



Reconstructing Pangaea

By Carolyn Estell

Instructor's Overview: To construct a model of the supercontinent Pangaea

Objectives:

- When asked, the student should be able to explain the concept of continental drift, stating the definition in their own words and using complete sentences.
- They should be able to list the evidence that supports the theory of continental drift by using three out of the four pieces of evidence: fossils, glacial deposits, shapes of the continents, and mountain ranges in their explanations.
- Given the locations of fossils, glacial deposits and mountain chains on cut-out pieces of the continent, the student should be able to reconstruct a model of the supercontinent Pangaea by placing five of the seven continents in the correct locations, according to geologists, and recording that information on a diagram of Pangaea.

Prerequisite Concepts: Fossils, glaciers, basic anatomy of animals that swim (fins, body shape).

Materials Needed

Option 1:

- 2 sets of cut-out continents (each set in its own envelope) for each group
- Student instruction sheet for each group
- Blank sheets of unlined paper
- Map or globe showing the continents

Instructional Sequence:

Introduction: (5–8 min)

Display map of the continents so that all students are able to see the map.

T: Ask the students to make observations about the map. *What can you tell me about the continents on this map?*

S: Possible Responses: There are seven continents. Australia is an island. Asia is the largest continent. Most of the continents are in the Northern Hemisphere, etc.

T: Focus their attention on the coastlines of Africa and South America. *Looking at the coastlines of Africa and South America, do you see any relationships between the two continents?* (Guide students, if necessary, to noticing

that Africa and South America look like you could put them back together, like pieces of a puzzle.)

S: It looks like you could fit them together into one piece, shapes are very similar, etc.

T: *Great! Alfred Wegener, a German meteorologist, made that same observation in the early 1900s. He proposed that all of Earth's continents were once part of a single land mass. That is a pretty interesting idea, huh.* (While speaking put the map aside; depending on the classroom, post it on the wall, and get the overhead projector and envelopes ready.)

T: Write Pangaea on the overhead and ask students if they have ever heard of Pangaea.

If they have, ask them what it is?

If they have not, begin with giving them the Greek meaning of the word (all lands). Then ask them what they think a supercontinent is? (Use super-size fast-food analogy if necessary.)

Supercontinent: (430–270Ma) large continent comprising of two or more of the current continents (large landmass). Write key words on the overhead: Greek meaning of Pangaea; supercontinent and definition.

Doing the Activity (30 minutes)

1) Divide students get into groups no larger than four. In your groups choose a (1) official group recorder, (2) leader, (3) spokesperson, and (4) facilitator/material person.

Have (4) students come to get the envelopes and pieces of paper.

Tell students to record information in their lab books. The official group recorder's copy is turned in for evaluation.

T: *Today we are going to reconstruct Pangaea.*

2) *You can see that you have pieces of the continents. In your groups, think of some ways that you could figure out how to put these pieces together and how many different ways they could fit together?*

S: Sketch a couple of ways that the continents could fit together and ask why the students chose to place the continent where they did. (For example, did they use the shape of the edges or current locations.) Allow some time for the students to complete the activity.

T: Walk around the room observing and asking questions to the students to ensure that they understand the reasons for placing the continents where they chose. Monitor progress.

3) T: Gather students attention.

Ask the groups what they came up with and write criteria that they used on the overhead. (Have them put Set 1 away.)

4) T: *From what we know about Earth and the continents, what other features that we find on earth would make it easier for us to reconstruct Pangaea?*

Possible answers: Mountains, fossils, mineral deposits, sedimentary or volcanic deposits, meteor impacts, etc. Write answers on the overhead.

T: If students are missing fossils, mountains, or geologic deposits, use further questions to see how these things might be useful. Make sure to ask students why these would be helpful and explain if necessary. Mention link with Wegener-collected more data on Earth features to help him put the pieces together.

5) **Have them open Set 2 (10 min).** Have them follow the same procedure they did for Set1 but using additional evidence. (It is like putting a puzzle together.)

Key for Symbols

AA = mountains

XX = glacial deposits

GG & MM = fossils

S: Using the evidence found on these pieces in Set 2 have them reconstruct Pangaea. Tell students to record why they chose to place the continents where they did. Sketch arrangement of continents including location of new evidence.

T: Move among groups, asking questions and keeping the students on task. Ask each group why, since India is since close to the equator today, it came to have glacial deposits on it? What are some possible explanations?

6) T: **Gather class attention (10 minutes).** Ask how many ways they could put together the continents using the Set 2 envelope? Ask them if they have any questions about the activity? If not, continue to work on the questions for the activity.

Questions:

1) What is Pangaea?

2) Is your second reconstruction different from the reconstruction that your group came up with using the 1st

set of pieces? What made you arrange them differently?

3) What can you infer about the habitat in which fossil type G may have existed?

4) India was a separate land mass in this activity and on maps today it is a part of Asia. What evidence might we look for to support the idea that it was once separated from Asia? (Hint: Think about the list of features that we came up with to help us put the land masses back together).

5) What other information about the land masses would help you to further reconstruct Pangaea?

6) Consider the fossil evidence. How do we know that the animals didn't just swim across the ocean to the other continent? What characteristics of the fossil would help you determine if the animal could swim or not?

7) Why do you think Alfred Wegener's hypothesis about continental drift was not accepted when he proposed it in the early 1900s?

Have students clean up. If groups are finished with the questions, have them turn in the projects. If they aren't finished with the questions, have them keep the labs to finish up at the beginning of next class period.

Reconstructing Pangaea

Student Instructions

Today, in your groups, we are going to reconstruct Pangaea.

1) Count off in your group 1 to 4, if you have less than 4 people, combine tasks.

(1) Official group recorder, (2) leader, (3) spokesperson and (4) facilitator.

Each person is to record information. The official group recorder's copy is to be turned in for evaluation.

Activity Part 1:

2) Open Set 1: You can see that you have pieces of the continents.

In your group, think of some ways that you could figure out how to put these pieces together before you try it. Make a list of these ideas. Using the ideas you just came up with, how many different ways can you fit the continents together?

Don't forget! Record your data and include at least two sketches. After this is completed, have your work checked by the teacher.

Teacher check box

You may proceed to Part 2 of the activity only after receiving permission to do so.

Activity Part 2:

3) Open Set 2: You can see that you again have pieces of the continents. What is different about this set of pieces?

Using the new information provided how many different ways can you fit the continents together?

Explain what reasons you used to place the continents together. Record your data, including sketches, and answer the following questions.

Questions:

1) What is Pangaea?

2) Is your reconstruction from Set 2 different than the reconstruction of Set 1? What made you arrange them differently?

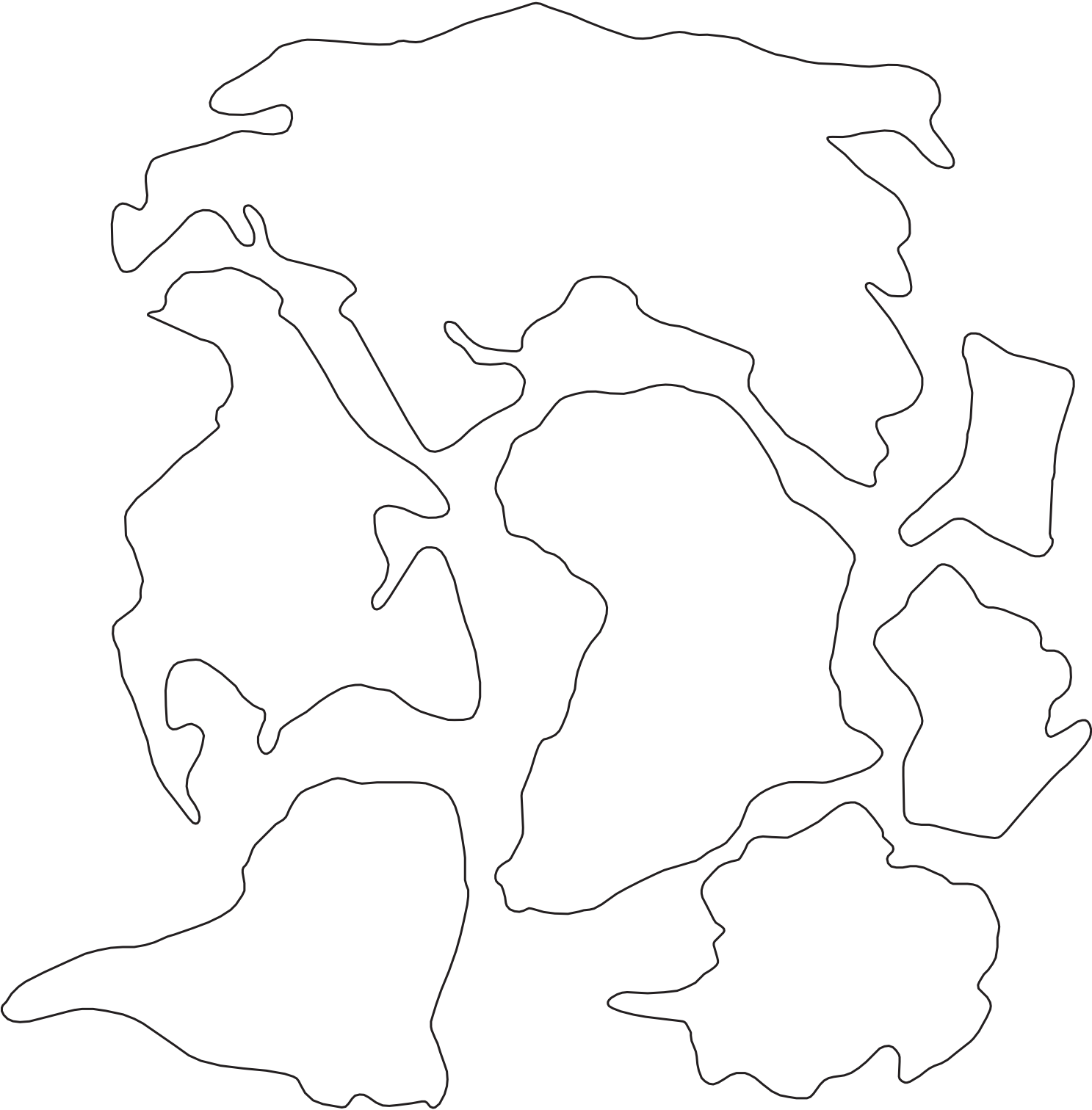
3) What can you infer about the habitat in which fossil type G may have existed?

4) India was once a separate land mass (as shown in this activity) and on maps today it is a part of Asia. What evidence might we look at to support the idea that it was once separated from Asia? (Hint: Think about the list of features that we came up with to help us put the land masses back together.)

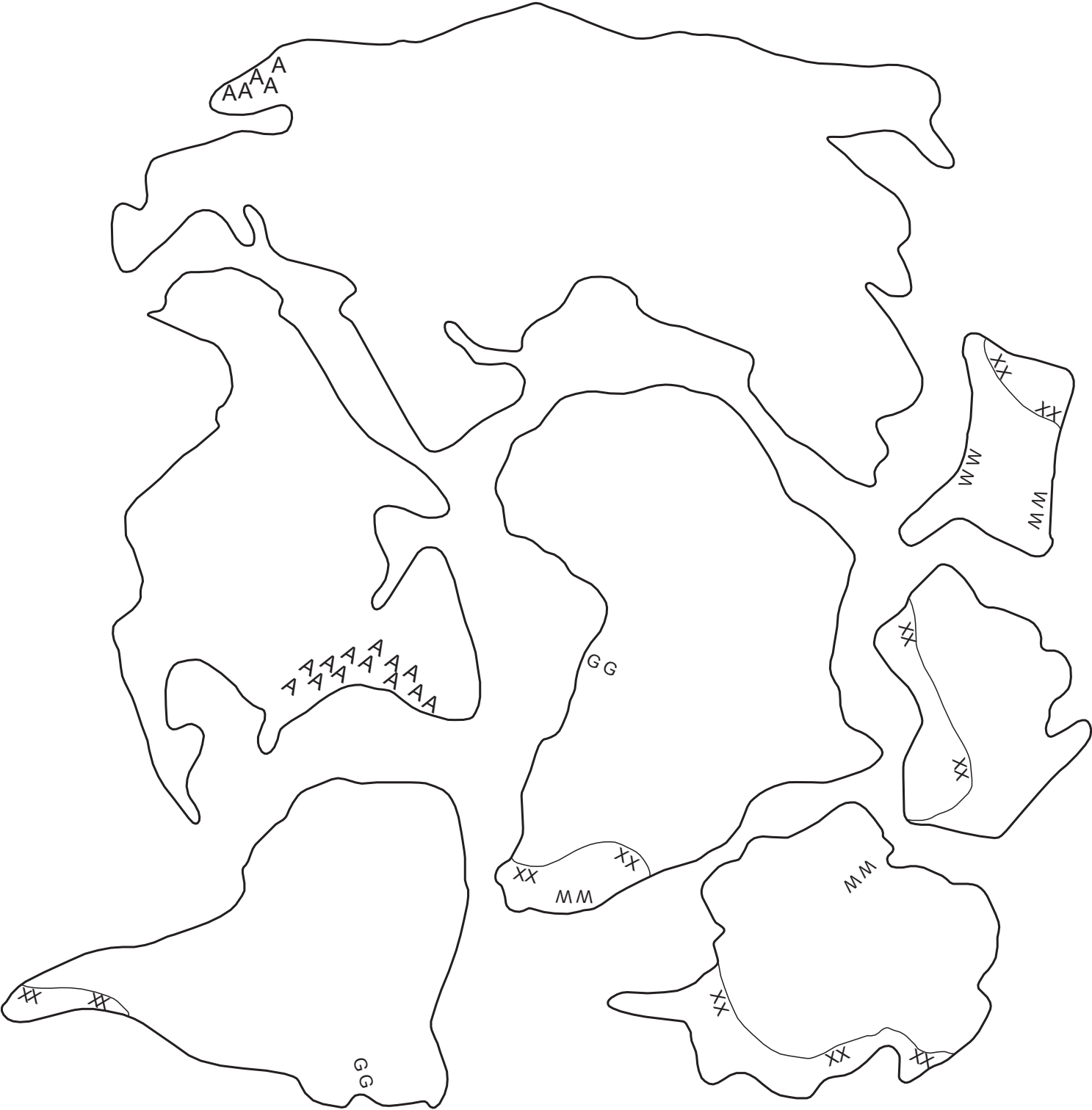
5) What other information about the land masses would help you to further reconstruct Pangaea?

6) Consider the fossil evidence. How do we know that the animals didn't just swim across the ocean to the other continent? What characteristics of the fossil would help you determine if the animal could swim or not?

Pangaea puzzle pieces – Set 1



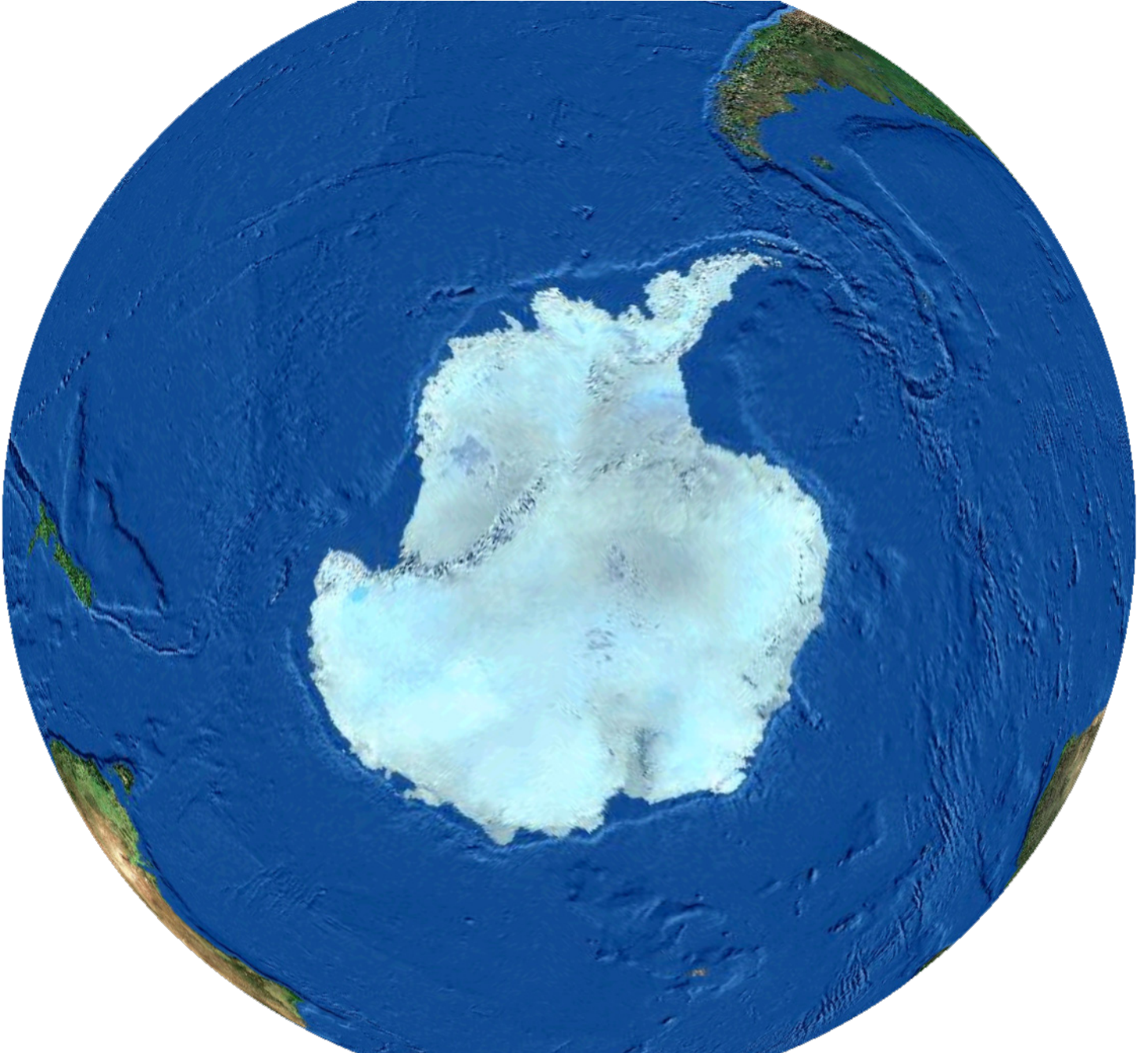
Pangaea puzzle pieces – Set 2



Africa



Antarctica



Asia



Australia



Europe



North America



South America

