Appendix A

MAP PROJECTIONS

A map projection is simply a system for displaying the curved surface of the Earth as a flat image, such as on a sheet of paper or computer screen. The definition is easy; the process is more difficult. No matter how one tries to "flatten" the Earth, it can never be done in such a fashion as to show all Earth details in their correct relative sizes, shapes, distances, or directions. Something is always wrong, and the cartographer's—the mapmaker's—task is to select and preserve those Earth relationships important for the purpose at hand and to minimize or accept those distortions that are inevitable but less important.

Round Globe to Flat Map

The best way to model the Earth's surface accurately, of course, would be to show it on a globe. But globes are not as convenient to use as flat maps and do not allow one to see the entire surface of the Earth all at once. Nor can they show very much detail. Even a very large globe of, say, 1 meter (nearly 3 feet) in diameter, compresses the physical or cultural information of some 130,000 square kilometers (about 50,000 sq mi) of Earth surface into a space 2.5 centimeters (1 in.) on a side.

Geographers make two different demands on the maps they use to represent reality. One requirement is to show at one glance generalized relationships and spatial content of the entire world; the many world maps used in this and other geography textbooks and in atlases have that purpose. The other need is to show the detailed content of only portions of the Earth's surface—cities, regions, countries, hemispheres—without reference to areas outside the zone of interest. Although the needs and problems of both kinds of maps differ, each starts with the same requirement: to transform a curved surface into a flat one.

If we look at the globe directly, only the front—the side facing us—is visible; the back is hidden (**Figure A.1**). To make a world map, we must decide on a way to flatten the globe's curved surface on the hemisphere we can see. Then we have to cut the globe map down the middle of its hidden hemisphere and place the two back quarters on their respective sides of the already visible front half. In simple terms, we have to "peel" the map from the globe and flatten it in the same way we might try to peel an orange and flatten the skin. Inevitably, the peeling and flattening process will produce a resulting map that either shows tears

Figure A.1 An orthographic projection gives us a visually realistic view of the globe; its distortion toward the edges suggests the normal perspective appearance of a sphere viewed from a distance. Only a single hemisphere—one half of the globe—can be seen at a time, and only the central portion of that hemisphere avoids serious distortion of shape.

or breaks in the surface (**Figure A.2a**) or is subject to uneven stretching or shrinking to make it lie flat (**Figure A.2b**).

Projections—Geometrical and Mathematical

Of course, mapmakers do not physically engage in cutting, peeling, flattening, or stretching operations. Their task, rather, is to construct or *project* on a flat surface the network of parallels and meridians (the graticule) of the globe grid (see Section 1.2). The idea of projections is perhaps most easily visualized by thinking of a transparent globe with an imagined light source located

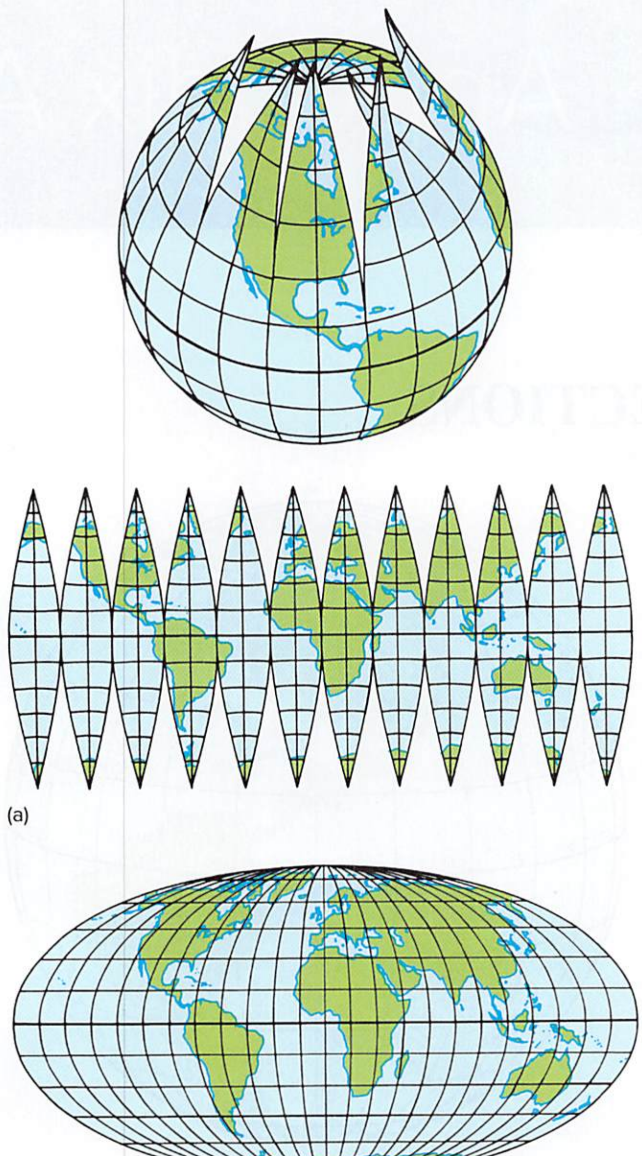


Figure A.2 (*a*) A careful "peeling" of the map from the globe yields a set of tapered "gores" that, although individually not showing much stretching or shrinking, do not collectively result in a very useful or understandable world map. (*b*) It is usually considered desirable to avoid or reduce the number of interruptions by depicting the entire global surface as a single flat circular, oval, or rectangular shape. That continuity of area, however, can be achieved only at the cost of considerable alteration of true shapes, distances, directions, or areas. Although the homolographic (Mollweide) projection shows areas correctly, it distorts shapes.

Source: American Congress Surveying and Mapping, "Choosing a World Map," Special Publication No. 2 of the American Cartographic Association, Bethesda, Md. Published in 1988 by CaGIS.

inside. Lines of latitude and longitude (or of coastlines or any other features) drawn on that globe will cast shadows on a nearby surface. A tracing of that shadow globe grid would represent a **geometrical map projection.**

In geometrical (or perspective) projections, the graticule is in theory visually transferred from the globe to a geometrical figure, such as a plane, cylinder, or cone, which, in turn, can be cut and then spread out flat (or *developed*) without any stretching or tearing. The surfaces of cylinders, cones, and planes are said to be **developable surfaces**—cylinders and cones can be cut and laid flat without distortion and planes are flat at the outset (**Figure A.3**). In actuality, geometrical projections are constructed not by tracing shadows but by the application of geometry and the use of lines, circles, arcs, and angles drawn on paper.

The location of the theoretical light source in relation to the globe can cause significant variation in the projection of the graticule on the developable surface. An **orthographic projection** results from placement of the light source at an infinite distance. A **gnomonic projection** is produced when the light source is at the center of the Earth. When the light is placed at the *antipode*—the point exactly opposite the point of tangency (point of contact between globe and map)—a **stereographic projection** is produced (**Figure A.4**).

Although a few useful and common projections are based on these simple geometric methods, most map designs can only be derived mathematically from equations involving angles and trigonometry developed for specific projections. The objective and need for **mathematical projections** is to preserve and emphasize specific Earth relationships that cannot be recorded by the perspective globe and shadow approach. The graticule of each mathematical projection is orderly and "accurate" in the sense of displaying the correct relative locations of lines of latitude and longitude. Each projection scheme, however, presents a different arrangement of the globe grid to minimize or eliminate some of the distortions inherent in projecting from a curved to a flat surface. Every projection represents a compromise or deviation from reality to achieve a selected purpose, but in the process of adjustment or compromise, each inevitably contains specific, accepted distortions.

Globe Properties and Map Distortions

The true properties of the global grid are detailed in Section 1.2. Not all of those grid realities can ever be preserved in any single projection; projections invariably distort some or all of them. The result is that all flat maps, whether geometrically or mathematically derived, also distort in different ways and to different degrees some or all of the four main properties of actual Earth surface relationships: area, shape, distance, and direction. And as our discussion above suggested, we can also see that all projections distort the Earth surface by showing a gap or break in what is actually a continuously connected surface without interruptions.

Area

Cartographers use **equal-area (equivalent) projections** when it is important for the map to show the *areas* of regions in correct or constant proportion to Earth reality—as it is when the map is intended to show the actual areal extent of

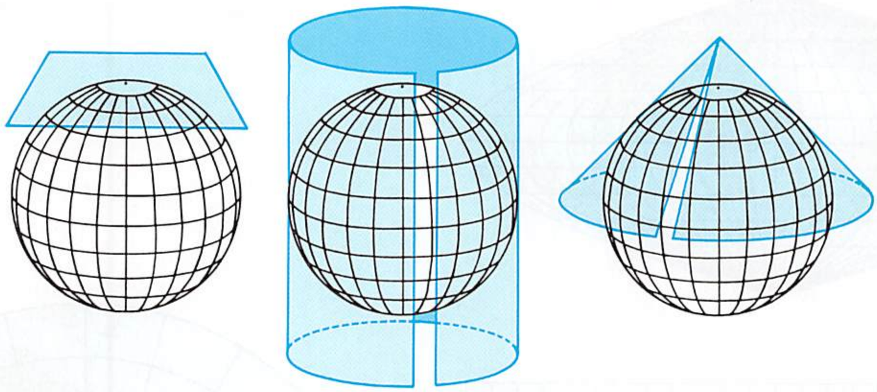


Figure A.3 The theory of *geometrical projections.* The three common geometric forms used in projections are the plane, the cylinder, and the cone.

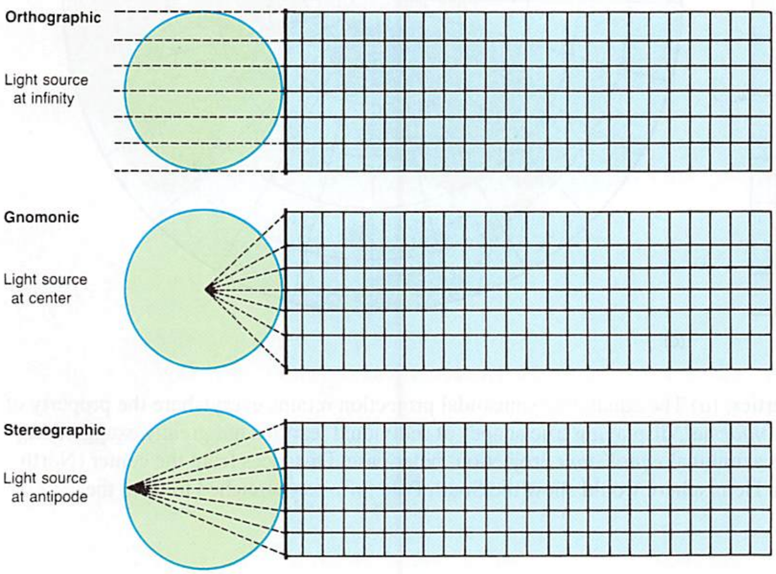


Figure A.4 The effect of light source location on planar surface projections. Note the variations in spacing of the lines of latitude that occur when the light source is moved.

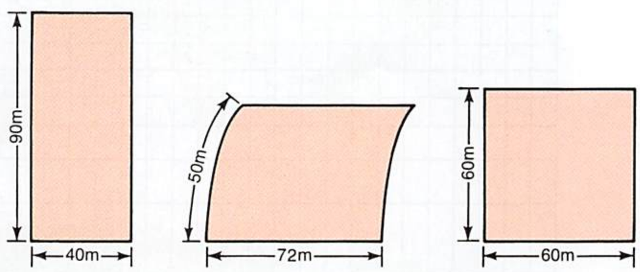
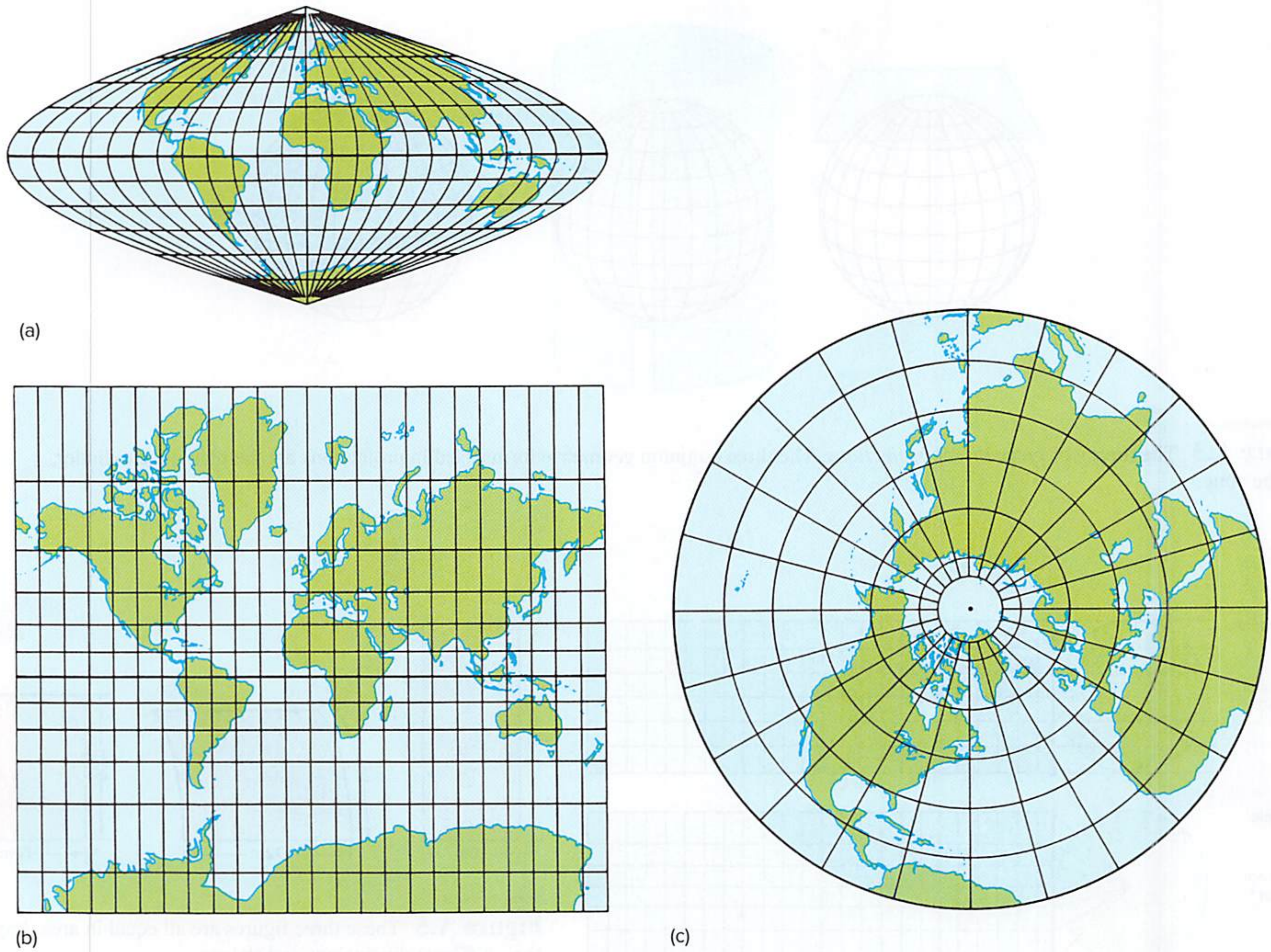


Figure A.5 These three figures are all equal in area despite their different dimensions and shapes.

a phenomenon on the Earth's surface. If we wish to compare the amount of land in agriculture in two different parts of the world, for example, it would be very misleading visually to use a map that represented the same amount of surface area at two different scales.[1] To retain the needed size comparability, our chosen projection must assure that a unit area drawn anywhere on it will always represent the same number of square kilometers (or similar units) on the Earth's surface. To achieve this *equivalence,* any scale change that the projection imposes in one direction must be offset by compensating changes in the opposite direction. As a result, the shape of the portrayed area is inevitably distorted. A square on the Earth, for example, may become a rectangle on the map, but that rectangle has the correct area (**Figure A.5**). *A map that shows correct areal relationships always distorts the shapes of regions,* as **Figure A.6a** demonstrates.

[1]Cartographic scale is the relationship between the size of a feature or length of a line on the map and that same feature or line on the Earth's surface. It may be indicated on a map as a ratio—for example, 1:1,000,000—that tells us the relationship between a unit of measure on the map and that same unit on the Earth's surface. In our example, 1 centimeter of map distance equals 1 million centimeters (or 10 kilometers) of actual Earth distance. See Figure 1.18.



(a)

(b)

(c)

Figure A.6 Sample projections demonstrating specific map properties. (*a*) The equal-area sinusoidal projection retains everywhere the property of *equivalence.* (*b*) The mathematically derived Mercator projection is *conformal,* displaying true shapes of individual features but greatly exaggerating sizes and distorting shapes away from the equator. (*c*) A portion of an azimuthal *equidistant* projection, polar-case. Distances from the center (North Pole) to any other point are true; extension of the grid to the Southern Hemisphere would show the South Pole infinitely stretched to form the circumference of the map.

Shape

Although no projection can reproduce correct shapes for large areas, some do accurately portray the shapes of small areas. These true-shape projections are called **conformal,** and the importance of *conformality* is that regions and features "look right" and have the correct directional relationships. They achieve these properties for small areas by assuring that lines of latitude and longitude cross each other at right angles and that the scale is the same in all directions at any given location. Both these conditions exist on the globe but can be retained for only relatively small areas on maps. Because that is so, the shapes of large regions—continents, for example—are always different from their true Earth shapes even on conformal maps. Except for maps for very small areas, *a map cannot be both equivalent and conformal;* these two properties are mutually exclusive, as **Figure A.6b** suggests. Even on maps of very small areas, these two properties hold only approximately.

Distance

Distance relationships are nearly always distorted on a map, but some projections do maintain true distances in one direction or along certain selected lines. True distance relationships simply mean that the length of a straight line between two points on the map correctly represents the **great circle** distance between those points on the Earth. (An arc of a great circle is the shortest distance between two points on the Earth's curved surface; the equator is a great circle and all meridians of longitude are half great circles.) Projections with this property can be designed, but even on such **equidistant** maps true distance in all directions is shown only from one or two central points. Distances between all other locations are incorrect and, quite likely, greatly distorted as **Figure A.6c** clearly shows.

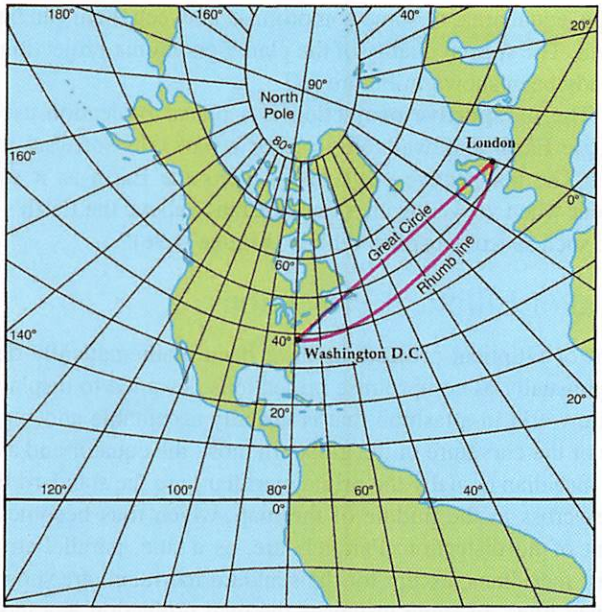


Figure A.7 A gnomonic projection centered on Washington, D.C. In this geometrical projection the light source is at the center of the globe (see Figure A.4), and the capital city marks the "standard point" where the projection plane is in contact with the globe. The rapid outward increase in graticule spacing makes it a projection impractical for more than a portion of a hemisphere. A unique property of the gnomonic projection is that it is the only projection on which all great circles appear as straight lines.

Direction

As is true of distances, directions between all points on a map cannot be shown without distortion. On **azimuthal projections,** however, true directions are shown from one central point to all other points. (An *azimuth* is the angle formed at the beginning point of a straight line, in relation to a meridian.) Directions or azimuths from points other than the central point to other points are not accurate. The azimuthal property of a projection is not exclusive—that is, an azimuthal projection may also be equivalent, conformal, or equidistant. The azimuthal equal-distance (*equidistant*) map shown as Figure A.6c is, as well, a true-direction map from the same North Pole origin. Another more specialized example is the gnomonic projection, displayed as **Figure A.7**.

Classes of Projections

Although there are many hundreds of different projections (and an infinite number of different projections could be created), the great majority of them can be grouped into four primary classes or families based on their origin. Each family has its own distinctive outline, set of similar properties, and pattern of distortions.

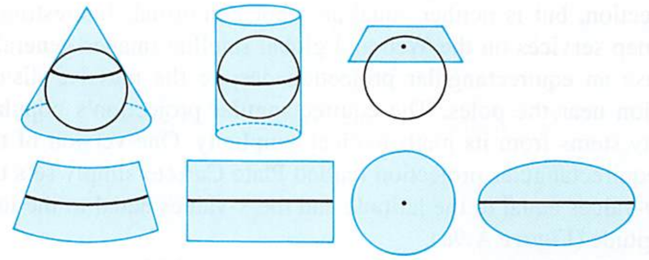


Figure A.8 Shape consistencies within families of projections. When the surface of a cone, cylinder, or plane is made *tangent*—that is, comes into contact with the globe—at either a point or along a circle and then *developed,* a characteristic family outline results. The tangent lines and point are indicated. A fourth common shape, the oval, may reflect a design in which the long dimension is a great circle comparable to the tangent line of the cylinder.

Source: American Congress Surveying and Mapping, "Choosing a World Map," Special Publication No. 2 of the American Cartographic Association, Bethesda, Md. Published in 1988 by CaGIS.

Three of them are easily seen as derived from the geometric or perspective projection of the globe grid onto the developable surfaces of cylinders, cones, and planes. The fourth class is mathematically derived; its members have a variety of attributes but share a general oval design (**Figure A.8**).

Cylindrical Projections

Cylindrical projections are developed geometrically or mathematically from a cylinder wrapped around the globe. Usually, the cylinder is tangent at the equator, which thus becomes the **standard line**—that is, transferred from the globe without distortion. The result is a globe grid network with meridians and parallels intersecting at right angles. There is no scale distortion along the standard line of tangency, but distortion increases with increasing distance away from it. The result is a rectangular world map with acceptable low-latitude representation, but with enormous areal exaggeration toward the poles.

The mathematically derived **Mercator projection** invented in 1569 is a special familiar but commonly misused cylindrical projection (see Figure A.6b). Its sole original purpose was to serve as a navigational chart of the world with the special advantage of showing true compass headings, or **rhumb lines,** as straight lines on the map. That is, any straight line drawn on a Mercator projection will follow a constant compass direction. For instance, one drawn from the lower left to the upper right would follow a northeasterly direction on the Earth surface; a ship could follow this line by constantly heading in the direction northeast (as indicated, for instance, by a magnetic compass). Its frequent use in wall or book maps gives grossly exaggerated impressions of the size of land areas away from the tropics.

The **equirectangular projection** is a cylindrical projection that converts the globe's meridians to equally spaced vertical lines and its parallels to equally spaced horizontal lines.

The result is a rectangular map that resembles the Mercator projection, but is neither equal-area nor conformal. Interestingly, map services on the Web and global satellite images generally use an equirectangular projection despite the massive distortion near the poles. The equirectangular projection's popularity stems from its mathematical simplicity. One version of the equirectangular projection (called Plate Carrée) simply sets the y-values equal to the latitude and the x-values equal to the longitude (**Figure A.9a**).

Equal-area alternatives to the conformal Mercator map are available, and a number of "compromise" cylindrical projections that are neither equal area nor conformal (for example, the Miller projection, **Figure A.9b**) are frequently used for world maps. The Robinson projection (**Figure A.9f**), used for many of the world maps in this textbook, is such a compromise. Designed to show the whole world in a visually satisfactory manner, it does not show true distances or directions and is neither equal-area nor conformal. Instead, it permits some exaggeration of size in the high latitudes in order to improve the shapes of landmasses. Size and shape are most accurate in the temperate and tropical zones, where most people live.

Conic Projections

Of the three developable geometric surfaces, the cone is the closest in form to one-half of a globe. **Conic projections,** therefore, are often employed to depict one hemisphere or smaller parts of the Earth. In the *simple conic* projection, the cone is placed tangent to the globe along a single standard parallel, with the apex of the cone located above the pole. The cone can also be made to intersect the globe along two or more lines, with a *polyconic* projection resulting; the increased number of standard lines reduces the distortion, which increases away from the standard parallel. The projection of the grid on the cone yields evenly spaced straight-line meridians radiating from the pole and parallels that are arcs of circles. Although conic projections can be adjusted to minimize distortions and become either equivalent or conformal, by their nature they can never show the whole globe. In fact, they are most useful for and generally restricted to maps of midlatitude regions of greater east-west than north-south extent. The Albers equal-area projection often used for U.S. maps is a familiar example (**Figure A.9c**).

Planar (Azimuthal) Projections

Planar (azimuthal) projections are constructed by placing a plane tangent to the globe at a single point. Although the plane may touch the globe anywhere the cartographer wishes, the polar case with the plane centered on either the North or the South Pole is easiest to visualize (see Figure A.6c). This equidistant projection is useful because it can be centered anywhere, facilitating the correct measurement of distances from that point to all others. When the plane is tangent at places other than the poles, the meridians and the parallels become curiously curved (**Figure A.9d**).

Planar maps are commonly used in atlases because they are particularly well suited for showing the arrangement of polar land-masses. Depending on the particular projection used, true shape, equal area, or some compromise between them can be depicted. The special quality of the planar gnomonic projection has already been shown in Figure A.7.

The **perspective projection** is a planar projection used in Google Earth and available in a variety of GIS software packages. The perspective projection depicts the Earth as it would appear when viewed from a finite distance above the Earth's surface such as from a space vehicle (**Figure A.9e**).

Oval or Elliptical Projections

Oval or elliptical projections have been mathematically developed usually as compromise projections designed to display the entire world in a fashion that is visually acceptable and suggestive of the curvature of the globe. In most, the equator and a central meridian (usually the prime meridian) are the standard lines. They cross in the middle of the map, which thus becomes the point of no distortion. Parallels are, as a rule, parallel straight lines; meridians, except for the standard meridian, are shown as curved lines. In some instances the oval projection is a modification of a projection based on a different original shape. Some of the world maps in this textbook (for example, Figures 8.12 and 13.19) are an oval adjustment of the circular (but not azimuthal) Van der Grinten projection, a compromise projection that achieves acceptable degrees of equivalence and conformality in lower and middle latitudes but becomes increasingly and unacceptably distorted in polar regions.

Other Projections and Manipulations

The geometric projections, we have seen, can all be thought of as developed from the projection of the globe grid onto a cylinder, cone, or plane. Many projections, however, cannot be classified in terms of simple geometric shapes. They are derived from mathematical formulas and usually have been developed to display the world or a portion thereof in a fashion that is visually acceptable or in any shape that is desired: ovals are most common, but hearts, trapezoids, stars, and other—sometimes bizarre—forms have been devised for special purposes. One often-seen projection is the equal-area Goode's homolosine, an *interrupted* projection that is actually a product of fitting together the least distorted portions of two different projections (the sinusoidal projection and the Mollweide, or homolographic, projection) and centering the split map along multiple standard meridians to minimize distortion of either (as desired) land or ocean surfaces (**Figure A.10**).

The homolosine map clearly shows how projections may be manipulated or adjusted to achieve desired objectives. Because most projections are based on a mathematically consistent rendering of the actual globe grid, possibilities for such manipulation are nearly unlimited. R. Buckminster Fuller, an architect and designer of the geodesic dome, produced the Fuller dymaxion projection (**Figure A.11**). It consists of 20 equilateral triangles, which can be hinged along different boundaries to show interesting Earth relationships. The projection minimizes distortion of the sizes and shapes of the world's landmasses.

Map properties to be retained, size and shape of areas to be displayed, and overall map design to be achieved may influence the cartographer's choices in reproducing the globe grid on the

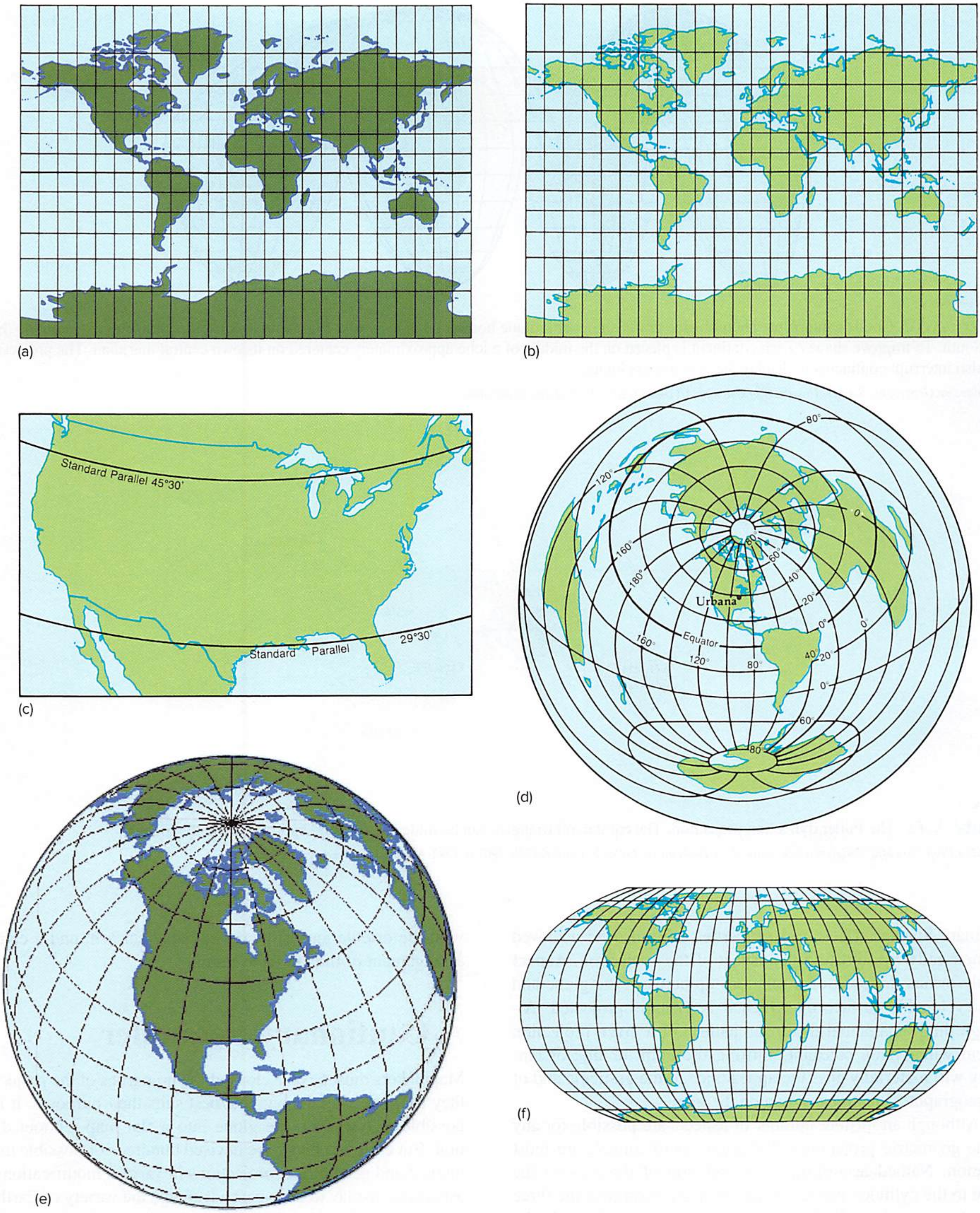


Figure A.9 Some sample members of the principal projection families. (*a*) The equirectangular projection is a simple cylindrical projection. The version shown here was created by setting the x-value equal to the longitude and the y-value equal to the latitude. (*b*) The Miller cylindrical projection is also mathematically derived. (*c*) The Albers equal-area conic projection, used for many official U.S. maps, has two standard parallels: 29 1/2° and 45 1/2°. (*d*) A planar, or azimuthal, equidistant projection centered on Urbana, Illinois. (*e*) The perspective projection is a planar projection that simulates the view from space. (*f*) The Robinson projection of the oval family; neither conformal nor equivalent, it was designed as a visually satisfactory world map.

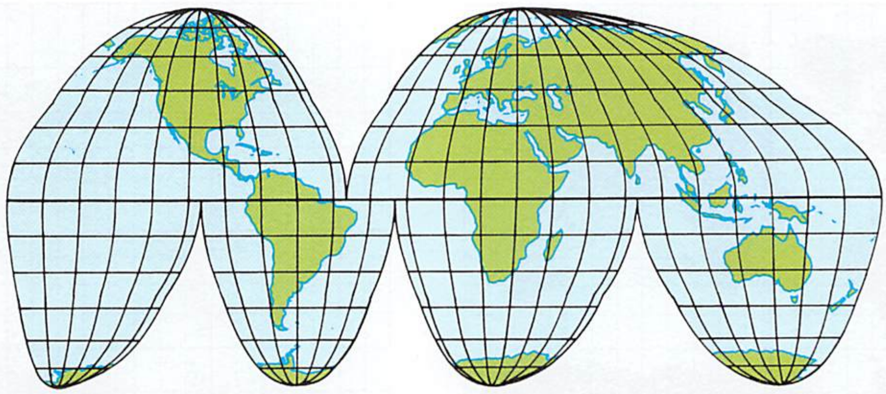


Figure A.10 Goode's interrupted homolosine grafts an upper latitude homolographic (Mollweide) onto a sinusoidal projection at about 40° North and South. To improve shapes, each continent is placed on the middle of a lobe approximately centered on its own central meridian. The projection can also interrupt continents to display the ocean areas intact.

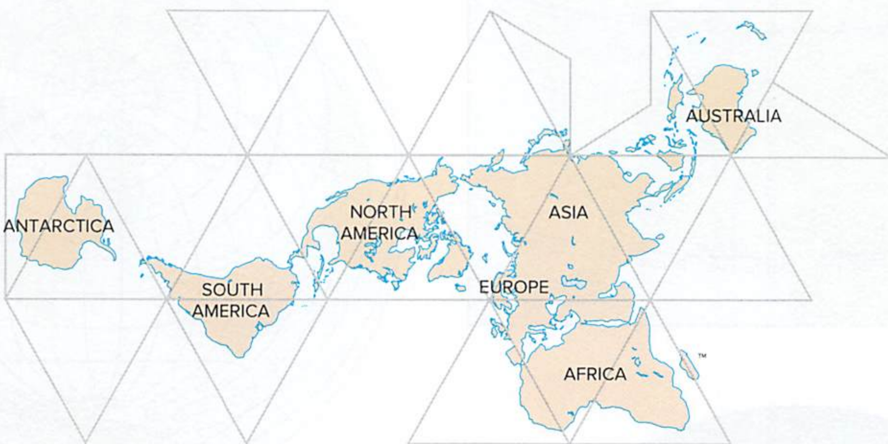


Figure A.11 The Fuller dymaxion projection. The equilateral triangles can be folded into a solid approximating the globe.

flat map. Special effects and properties may also be achieved geometrically by adjusting the aspect of the projection. **Aspect** simply means the positional relationship between the globe and the developable surface on which it is visually projected. Although the fundamental distortion pattern of a given projection system will remain constant, shifting the point or line of tangency will materially alter the appearance of the graticule and of the geographical features shown on the map.

Although an infinite number of aspects are possible for any of the geometric projections, three classes of aspects are most common. Named according to the relation of the axis of the globe to the cylinder, cone, or plane projection surface, the three classes are usually called *equatorial, polar,* and *oblique*. In the equatorial, the axis of the globe parallels the orientation of the plane, cylinder, or cone; a parallel, usually the central equator, is the line of tangency. In the polar aspect, the axis of the globe is perpendicular to the orientation of the developable surface. In the oblique aspect, the axis of the globe makes an oblique angle with the orientation of the developable surface, and a complex arrangement of the graticule results.

A Cautionary Reminder

Mapmakers must be conscious of the properties of the projections they use, selecting the one that best suits their purposes. It is not possible to transform the globe into a flat map without distortion. But cartographers have devised hundreds of possible mathematical and geometrical projections in various modifications and aspects to display to their best advantage the variety of Earth features and relationships they wish to emphasize. Some projections are highly specialized and properly restricted to a single limited purpose; others achieve a more general acceptability and utility.

If the map shows only a small area, the choice of a projection is less critical because distortion due to projection decreases as map scale increases (i.e., as the Earth surface area shown decreases)—virtually any can be used. The choice becomes more important when the area to be shown extends over a considerable longitude and latitude; then the selection of a projection clearly depends on the purpose of the map. As we have seen, Mercator or gnomonic projections are useful for navigation. Unfortunately, the Mercator projection grossly exaggerates the area of high latitude features, giving a misleading impression when used for books or wall maps. If numerical data are being mapped, the relative sizes of the areal units (countries, states, counties, and so forth) should be correct, and equivalence is the sought-after map property. Conformality and equal distance may be required in other instances.

While selection of an appropriate projection is the task of the cartographer, understanding the consequences of that choice and recognizing and allowing for the distortions inevitable in all flat maps are the responsibility of the map reader. When skillfully designed maps are read by knowledgeable users, they clearly and accurately convey important spatial information and Earth relationships.

KEY WORDS

aspect
azimuthal projection
conformal projection
conic projection
cylindrical projection
developable surface
equal-area (equivalent) projection
equidistant
equirectangular projection
geometrical projection
gnomonic projection
great circle
mathematical projection
Mercator projection
orthographic projection
perspective projection
planar (azimuthal) projection
rhumb line
standard line
stereographic projection

Appendix B

2017 WORLD POPULATION DATA

	Population mid-2017 (millions)	Births per 1,000 Population	Deaths per 1,000 Population	Net Migration Rate per 1,000	Projected Population (millions), Mid-2050	Projected Population Change, 2017–2050, %	Infant Mortality Rate[a]	Total Fertility Rate[b]	Percent of Population Ages <15	Percent of Population Ages 65+	GNI PPP per Capita ($US), 2016	Percent Urban	Population per Square Kilometer of Arable Land (thousands)	Life Expectancy at Birth (years), Males	Life Expectancy at Birth (years), Females	Secondary School Enrollment Ratio[c], Males (2009–2016)	Secondary School Enrollment Ratio[c], Females (2009–2016)
WORLD	**7,536**	**20**	**8**	**0**	**9,846**	**31%**	**32**	**2.5**	**26**	**9**	**16,101**	**54**	**532**	**70**	**74**	**77**	**76**
MORE DEVELOPED	1,263	11	10	3	1,325	5%	5	1.6	16	18	41,421	78	239	76	82	107	107
LESS DEVELOPED	6,273	21	7	0	8,520	36%	35	2.6	28	7	10,822	49	707	69	72	74	73
LESS DEVELOPED (Excl. China)	4,878	24	7	0	7,169	47%	39	2.9	31	5	9,353	47	624	67	71	71	70
LEAST DEVELOPED	1,001	33	8	–1	1,952	95%	52	4.3	40	4	2,566	32	572	63	66	46	41
AFRICA	**1,250**	**35**	**9**	**–1**	**2,574**	**106%**	**51**	**4.6**	**41**	**3**	**4,833**	**41**	**534**	**61**	**64**	**52**	**48**
SUB-SAHARAN AFRICA	**1,021**	**37**	**10**	**0**	**2,193**	**115%**	**56**	**5.0**	**43**	**3**	**3,592**	**39**	**534**	**58**	**62**	**48**	**43**
NORTHERN AFRICA	**230**	**28**	**6**	**–1**	**381**	**66%**	**24**	**3.3**	**31**	**5**	**10,046**	**52**	**538**	**71**	**74**	**77**	**75**
Algeria	42.2	26	4	0	64.8	54%	21	3.1	29	6	14,720	71	565	75	78	98	102
Egypt	93.4	30	7	0	163.5	75%	16	3.3	31	4	11,110	43	3,498	71	73	86	86
Libya	6.4	20	5	–7	8.1	27%	23	2.3	29	4	11,210	79	372	69	75	—	—
Morocco	35.1	19	5	–2	40.2	15%	25	2.4	25	6	7,700	60	432	74	77	74	64
Sudan	40.6	34	8	–2	88.1	117%	46	4.7	41	4	4,290	35	205	63	66	44	41
Tunisia	11.5	20	6	–1	15.3	33%	15	2.4	24	8	11,150	68	397	75	78	90	94
Western Sahara[d]	0.6	20	5	6	0.9	50%	31	2.4	29	3	—	81	15,000	68	71	—	—
WESTERN AFRICA	**371**	**39**	**11**	**–1**	**809**	**118%**	**64**	**5.3**	**44**	**3**	**4,095**	**46**	**437**	**55**	**57**	**53**	**47**
Benin	11.2	37	9	–1	23.9	113%	67	5.0	43	3	2,170	44	415	59	62	67	47
Burkina Faso	19.6	41	9	–1	48.4	147%	65	5.7	49	3	1,680	31	327	59	61	35	32
Cape Verde	0.5	20	6	–3	0.6	20%	21	2.3	31	5	6,220	66	909	71	75	88	98
Côte d'Ivoire	24.4	37	13	0	50.1	105%	64	5.0	43	3	3,610	55	841	52	55	51	37

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Gambia	2.1	40	8	–1	5.1	143%	47	5.5	46	2	1,640	60	477	60	62	59	56
Ghana	28.8	32	8	0	51.2	78%	41	4.0	39	3	4,150	55	613	61	63	63	61
Guinea	11.5	36	10	–3	24.3	111%	59	4.9	43	3	1,200	38	371	59	60	47	31
Guinea–Bissau	1.9	37	11	–1	3.6	89%	75	4.7	42	3	1,580	50	633	55	59	—	—
Liberia	4.7	35	8	–1	9.8	109%	54	4.7	42	3	700	50	940	61	63	42	33
Mali	18.9	43	11	–3	44.8	137%	56	6.0	48	3	2,040	41	295	57	58	46	37
Mauritania	4.4	35	8	2	9	105%	75	4.6	40	3	3,760	60	978	62	65	32	29
Niger	20.6	48	10	0	65.6	218%	61	7.3	50	3	970	19	130	59	61	24	17
Nigeria	190.9	39	13	0	410.6	115%	69	5.5	44	3	5,740	49	562	52	54	58	53
Senegal	15.8	37	6	–1	33.8	114%	39	4.9	43	3	2,480	44	494	65	69	50	49
Sierra Leone	7.6	37	13	–1	13	71%	92	4.9	43	3	1,320	40	480	51	52	46	40
Togo	7.8	35	9	0	15.3	96%	52	4.5	42	3	1,370	40	294	59	61	—	—
EASTERN AFRICA	**422**	**36**	**8**	**–1**	**886**	**110%**	**47**	**4.7**	**43**	**3**	**2,154**	**27**	**636**	**62**	**65**	**38**	**36**
Burundi	10.4	42	11	–1	23.5	126%	47	5.5	45	3	770	12	867	55	59	44	41
Comoros	0.8	33	8	–3	1.5	88%	55	4.3	40	3	1,520	28	1,231	62	65	58	62
Djibouti	1.0	23	8	1	1.3	30%	53	2.9	32	4	—	77	50,000	61	64	53	43
Eritrea	5.9	31	7	–15	8.9	51%	46	4.2	41	4	1,500	23	855	62	67	33	28
Ethiopia	105.0	33	7	0	190.9	82%	48	4.6	42	3	1,730	20	695	63	67	36	34
Kenya	49.7	32	6	0	95.5	92%	37	3.9	41	3	3,130	26	857	64	69	63	57
Madagascar	25.5	33	7	0	48.1	89%	33	4.2	41	3	1,440	36	729	64	67	39	38
Malawi	18.6	35	8	0	37.4	101%	42	4.4	44	3	1,140	16	490	60	65	46	41
Mauritius	1.3	10	8	–1	1.1	–15%	13.7	1.4	20	9	20,980	41	1,733	71	78	94	98
Mayotte	0.2	39	2	0	0.5	150%	4	5.0	44	3	—	47	2,247	75	77	—	—
Mozambique	29.7	39	10	0	67.8	128%	65	5.3	45	3	1,190	33	526	56	60	34	31
Reunion	0.9	17	5	–6	1.1	22%	7	2.5	24	11	—	95	2,528	77	84	—	—
Rwanda	12.3	33	6	–1	24.3	98%	32	4.2	40	3	1,870	30	1,070	65	69	35	38
Seychelles	0.09	17	8	–3	0.1	11%	13.4	2.3	22	8	28,390	54	112,500	68	78	79	84
Somalia	14.7	44	12	–3	35.9	144%	74	6.4	47	3	—	40	1,336	54	58	—	—
South Sudan	12.6	37	11	5	27.9	121%	72	5.1	42	3	1,700	19	—	55	57	12	7
Tanzania	57.5	40	7	–1	152.2	165%	43	5.2	45	3	2,740	32	426	63	67	34	31
Uganda	42.8	40	9	–1	95.6	123%	43	5.4	48	3	1,820	20	620	62	64	24	22
Zambia	16.4	39	8	0	39.3	140%	50	5.2	45	3	3,790	40	432	59	64	—	—
Zimbabwe	16.6	36	9	–2	33.2	100%	50	4.0	41	3	1,920	33	415	59	62	48	47

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MIDDLE AFRICA	**163**	**42**	**10**	**–1**	**410**	**152%**	**62**	**5.9**	**46**	**3**	**2,688**	**44**	**630**	**57**	**60**	**48**	**32**
Angola	28.6	45	9	0	79.6	178%	44	6.2	47	2	6,220	45	584	58	64	35	23
Cameroon	25.0	36	10	–4	51.9	108%	54	4.8	43	3	3,250	55	403	57	59	63	54
Central African Republic	4.7	36	14	–12	8.9	89%	87	4.9	44	4	700	40	261	50	53	23	12
Chad	14.9	46	13	1	36.8	147%	72	6.4	48	2	1,950	23	304	51	54	31	14
Congo	5.0	36	10	–6	10.2	104%	42	4.7	42	3	5,380	66	909	58	60	58	51
Congo, Dem. Rep.	81.5	44	10	0	215.9	165%	69	6.3	46	3	730	43	1,148	58	61	54	33
Equatorial Guinea	1.3	35	10	15	2.9	123%	65	4.8	37	3	17,020	40	1,083	56	59	—	—
Gabon	2.0	30	8	5	3.5	75%	38	3.9	36	5	16,720	87	615	64	67	—	—
Sao Tome and Principe	0.2	33	7	–5	0.3	50%	38	4.4	42	4	3,240	67	2,299	64	69	81	92
SOUTHERN AFRICA	**65**	**22**	**9**	**2**	**88**	**35%**	**35**	**2.5**	**30**	**5**	**12,467**	**62**	**459**	**61**	**66**	**86**	**108**
Botswana	2.3	24	7	1	3.4	48%	31	2.8	33	5	16,380	58	576	63	69	—	—
Lesotho	2.2	29	13	–2	3.2	45%	59	3.3	36	4	3,390	28	808	51	56	46	62
Namibia	2.5	28	8	0	4.2	68%	38	3.4	38	4	10,550	48	313	62	65	—	—
South Africa	56.5	21	9	2	75.2	33%	33	2.4	30	5	12,860	65	452	61	67	88	112
Swaziland	1.4	29	10	–1	2.1	50%	50	3.3	38	3	7,980	21	800	54	60	66	66
AMERICAS	**1,005**	**15**	**7**	**1**	**1,227**	**22%**	**14**	**2.0**	**23**	**10**	**30,130**	**80**	**267**	**74**	**80**	**94**	**97**
NORTHERN AMERICA	**362**	**12**	**8**	**4**	**444**	**23%**	**6**	**1.8**	**19**	**15**	**56,554**	**81**	**181**	**77**	**81**	**98**	**99**
Canada	36.7	11	8	9	47.1	28%	4.3	1.6	16	17	43,420	82	80	79	84	110	110
United States	325.4	12	8	3	396.8	22%	5.8	1.8	19	15	58,030	81	211	76	81	97	98
LATIN AMERICA AND THE CARIBBEAN	**643**	**17**	**6**	**–1**	**783**	**22%**	**17**	**2.1**	**26**	**8**	**15,001**	**80**	**366**	**73**	**79**	**92**	**97**
CENTRAL AMERICA	**177**	**20**	**5**	**–1**	**232**	**31%**	**19**	**2.3**	**29**	**6**	**15,315**	**74**	**631**	**74**	**79**	**84**	**88**
Belize	0.4	24	6	4	0.6	50%	9	2.6	32	4	8,000	45	513	71	77	80	82
Costa Rica	4.9	14	5	1	6.1	24%	7.9	1.7	23	8	15,750	78	2,111	78	83	121	126
El Salvador	6.4	20	7	–7	8	25%	17	2.3	28	8	8,220	66	853	69	78	79	80
Guatemala	16.9	24	5	–1	27	60%	25	2.9	40	5	7,750	52	1,810	69	76	68	63
Honduras	8.9	22	5	0	12.7	43%	26	2.5	33	4	4,410	55	873	71	76	65	77
Mexico	129.2	20	5	0	164.3	27%	18	2.2	27	6	17,740	80	562	75	79	88	93
Nicaragua	6.2	20	5	–4	7.9	27%	18	2.2	30	5	5,390	59	412	72	78	70	79
Panama	4.1	19	5	2	5.8	41%	13	2.4	27	8	20,990	67	728	75	81	73	78

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CARIBBEAN	**43**	**17**	**8**	**–2**	**47**	**9%**	**29**	**2.2**	**25**	**10**	**—**	**71**	**821**	**71**	**76**	**83**	**89**
Antigua and Barbuda	0.1	15	6	0	0.1	0%	8	1.9	25	7	21,840	23	2,500	74	79	102	104
Bahamas	0.4	13	6	4	0.4	0%	9	1.7	21	8	22,090	83	5,000	72	78	90	95
Barbados	0.3	11	9	1	0.3	0%	9	1.7	19	15	16,070	31	2,727	73	78	108	111
Cuba	11.3	11	9	–5	9.8	–13%	4.3	1.7	17	15	—	77	366	76	81	98	103
Curaçao	0.2	11	9	7	0.2	0%	11.4	1.7	18	16	—	89	—	75	81	86	91
Dominica	0.07	12	8	1	0.08	14%	20	1.8	22	10	10,610	70	1,167	73	78	101	100
Dominican Republic	10.7	21	6	–3	13.2	23%	31	2.5	30	7	14,480	80	1,338	71	77	74	82
Grenada	0.1	17	8	–2	0.1	0%	15	2.1	26	7	13,440	36	3,333	74	79	99	99
Guadeloupe	0.4	12	7	–5	0.4	0%	7.3	2.1	20	17	—	98	1,794	77	85	—	—
Haiti	10.6	23	8	2	14.5	37%	48	2.9	33	4	1,790	60	991	61	66	—	—
Jamaica	2.9	17	7	–6	2.7	–7%	14	2.0	23	9	8,500	55	2,417	73	78	79	85
Martinique	0.4	11	8	–5	0.3	–25%	6	2.0	18	19	—	89	3,960	79	85	—	—
Puerto Rico	3.4	9	8	–5	2.7	–21%	7.0	1.3	16	19	24,020	99	5,574	76	83	79	84
St. Kitts-Nevis	0.05	14	9	3	0.06	20%	17	1.8	21	8	25,940	32	1,000	73	78	88	93
Saint Lucia	0.2	12	6	4	0.2	0%	18	1.5	21	11	11,370	19	6,667	75	83	85	85
St. Vincent and the Grenadines	0.1	16	9	–6	0.1	0%	18	2.1	25	7	11,530	51	2,000	70	75	108	105
Trinidad and Tobago	1.4	14	8	–2	1.3	–7%	13	1.7	19	10	30,810	8	5,600	69	75	—	—
SOUTH AMERICA	**423**	**16**	**6**	**0**	**504**	**19%**	**15**	**1.9**	**25**	**8**	**15,192**	**83**	**297**	**72**	**79**	**96**	**101**
Argentina	44.3	17	8	0	54.1	22%	10.1	2.3	25	12	19,480	91	113	74	80	103	110
Bolivia	11.1	24	7	–1	16.5	49%	39	2.9	32	6	7,090	69	248	66	71	87	86
Brazil	207.9	13	6	0	231.1	11%	14	1.6	23	8	14,810	86	260	72	79	97	102
Chile	18.4	14	6	1	21.1	15%	7.3	1.8	20	11	23,270	83	1,427	77	82	100	101
Colombia	49.3	18	6	–1	61.5	25%	14	2.0	26	8	13,910	76	2,943	73	79	95	102
Ecuador	16.8	20	5	0	23.2	38%	20	2.5	30	7	11,070	64	1,651	73	79	105	109
French Guiana	0.3	25	3	4	0.5	67%	9	3.4	34	5	—	85	2,273	77	83	—	—
Guyana	0.8	21	8	–7	0.8	0%	32	2.5	30	5	7,860	29	191	64	69	90	89
Paraguay	6.8	21	6	–3	8.9	31%	28	2.5	30	6	9,060	60	142	71	75	74	79
Peru	31.8	20	6	–1	41.2	30%	17	2.4	28	7	12,480	79	766	72	77	96	96
Suriname	0.6	18	7	–2	0.6	0%	16	2.4	27	7	13,720	66	923	68	75	72	91
Uruguay	3.5	14	9	–1	3.7	6%	11.9	2.0	21	14	21,090	95	145	74	81	90	100
Venezuela	31.4	19	5	–1	40.5	29%	12.5	2.4	28	7	17,700	88	1,163	73	79	86	93

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ASIA	**4,494**	**18**	**7**	**0**	**5,245**	**17%**	**28**	**2.2**	**24**	**8**	**12,833**	**49**	**933**	**71**	**74**	**80**	**80**
ASIA (Excl. China)	**3,099**	**20**	**7**	**0**	**3,894**	**26%**	**34**	**2.4**	**28**	**7**	**11,454**	**45**	**825**	**69**	**73**	**76**	**75**
WESTERN ASIA	**269**	**21**	**5**	**3**	**390**	**45%**	**22**	**2.8**	**29**	**5**	**27,583**	**71**	**691**	**72**	**76**	**88**	**81**
Armenia	3.0	14	9	–8	2.4	–20%	9	1.6	20	11	9,000	64	670	72	78	88	89
Azerbaijan	9.9	17	6	0	11.7	18%	11	2.0	23	6	16,130	53	514	73	78	—	—
Bahrain	1.5	14	2	19	2.1	40%	6	1.9	21	2	44,690	100	93,750	76	78	102	102
Cyprus	1.2	12	6	7	1.4	17%	2	1.4	17	13	31,420	67	1,504	80	84	100	99
Georgia	3.9	15	14	–2	3.4	–13%	9	1.7	19	14	9,450	57	853	68	77	104	104
Iraq	39.2	32	4	2	76.5	95%	38	4.1	40	3	17,240	70	779	67	72	—	—
Israel	8.3	21	5	1	13.8	66%	3.1	3.1	28	11	37,400	91	2,762	80	84	102	103
Jordan	9.7	26	4	12	12.7	31%	16	3.3	36	4	8,980	84	4,084	73	76	80	85
Kuwait	4.1	15	2	22	5.6	37%	8	2.0	21	2	83,420	98	43,158	74	76	88	103
Lebanon	6.2	14	5	15	5.6	–10%	8	1.7	25	7	13,860	88	4,697	76	79	61	61
Oman	4.7	21	3	36	7.3	55%	9	2.9	22	3	41,320	75	12,368	75	79	101	108
Palestinian Territory	4.9	31	4	–2	8.7	78%	18	4.0	40	3	3,290	75	7,656	71	75	79	87
Qatar	2.7	11	1	36	3.8	41%	7	2.0	14	1	124,740	99	20,611	77	80	82	104
Saudi Arabia	32.6	20	4	7	44.6	37%	12	2.6	25	3	55,760	83	931	73	76	123	94
Syria	18.3	22	6	–21	34	86%	17	2.9	37	4	—	58	393	64	77	50	51
Turkey	80.9	17	5	4	94.8	17%	10	2.1	24	8	23,990	74	391	75	81	104	101
United Arab Emirates	9.4	10	2	9	13.2	40%	6	1.8	14	1	72,850	86	25,067	76	79	—	—
Yemen	28.3	32	7	–1	48.3	71%	45	4.1	41	3	2,490	35	2,268	63	66	57	40
CENTRAL ASIA	**71**	**24**	**6**	**–1**	**104**	**46%**	**26**	**2.8**	**29**	**5**	**10,916**	**41**	**189**	**69**	**75**	**98**	**96**
Kazakhstan	18.0	23	7	1	25	39%	9	3.0	25	7	22,910	55	61	68	77	111	113
Kyrgyzstan	6.2	27	6	–1	9.3	50%	18	3.2	32	4	3,410	34	484	67	75	91	93
Tajikistan	8.8	29	5	–2	14.4	64%	36	3.4	35	3	3,500	27	1,206	68	74	92	83
Turkmenistan	5.8	27	7	–1	8.8	52%	45	3.2	30	4	16,060	50	299	64	71	87	84
Uzbekistan	32.4	23	5	–1	46.5	44%	29	2.5	28	4	6,640	37	736	71	76	97	95
SOUTH ASIA	**1,885**	**22**	**6**	**–1**	**2,406**	**28%**	**40**	**2.4**	**29**	**5**	**6,054**	**35**	**855**	**67**	**70**	**70**	**70**
Afghanistan	35.5	35	7	1	68.9	94%	60	5.3	45	2	1,900	24	457	62	65	71	40
Bangladesh	164.7	19	5	–3	201.9	23%	38	2.3	29	5	3,790	35	2,148	71	74	60	67
Bhutan	0.8	19	6	1	1	25%	27	2.1	27	5	8,070	39	798	70	70	81	87
India	1,352.6	21	7	0	1,675.6	24%	37	2.3	29	6	6,490	33	865	67	70	74	74
Iran	80.6	20	5	–3	92.9	15%	5	1.8	24	5	17,370	73	549	75	77	89	89
Maldives	0.4	20	3	8	0.6	50%	8	2.2	23	4	11,970	46	10,256	76	78	—	—

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Nepal	29.4	20	6	–2	33.3	13%	32	2.3	31	5	2,520	20	1,391	69	71	67	72
Pakistan	199.3	29	7	–1	310.5	56%	67	3.6	35	4	5,580	39	655	65	67	49	39
Sri Lanka	21.4	16	6	–4	21.3	0%	7	2.1	25	9	11,970	18	1,646	72	78	97	102
SOUTHEAST ASIA	**644**	**18**	**7**	**0**	**789**	**23%**	**23**	**2.3**	**27**	**6**	**11,376**	**48**	**926**	**68**	**73**	**85**	**87**
Brunei	0.4	16	4	1	0.5	25%	6	1.9	24	4	83,250	77	8,000	75	79	96	96
Cambodia	15.9	24	6	–2	21.8	37%	25	2.6	32	4	3,510	21	418	66	71	—	—
Indonesia	264.0	19	7	–1	321.6	22%	23	2.4	28	5	11,220	54	1,123	67	71	86	86
Laos	7.0	24	7	–4	9.3	33%	43	2.8	34	4	5,920	40	459	65	68	64	59
Malaysia	31.6	17	5	4	41.7	32%	7	2.0	25	6	26,900	75	3,312	73	77	75	81
Myanmar	53.4	18	8	–1	62.4	17%	52	2.3	28	5	5,070	35	495	64	69	51	52
Philippines	105.0	23	7	–1	151.4	44%	21	2.8	32	5	9,400	45	1,878	66	73	84	93
Singapore	5.7	9	5	8	6.5	14%	2.4	1.2	15	12	85,050	100	1,017,857	81	85	—	—
Thailand	66.1	11	8	0	62.6	–5%	10	1.5	18	11	16,070	49	393	72	79	133	125
Timor-Leste	1.3	38	10	–8	2.4	85%	39	5.6	44	3	4,340	33	839	67	70	74	80
Vietnam	93.7	16	7	0	108.2	15%	15	2.1	24	8	6,050	33	1,462	71	76	—	—
EAST ASIA	**1,625**	**12**	**7**	**0**	**1,557**	**–4%**	**9**	**1.8**	**16**	**12**	**18,561**	**62**	**1,414**	**76**	**79**	**94**	**96**
China	1,386.8	13	7	0	1,342.5	–3%	10	1.8	17	11	15,500	57	1,312	75	78	93	96
China, Hong Kong SAR[e]	7.4	8	6	7	8.2	11%	1.5	1.2	11	16	60,530	100	238,710	81	87	103	99
China, Macao SAR[e]	0.6	11	3	11	0.8	33%	2	1.1	12	10	98,450	100	—	80	86	97	96
Japan	126.7	8	10	1	101.9	–20%	1.9	1.5	12	28	42,870	94	3,000	81	87	102	102
Korea, North	25.5	14	9	0	26.8	5%	16	1.9	21	10	—	61	1,085	68	75	93	94
Korea, South	51.4	8	6	1	49.2	–4%	2.7	1.2	13	14	35,790	83	3,482	79	85	99	98
Mongolia	3.2	27	6	–1	4.7	47%	15	3.0	29	4	11,290	67	564	66	75	91	92
Taiwan	23.6	9	7	0	22.7	–4%	4.1	1.2	14	13	—	77	3,969	77	83	—	—
EUROPE	**745**	**11**	**11**	**2**	**736**	**–1%**	**4**	**1.6**	**16**	**18**	**33,677**	**74**	**269**	**75**	**81**	**111**	**111**
EUROPEAN UNION	**511**	**10**	**10**	**3**	**515**	**1%**	**4**	**1.6**	**15**	**19**	**39,480**	**75**	**472**	**78**	**83**	**115**	**115**
NORTHERN EUROPE	**104**	**12**	**9**	**5**	**121**	**16%**	**4**	**1.8**	**18**	**18**	**44,333**	**81**	**529**	**79**	**83**	**126**	**132**
Channel Islands	0.2	10	8	8	0.2	0%	8.0	1.5	16	17	—	32	4,796	80	85	—	—
Denmark	5.8	11	9	6	6.3	9%	3.1	1.8	17	19	51,040	88	239	79	83	128	133
Estonia	1.3	11	12	1	1.1	–15%	2.5	1.6	16	19	28,920	68	201	73	82	116	115
Finland	5.5	10	10	3	5.9	7%	1.9	1.6	16	21	43,400	84	247	78	84	143	156
Iceland	0.3	12	7	12	0.4	33%	1.7	1.8	20	14	52,490	94	248	81	84	116	121
Ireland	4.8	14	7	1	5.9	23%	3.3	1.9	21	13	56,870	64	454	79	84	126	129

	Population mid-2017 (millions)	Births per 1,000 Population	Deaths per 1,000 Population	Net Migration Rate per 1,000	Projected Population (millions), Mid–2050	Projected Population Change, 2017–2050, %	Infant Mortality Rate[a]	Total Fertility Rate[b]	Percent of Population Ages <15	Percent of Population Ages 65+	GNI PPP per Capita ($US), 2016	Percent Urban	Population per Square Kilometer of Arable Land (thousands)	Life Expectancy at Birth (years), Males	Life Expectancy at Birth (years), Females	Secondary School Enrollment Ratio[c], Males (2009–2016)	Secondary School Enrollment Ratio[c], Females (2009–2016)
Latvia	1.9	11	14	–5	1.5	–21%	4.1	1.7	15	20	26,090	68	157	70	79	120	119
Lithuania	2.8	11	14	–10	2.4	–14%	4.5	1.7	15	19	28,840	67	119	69	80	110	106
Norway	5.3	11	8	5	6.7	26%	2.2	1.7	18	17	62,510	81	657	81	84	115	111
Sweden	10.1	12	9	12	12.4	23%	2.5	1.9	18	20	50,000	86	390	81	84	132	150
United Kingdom	66.2	12	9	5	77.7	17%	3.9	1.8	18	18	42,100	83	1,062	79	82	125	130
WESTERN EUROPE	**195**	**10**	**10**	**4**	**207**	**6%**	**3**	**1.7**	**15**	**20**	**47,708**	**80**	**574**	**79**	**84**	**113**	**112**
Austria	8.8	10	9	7	9.8	11%	3.1	1.5	14	19	49,990	66	651	79	84	102	98
Belgium	11.3	11	10	4	12.7	12%	3.4	1.7	17	19	46,010	98	1,383	79	83	156	178
France	65.0	12	9	–3	72.3	11%	3.5	1.9	18	19	42,380	80	355	79	85	110	111
Germany	83.1	9	11	9	83.2	0%	3.3	1.5	13	21	49,530	76	700	78	83	106	100
Liechtenstein	0.04	9	7	5	0.04	0%	3.3	1.3	15	17	—	14	1,724	81	83	131	102
Luxembourg	0.6	10	7	16	0.7	17%	3.8	1.4	16	14	75,750	90	958	81	85	101	103
Monaco	0.04	7	7	10	0.04	0%	—	1.5	13	26	—	100	—	—	—	—	—
Netherlands	17.1	10	9	5	18.1	6%	3.5	1.7	16	18	50,320	91	1,636	80	84	135	136
Switzerland	8.5	11	8	9	9.9	16%	3.4	1.5	15	18	63,660	85	2,124	81	85	103	99
EASTERN EUROPE	**293**	**11**	**13**	**1**	**267**	**–9%**	**6**	**1.6**	**16**	**15**	**21,068**	**70**	**150**	**68**	**78**	**104**	**102**
Belarus	9.5	12	13	1	9.1	–4%	3.2	1.7	17	15	17,210	78	168	69	79	108	106
Bulgaria	7.1	9	15	–1	5.8	–18%	6.5	1.5	14	21	19,020	73	204	71	78	101	97
Czech Republic	10.6	11	10	2	10.4	–2%	2.8	1.6	15	18	32,710	73	337	76	81	105	106
Hungary	9.8	10	13	0	9.5	–3%	3.9	1.5	14	18	25,640	72	223	72	79	105	105
Moldova	3.6	11	11	0	2.9	–19%	9	1.3	16	11	5,670	43	198	68	76	86	86
Poland	38.4	10	10	0	32.6	–15%	4.0	1.4	15	16	26,770	60	351	74	82	110	106
Romania	19.6	10	13	–2	13.9	–29%	7.3	1.2	16	17	22,950	55	223	72	79	93	92
Russia	146.8	13	13	2	144.8	–1%	6.0	1.7	17	14	22,540	74	119	66	77	106	103
Slovakia	5.4	11	10	1	5	–7%	5.1	1.4	15	14	29,910	54	387	73	80	92	93
Ukraine	42.3	9	14	0	33.5	–21%	7.4	1.5	15	16	8,190	70	130	66	76	100	98
SOUTHERN EUROPE	**153**	**9**	**10**	**1**	**141**	**–8%**	**4**	**1.4**	**14**	**20**	**32,803**	**70**	**538**	**79**	**84**	**112**	**110**
Albania	2.9	11	7	–3	2.6	–10%	8.7	1.6	18	13	11,880	56	471	77	80	99	93
Andorra	0.08	9	4	–4	0.07	–13%	3.4	1.2	14	14	—	85	2,857	—	—	—	—
Bosnia-Herzegovina	3.5	9	11	–4	2.7	–23%	5	1.2	14	16	12,140	40	346	74	79	—	—
Croatia	4.1	9	12	–5	3.4	–17%	4.1	1.4	15	19	22,880	59	504	74	80	96	101
Greece	10.7	8	11	–4	9.1	–15%	4.0	1.3	14	21	26,900	78	412	78	84	109	103
Italy	60.5	8	10	2	57.5	–5%	3.0	1.3	14	22	38,230	69	899	81	85	104	102
Kosovog	1.8	13	5	2	1.8	0%	12	1.8	24	8	10,200	38	—	74	79	—	—

	Population mid-2017 (millions)	Births per 1,000 Population	Deaths per 1,000 Population	Net Migration Rate per 1,000	Projected Population (millions), Mid-2050	Projected Population Change, 2017–2050, %	Infant Mortality Rate[a]	Total Fertility Rate[b]	Percent of Population Ages <15	Percent of Population Ages 65+	GNI PPP per Capita ($US), 2016	Percent Urban	Population per Square Kilometer of Arable Land (thousands)	Life Expectancy at Birth (years), Males	Life Expectancy at Birth (years), Females	Secondary School Enrollment Ratio[c], Males (2009–2016)	Secondary School Enrollment Ratio[c], Females (2009–2016)
Macedonia[g]	2.1	11	10	1	1.9	−10%	12	1.5	17	13	14,480	57	507	73	77	80	78
Malta	0.4	10	8	10	0.4	0%	5.7	1.5	14	19	35,720	96	4,459	80	84	92	98
Montenegro	0.6	12	10	2	0.7	17%	3.5	1.6	18	14	17,090	64	6,873	74	79	90	90
Portugal	10.3	8	11	−1	9.2	−11%	3.2	1.4	14	21	29,990	64	906	78	83	121	117
San Marino	0.03	8	8	5	0.03	0%	2.3	1.4	15	19	—	94	3,000	85	89	93	96
Serbia	7.0	9	14	0	5.3	−24%	5.4	1.5	14	19	13,680	60	269	73	78	96	97
Slovenia	2.1	10	10	0	1.9	−10%	1.8	1.6	15	17	32,360	50	1,140	78	84	111	111
Spain	46.6	9	9	2	44.4	−5%	2.6	1.3	15	19	36,340	80	380	80	86	130	130
OCEANIA	**42**	**16**	**7**	**4**	**63**	**50%**	**20**	**2.3**	**23**	**12**	**33,668**	**69**	**87**	**75**	**79**	**103**	**98**
Australia	24.5	13	7	8	37.1	51%	3.2	1.8	19	15	45,970	90	52	80	85	141	134
Federated States of Micronesia	0.1	22	6	−13	0.1	0%	32	3.0	34	4	4,330	23	5,000	68	70	—	—
Fiji	0.9	18	9	−6	1.1	22%	14	3.1	29	6	9,140	51	546	67	73	84	93
French Polynesia	0.3	14	5	−5	0.3	0%	7.5	1.8	24	7	—	56	12,000	74	78	—	—
Guam	0.2	21	6	−5	0.2	0%	10.6	2.9	25	8	—	94	20,000	76	82	—	—
Kiribati	0.1	29	7	−4	0.2	100%	44	3.8	35	4	3,240	44	5,000	63	70	—	—
Marshall Islands	0.06	27	4	−17	0.08	33%	22	4.1	41	3	5,280	74	3,000	71	73	73	80
Nauru	0.01	34	8	−8	0.01	0%	18	3.9	37	13	17,520	100	—	63	71	82	83
New Caledonia	0.3	15	5	3	0.4	33%	12	2.3	24	9	—	71	4,808	74	80	—	—
New Zealand	4.8	13	7	3	5.3	10%	3.6	1.9	20	15	37,860	86	814	80	83	113	120
Palau	0.02	13	9	0	0.02	0%	12	2.2	21	7	14,740	88	2,000	70	77	96	95
Papua New Guinea	8.3	28	7	0	14	69%	47	3.7	37	4	2,700	13	2,767	63	68	46	35
Samoa	0.2	26	5	−13	0.2	0%	17	4.2	37	5	6,200	18	2,500	72	78	81	90
Solomon Islands	0.7	29	5	−4	1.1	57%	26	3.9	40	3	2,150	20	3,500	69	72	50	47
Tonga	0.1	24	6	−11	0.1	0%	20	3.6	36	6	5,760	24	556	70	76	86	94
Tuvalu	0.01	25	9	−3	0.01	0%	10	3.6	33	5	5,920	61	—	67	72	76	97
Vanuatu	0.3	27	5	0	0.6	100%	22	3.4	36	4	3,050	26	1,500	70	74	53	56

(—) Indicates data unavailable or inapplicable.
a. Infant deaths per 1,000 live births.
b. Average number of children born to a woman during her lifetime.
c. The ratio of number of students enrolled in secondary school to the population ages 12–17. Values may exceed 100 when the secondary school population exceeds the size of the relevant age group.
d. The status of Western Sahara is disputed by Morocco.
e. Special Administrative Region.
f. Kosovo declared independence from Serbia on Feb. 17, 2008. Serbia has not recognized Kosovo's independence.
g. The former Yugoslav Republic.

Table modified from the **2017 World Population Data Sheet** prepared by the Population Reference Bureau.

Appendix C

CANADA, MEXICO, AND UNITED STATES REFERENCE MAP