**Organelles**

The word “organelle” comes from the Latin for “little organ,” which fits their function as organized structures within cells that allow the cell to survive.

* Nucleus: The nucleus is the “command central” of the cell because it contains almost all of the cell’s **DNA**, which encodes the information needed to make all the **proteins** that the cell uses. The DNA appears as **chromatin** through most of the cell cycle, but condenses to form **chromosomes** when the cell is undergoing **mitosis**. Within the nucleus there are dense bodies called **nucleoli**, which contain **ribosomal RNA**. In **eukaryotes**, the nucleus is surrounded by a selectively-permeable **nuclear envelope**.
* Ribosomes: Ribosomes are the machines that coordinate **protein synthesis**, or **translation**. They consist of several RNA and protein molecules arranged into **two subunits**. Ribosomes read the **messenger RNA** copy of the **DNA** and assemble the appropriate **amino acids** into **protein chains**.
* Mitochondria: The **powerhouses of the cell**. Mitochondria are **double-membrane-bound** organelles that are the site of **respiration** and **oxidative phosphorylation**, processes that **produce energy** for the cell in the form of **ATP**. The inner membrane of a mitochondrion forms folds called **cristae**, which are suspended in a fluid called the **matrix**. The mitochondrial matrix contains DNA and ribosomes.
* Endoplasmic reticulum: The ER is a network of **tube-like membranes** continuous with the **nuclear envelope**. Part of it are **“rough” because they are covered in ribosomes, while other parts are “smooth” because they aren’t. In the ER, proteins undergo modifications and folding to yield the final, functional protein structures.**
* Golgi apparatus: The stack of **flattened, folded membranes** that forms the Golgi apparatus acts as the **“post office of the cell.”** Here **proteins** from the ribosomes are **stored**, chemically **modified**, “addressed” with **carbohydrate tags**, and **packaged** in vesicles for delivery.
* Lysosomes: Lysosomes are membrane-bound organelles that contain **digestive enzymes** that **break down proteins**, **lipids**, **carbohydrates**, and **nucleic acids**. They are important in processing the contents of **vesicles** taken in from outside the cell. It is crucial to maintain the integrity of the lysosomal membranes because the enzymes they contain can digest cellular components as well.
* Chloroplasts: Found only in **plants** and certain **protists**, the chloroplast contains the green pigment **chlorophyll** and is the site of **photosynthesis**. Like the mitochondrion, a chloroplast is a **double-membrane-bound** organelle, and it has its own DNA and ribosomes in the **stroma**. Chloroplasts contain **grana**, which are stacks of single membrane structures called **thylakoids** on which the reactions of photosynthesis occur.
* Vacuoles: Found mainly in **plants** and **protists**, vacuoles are **liquid-filled cavities** enclosed by a single membrane. They serve as **storage bins** for **food** and **waste products**. **Contractile vacuoles** are important for freshwater protists to rid their cells of excess water that accumulates because of salt imbalance with the environment.
* Cilia and flagella: Cilia and flagella are important organelles of **motility**, that is, they allow the cell to move. Flagella are **long, whip-like** structures, while cilia are **short, hair-like** projections. Both contain a **9 + 2 arrangement of microtubules** in cross-section (two microtubules in the middle, nine pairs in a circle around the outside) and are powered by molecular motors of **kinesin** and **dynein** molecules.
* Centrioles: Not found in plant cells, centrioles are paired organelles with nine sets of microtubule triplets in cross section. They are important in organizing the **microtubule spindle** needed to move the chromosomes during **mitosis**.

**United States Presidential Elections**

Every U.S. presidential election is fair game for quiz bowl questions, but some elections are asked about *very* frequently, either for the unusual nature of the election (e.g., 1876), for the extraordinary significance of the election in American history (e.g., 1860), or for the people involved (e.g., 1912).

* 1800: Democratic-Republican **Thomas Jefferson** narrowly beat the incumbent Federalist **John Adams** 73–65, marking the ascent of that party’s power. At the time, [one electoral vote each was cast for president and vice president](http://www.law.cornell.edu/constitution/articleii#section1), so Democratic-Republican VP candidate **Aaron Burr** also had 73 votes, but Burr refused to step aside. In the House of Representatives, neither man won the necessary nine state delegations outright until the 36th ballot, when **James Bayard** of Delaware changed his vote to Jefferson. The debacle led to the passage of the [**12th amendment**](http://www.law.cornell.edu/constitution/amendmentxii) in 1804. The Federalists never recovered; **Alexander Hamilton**’s opposition to Adams led to a permanent split between the two, and Hamilton’s opposition to Burr was one cause of their 1804 **duel**, in which Burr (then the vice president) killed Hamilton. This was the first peaceful transfer of power from one party to another.
* 1824: The candidates were **John Quincy Adams**, **Henry Clay**, **William Crawford**, and **Andrew Jackson**, all Democratic-Republicans. After **John C. Calhoun** decided to seek the vice presidency and Crawford (from Georgia) had a stroke, Jackson took most of the South and won the popular vote. Jackson had 99 electoral votes, Adams 84, Crawford 41, and Clay 37, but since none had more than 50% of the vote, **the House decided the election**. Adams won in the House with support from Clay, and Jacksonians cried foul when **Clay was made Secretary of State** (the so-called **“corrupt bargain”**), giving fuel to Jackson’s victorious 1828 campaign. Jackson is the only candidate to lose a presidential race despite having the most electoral votes, and he is one of five (with Tilden, Cleveland, Gore, and Hillary Clinton) to lose despite winning the popular vote. The election also led to the **founding of the Democratic Party**.
* 1860: Another four-candidate election, with Republican **Abraham Lincoln**, (northern) Democrat **Stephen Douglas**, (southern) Democrat **John C. Breckinridge**, and Constitutional Unionist **John G. Bell**. The Republican Party, founded in 1854, won in its second election (its first candidate being **John C. Frémont** in 1856), aided by the fragmenting of the Democrats. Bell took Tennessee, Kentucky, and Virginia, Breckinridge swept the other slave states, and Lincoln nearly swept the free states. Though winning under 40% of the total popular vote, Lincoln dominated the electoral count with 180 to a combined 123 for his opponents (Breckinridge 72, Bell 39, Douglas 12). Seven southern states **seceded** before Lincoln even took office, and war soon followed.
* 1876: Republican **Rutherford B. Hayes** faced Democrat **Samuel Tilden**, best known for battling **Tammany Hall** and the **Tweed Ring** in New York. Tilden **won the popular vote** and seemed to win the election, but results in Florida, South Carolina, and Louisiana were contested, as was one vote in Oregon; if Hayes swept these votes, he would win the electoral count 185–184. In Congress, an informal bargain was reached (often called the **Compromise of 1877**) in which Hayes won the election in exchange for **Reconstruction being brought to an end**.
* 1896: In the election itself, Republican **William McKinley** swept the North and Northeast to beat Democrat **William Jennings Bryan**, but the campaign was the interesting part. The most prominent issue, the **gold standard** versus **free silver** coinage, led to Bryan’s famous [**“Cross of Gold”**](http://historymatters.gmu.edu/d/5354/) speech. Shunned by Eastern press, Bryan — a legendary orator — traveled 18,000 miles through 27 states and was heard by some three million people. McKinley would not accept Bryan’s challenge to debate, comparing it to putting up a trapeze and competing with a professional athlete. McKinley instead had a **“front porch” campaign**, as **railroads** brought voters by the thousands to hear him speak in his hometown, Canton, Ohio. **Mark Hanna**, McKinley’s campaign manager, is often considered the **first modern campaign manager**. The election also represented the **demise of the Populist Party** and ushered in a 16-year period of Republican rule. The gold question would disappear soon after the election with **gold strikes** in Australia and Alaska.
* 1912: Three presidents — **Teddy Roosevelt**, **William Howard Taft**, and **Woodrow Wilson** — earned electoral votes. Roosevelt, displeased with his successor Taft, returned to lead the **progressive Republican** faction; after Taft got the Republican nomination, Roosevelt was nominated by the **Progressive Party** (nicknamed the **“Bull Moose” Party**). Wilson won with 435 electoral votes to Roosevelt’s 88 and Taft’s 8, making Taft the **only incumbent to finish third** in a re-election bid. Though Wilson did set forth his **New Freedom program**, his dominating win must be credited largely to the splitting of the Republican vote by Roosevelt and Taft.
* 1948: In the most recent election with four significant candidates, Democrat **Harry Truman** beat Republican **Thomas Dewey**, contrary to the [**famous headline of the *Chicago Tribune***](https://www.history.com/news/dewey-defeats-truman-election-headline-gaffe), which was printed before results from the West came in. Dewey dominated the northeast, but Truman nearly swept the West to pull out the victory. Former vice president **Henry Wallace** earned over a million votes as the **Progressive** candidate, and **Strom Thurmond** took over a million popular votes and 39 electoral votes as the **States’ Rights** (or **Dixiecrat**) candidate.
* 1960: **John F. Kennedy** defeated vice president **Richard Nixon** 303–219 in a tight election, winning the popular vote by just two-tenths of a percent. The first Kennedy-Nixon **debate** (September 26, 1960) is a classic in political science; those who saw the **calm, handsome** Kennedy and the **tired, uncomfortable**-looking Nixon on television were more likely to select Kennedy as the winner than were those who listened on radio. (**Theodore White**’s notable ***The Making of the President*** series began with the 1960 election.) **Voting irregularities** in Texas and Illinois (especially in Richard Daley’s Chicago) led to allegations of fraud, but a recount would not have been feasible, and Nixon did not press the issue. Nixon would go on to lose the 1962 California gubernatorial race (occasioning his famous statement “You won’t have Dick Nixon to kick around any more”).
* 1968: After Lyndon Johnson declined to run for re-election, and after **Robert F. Kennedy** was killed in California, the Democratic nomination went to **Hubert Humphrey**. **Richard Nixon**, gradually returning from political obscurity over the past six years, gained the Republican nomination. Alabama governor **George Wallace** ran as the **American Independent** candidate, becoming the last third-party candidate to win multiple electoral votes. Nixon edged Humphrey by half a million popular votes and a 301—191 electoral count, while Wallace won nearly ten million votes. Wallace’s presence may well have tipped the election to the Republicans, who, after being out of power for 28 of the last 36 years, would hold the presidency for all but four years through 1992.
* 2000: The closest election in American history. **Al Gore** won the popular vote but lost the electoral vote to **George W. Bush** by a final count of 271—266 (one Gore elector abstained). **Ralph Nader** of the **Green Party** won an important 2.7% of the vote, while **Pat Buchanan** of the Reform Party placed fourth. New Mexico and Oregon were initially too close to call but went to Gore, and **Florida** became the center of attention. Ballot confusion in **Palm Beach County**, **intimidation of vote recounters** in **Miami-Dade County**, and **absentee ballots** throughout Florida became significant issues, as Americans had to hear about **butterfly ballots**, **hanging chads**, and Florida Secretary of State **Katharine Harris** for the next five weeks. Gore officially conceded the election on December 13, 2000.

# British Monarchs

* Alfred the Great (849–899; r. 871–899) **Saxon House**. Actually just the **King of Wessex** in southwestern England, he expelled the rival **Danes** from the **Mercian** town of London in 886, eventually conquering most of the **Danelaw** territory. Alfred also kept England from the worst of the **Dark Ages** by encouraging his bishops to foster **literacy**; in addition, he translated **Boethius**, **Augustine**, and the **Venerable Bede**’s works into **Anglo-Saxon**.
* William I (the Conqueror) (1028–1087, r. 1066–1087) **House of Normandy**. **Duke of Normandy** from 1035, he was promised succession to the throne by **Edward the Confessor**, but when Edward gave the throne to **Harold II** in 1066, William invaded England, killing Harold and **defeating the Anglo-Saxons** at the **Battle of Hastings**. An able administrator, he authorized a **survey** of his kingdom in the 1086 **Domesday Book**. By that time William had replaced Anglo-Saxon nobles and clergy with Normans and other continentals.
* Henry II (1133–1189; r. 1154–1189) **House of Plantagenet**. The son of **Geoffrey of Anjou** and **Matilda**, he married **Eleanor of Aquitaine** in 1152, and invaded England the following year, forcing **Stephen of Blois** to acknowledge Henry as his heir. While king he developed the **common law** and **due process**, but fought with **Thomas à Becket** over **submission to the Pope**; Henry had Becket executed in 1170 but performed **penance** at **Canterbury**. Eleanor and his four sons **conspired** with French king **Philip II** against Henry on several occasions.
* Richard I (the Lion-Hearted) (1157–1199; r. 1189–1199) **House of Plantagenet**. The third son of **Henry II**, he spent only five months of his reign in England. He went on the **Third Crusade** to Jerusalem, winning many victories in the Holy Land, but on his way back was captured by **Leopold V**, Duke of Austria. He also fought **Philip II** in **Normandy**, and died while defending his possessions in **Aquitaine**.
* John Lackland (1167–1216, r. 1199–1216) **House of Plantagenet**. Though he tried to seize the crown from his brother **Richard** while the latter was in Germany, Richard forgave John and made him his successor. **Excommunicated** by the Pope for four years for refusing to accept **Stephen Langton** as **Archbishop of Canterbury**, John was also weak as a fighter, as French King **Philip II** routed him at **Bouvines** in 1214. A year later, England’s **barons** forced John to sign the **Magna Carta** at **Runnymede**, an event that marked the beginning of the development of the **British constitution**.
* Richard III (1452–1485, r. 1483–1485) **House of York**. He was made **Duke of Gloucester** in 1461 when his brother **Edward IV** deposed the **Lancastrian** king **Henry VI**, as part of the **Wars of the Roses**. Upon Edward’s death in 1483, Richard served as regent to his nephew **Edward V**, but likely **had the boy murdered** in the **Tower of London** that year. Two years later, Richard died at the hands of **Henry Tudor**’s Lancastrian forces at **Bosworth Field**, ending the Wars of the Roses and beginning the reign of **Henry VII**.
* Henry VIII (1491–1547, r. 1509–1547) **House of Tudor**. The son of Tudor founder **Henry VII**, he brought England into both the **Renaissance** and the **Reformation**. Henry patronized the philosopher **Erasmus** the painter **Hans Holbein the Younger**, and the writer **Thomas More**. Originally a supporter of the **Catholic Church** — the Pope had named him **“Defender of the Faith”** — he named himself head of the **Church of England** in 1533 so that he could **divorce** **Catherine of Aragon** and marry **Anne Boleyn**. Henry **executed** top ministers who crossed him, including **Thomas Cromwell** and **Thomas More**. He married six times, but only his third wife, **Jane Seymour**, bore him a son, the sickly **Edward VI**.
* Elizabeth I (1533–1603, r. 1558–1603) **House of Tudor**. Known as the **“Virgin Queen”** because she never married, as **Henry VIII**’s daughter by **Anne Boleyn**, the Catholic Church considered her illegitimate. After the death of her Catholic sister **Mary I**, Elizabeth I tried to restore religious order by declaring England a **Protestant** state but naming herself only **“Governor” of the Church**. She foiled attempts at her throne by Spanish king **Philip II** and **Mary, Queen of Scots**; the latter Elizabeth reluctantly **executed** in 1587. Her reign saw great expansion of the **English navy** and the emergence of **William Shakespeare**, but when she died, the Crown went to Scottish king **James VI**, the son of Mary, Queen of Scots.
* James I (1566–1625, r. 1603–1625) **House of Stuart**. At age one James succeeded his mother **Mary** as **King James VI of Scotland**. As the great-great-grandson of **Henry VII**, he claimed the English throne upon the death of **Elizabeth I**. James was the intended target of Catholic fanatic **Guy Fawkes**’ failed **Gunpowder Plot** in 1605. A believer in **absolutism**, James **dissolved Parliament** from 1611 to 1621, favoring ministers **Robert Cecil** and the **Duke of Buckingham** instead. His rule saw English expansion into North America, through royal charter in Virginia and Puritan protest in Massachusetts.
* Charles I (1600–1649, r. 1625–1649) **House of Stuart**. The **last absolute English monarch**, Charles ran into trouble almost immediately. His minister, the **Duke of Buckingham**, asked Parliament for money to fight costly foreign wars, and when Parliament balked, Charles had to sign the **Petition of Right**. From 1630 to 1641 he tried to rule solo, but financial troubles forced him to call the **Short and Long Parliaments**. His attempt to **reform the Scottish Church** was the last straw, as Parliament entered into the **English Civil War**. They defeated Charles, convicting him of **treason** and **executing** him. England became a **Commonwealth** with **Oliver Cromwell** as **Lord Protector**.
* Charles II (1630–1685; r. 1660–1685) **House of Stuart**. While **Oliver Cromwell** ruled the **Commonwealth**, Charles was crowned **King of Scotland** in 1651. After Cromwell died, Charles used the **Declaration of Breda** to restore himself to the English throne. He fought two lackluster wars against the **Dutch**, and needed protection from **Louis XIV** through the **Treaty of Dover**. His wife **Catherine of Braganza** produced no legitimate heirs, but this **“Merry Monarch”** has as many as **14 illegitimate children**. Tolerant of Catholics, he **dissolved Parliament** over the issue in 1681 and refused to prevent his brother James from succeeding him.
* James II (1633–1701; r. 1685–1688) **House of Stuart**. The 1678 **Popish Plot** against **Charles II** would have elevated the **Roman Catholic** James to the throne, had it been real and not **fabricated by Titus Oates**. James’s three years, however, did feature heavy **favoritism toward Catholics**, so much so that Protestants invited James’s son-in-law **William of Orange** to rule England, deposing James in the bloodless **Glorious Revolution**. Exiled to **Louis XIV**’s court, he made an attempt to regain his crown in 1690 but was routed at the **Battle of the Boyne**.
* George III (1738–1820, r. 1760–1820) **House of Hanover**. Though he lost the American colonies in the **Revolutionary War**, Britain’s economic empire expanded during his reign. While George’s ministers kept their lives, they fell from power frequently, including **William Pitts**, **Lord Bute**, and **Lord North**. Popular at home, he suffered from **porphyria**, causing the “madness” that ultimately led to the **Regency period** (1811–1820) of his son **George IV**.
* (Alexandrina) Victoria (1819–1901, r. 1837–1901; Empress of India 1876–1901) **House of Hanover**. The **second-longest-reigning** monarch in British history (after Elizabeth II), she relinquished much of the remaining royal power, both to her husband **Albert** and to her favored prime ministers, **Lord Melbourne**, **Robert Peel**, and **Benjamin Disraeli**. After Albert’s death in 1861, Victoria largely went into **seclusion**, though she influenced the passage of the **Reform Act of 1867**, which doubled the number of Britons who could vote.
* Elizabeth II (1926–present, r. 1952–present) **House of Windsor**. Representative of the modern **ceremonial monarchy**, she and her husband **“Prince” Philip Mountbatten** have traveled the globe representing British interests. **Marital failures** by her sons **Charles, Prince of Wales** and **Andrew** have plagued her reign. She superseded Victoria as the longest-reigning British monarch.

**Computation Problems**

* Pythagorean triples: Sets of small integers that satisfy the equation of the Pythagorean theorem, *a*2 + *b*2 = *c*2, and could therefore be the side lengths of a **right triangle**. The simplest ones are **{3, 4, 5}**, **{5, 12, 13}**, **{7, 24, 25}**, and **{8, 15, 17}**. Note that any multiple of a Pythagorean triple is also a Pythagorean triple, so (for instance) **{6, 8, 10}**, **{15, 20, 25}**, and **{300, 400, 500}** are also ones by virtue of {3, 4, 5} being one.
* Matrices: Every team should be able to [**add**, **subtract**, **multiply**, take the **determinant** of, **transpose**, and **invert** matrices](https://math.dartmouth.edu/archive/m8s00/public_html/handouts/matrices3/node3.html), particularly 2×2 ones.
* Vectors: Every team should be able to [find the **magnitude** (length) of a vector, and **add**, **subtract**, find the **angle** between, find the **dot product** of, and find the **cross product**](http://www.ltcconline.net/greenl/courses/107/Vectors/DOTCROS.HTM) of two vectors.
* Solids: Teams should be able to calculate the **volume** and **surface area** of [simple geometric figures](https://www.skillsyouneed.com/num/area-volume-reference.html) including the **sphere**, **cone**, **cylinder**, **pyramid**, **hemisphere**, **prism**, and **parallelepiped**.
* Plane figures: Teams should be able to calculate the **areas** of **triangles**, **trapezoids**, **parallelograms**, **rhombi**, **regular polygons**, and **circles** using several methods.
* Similar figures: The areas of similar figures are related by the **square** of any corresponding length, and the volumes are related by the **cube** of any corresponding length. For instance, if a square has a diagonal that is 30% longer than another square, it has an area that is 1.30 × 1.30 = 1.69 times as great (69% greater). Similar reasoning applies to perimeters, side lengths, diameters, and so forth.
* Combinatorics: Teams should be able to compute the number of [**permutations** and **combinations**](http://mathforum.org/dr.math/faq/faq.comb.perm.html) of *n* objects taken *m* at a time. They should also have memorized the first six (or so) values of the **factorial function** to make this easier.
* Logarithms: Teams should be familiar with [basic operations of logarithmic math](http://www.themathpage.com/alg/logarithms.htm): simplifying the logarithm of a product, difference, or power, and **converting** from one base to another.
* Complex numbers: Teams should be familiar with the symbol *i* representing an imaginary square root of –1, [basic operations on complex numbers](http://www.clarku.edu/~djoyce/complex/), graphing complex numbers, and converting complex numbers to **polar form**.
* Divisibility rules: Teams should be able to quickly apply the [divisibility rules](http://mathforum.org/dr.math/faq/faq.divisibility.html) for small integers (2 through 11) to large integers.
* Polynomials: Teams should be able to quickly **add**, **subtract**, **multiply**, **divide**, **factor**, and find the **roots** of low-**degree** polynomials, and understand how the degree behaves under the first four operations.
* Calculus: Teams should be able to find the [**derivative**, **integral**, **slope at a point**, **local extrema**, **points of inflection**, and **critical points**](http://www.sosmath.com/calculus/calculus.html) of **polynomial**, **trigonometric**, and other common functions.

**Civil War Battles and Campaigns**

* Fort Sumter (April 12, 1861). Built on an island in 1829, the fort was one of three that the United States maintained in the harbor of **Charleston, South Carolina**. In order to claim true independence from the Union, **Jefferson Davis** decided that the forts needed to be taken; a Confederate force under **P. G. T. Beauregard** ordered the small Union garrison, controlled by **Major Robert Anderson**, to surrender. Anderson refused, shots were fired, and the Union commander surrendered two days later with only one soldier killed. The Union made two unsuccessful attempts to recapture the fort with **ironclad ships** in 1863, but Confederate forces finally abandoned Sumter when they left Charleston in February 1865.
* First Bull Run (or First Manassas) (July 21, 1861). Fought at a creek near Manassas, Virginia (30 miles west of Washington, D.C.), this was the first major showdown of the war. **P. G. T. Beauregard** led an army against Union commander **Irwin McDowell** and received reinforcements from **Joseph Johnston**’s troops (whom Union General Robert Patterson failed to detain). The Confederacy routed the Union when **Thomas Jackson**’s brigade held the left line at **Henry House Hill**; this effort earned him the nickname **“Stonewall.”** Congressmen and reporters, who had expected to watch a Union victory, fled in panic back to D.C.
* Hampton Roads (March 9, 1862). A channel in southeastern Virginia was the site of the first major fight between two **ironclad ships**. The Confederates raised an old wooden boat, the ***Merrimack***, and fit it with ten guns and iron armor plates. Renamed the ***Virginia***, it was captained by **Franklin Buchanan**. The Union countered by constructing a large oval with a rotating gun, called the ***Monitor*** and piloted by **John Worden**. The *Virginia* tore through Union wooden ships (the *Cumberland*, *Congress*, and *Minnesota*) but when the *Monitor* arrived, the two ironclads fought to a **stalemate**; the Union thus maintained its **naval blockade** of the Confederacy. The South deliberately destroyed the *Virginia* two months later. The Monitor sank in a storm off Cape Hatteras in December 1862.
* Shiloh (or Pittsburg Landing) (April 6–7, 1862). This battle was named after a church in Pittsburg Landing, **Tennessee** (100 miles southwest of Nashville). Confederate commander **Albert Sidney Johnston** led a force north from Corinth, Mississippi. **Ulysses S. Grant**, who had just captured Fort Donelson, brought five Union divisions to face him. At first, the South’s surprise attack drove Union troops back, but Grant’s soldiers held the **“Hornets’ Nest”** for hours, killing Johnston in the process. P. G. T. Beauregard took over, but by the second day Northern Generals **Don Carlos Buell** and **Lew Wallace** (who wrote ***Ben-Hur***) brought reinforcements, causing the Confederates to retreat. More than 13,000 Union and 10,000 Confederate soldiers were killed, wounded, or captured at Shiloh.
* Peninsular Campaign (March–July 1862). Union commander **George McClellan** devised this plan to capture the Confederate capital at **Richmond, Virginia** by sending 110,000 men up the peninsula between the **York and James Rivers**. Advised of Northern maneuvers, Southern commander **Joseph Johnston** detached a force to defend the peninsula. He also sent a small unit (led by **Stonewall Jackson**) that crushed Union reinforcements in the **Shenandoah Valley**. After Johnston was wounded at **Seven Pines** (June 1), Davis replaced him with **Robert E. Lee**. Lee concentrated his force north of the **Chickahominy River**; in the **Seven Days’ Battles** (June 25 – July 1), the Confederates broke through Union defenses, leading to McClellan’s **retreat down the James** toward **Harrison’s Landing**, and the failure of the campaign.
* Second Bull Run (or Second Manassas) (August 29–30, 1862). This resounding victory by **Robert E. Lee** and **Stonewall Jackson** pushed Union forces back to Washington, D.C. **President Abraham Lincoln** gathered forces in northern Virginia under **General John Pope**, who would protect the capital until **George McClellan**’s **Army of the Potomac** returned from the Peninsula Campaign. Lee maneuvered Jackson’s troops behind those of Pope; Jackson detained Pope’s men at Manassas while Lee sent James Longstreet to crush Pope’s left flank. Pope’s and McClellan’s joint forces retreated to defend Washington, **ceding all of Virginia** to the Confederacy and marking a low point in the Union effort.
* Antietam (or Sharpsburg) (September 17, 1862). The **bloodiest single day** of the Civil War: 12,000 Union and 10,000 Confederate casualties. **Robert E. Lee** invaded Maryland, but a Union soldier **discovered Lee’s battle plans** wrapped around three discarded cigars. After the **Battle of South Mountain** (September 14), Lee’s forces retired toward Antietam Creek. Meanwhile, Stonewall Jackson’s forces captured **Harper’s Ferry, Virginia**, and rushed north to rejoin Lee’s main army. **George McClellan** had a substantial numerical superiority over Lee’s Confederates, but failed to effectively coordinate his army’s attacks. Antietam thus was actually a series of several distinct clashes, near the **Dunker Church**, along the **Bloody Lane**, and around **Burnside’s Bridge**. After the battle’s conclusion, Lee’s battered army **retreated across the Potomac** into Virginia; the Union victory allowed President Lincoln to issue the **Emancipation Proclamation**.
* Fredericksburg (December 13, 1862). At this site, about 50 miles south of Washington, Union commander **Ambrose Burnside** (who had replaced George McClellan) tried to take the initiative and cross the **Rappahannock River** in a march toward Richmond. He met Robert E. Lee’s forces, which were well entrenched on **Marye’s Heights** behind the town. Burnside’s army took heavy losses assaulting the heights, and fell back across the Rappahannock. A later attempt to flank the Confederate position was foiled by heavy rain during the so-called **“Mud March”** of January 1863.
* Vicksburg Campaign (April 29 – July 4, 1863). This campaign was launched by **Ulysses S. Grant** to take control of the **Mississippi River** and cut off the western Confederate states from the east. Grant ordered forces led by **James McPherson**, **John McClernand**, and **William Tecumseh Sherman** through bayous west of the Mississippi to **Hard Times, Louisiana**. They were up against Confederate defenders under **Joseph Johnston** and **John Pemberton**. Sherman and McPherson drove Johnston from **Jackson, Mississippi** on May 14, and the Union scored a victory at **Champion’s Hill** two days later, but could not drive the Southerners out of Vicksburg, so Grant laid siege to the town. Outnumbered 71,000 to 20,000 and on the brink of starvation, Pemberton finally surrendered his men; Johnston withdrew east.
* Chancellorsville (May 1–4, 1863). A victory for the South, but with great cost, as **Stonewall Jackson** lost his life. Lincoln called on **“Fighting Joe” Hooker** to command the Union army; Hooker took a force of 134,000 and provoked **Robert E. Lee** and Jackson’s 60,000 men into battle. Jackson moved around Hooker and counterattacked the Union flank on May 2. That night, while Jackson was on reconnaissance, **his own men** mistook him for a Northerner and shot him; he died of pneumonia eight days later. The following morning, a cannonball blast hit the **Chancellor House**, knocking Hooker unconscious; Union troops, led by **John Sedgwick**, then retreated. Casualties for the North outnumbered those of the South, 17,000 to 13,000.
* Gettysburg (July 1–3, 1863). This marked both the **farthest northward** advance by the Confederacy and the **turning point** that led to its defeat. **Robert E. Lee**, along with **James Longstreet**, **A. P. Hill**, and **Richard Ewell**, led the attack into southern Pennsylvania; **J. E. B. Stuart** was supposed to monitor Union movement with his cavalry, but strayed so far east of Gettysburg that his force did not return (exhausted) until the second day of battle. **George Meade** replaced **Joseph Hooker** as leader of the Union army; Southern forces drove Northerners through the town of Gettysburg but could not secure key positions at **Cemetery Ridge** and **Little and Big Round Tops**. Low on supplies, on the third and final day Lee ordered an attack on the center; **George Pickett** led his famous **“charge”** through open fields, where the Union mowed down one-third of his 15,000 men. The Confederates lost 20,000 and Lee retreated to Virginia.
* Chattanooga Campaign (September–November 1863). It began when Union **General William Rosecrans** forced Confederate commander **Braxton Bragg** out of the city on September 9. Ten days later, at **Chickamauga** (in Georgia), Bragg and **James Longstreet** turned the tables by whipping Rosecrans, forcing him into a siege position at Chattanooga. Only **George Thomas** (the **“Rock of Chickamauga”**) saved Rosecrans’s army from annihilation. Well-developed **railroad networks**, however, allowed **Ulysses S. Grant**, **Joseph Hooker**, and **William Tecumseh Sherman** to bring reinforcements. On November 24 Hooker took **Lookout Mountain** in the southwest, in the **“Battle Above the Clouds.”** The next day, Thomas ran right over the Southern force at **Missionary Ridge**, securing Tennessee for the North.
* Wilderness Campaign (or Overland Campaign) (May 5 – June 12, 1864). The first clash between **Ulysses S. Grant** and **Robert E. Lee**, this series of conflicts started with the **Battle of the Wilderness**, fought in a dense forest 50 miles northwest of Richmond. At **Spotsylvania Court House**, **George Meade** assaulted Robert E. Lee’s men, but Lee’s troops were able to hold on near the **“Bloody Angle.”** Advancing within ten miles of Richmond, Grant met Lee at **Cold Harbor (June 3); he lost 7,000 men to Lee’s 1,500. By the end of the campaign, Grant’s army approached the James River and Lee’s army had suffered severely from a “war of attrition.”**
* Petersburg Campaign (June 1864 – April 1865). After Cold Harbor, **Ulysses S. Grant** moved south to lay siege to this **railroad hub**, 25 miles from Richmond. The **trenches** in which much of the fighting took place were similar to those later used in World War I. On July 30, Pennsylvania **coal miners** detonated four tons of powder in a tunnel underneath the Confederate line; this **“Battle of the Crater”** killed many defenders. Although the South held the city of Petersburg, its supplies ran thin in the winter of 1865. Grant finally destroyed the Confederate right flank at **Five Forks** (April 1–2), 14 miles southwest of Petersburg. This resounding defeat led to **Robert E. Lee**’s **surrender to Grant at Appomattox Court House** one week later, effectively ending the Civil War.

**Hindu Deities and Heroes**

* Vishnu: One of the **Trimurti** (the holy trinity of Hindu gods), Vishnu is the **Preserver**, protecting the world. When needed, Vishnu descends to Earth as an ***avatar***, or incarnation. Nine have appeared so far: **Matsya**, **Kurma** (tortoise), **Varah** (boar), **Narasimha** (man-lion), **Vamana** (dwarf), **Parashurama**, **Rama**, **Krishna**, and **Buddha**. A tenth, **Kalki**, will appear with a flaming sword to save humans from the **darkness**. Some cult followers worship Vishnu as **Narayana**, the primal being. Vishnu has dark **blue skin**, rides with the eagle **Garuna**, and sits on the snake **Shesha**. His symbols are the **conch**, **disc**, **club**, and **lotus**; his chief wives are **Lakshmi** and **Bhu** (the Earth). **Kama**, the god of love, may be his son.
* Shiva: Also known as **Lord Mahesh**, Shiva is the **Destroyer** in the **Trimurti**. Developed from **Rudra**, the Vedic god of death, Shiva is often shown sitting on a **tiger skin** and riding the bull **Nandi**. He is also associated with a ***lingam*** (phallus). He has **three eyes**, of which the third (in the middle of his head) is **all-knowing**; when it opens, the world is destroyed and regenerated. Lord of all underworld beings, he wears a **necklace of skulls** and another made of a **snake**. He carries a **trident** as a weapon and has a **blue throat**, the result of drinking **poison** while the ocean churns. **Parvati**, one of his several consorts, bears him two sons: **Kartikeya** (the god of war) and **Ganesha**.
* Brahma: The third of the **Trimurti**, Brahma is the **Creator**. By dropping an **egg** into the cosmic waters, he hatches a younger form of Brahma that creates other beings. Also the **chief priest**, he has **four heads** that each point in a cardinal direction, representing the **Four Vedas**. Brahma has a **fifth head** until Shiva plucked it off; as punishment for that act, Shiva is forced to wander as a **beggar** and carry Brahma’s severed skull as a bowl. Brahma’s wife is **Savitri**, who curses him after he lets a **cow-maiden** stand in for her at an important ritual. Few people worship Brahma, either because of the curse or because he lost a power struggle to Vishnu.
* Krishna: This **eighth avatar of Vishnu** is born when Vishnu plucks two of his own **hairs** — one light, one dark — and uses the dark hair to impregnate **Devaki**. Her husband **Vasudeva** saves Krishna from evil **King Kansa** by carrying him across the river **Yamuna** to safety in **Gokula**. Krishna can be depicted as a child, adolescent, or adult. As an infant, he plays **pranks** such as **stealing butter**. As a youthful lover, he plays the **flute** and dances with the ***gopis*** (cow-maidens) in the **Vrindavana forest**. As an adult, he is a dark-skinned **warrior** with a light, angelic face, **charioteer to Arjuna** (in the ***Mahabharata***). In the ***Bhagavad-Gita*** it is he who reveals the importance of ***dharma*** and ***bhakti***. His consort is the cowherd girl **Radha**.
* Ganesha: This **elephant-headed** god of **wisdom and learning** is often shown riding a **rat**. **Parvati** “gives birth” to Ganesha by creating him from the **saffron paste** she scrubbed off of herself after bathing. When Parvati instructs Ganesha **not to let anyone in** as she took another bath, Ganesha prevents **Shiva** from entering, prompting Shiva to **cut off Ganesha’s head**. To calm Parvati, Shiva tells servants to take the head of the first baby found whose **mother had her back turned**; the servants bring back the head of a **baby elephant**. Ganesha has two wives (**Riddhi** and **Siddhi**), two sons, and a daughter. People pray to this **remover of obstacles** and bringer of **good fortune** before they commence business.
* Rama: The **seventh avatar of Vishnu** is hero of the ***Ramayana***. Born as a prince to **King Dasharatha** and **Queen Kaushalya**, Rama wins the hand of his wife **Sita** in a competition held by Sita’s father, **King Janaka**; only he can **string Shiva’s bow**. When his aunt **Kaikeyi** schemes to deprive him of Dasharatha’s throne by putting her son **Bharata** there, Rama and Sita are banished to a forest for 14 years. During that time, the ten-headed demon **Ravana** kidnaps Sita, but Rama rescues her and kills Ravana. Bharata abdicates; Rama makes Sita **walk through fire** to prove that Ravana had not corrupted her.
* Indra: The god of **rain**, **thunder**, and **war**, Indra wields the **thunderbolt** (*vajra*) and rides **Airavat**, the **four-tusked white elephant**. In early Vedic times he was king of the gods who ruled ***swarga***; many ***Rig Veda*** hymns are devoted to him. With the aid of both the **Marut storm gods** and his favorite drink, ***soma***, Indra leads the **Aryan conquest** of India. He also defeats the dragon **Vritra**, who had **stolen the world’s water**.
* Lakshmi (or Sri): The last and greatest treasure born from the **“churning of the ocean,”** Lakshmi is the goddess of **prosperity** and patron to **moneylenders**. The epitome of **feminine beauty**, she sits or stands on a **lotus flower** and appears in her own avatars alongside **Vishnu**: **Sita** to his Rama; **Padma** the lotus to Vamana the dwarf; **Radha** (or Rukmini) to Krishna. A form of the mother goddess (**Shakti**, or **Devi**), she also represents **virtue** and **honesty**.
* Shiva’s consort: Several incarnations of the “mother goddess” take this moniker. **Parvati**, the most benevolent form, is the reincarnation of **Sati**, who threw herself into the fire. **Durga** is a **demon-slayer** who rides a **lion** into battle and carries a weapon in each of her **many arms**. **Kali** is a black-skinned goddess of **destruction**, who defeats the demon leader **Raktavija** by drinking all of his blood. Although Kali’s **dance** can destroy the world, Shiva **throws himself at her feet** to calm her, turning her into Parvati.
* Arjuna: The chief hero of the ***Mahabharata***, Arjuna is the son of **Indra** and one of five **Pandava brothers**, who fight a bitter war against their 100 cousins, **Kauravas**, culminating at the battle on **“Kuru’s Field.”** Before the battle, Arjuna asks his **charioteer** (Krishna) why he must fight. Krishna responds that Arjuna must follow a devotion to god (***bhakti***), and that even as he slays his brethren, it is for a **just cause**. Along with the rest of the Pandavas, Arjuna is married to **Draupadi**.
* Hanuman: Son of the wind god **Vaayu** and **Queen Anjana**, Hanuman has a **human body with a monkey’s head**. As a boy he **swallows the sun** (mistaking it for a piece of fruit); the angry **Indra** whips him with a thunderbolt. In response, the wind god Vaayu refuses to breathe air into the world, prompting Indra to apologize and the other gods to bestow **immortality** and **shapeshifting** ability on Hanuman. He figures prominently in the ***Ramayana***, where he flies to **Lanka** to tell **Sita** that **Rama** will **rescue** her from **Ravana**.
* Agni: Part of a trinity with **Surya** (the sun) and **Vaayu** (the wind), Agni can be brought to life by rubbing two sticks together. Since Agni is responsible for **sacrificial fires**, he is the **patron of priests**. He has a **red body**, **two heads**, **three legs**, **four arms**, and **seven tongues**; he often carries a **flaming javelin**. In the ***Mahabharata***, Agni’s grandfather is one of seven great sages; with the help of Krishna, he devours the **Khandav forest**.

**Deserts**

* Antarctica (5.4 million mi2) Because it is covered with (solid) water, it is somewhat surprising that Antarctica is considered a desert, but it is classified as such due to its **lack of precipitation**. Players should be familiar with its **tallest mountain**, **Vinson Massif** in the Ellsworth Mountains; its active **volcano** **Mount Erebus**; the surrounding **Ross** and **Weddell Seas**; and the **Ross Ice Shelf**. The Norwegian explorer **Roald Amundsen** was the first to reach the **South Pole** (1911), while the Englishman **Robert Scott** died trying to reach it. **Ernest Shackleton** had to abandon his ship, the ***Endurance***, during an attempt to cross Antarctica on foot.
* Sahara Desert (**Northern Africa**; 3.5 million mi2) The Sahara is the world’s second largest desert, but its **largest hot desert**. The **Atlas Mountains** bound the western Sahara on the north, and the **Sahel** — a **savannah**-like strip — bounds it on the south. It is dominated by rocky regions (**hamada**), sand seas (**ergs**), and salt flats (**shatt**) and dry river valleys (**wadi**) that are subject to **flash floods**. The **Berber** and **Tuareg** peoples are native to the Sahara.
* Atacama Desert (**Chile**; 70,000 mi2) The Atacama’s chief claim to fame is the **rain shadow of the Andes**, which makes it the **driest hot desert in the world**. The desert was the primary bone of contention in the **War of the Pacific** (1879 1883; Chile defeated Peru and Bolivia) that sought to control its **nitrate** resources, which were necessary for the production of explosives.
* Kalahari Desert (**Botswana**, **Namibia**, **South Africa**; 360,000 mi2) The Kalahari is a large region, not all of which is arid enough to qualify as a desert. It is known for its **red sand**, large **game reserves** (**meerkats**, **gemsbok**, **springbok**, **steenbok**), and **mineral deposits** (notably **uranium**). Its **San Bushmen** speak a **click language**.
* Mojave moh-HAH-vay Desert (mostly **California**, and some of **Arizona**, **Utah**, and **Nevada**; 25,000 mi2) The Mojave is bounded by the **San Gabriel** and **San Bernardino mountain ranges** along the **San Andreas** and **Garlock Faults**. It is between the **Great Basin** and the **Sonoran Desert**, and it contains the **lowest and driest point** of North America, **Death Valley**. It is most strongly associated with the **Joshua tree** (*Yucca brevifolia*).
* Gobi Desert (**China** and **Mongolia**; 500,000 mi2) The Gobi, Asia’s second largest desert (after the Arabian Desert), is bounded on the north by the **Altai Mountains**. It is known for its role in the **Silk Road** trading route and the **Nemegt Basin**, where **fossilized dinosaur eggs** and human artifacts have been found.
* Rub’ al-Khali (**Arabian Peninsula**; 250,000 mi2) Its name means **“Empty Quarter”** in English, is sometimes considered the most inhospitable place on earth. It is known for the **world’s largest oil field**, the **Ghawar**, and for once being part of the **frankincense trade**.
* Namib Desert (**Namibia** and **Angola**; 30,000 mi2) The Namib, a **coastal desert**, is known for its bizarre **Welwitschia** and medicinal **Hoodia** plants. It is thought to be the oldest desert in the world.
* Painted Desert (Northern **Arizona**) The Painted Desert, which is shared by **Grand Canyon** and **Petrified Forest National Parks**, is known for its **colorful, banded rock formations**.
* Negev Desert (**Israel**; 4,700 mi2) The triangular Negev covers the southern half of **Israel**.
* Taklamakan Desert (**China**; 105,000 mi2) The Taklamakan is an extremely **cold**, **sandy** desert known for splitting the **Silk Road** into branches running north and south of it. It is bounded by the **Kunlun**, **Pamir**, and **Tian Shan** mountain ranges.
* Great Sandy Desert (**Western Australia**; 140,000 mi2) Part of the **Western Desert**, and the ninth largest in the world. The above list is based on the frequency with which deserts have appeared in NAQT’s packet sets, but half of the world’s ten largest deserts don’t make that list: the Arabian Desert (#3, which includes the **Rub’ al-Khali**), the Patagonian Desert (#5), the Great Victoria Desert (#6), the Great Basin (#7), and the Chihuahuan (#8).

**Ancient Philosophers**

* [Socrates](http://plato.stanford.edu/entries/socrates/) (c. 469 BC–399 BC) We have no writings from Socrates’s own hand, and know about him largely from the dialogues of his student **Plato**. Proclaiming his own **ignorance of all things**, Socrates went around **Athens** engaging in **question-and-answer sessions** to search for truths or draw out contradictions (the **“Socratic method”**). The Athenian state disapproved of his conduct; he was put on trial for **corrupting the city’s youth**, and sentenced to **death by drinking hemlock**. Socrates’ trial, imprisonment, and death are recounted in Plato’s ***Apology***, ***Crito***, and ***Phaedo***, respectively.
* [Plato](http://plato.stanford.edu/entries/plato/) (c. 429 BC–347 BC) Plato’s **Socratic dialogues** are our main source both for **Socrates**’s philosophy and his own; Plato often put his own thoughts in Socrates’ mouth. Plato’s dialogues include the ***Republic*** (about **justice** and the **ideal city-state**), the ***Symposium*** (about the **nature of love**), and the ***Meno*** (about whether **virtue** can be taught). Plato believed in a world of **“forms”**—or ideal versions of real things that lie beyond the human senses—which he discussed in such works as the ***Phaedo***. Plato founded a school called the **Academy**, from which we get the common word.
* [Aristotle](http://plato.stanford.edu/entries/aristotle/) (c. 384 BC–322 BC) Aristotle was a student of **Plato**; in turn, Aristotle was a tutor to **Alexander the Great**. Many of his works come to us in the form of lectures he gave at his school, known as the **Lyceum**. His philosophical output includes the ***Nicomachean Ethics***, which argues that virtues consist in a **“golden mean”** between two extremes; the ***Physics***, which describes motion and change in terms of **“four causes”** that make a given thing what it is; and the ***Metaphysics***, which describes the **structure of reality**. Aristotle’s ***Poetics*** discusses the types of **drama** and considers an effect of **tragedies** known as ***catharsis***, or the purging of bad feelings.
* [Confucius](http://plato.stanford.edu/entries/confucius/) (or Kong Fu Zi) (6th century BC) A pivotal thinker from **China**’s **Spring and Autumn period**, Confucius’s views on proper conduct and **filial piety** influence China to this day. Many sayings attributed to Confucius were compiled by his disciples following his death in a text known as the ***Analects***. Confucius put much importance on ***ren***, the inner state which allows one to behave compassionately toward others, and on a concept called ***li***, which can help individuals attain *ren*.
* [Lao Tzu](http://plato.stanford.edu/entries/laozi/) (also given as Lao Tse or Laozi) (dates unknown, 6th century BC) is a quasi-mythical thinker of the **Taoist** tradition, to whom the pivotal ***Tao te Ching*** is attributed. Concepts associated with him include that of the ***Tao***, or “the way,” and ***wu wei***, or a life of **non-action** in accordance with the Tao. In later centuries, Lao Tzu was accorded godlike status as one of the **Three Pure Ones** of Taoism, and is frequently depicted as an **old man with a donkey**. To Lao Tzu is attributed the quote “The journey of a thousand miles begins with a single step.”
* [Diogenes](http://www.iep.utm.edu/diogsino/) (c. 410s BC–323 BC) Diogenes of Sinope was a student of **Antisthenes**, who founded the ancient school of philosophy known as **Cynicism**. (The term “cynic” comes from the Greek for **“dog-like,”** and is thought to have originated as an insult to the school’s members.) The Cynics rejected conventional social norms in search of a truly **virtuous** life. Diogenes himself was something of an eccentric—according to legend, he lived in a **tub** or a barrel on the street, and wandered Athens holding a **lamp** in his futile search for an **honest man**.
* [Epicurus](http://plato.stanford.edu/entries/epicurus/) (341 BC–270 BC) Epicurus’s namesake school, **Epicureanism**, believed that **pleasure** was the highest (or only) good, and that the absence of pain (***aponia***) was the highest pleasure. They also believed that human happiness consisted of a kind of tranquillity known as ataraxia. Critics of Epicureanism accused his school of promoting **hedonism** and making **selfishness** into a good, though Epicureans did not believe themselves to be hedonists.
* [Zeno of Elea](http://plato.stanford.edu/entries/zeno-elea/) (c. 490 BC–430 BC) Zeno of Elea was a student of **Parmenides**, who founded the **Eleatic school** in a Greek colony of the Italian peninsula. He is most famous today for **“Zeno’s paradoxes,”** the best-known of which involve an **arrow** in flight and a **race** between **Achilles** and a **tortoise**. Zeno’s paradoxes purport to show that physical movement is impossible, since any attempt to travel a distance must be preceded by moving half that distance, which must be preceded by moving half of half that distance, and so on. (Zeno of Elea is not to be confused with **Zeno of Citium**, who founded the philosophical school of **Stoicism** two centuries later.)
* [Thales](http://www.iep.utm.edu/thales/) (c. 620 BC–546 BC) Thales was a pre-Socratic thinker from the Greek colony of **Miletus** who many consider to be the “first philosopher.” Rejecting mythical explanations of the universe’s nature, he believed that the **first principle** of all existence, the natural element from which all things emerged, was **water**. Thales was also a **civil engineer** and **mathematician**, and is credited with discovering that if a circle goes through all three vertices of a triangle and one side of the triangle is a diameter of the circle, then the triangle is a right triangle. He is sometimes thought of as the founder of a **“Milesian school”** of philosophy, whose other members include **Anaximander** and **Anaximenes**.
* [Cicero](http://www.iep.utm.edu/cicero/) (106 BC–43 BC) Though he is better remembered today for his role in the political life of the **Roman Republic**, Marcus Tullius Cicero (sometimes known as “Tully”) was also a significant philosopher. He described the ideal state in such dialogues as ***On the Republic*** and ***On the Laws***, while he discussed **Epicurean** and **Stoic** views on religion in ***On the Nature of the Gods***. Through the Middle Ages and Renaissance, Cicero was considered one of the most important of ancient philosophers. Indeed, **Saint Augustine** asserted that he turned to philosophy as a result of reading a now-lost work by Cicero known as the ***Hortensius***.