers.edu/explorations/rider/geology.htm>

Your group is assigned the following zoom-in region listed beneath the image to complete this exercise: **Indonesia**

**Data description:** Before you can complete this exercise, you will need to look carefully at the data so you can use it to make and support a decision.

Orientation: tour of data sets & students explore

1. Discuss in your groups what you notice about the individual data sets. See how many different observations you can make and how well you can describe them for those listening to your description. Your observations will be discussed with the entire class before moving on to Step 2.

Q&A and additional Orientation

2. For each individual data set (a-d) found below, draft *thorough* written descriptions of data patterns, using the questions below as a guide. Discuss options. Try to do this together; for example one person can take turns speaking out loud, others help refine and one person records. *Everyone in the group should contribute to the writing of these description statements...please put your initials in [ ]s at the end of each you add.* Be sure to include descriptions of patterns in the data AND quantitative details whenever possible (see legends info to help with this).

**a. Bathymetry**

Orientation: patterns, comparisons, etc.

- What types of geographic features are present in your assigned area (consider features described in the intro for this topic: trench, MOR, land mountain belt, islands, land volcano chain, continental shelf/slope/rise)? Be sure to look at features found on the seafloor as well as on land (when present in your region).

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To guide students, we use a boundary location not assigned to any group to model process and reveal our expectations

- Describe any patterns in the location of the features relative to each other and relative to plate boundary location

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As students work, instructors provide additional guidance to groups and entire class to help them identify and articulate patterns, comparisons, etc.

### b. Volcanoes

- Describe the patterns in the volcano data: number of them, shapes, & dimensions of the volcano distribution patterns.
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- Now compare the geographic location of volcanoes to the location of other geographic features and the plate boundary location. Be sure to include if the differences in number of volcanoes, shapes and dimensions are associated with certain geographic features.
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### c. Earthquakes

- Describe the shapes & dimensions of the earthquake depth distribution patterns specifying the different depth ranges shown by the color coding.
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- Describe the geographic locations (spatial patterns) of earthquake depths in your area.
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- Compare earthquake locations to the geographic features, plate boundary location, and volcanoes.
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### d. Seafloor Age *(FYI, the data set for this variable is not complete and does not include, for example, age for trenches or seafloor close to continents or islands. If you are confused about whether seafloor age data is present in your assigned region, simply turn seafloor age data on and off to see where it is available.)*

- Note the range of seafloor ages that occur in the region you are studying.
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- Describe the patterns of seafloor age
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- Compare sea floor age patterns to the geographic features, plate boundary location, earthquake location/depths and volcanoes (if the seafloor age overlaps with these 2 data sets).
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Once this work is submitted, we provide feedback about their work

### 3. Claim:

After discussion with the class, and based on your careful analysis of data patterns, decide what type of plate boundary exists at your location. Just state your claim (conclusion) in one succinct statement here using the complete name for the boundary

type you selected; you will explain your reasoning and support it with evidence in the question that follows.

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Interpretation: What do the patterns reveal?

#### 4. Reasoning & Explanation

Answer this *individually* in the Canvas Assignment: PT “final” answer draft”.

Using all relevant information from your work above, compose a scientific explanation that supports your claim. Scientific explanations should **tie together (integrate)** all relevant **specific data patterns** **AND your understanding of relevant science concepts introduced for this topic that would explain your claim** in a logical sequence (your “reasoning!”).– *Your answer should take several sentences that tie together data descriptions and your understanding of science concepts sentences to complete this question.*

Synthesis: reasoning using multiple lines of evidence connected to details about the relevant science concepts to support their Claim

#### Introduction to the DCER framework

Scientists work to explain natural phenomena they study using the series of steps you just completed. They ask a testable question, collect data they think should be gathered to investigate the question, analyze patterns in the various data sets they collect (data descriptions), and make a claim given their analyzed data and background understandings of the phenomenon they are studying (claim). To support their claim, they must tie together all relevant and appropriate data patterns (evidence) that support their claim with their understandings of science concepts to support their claim (reasoning). The **Data Description - Claim - Evidence - Science concepts - Reasoning** (DCER) structure you completed above will be used in numerous exercises in this class to help you learn about the science and produce coherent explanations about claims you make. You will use a modified form of this process to make sense of data sets introduced in this class to help you better understand some of the phenomena that scientists have studied and explained (as best they can so far!).

Provide written feedback about their writing and their color coding; also reveal our work for all the parts of this process.