

3L Week 5
READING Packet

MATH INSTRUCTIONS

Ms. Medcalf's Math Scholars-

Here are things to keep in mind:

1. The checklist is a guideline to make sure you complete everything you are asked to complete within the week. You are being asked to complete at least 30 minutes of math practice a day, but we encourage you to do as much as you can on any assignment.
2. Please complete only the **EVEN numbered problems** for each problem set. Completing more is great practice, but you are only going to be required to complete the evens for this week (again).
3. There may be extra homework sheets attached within your packet in case anyone needs them.
4. Be mindful of your own math course. Whichever math textbook you have is the math work you should follow in the checklist.
5. **Please put your first and last name AND your math teacher's name (Ms. Medcalf) at the top of EVERY math page!** This will help the staff who sort the work to ensure that I get all the work from my scholars. 😊

For Week 5 of distance learning (May 5th – May 8th),

Ms. Medcalf's classes should complete the **even** problems in the sets for:

3L Saxon 8/7: Lessons 61, 62, 63

3L Algebra ½: Lessons 90, 91, 92, 93

For additional resources to help you through the lessons, take a look at our website www.parnassusteachers.com; the password is: Pegasus. Click on "School of Logic" to find resources organized by subject.

Feel free to email me at medcalf@parnassusprep.com, or call/text me at 612-465-9631 with any questions you have about anything school related.

When you know better, you do better! 😊 Ms. Medcalf

ENGLISH INSTRUCTIONS

Clarifications and Notes

Reminders:

1. NOTE: Please write “**Ms. Rossi English**” and **your name** at the top of your piece of paper before turning this in! It really helps the teachers who are sorting the work.
 2. All answers should be written in **cursive full sentences** on a separate sheet of paper! That is the only work you need to turn in for English. If you write everything on the same sheet of paper (which is recommended), then make sure to label each section (Friday, Monday, Tuesday, Wednesday, and Thursday) so it’s clear to me!
-

Friday: This is a day off! No teacher contact today. (Staff Development)

Monday: This is a day off! No teacher contact today. (Staff Development)

Tuesday: Read 65-72. Answer all of the “Closer Look” questions on page 72 on your sheet of paper.

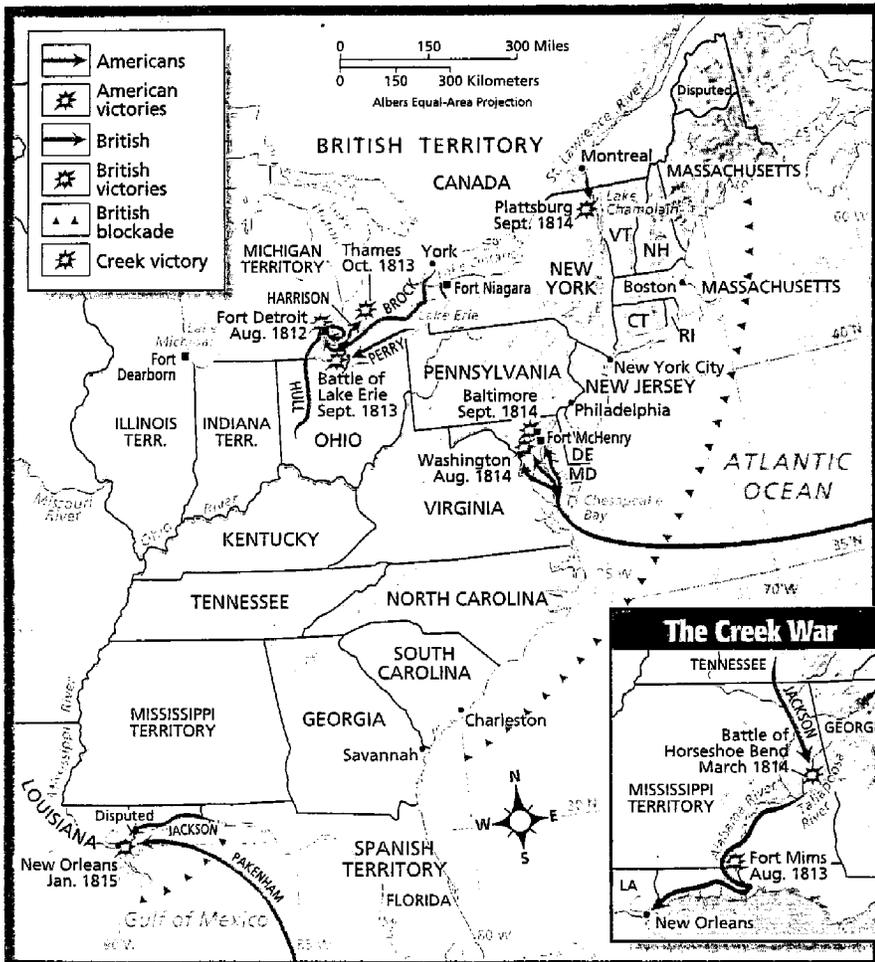
Wednesday: Read pages 80-86. Answer the “Closer Look” questions from page 87 on your sheet of paper.

Thursday: Metonymy. Read about what it is on pages 88-89. Number your separate sheet of paper 1-20. For each number, write what the BOLD words in the sentences really mean (what they stand for). You do NOT need to write the full sentence out!

Example:

1. eye= attention
2. Cold feet= too nervous to do something
3. Factory hand= a worker in a factory

HISTORY READING



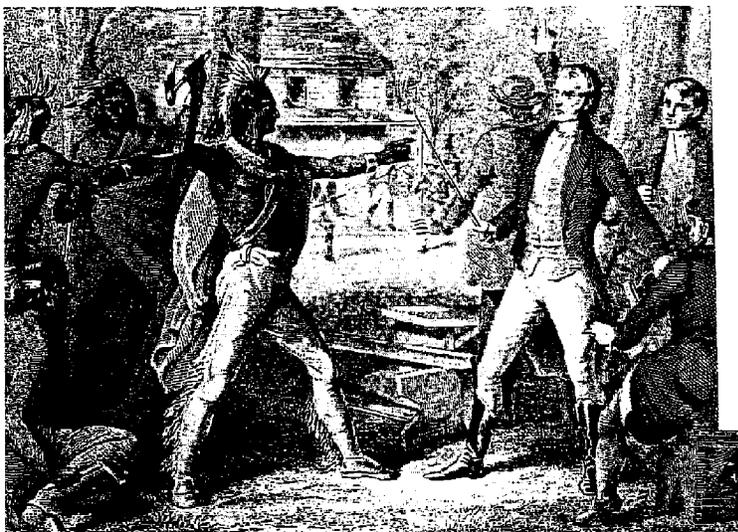
Reading 67 - Native American Resistance

The War of 1812

Learning from Maps During the War of 1812 battles took place in several regions of the United States.

Place What battle took place in the state of New York?

The Battle of Tippecanoe broke the power of Tecumseh's Indian confederation.



Tecumseh and William Henry Harrison disagreed violently about treaties between the United States and American Indian nations.



Reading 67 Native American Resistance

The Struggle over Land

P.1 Throughout the early 1800s, thousands of American settlers poured into the Northwest Territory, where they established farms and settlements. The Treaty of Greenville provided the federal government with much of the land settled by these pioneers.

P.2 Britain wanted to contain the rapid western expansion of the United States and to protect its interests in Canada. British leaders did not want to fight the United States, however. The British government therefore provided military aid to Indian nations in the Northwest Territory. These nations were angry over the terms of the Treaty of Greenville—which many of them had not signed—and over American settlement of lands beyond those that were not in the U.S. territory included in the treaty.

Tecumseh

P.1 One of the most influential and talented Indian leaders of this period was Tecumseh, a Shawnee chief. A skilled warrior and a brilliant speaker, Tecumseh warned other tribes about the dangers they faced from settlers:

P.2 Tecumseh's dream was to unite the American Indians of the Northwest Territory, the South, and the eastern Mississippi Valley into a single confederation to oppose the American settlers. Tecumseh and his brother, a religious leader some Indians called the Prophet, began uniting these different Indian groups and gathering followers. Tecumseh founded a village for his followers near the Wabash and Tippecanoe Rivers.

P.3 William Henry Harrison, the governor of the Indiana Territory, believed that Tecumseh was a serious threat to American power, calling him "one of those uncommon geniuses which spring up occasionally to . . . overturn the established order." In 1810 Tecumseh informed Harrison of the Indians' anger over the treaty.

P.4 The next year Tecumseh met face to face with Harrison, who asked if the Indian leader would follow the treaties that had been signed. Tecumseh replied, "The white people have no right to take the land from the Indians, because the Indians had it first." No single chief, he insisted, could sell land that belonged to all the Indian groups who used it. In response, Harrison warned Tecumseh not to resist the power of the United States.

The Battle of Tippecanoe

P.1 In 1811 Tecumseh left his brother in charge while he traveled south to ask the leaders of the Creek nation to join his Indian confederation. Harrison decided to take advantage of Tecumseh's absence and lead an army against the Indian confederacy. Harrison's forces marched close to the Indians, provoking an attack.

P.2 The **Battle of Tippecanoe** began when Indians attacked Harrison's camp in the early morning hours of November 7, 1811. The Indians broke through the army's lines, but Harrison maintained a "calm, cool, and collected" manner, according to one observer. During the all-day battle, Harrison's soldiers forced the Indian warriors to retreat and then destroyed Tecumseh's village. Said Chief Shabbona, "With the smoke of that town and the loss of that battle, I lost all hope." Although Tecumseh was safe, he lost the support he needed to create his dream of a great Indian confederation.

★ The Frontier War

P.1 Harrison took advantage of Perry's victory by pursuing the British and their Indian allies, led by Tecumseh, into Canada. Rather than stand and fight, British general Henry Proctor retreated and looked for reinforcements.

The Battle of the Thames

P.1 Tecumseh was furious with Proctor for retreating so quickly and abandoning his Indian allies who remained in the Great Lakes region. Tecumseh convinced Proctor to make a stand by the Thames River in southern Canada. U.S. troops under General Harrison caught up with the British there in early October 1813.

P. 2 In the **Battle of the Thames**, Harrison boldly ordered a cavalry charge directly into the British defenses, breaking them apart. The Indians continued to fight the U.S. soldiers on foot and took heavy casualties. Eventually, the Indian forces retreated. The American victory in the Battle of the Thames broke British power in the Northwest and secured the border with Canada. In addition, Tecumseh was killed during the battle. The death of this powerful leader weakened the Indian-British alliance around the Great Lakes.

The Creek War

In 1813 the Creek Indians that Tecumseh had visited two years earlier finally decided to take up arms against the United States. Led by Chief Red Eagle,

P. 1

Creek forces destroyed Fort Mims in present-day Alabama, killing more than 500 soldiers and settlers. When this news reached Andrew Jackson, a general in the Tennessee militia, he led his soldiers south to fight the Creek.

P. 2

Each side had victories in several bloody battles. Jackson also led attacks against Creek villages. Then in the spring of 1814, Jackson attacked the Creek's main base, a small fort on the Tallapoosa River in Alabama. The **Battle of Horseshoe Bend** was an overwhelming victory for Jackson and his troops against the Creek. Days later, Red Eagle came into Jackson's camp and surrendered. The Indian leader said wearily: "I have done the white people all the harm I could; . . . if I had an army, I would yet fight, and contend [struggle] to the last." Jackson's victory ended the Creek War and led to a treaty that forced the Creek to give up millions of acres of their land.

★ The Black Hawk War

P. 31

In 1827 the government of Illinois decided to end years of conflict between American Indians and American settlers by ordering the removal of all Indians from the state. Black Hawk and his followers ignored the removal policy and refused to accept the idea of land ownership.

P. 2

When the Sauk Indians returned to their village of Saukenuk after a winter hunt in 1829, they found white settlers had set up camp there. Black Hawk and his followers remained, but as more settlers arrived Governor John Reynolds became determined to remove the Sauk. In the spring of 1831 the militia destroyed Saukenuk and drove out the Sauk. When Black Hawk returned the next year, President Jackson ordered federal troops to join the militia.

P. 3

In May 1832 Black Hawk and around 40 other Sauk observed a force of about 275 militia approaching their camp. Black Hawk sent a peace delegation under a white flag. The militia ignored the flag and attacked the Sauk delegates, killing three. Black Hawk's followers then attacked so fiercely that the troops retreated.

P. 4

Black Hawk's victory inspired other Indian tribes to resist removal. Many Indian groups began to raid American settlements and fight against the U.S. Army. However, by August the Sauk forces were running out of food and supplies. The Black Hawk War ended when U.S. Army troops attacked the Sauk as they were attempting to retreat west across a river. The army had 20 casualties, while the Sauk lost about 300 lives. When Black Hawk surrendered in late August, he agreed to give up leadership of the Sauk.

★ The Indian Removal Act

P. 1

After the Black Hawk War, Indians in the Northwest Territory no longer physically resisted white settlement on their lands. By 1846 the government had completed Indian removal northeast of the Mississippi River. Meanwhile, conflict over removal of American Indians from the Southeast increased.

Conflict over Land

P.1 American Indians had long thrived on the fertile lands of the Lower South, with settlements stretching from Georgia to Mississippi. President Jackson and other political

leaders decided to clear the land for American farmers. The government wanted Indians in the Southeast to move to lands in the West.

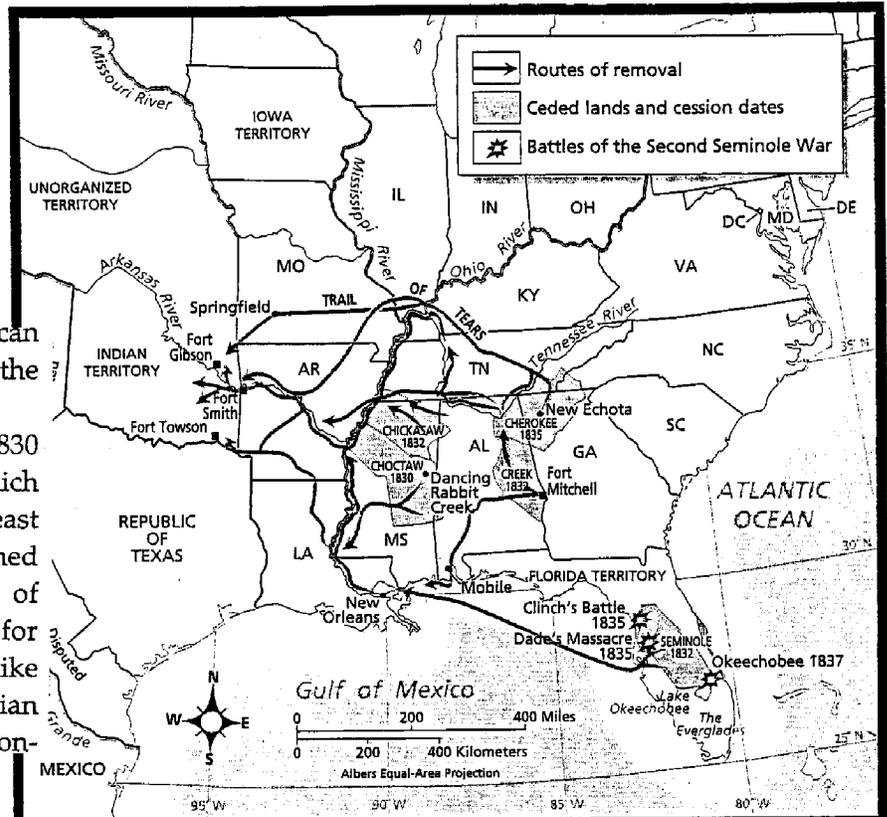
P.2 Under steady pressure from Jackson, in 1830 Congress passed the **Indian Removal Act**, which authorized the removal of Indians who lived east of the Mississippi River. Congress then established **Indian Territory**, an area containing most of present-day Oklahoma, as a new homeland for removed tribes. Some supporters of this plan, like John C. Calhoun, argued that removal to Indian Territory would protect Indians from further conflicts with American settlers. To

oversee the federal policy toward American Indians, Congress also created the **Bureau of Indian Affairs**.

Removal

P.1 The Choctaw were the first Indians sent to Indian Territory. After the Mississippi legislature abolished the government of the Choctaw, some Choctaw leaders signed the **Treaty of Dancing Rabbit Creek**. This treaty gave more than 10 million acres of their land to the state. The Choctaw then made the journey from Mississippi to Indian Territory during the winter of 1831–32. The trek was disastrous in part because federal officials in charge of the move did not provide enough food or supplies. About one fourth of the Choctaw died of cold, hunger, and disease.

P.2 The experience of the Choctaw increased Indian resistance to removal. Some Creek were determined to stay on their lands, located mainly in Alabama. When settlers launched raids on Creek villages to force them to move, Creek leader Opothleyaholo tried to organize an armed resistance. Then Alabama officials ordered the forced removal of all the Creek. In 1836 federal troops led some 14,500 captured Creek Indians, many in chains, to Indian Territory.



Indian Removal from the Southeast, c. 1830s

Learning from Maps The Indian Removal Act of 1830 allowed the president to exchange land west of the Mississippi River for lands owned by American Indians in the Southeast. American Indians were forced from their homes and marched hundreds of miles to the new Indian Territory.

Place From what present-day state were the Seminole removed?

P.3 The Chickasaw, from upper Mississippi, were removed west in 1837–38. They had negotiated a treaty for better supplies on their trip to Indian Territory. Nevertheless, Chickasaw lives were also lost during removal.

★ The Cherokee Nation

American Indians resisted removal in various ways. The Cherokee, for example, sought justice through the U.S. court system.

Cherokee Society

Many Cherokee believed that they could avoid conflict with settlers by adopting practices similar to those of white society. For example, in the early 1800s, the Cherokee invited missionary societies to establish schools in their towns. In these schools, Cherokee children learned how to read and write English.

P.1

Although American Indian cultures had complex spoken languages,

P.2

none had a written language. In 1821 a Cherokee named Sequoyah produced a writing system that used 85 characters to represent Cherokee syllables. In 1828 the Cherokee began publishing a newspaper, the *Cherokee Phoenix*, in both English and Cherokee.

The Cherokee also created a government system inspired by the U.S. Constitution. They established an election system, a bicameral council, and a court system, all headed by a principal chief. Voters elected John Ross, a successful plantation owner, as the first principal chief.

P.3

Supreme Court rejected the claim, saying that Indian tribes were "domestic dependent nations." This ruling meant that American Indians were neither a foreign nation nor U.S. citizens. They could not sue in federal court, but they still had to obey federal laws. Although the justices implied that Georgia was not treating the Cherokee fairly, they issued no order to stop the state's actions.

The Cherokee and their supporters continued to argue the issue. Samuel Worcester, a missionary who worked with the tribe, was arrested for failing to take an oath of allegiance and to obey a Georgia militia order to leave the Indians' lands. Worcester sued, charging that Georgia had no legal authority on Cherokee lands. In 1832 the Supreme Court agreed. In *Worcester v. Georgia* the Court ruled that the Cherokee Nation "is a distinct community, occupying its own territory, . . . in which the laws of Georgia can have no force." This decision agreed with the Court's earlier ruling that the Cherokee tribe was a domestic dependent nation. The Court also ruled that only the federal government, not the states, had authority over the Cherokee.

The Court ruling made Georgia's actions illegal. However, with Jackson's support, Georgia defied the Court's ruling. "John Marshall has made his decision; now let him enforce it," Jackson declared. By not enforcing the Court's decision, Jackson was violating his presidential oath to uphold the laws of the land. However, most members of Congress and the American people chose not to take serious issue over Indian Removal and Jackson's method of accomplishing it.

A Court Challenge

The adoption of white culture did not protect the Cherokee after gold was discovered on their land in Georgia. Ignoring the Cherokee's treaty rights, Georgia officials began preparing for the removal. After the Cherokee refused to move, the Georgia militia began attacking Indian towns.

The tribe sued the state, arguing that the Cherokee were an independent nation and did not have to follow state laws. In March 1831 the



Cherokee children used this primer in school to learn how to read and write in Cherokee.

P.4

The Trail of Tears

With President Jackson refusing to enforce the Supreme Court's decision, many Cherokee saw removal as unavoidable. Elias Boudinot, editor of the *Cherokee Phoenix*, wrote, "I cannot tell (my people) that we will be reinstated in [given back] our rights when I have no such hope." To silence further criticism, the Georgia militia destroyed the *Phoenix's* printing press.

P.1



The removal of the southeastern Indian tribes often had tragic results. Many American Indians died on journeys such as the Trail of Tears, shown here.

P.2 In the spring of 1838, U.S. troops began to force the removal of all Cherokee to Indian Territory. While a few managed to escape and hide in the mountains of North Carolina, most were captured. Georgia took the Cherokee's farms, businesses, and property after they were removed.

P.3 The Cherokee's 800-mile forced march, known as the **Trail of Tears**, lasted from 1838 to 1839. Almost one fourth of the 18,000 Cherokee died from disease, hunger, and harsh weather.

The Second Seminole War

Unlike the Cherokee, the Seminole of Florida resisted removal with armed force. In 1832 some Seminole leaders were forced to sign a treaty promising to leave Florida within three years and agreeing that any Seminole of African ancestry would be considered a runaway slave. This last condition concerned the Seminole because they had a tradition of harboring runaway slaves. Many escaped slaves had married into the tribe, becoming accepted as family members of the Seminole.

P.2 The Seminole ignored the treaty and refused to leave Florida. Federal officials then pressed for a new removal agreement. A Seminole leader named Osceola refused to sign the new treaty. He called upon the Seminole to resist removal by force:

“When the Great Spirit tells me to go with the white man, I go, but he tells me not to go. I have a rifle, and I have some powder and some lead. I say, we must not leave our homes and lands.”

Osceola's followers rallied behind him, and the Second Seminole War began.

P.3 Initially, the Seminole won many battles against the U.S. forces. One of their greatest victories was on New Year's Eve, 1835, when an outnumbered Seminole force surprised and defeated some 800 Florida militia and U.S. Army troops at the Withlacoochee River. Then in 1837, U.S. forces captured Osceola. He died in prison the next year, but the Seminole continued to fight against the United States.

P.4 By 1842 the U.S. Army had captured and removed some 3,000 Seminole and killed hundreds



Indian removals forced many of the Seminole to abandon villages like this one in the Florida Everglades.

of others. In the process, some 1,500 U.S. soldiers lost their lives. After spending millions of dollars, U.S. officials decided to give up the fight. The Seminole had not been defeated.

P.5 Some Seminole eventually chose to migrate to Indian Territory. One such Seminole was Wildcat, a warrior who had fought against removal for years. He said, “I am about to leave Florida forever and have done nothing to disgrace it. It was my home; I loved it, and to leave it is like burying my wife and child.” Several hundred Seminole remained carefully hidden in the Florida Everglades, where they continued to maintain their culture. The Seminole still live on tribal lands in Florida today.

3L History Reading 68 – The Dakota War of 1862

P. 1 The U.S.-Dakota War of 1862 is a significant event in the history and development of the state of Minnesota and in the long and complex history of the Dakota people and the United States.

P. 2 Between 1805 and 1858, treaties made between the U.S. government and the Dakota nation reduced Dakota lands and significantly altered Minnesota's physical, cultural, and political landscape. These treaties had significant impact on the lives of the Dakota people and the European-Americans flooding into Minnesota during the first half of the 1800s, and many historians agree that major factors in the lead-up to the U.S.-Dakota War of 1862 lie in those treaties. The treaties of 1851 (in which the largest amount of land was ceded [given away] by the Dakota) established that the Dakota would be paid by the U.S. government for the land they ceded in yearly installments called "annuities." Provisions in the treaties stated that portions of the money paid to the Dakota would go to fund trade shops, purchase agricultural tools and supplies, as well as to pay off debts claimed by traders. Many Dakota claimed these debts had been inflated or were falsified, and were opposed to the traders being paid directly by the U.S. government. As a result resentment grew within many Dakota communities towards the traders and U.S. government.

P. 3 In addition, U.S. government policies toward the acculturation of American Indians helped create divisions within the Dakota community at large. Dakota individuals who cut their hair and adopted European American agricultural methods received supplies, tools and housing at the expense of the U.S. government. Many Dakota who maintained their traditional life-ways resented what was perceived as preferential treatment of one group over another by the U.S. government.

P. 4 By the summer of 1862 the situation for many Dakota families was desperate; annuity payments were late due to the U.S. government's priority in financing the Civil War; some traders and officials at the Indian Agencies refused to extend credit for food and supplies until the Dakota had cash to pay their debts; and crop failures and poor hunting had left many Dakota families hungry. Due to these and other factors, tensions within Minnesota's Dakota community reached a breaking point.



*Taoyatedute (Little Crow), ca. 1860.
MHS photographic collections.*

P. 5 On Aug. 17, 1862 four Dakota men killed five people living at the farms of Robinson Jones and Howard Baker in Acton Township [in Meeker County today]. When word of the killings spread to the Lower Sioux Reservation, a group of Dakota men argued that it was time to go to war with Minnesota's European-American population to reclaim their ancestral land. Without consensus from the Dakota community at large, these men went directly to Taoyateduta, "His Scarlet Nation" (Little Crow), an influential Dakota leader, to convince him to lead a military effort. After intense debate, Taoyateduta reluctantly agreed, even though he feared the war would end disastrously for their nation. "You will die like rabbits when the hungry wolves hunt them in the Hard Moon," he is quoted as having said, but added "Taoyateduta is not a coward: he will die with you."

P. 6 The following day a group of Dakota under the command of Taoyateduta attacked the Lower Sioux Agency, killing many of the civilians there. Over the next several weeks, groups of Dakota soldiers attacked European American communities throughout the Minnesota River

3L History Reading 68 – The Dakota War of 1862

Valley, including New Ulm, as well as launching attacks on U.S. military posts. The war lasted nearly six weeks, during which more than 600 civilians and U.S. soldiers, as well as an unknown number of Dakota, lost their lives.

P. 7 The war fractured Minnesota's Dakota community. It was fought primarily by a relatively small group of Dakota and there was not universal support for the war within the Dakota community at large. Throughout the war, many Dakota as well as individuals of both Dakota and European ancestry (called "mixed-bloods" during the period) protected prisoners and worked to secure their release to U.S. soldiers. For a tense period of time it seemed as though a civil war might erupt between the Dakota on both reservations over the war.



Battle of Wood Lake (Sept. 23, 1862), MHS collections.

P. 8 Fort Snelling played an important role in the war. Soldiers were organized at the fort under Col. Henry H. Sibley for a military response to the Dakota. After the Battle of Wood Lake (Sept. 23), the last major battle of the war in Minnesota, many Dakota left the state, while others surrendered to U.S. military forces at Camp Release (near present-day Montevideo). Col. Sibley established a military commission to try Dakota men suspected of killing or assaulting civilians, and by the end of the process 303 men were convicted and sentenced to death. However, upon further review of the evidence the number was reduced to 39 by President Abraham Lincoln who wanted to distinguish between Dakota men who had only fought in battles and those accused of killing and assaulting civilians. Just prior to the execution a man named Tatemina (Round Wind) was reprieved because his conviction had been based on questionable testimony. The remaining 38 men were hanged simultaneously in Mankato on Dec. 26 in the largest mass execution in U.S. history.

P. 9 The rest of the approximately 1,600 Dakota and "mixed-bloods" who surrendered at Camp Release (mostly women, children and the elderly) were removed to Fort Snelling where they spent the winter of 1862-63 in a civilian internment camp, sometimes referred to as a concentration camp, below the fort (located in the present-day Fort Snelling State Park) to await forced relocation to western reservations. According to reports in local newspapers and Dakota oral histories some of the prisoners endured assaults and violence at the hands of soldiers and local civilians. "Amid all this sickness and these great tribulations," remembered Tiwakan (Gabriel Renville), a "mixed-blood" man who was held in the stockade along with his family, "it seemed doubtful at night whether a person would be alive in the morning."

3L History Reading 68 – The Dakota War of 1862

P. 10 Many detainees sold personal possessions in order to purchase food to supplement the military-issue rations they were given. Some of the “mixed-blood” families owned land vouchers that had been granted them in treaties with the U.S. government. These vouchers granted each head-of-household up to 640 acres of any unsurveyed, non-federal land in exchange for giving up claim to land in Minnesota. Many sold these vouchers to local businessmen at deflated prices in order to have cash in hand to provide for their families while in the stockade. Businessmen, such as Franklin Steele, profited by purchasing these vouchers and later selling them to land developers for large profits.

P. 11 A definitive number is unknown, but it is estimated that somewhere between 130 and 300 people died within the camp, mostly due to disease (a measles outbreak swept the region that winter). The majority of those remaining were taken by steamboats to the Crow Creek reservation in May 1863. By summer of 1863 the vast majority of the Dakota had left Minnesota, heading into the western territories or north into Canada, where many of their descendants live today. As a result of the war, approximately 6,000 Dakota and “mixed-blood” people were displaced from their Minnesota homes. Today Dakota communities remain spread throughout Minnesota, Nebraska, North and South Dakota, Montana and Canada.



Sakpedan (Little Six), left, and Wakanozhanzhan (Medicine Bottle), right, 1864. MHS photographic collections.

P. 12 After the war many Dakota were captured and imprisoned by the U.S. military, among them Sakpedan (Little Six) and Wakanozhanzhan (Medicine Bottle). The two men fled to Canada after the war but were apprehended and delivered to U.S. authorities by British agents in Jan. 1864. Both men were subsequently imprisoned at Fort Snelling. They were charged and convicted by a military commission for the deaths of civilians and sentenced to death. Their execution took place at Fort Snelling on Nov. 11, 1865 in the presence of the fort’s garrison and numerous civilians. Tradition says that as they climbed the scaffold a steam train whistle

blew in the distance, prompting Sakpedan to say, “As the white man comes in, the Indian goes out.”

P. 13 During the summer of 1863, newly promoted Brig. Gen. Sibley, along with Brig. Gen. Alfred Sully, mounted a joint military operation, called the “Punitive Expedition,” against those Dakota who had left Minnesota and headed west. Sibley’s troops pushed past Devil’s Lake and towards the Missouri River, fighting three major battles against combined Dakota and Lakota forces: Dead Buffalo Lake (July 26); Stony Lake (July 28); and Whitestone Hill (Sept. 3). In 1864 Sibley remained in Minnesota while a second expedition was launched. Sully commanded the operation and defeated a large, combined group of Dakota, Lakota and Yanktonai at the Battle of Tahchakuty, or Killdeer Mountain (July 28). Eventually, the U.S. military forcibly removed many Dakota to reservations in North and South Dakota. Intermittent fighting continued between the U.S. military and the Dakota nation in the western territories throughout the late 1800s, culminating at Wounded Knee on Dec. 29, 1890.

<http://www.historicfortsnelling.org/history/us-dakota-war>

Additional information available at the Minnesota Historical Society

SCIENCE READING

The Cell and Inheritance

Reading Preview

Key Concepts

- What role do chromosomes play in inheritance?
- What events occur during meiosis?
- What is the relationship between chromosomes and genes?

Key Term

- meiosis

Target Reading Skill

Identifying Supporting Evidence

As you read, identify the evidence that supports the hypothesis that chromosomes are important in inheritance. Write the evidence in a graphic organizer.

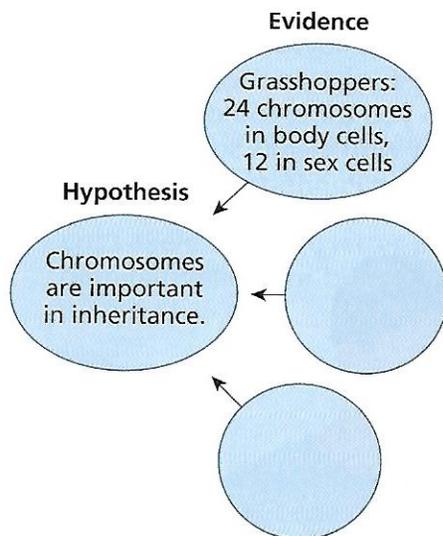


FIGURE 11
Sex Cells

The large egg is a female sex cell, and the smaller sperm is a male sex cell.

Lab
zone

Discover Activity

Which Chromosome Is Which?

Mendel did not know about chromosomes or their role in genetics. Today we know that genes are located on chromosomes.

1. Label two craft sticks with the letter *A*. The craft sticks represent a pair of chromosomes in the female parent. Turn the sticks face down on a piece of paper.
2. Label two more craft sticks with the letter *a*. These represent a pair of chromosomes in the male parent. Turn the sticks face down on another piece of paper.
3. Turn over one craft stick "chromosome" from each piece of paper. Move both sticks to a third piece of paper. These represent a pair of chromosomes in the offspring. Note the allele combination that the offspring received.

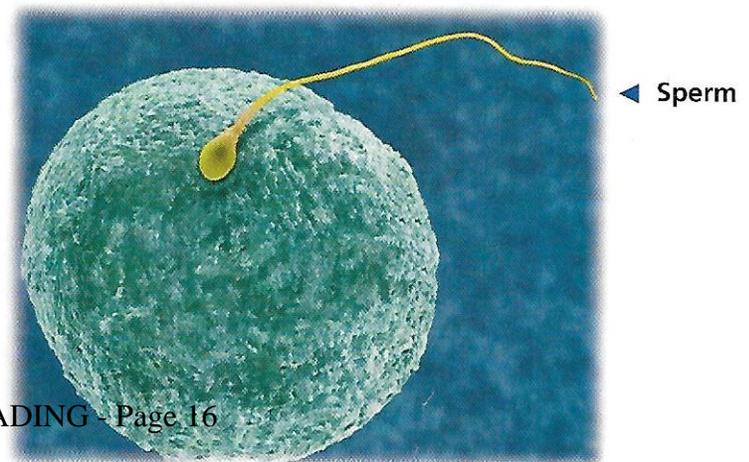
Think It Over

Making Models Use this model to explain how chromosomes are involved in the inheritance of alleles.

Mendel's work showed that genes exist. But scientists in the early twentieth century did not know what structures in cells contained genes. The search for the answer to this puzzle is something like a mystery story. The story could be called "The Clue in the Grasshopper's Cells."

In 1903, Walter Sutton, an American geneticist, was studying the cells of grasshoppers. He wanted to understand how sex cells (sperm and egg) form. Sutton focused on the movement of chromosomes during the formation of sex cells. He hypothesized that chromosomes were the key to understanding how offspring have traits similar to those of their parents.

Egg ▶



Grasshopper chromosomes ▼

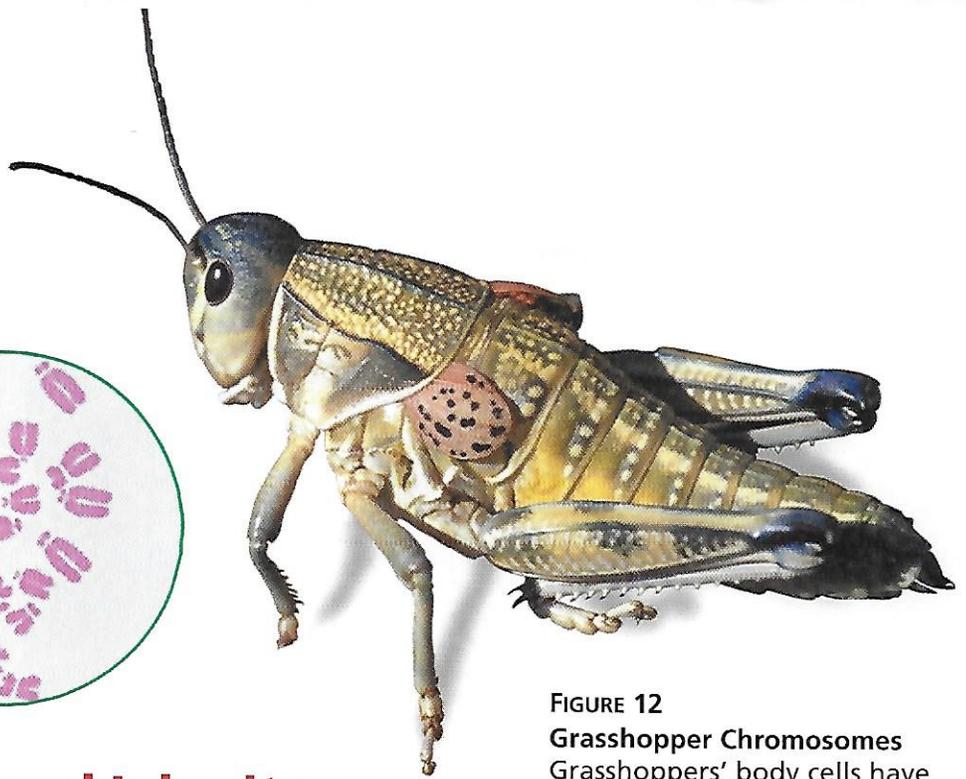
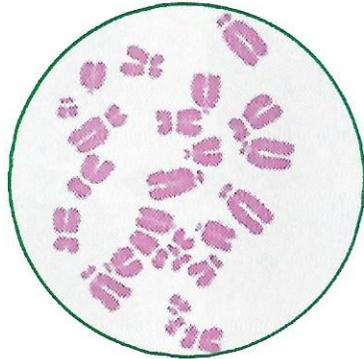


FIGURE 12

Grasshopper Chromosomes

Grasshoppers' body cells have twice the number of chromosomes as their sex cells.

Applying Concepts *What is the function of chromosomes?*

Chromosomes and Inheritance

Sutton needed evidence to support his hypothesis that chromosomes were important in the inheritance of traits. He found that evidence in grasshoppers' cells. The body cells of a grasshopper have 24 chromosomes. To his surprise, Sutton found that the grasshopper's sex cells have only 12 chromosomes. In other words, a grasshopper's sex cells have exactly half the number of chromosomes found in its body cells.

Chromosome Pairs Sutton observed what happened when a sperm cell and an egg cell joined during fertilization. The fertilized egg that formed had 24 chromosomes. As a result, the grasshopper offspring had exactly the same number of chromosomes in its cells as did each of its parents. The 24 chromosomes existed in 12 pairs. One chromosome in each pair came from the male parent, while the other chromosome came from the female parent.

Genes on Chromosomes Recall that alleles are different forms of a gene. Because of Mendel's work, Sutton knew that alleles exist in pairs in an organism. One allele in a pair comes from the organism's female parent and the other allele comes from the male parent. Sutton realized that paired alleles were carried on paired chromosomes. Sutton's idea came to be known as the chromosome theory of inheritance. **According to the chromosome theory of inheritance, genes are carried from parents to their offspring on chromosomes.**

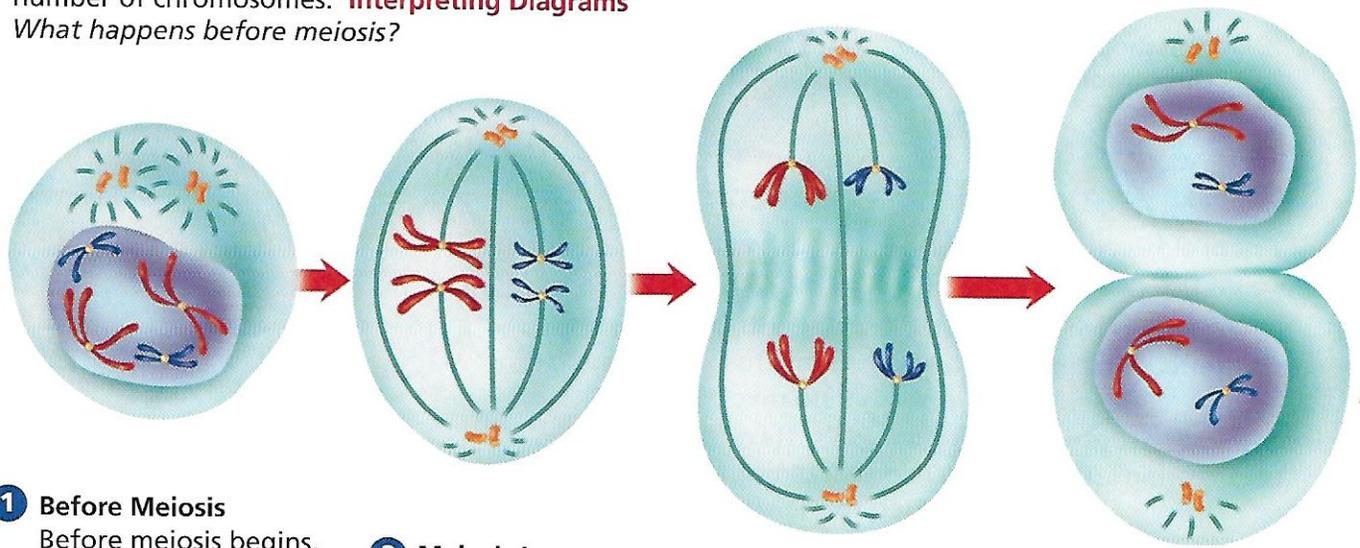


Reading
Checkpoint

What is the relationship between alleles and chromosomes?

FIGURE 13
Meiosis

During meiosis, a cell produces sex cells with half the number of chromosomes. **Interpreting Diagrams**
What happens before meiosis?



1 Before Meiosis
Before meiosis begins, every chromosome in the parent cell is copied. Centromeres hold the two chromatids together.

2 Meiosis I
A The chromosome pairs line up in the center of the cell.

B The pairs separate and move to opposite ends of the cell.

C Two cells form, each with half the number of chromosomes. Each chromosome still has two chromatids.

Meiosis

How do sex cells end up with half the number of chromosomes as body cells? To answer this question, you need to understand the events that occur during meiosis. **Meiosis** (my OH sis) is the process by which the number of chromosomes is reduced by half to form sex cells—sperm and eggs.

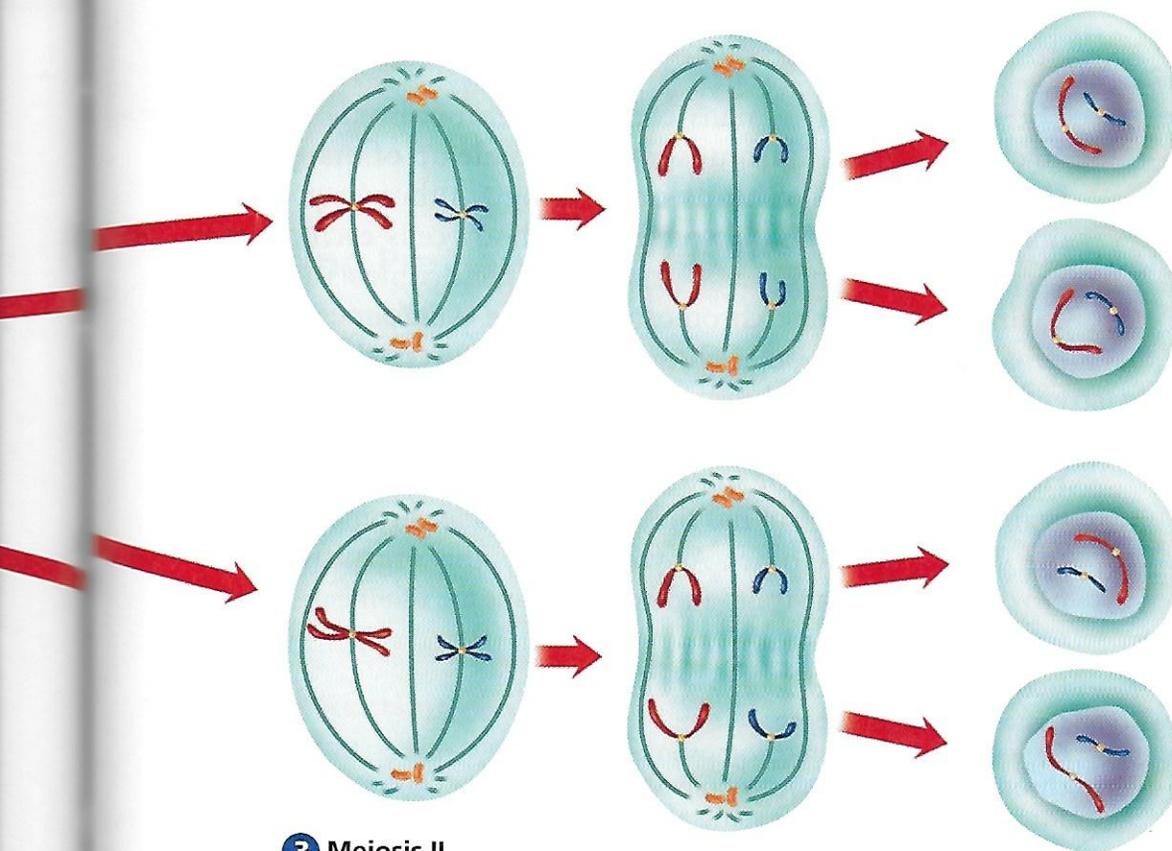
What Happens During Meiosis You can trace the events of meiosis in Figure 13. In this example, each parent cell has four chromosomes arranged in two pairs. **During meiosis, the chromosome pairs separate and are distributed to two different cells. The resulting sex cells have only half as many chromosomes as the other cells in the organism.** The sex cells end up with only two chromosomes each—half the number found in the parent cell. Each sex cell has one chromosome from each original pair.

When sex cells combine to form an organism, each sex cell contributes half the normal number of chromosomes. Thus, the offspring gets the normal number of chromosomes—half from each parent.

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3 Meiosis II

A The chromosomes with their two chromatids move to the center of the cell.

B The centromeres split, and the chromatids separate. Single chromosomes move to opposite ends of the cell.

4 End of Meiosis

Four sex cells have been produced. Each cell has only half the number of chromosomes that the parent cell had at the beginning of meiosis. Each cell has only one chromosome from each original pair.

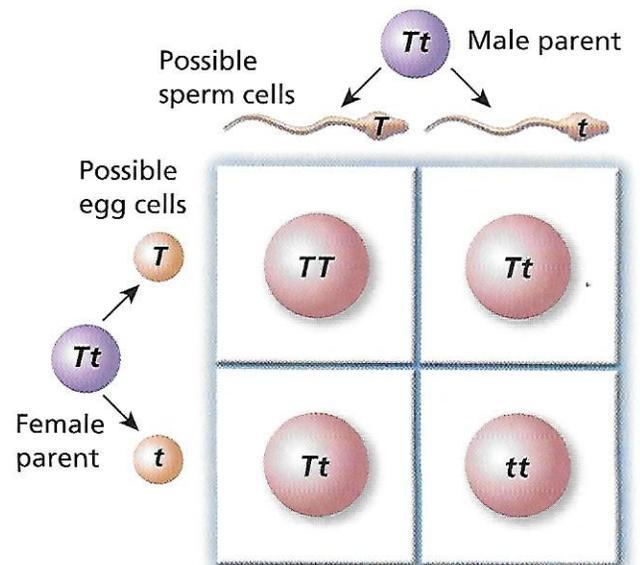
Meiosis and Punnett Squares A Punnett square is actually a way to show the events that occur at meiosis. When the chromosome pairs separate and go into two different sex cells, so do the alleles carried on each chromosome. One allele from each pair goes to each sex cell.

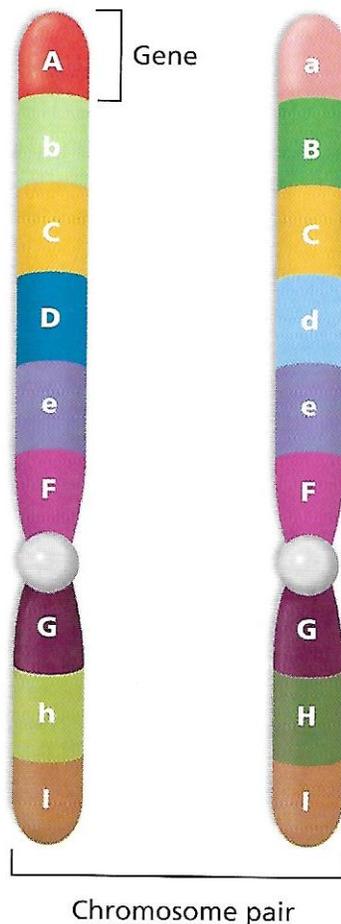
In Figure 14, you can see how the Punnett square accounts for the separation of alleles during meiosis. As shown across the top of the Punnett square, half of the sperm cells from the male parent will receive the chromosome with the *T* allele. The other half of the sperm cells will receive the chromosome with the *t* allele. In this example, the same is true for the egg cells from the female parent, as shown down the left side of the Punnett square. Depending on which sperm cell combines with which egg cell, one of the allele combinations shown in the boxes will result.

FIGURE 14

Meiosis Punnett Square

Both parents are heterozygous for the trait of stem height. The Punnett square shows the possible allele combinations after fertilization.





A Lineup of Genes

The body cells of humans contain 23 chromosome pairs, or 46 chromosomes. **Chromosomes are made up of many genes joined together like beads on a string.** Although you have only 23 pairs of chromosomes, your body cells each contain between 20,000 and 25,000 genes. Each gene controls a trait.

In Figure 15, one chromosome in the pair came from the female parent. The other chromosome came from the male parent. Notice that each chromosome in the pair has the same genes. The genes are lined up in the same order on both chromosomes. However, the alleles for some of the genes might be different. For example, the organism has the *A* allele on one chromosome and the *a* allele on the other. As you can see, this organism is heterozygous for some traits and homozygous for others.

FIGURE 15
Genes on Chromosomes

Genes are located on chromosomes. The chromosomes in a pair may have different alleles for some genes and the same alleles for others.

Classifying For which genes is this organism homozygous? For which genes is it heterozygous?

Section 3 Assessment

Target Reading Skill Identifying Supporting Evidence Refer to your graphic organizer about the chromosome theory of inheritance as you answer Question 1 below.

Reviewing Key Concepts

- Comparing and Contrasting** According to Sutton's observations, how does the number of chromosomes in a grasshopper's body cells compare to the number in its sex cells?
 - Describing** Describe what happens to the number of chromosomes when two grasshopper sex cells join in fertilization.
 - Explaining** How do Sutton's observations about chromosome number support the chromosome theory of inheritance?
- Defining** What is meiosis?
 - Interpreting Diagrams** Briefly describe meiosis I and meiosis II. Refer to Figure 13.
 - Sequencing** Use the events of meiosis to explain why a sex cell normally does not receive both chromosomes from a pair.
- Describing** How are genes arranged on a chromosome?
 - Comparing and Contrasting** How does the order of genes in one member of a chromosome pair compare to the order of genes on the other chromosome?

Writing in Science

Newspaper Interview You are a newspaper reporter in the early 1900s. You want to interview Walter Sutton about his work with chromosomes. Write three questions you would like to ask Sutton. Then, for each question, write answers that Sutton might have given.

LOGIC READING

LESSON 9 Was Andrew Jackson a Representative of the Common People?

Andrew Jackson was elected president in 1828. This lesson presents two interpretations on the issue of whether Jackson was a representative of the

common people against the rich. Read the interpretations and answer the questions which follow.

Historian A

(1) When Andrew Jackson was elected President in 1828, he symbolized the change in politics from control by the rich aristocrats to control by the common people. The rich had built a system based on an alliance of government and business. This alliance was pushed for or adopted in such policies as the U.S. Bank and the American System [tariffs and government-supported transportation to help business]. In the 1820s the common people became increasingly discontented with the Neofederalist program, however. Western farmers blamed the Panic of 1819 on the tight money policies of the U.S. Bank. Workingmen were also upset by rising prices, which they associated with the U.S. Bank, and by the loss of control and craftsmanship which they experienced in the spreading factory system.

(2) More of the common people could vote in the 1820s, and this allowed them to elect a president who would represent their interests—Andrew Jackson. The new president began immediately to make changes by replacing government officials with representatives of the common people. He brought in reformers as unofficial advisors, called the kitchen cabinet. These advisors would help bring about the necessary changes in the rich-dominated system.

(3) One of the symbols of privilege and dominance by the rich was the U.S. Bank. Under the direction of Nicholas Biddle, the Bank had extensive control over the monetary system (such as prices and credit) of the country. President Jackson believed that true democracy included equality of economic opportunity as well as political equality. So, Jackson attacked the Bank. An examination of Jackson's veto message of the Bank charter shows not a criticism of the Bank in terms of too much inflation or not enough money expansion. Rather, it shows a criticism that the Bank had too much power and gave extensive privileges to the rich. Jackson characterized the Bank War as a contest between the *rich and powerful* and the *humble members of society*.

(4) Jackson was extremely popular with the common man after he defeated the U.S. Bank. The rich conservatives were depressed by Jackson's reforms. They banded together into the Whig Party in order to defeat their new opponent whom they called *King Andrew the First*. Eventually, the Whigs adopted mass rallies and empty slogans to attract popular support at election time. They avoided talking about the issues which Jackson brought to the nation's attention.

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Historian A

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(5) As a result, the Whigs regained control of the government in 1840. Conservative policies were reimposed on the country. However, the rich conservatives could not undo most of Jackson's reforms. Jackson had established the principles that the lower classes were to have more say in the political decisions of the nation, and that the government would

play a strong role in the economic system. These principles became the liberal tradition which was reinforced by the other liberal presidents: Theodore Roosevelt, Woodrow Wilson, and Franklin Roosevelt. The rich conservatives criticized the liberal policies as too radical. However, the result of liberal reform was to keep the capitalists from destroying capitalism.

Historian B

(1) Liberal historians, such as Historian A, have characterized the Jacksonian period of American History as a struggle between the liberal viewpoints of the working class, led by the Democratic Party of Andrew Jackson, and the conservative viewpoints of the wealthy class, led by the Whigs. This narrow characterization oversimplifies and distorts a much more complex struggle in the 1820s and 1830s.

(2) First of all, Jackson himself was not a common man, but rather an aristocrat in Tennessee. Likewise, many of the leading Jacksonians were men of great wealth or men eager to become wealthy. They took political positions to gain the support of workers, but used to help aspiring capitalists, not workingmen.

(3) There were, in fact, rich and poor in both Democratic and Whig Parties. The whole idea that there was a struggle of the poor (organized in one party) against the rich (united in the other party) is mistaken. This is shown in an examination of the two parties in New York State. Both parties included big and small businessmen, farmers, workers, and used the same slogans

and appeals.¹

(4) Through studying voting patterns one is led to the conclusion that ethnic and religious differences rather than class difference, are what influenced people to vote for one party over the other. There really were no significant differences in the Democrats and the Whigs in terms of political-economic ideology (beliefs). Americans were simply too individualistic to be organized by classes into political parties. Almost all Americans believed in liberal ideals such as equality of opportunity. Both parties appealed broadly to these ideals and avoided touchy issues.

(5) What the liberal historians have described as a struggle between the parties of the rich and poor was, in reality, a consensus [agreement] of political beliefs by both parties. Americans in the Jacksonian period differed in their viewpoints not because of class differences, but rather because of ethnic and religious differences. Andrew Jackson, far from being the champion of farmers and workers, was an astute politician who used class rhetoric to gain support for his own political ends.

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Endnote for Historian B

1. From Lee Benson, *The Concept of Jacksonian Democracy: New York as a Test Case*, Princeton University Press, 1961, pp. 148-50, pp. 183-85. This information was summarized by Historian B.

In a study of voting patterns in counties in New York State in the 1844 Election two results were noted:

First, within the same county there was no significant relationship between the wealth of towns and how those towns voted in the 1844 Election. That is, some wealthy towns voted overwhelmingly Democrat while other wealthy towns voted overwhelmingly against the Democrats. Likewise, some poor towns voted Democrat while others did not.

For example, in Delaware County two towns (Davenport and Hamden) of about equal economic status (average value of dwelling per family was \$305 for Davenport and \$502 for Hamden) had completely different voting percentages for the Democrats. Davenport gave the Democrats 81.1 percent of its vote, and Hamden gave 31.8 percent. One of the wealthiest towns (Franklin) gave the Democrats only 44.9 percent of its vote. The richest town in the county (Delhi) and one of the poorest towns (Masonville) gave the Democrats about the same percentage of votes (48.5 and 46.8 percent, respectively).

This pattern is the same for all the other counties studies in New York State. Urban areas were not studied since the average value of dwelling per family could not be constructed from the available information.

Second, ethnic group and religious affiliation were very much related to how people voted. We can only estimate group percentages, but the estimates clearly show the basic point that ethnic group and religious group were important. In the 1844 Election, Yankees were fairly evenly divided between Whigs (55 percent) and Democrats (45 percent), Negroes voted about 95 percent for the Whigs. Catholic immigrants (Irish French and French Canadians) voted overwhelmingly Democrat (80 percent to 95 percent) while Protestant immigrants (Irish, Welsh, Scots, and English) voted overwhelmingly Whig (75 percent to 90 percent). It is interesting to note the difference between Catholic and Protestant Irish voting.

These estimates were made by comparing the vote in the counties and towns in the 1844 Election with the ethnic and religious make-up of those counties and towns. The estimates lead to the conclusion that the native Americans were rather evenly divided between the two parties while the immigrant groups leaned strongly for one party or the other.

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