About hurricanes...

Do you know where hurricanes happen? Do you know how they might be changing because of climate warming? This investigation will help you explore these questions. The first step is to collect and organize the facts about hurricanes. Use this page to help you organize the facts. List what you know and the questions you have about hurricanes. Then explore more about hurricanes on by reading the web article to help you answer your questions.

What I know about hurricanes:

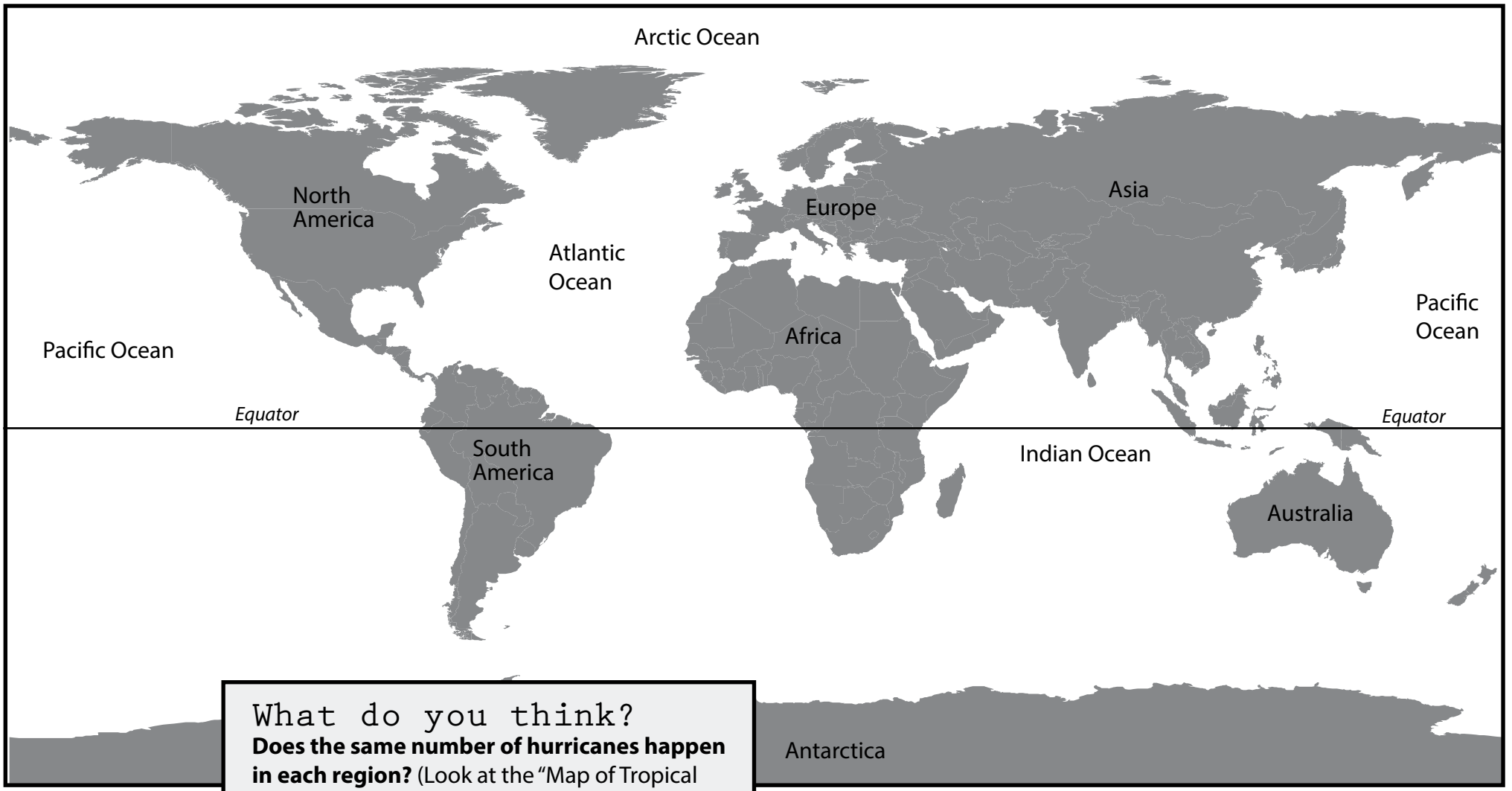
Questions I have about hurricanes:

What I learned about hurricanes:

Go to: **scied.ucar.edu/shortcontent/hurricanes**
As you explore online, fill in what you learn here.

Where do hurricanes happen?

There are six regions of the world where hurricanes (tropical cyclones) are likely to occur. Label these on the map below after you look at the "Map of Tropical Cyclones 1985–2005". Choose a different color for each region and color the part of the ocean where hurricanes are likely to occur. Fill the colors into the key below.



What do you think?

Does the same number of hurricanes happen in each region? (Look at the "Map of Tropical Cyclones" to help you answer this question.)

☐ YES ☐ NO

N
W E
S

☐ East Pacific Ocean
☐ West Pacific Ocean
☐ North Atlantic
☐ Southwestern Pacific
☐ North Indian Ocean
☐ South Indian Ocean

How many hurricanes happen?

The number of hurricanes (tropical cyclones) that happen varies a bit from year to year. But the average number can tell you how many are likely. Take a look at the data table below. This shows the time of hurricane season and the average number of hurricanes in each region. What do you think? Do regions get the same number of hurricanes?

Hurricane Region	Hurricane Season	Number of hurricanes per year (average)
East Pacific Ocean	May - November	9
West Pacific Ocean	April - January	17
North Atlantic	June - November	6
Southwestern Pacific	October - May	5
North Indian Ocean	April - December	2
South Indian Ocean	October - May	10

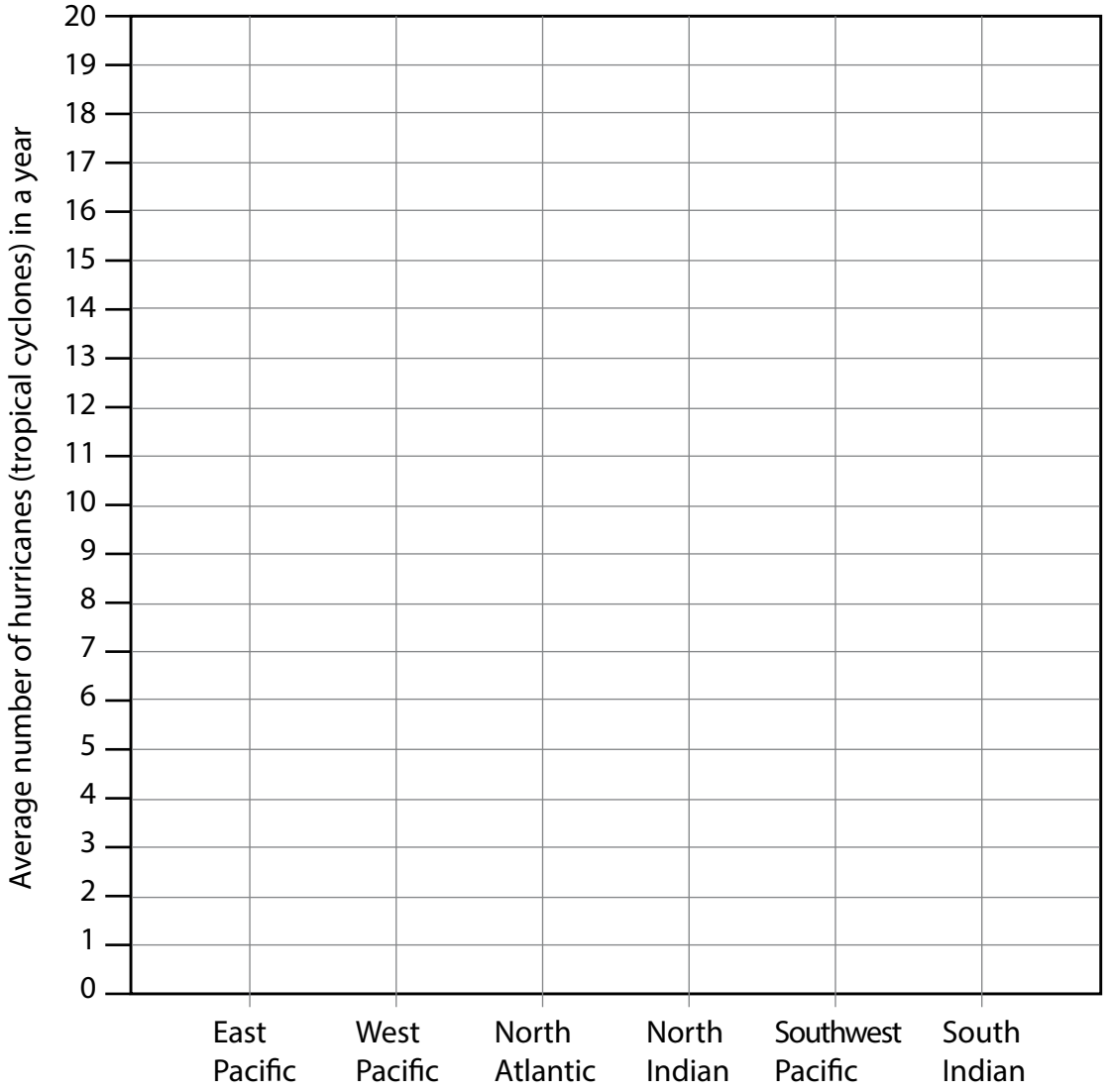
Average hurricanes data from NOAA based on data from 1968-1989 and rounded to closest whole number.

Now what do you think?

Does the same number of hurricanes happen in each region? (Look at your bar graph to help you answer this question.)

☐ YES ☐ NO

Make a bar graph! A bar graph is a great way to show relative differences in number. Each bar is the amount of hurricanes for each region. Draw each bar using the same colors that you used for the map on the previous page.



When do hurricanes happen?

Hurricane season is the time of year when hurricanes will most likely happen. But hurricane season is not at the same time in all places. Use the same colors from your key on page 2 to indicate the hurricane season for each region on the timeline below.

	January	February	March	April	May	June	July	August	September	October	November	December
East Pacific Ocean												
West Pacific Ocean												
North Atlantic												
North Indian Ocean												
Southwest Pacific												
South Indian Ocean												

Questions:(Answer this on a separate Google Doc)

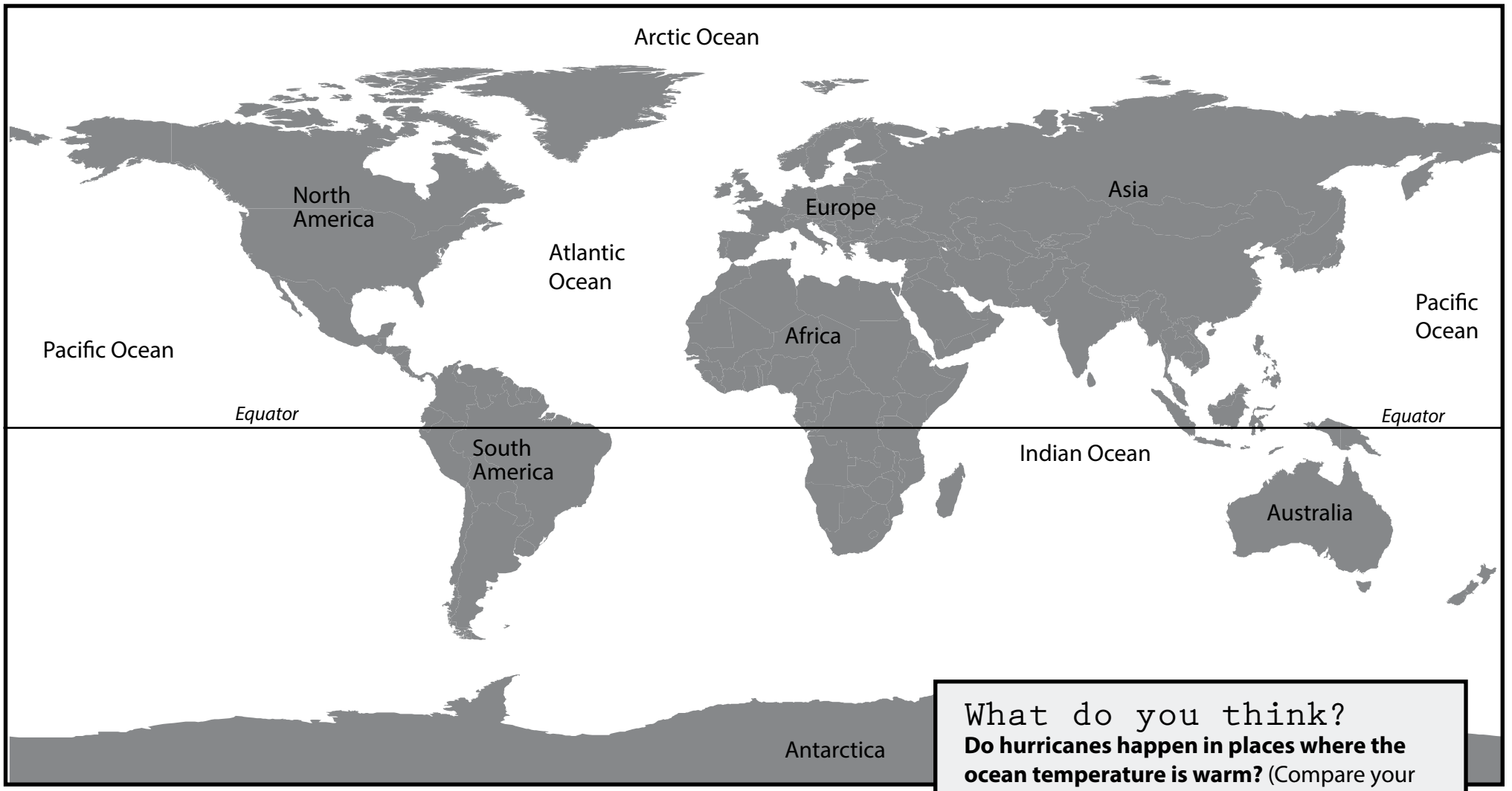
1. Which regions have hurricane season at about the same time of year? Can you see how regions fall into two groups based on the timing of hurricane season? Which regions have similar timing?

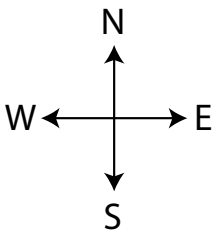
2. Look at where these regions are located on your map. In terms of their location, what do regions with similar hurricane seasons have in common? (Hint: look for the Equator!)

3. In which seasons are hurricanes most common? (Remember, seasons are opposite in the Northern and Southern Hemispheres.)

Where's the warm water?

The temperature of the ocean surface is not the same everywhere and it has an impact on hurricanes.
Use a red or orange pencil to color the parts of the ocean where the water is the warmest based on what you see in the "Sea Surface Temperatures" map.





What do you think?

Do hurricanes happen in places where the ocean temperature is warm? (Compare your map of warm water to your map of the six hurricane regions to answer this.)

☐ YES ☐ NO

Is climate warming affecting hurricanes?

We know that hurricanes form above warm ocean water. And it's thought that warmer water can lead to stronger hurricanes. The Earth warmed one degree Fahrenheit over the 20th Century. Warming is causing sea surface temperatures to climb. Has the warming climate had an impact on hurricanes? This is an area of active research. One way that scientists are trying to answer this question is by looking at the history of hurricanes.

The top table shows the total number of hurricanes that happened in each region during three time periods. The lower table shows the number of very strong hurricanes that happened over the same three time periods.

Take a look at the numbers and answer the questions below.

Total Number of Hurricanes:

Hurricane Region	1971-1985	1986-2000	2001-2016
East Pacific Ocean	148	150	143
West Pacific Ocean	137	228	228
North Atlantic	78	92	116
Southwestern Pacific	76	101	76
North Indian Ocean	0	17	17
South Indian Ocean	91	123	129

Number of Strong Hurricanes:
(Catagory 4 and 5 storms)

Hurricane Region	1971-1985	1986-2000	2001-2016
East Pacific Ocean	35	50	42
West Pacific Ocean	24	22	37
North Atlantic	13	21	31
Southwestern Pacific	7	9	23
North Indian Ocean	0	4	6
South Indian Ocean	16	22	34

Data from NOAA National Centers for Environmental Information IBTrACS v.3 retrieved by Ming Ge (NCAR)

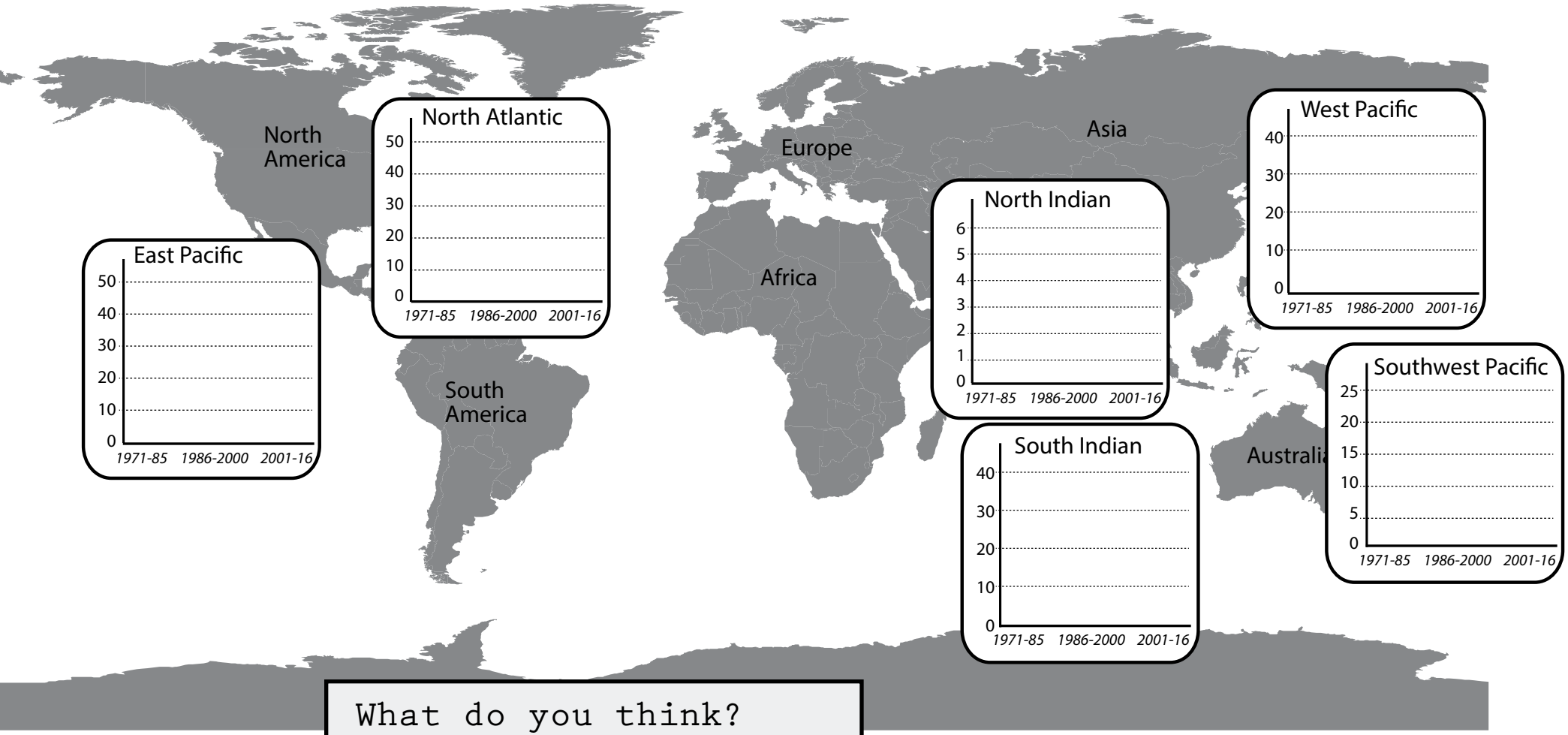
Questions:

1. Has the total number of hurricanes increased, decreased, or stayed about the same? Is the trend the same for all regions?

2. Has the number of strong (catagory 4 and 5) storms increased, decreased, or stayed about the same? Is the trend the same for all regions.

Are hurricanes getting stronger?

How many strong hurricanes were there a few decades ago? How many are there today?
Make small bar graphs on the map below using the data on the previous page to show whether there has been a change in the number of strong hurricanes in the six regions of the world where tropical cyclones occur.



What do you think?

Are there more strong hurricanes now? (Take a look at the bar graphs of strong hurricanes you made above. Do they show a trend?)

☐ YES ☐ NO