

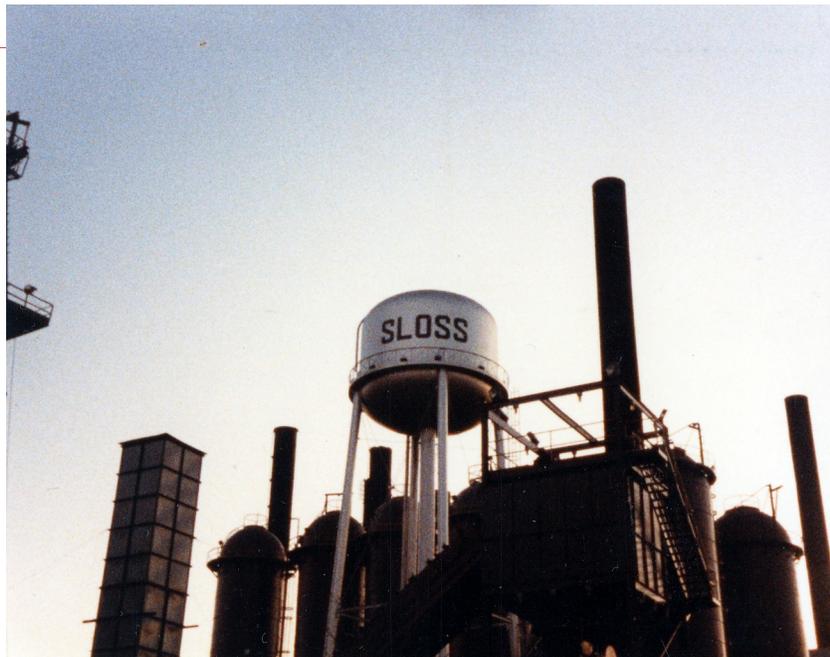


Sloss Furnaces National Historic Landmark

Teacher's Handbook

Teacher's Handbook

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This handbook offers an abundance of information about Sloss Furnaces National Historic Landmark and the ironmaking process.

Sloss Furnaces is Birmingham's museum of industrial history. The focus of the museum is a group of structures comprising the Sloss-Sheffield Steel and Iron Company's City Furnaces that produced pig iron from 1882 to 1970. The site has been formally recognized as a National Historic Landmark, reflecting the national significance of the complex's structures.

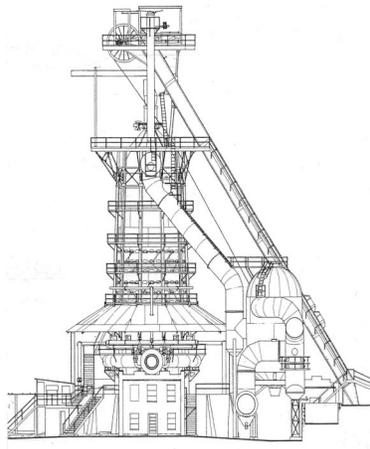
The purpose of the Sloss Furnace Museum is four-fold:

- 1. to act as a cultural resource by being a center for community events, civic life and for the creation, display, and interpretation of metal art.*
- 2. To preserve the physical facility as an historic landmark and museum.*
- 3. To collect objects and documents to increase understanding of Birmingham's historic industrial technology and culture.*
- 4. Interpret the historic, cultural and technological aspects of the facility.*

THIS MATERIAL IS DESIGNED TO FAMILIARIZE EDUCATORS AND THEIR STUDENTS WITH SLOSS FURNACES NATIONAL HISTORIC LANDMARK. IT GIVES INFORMATION TO HELP MEET TEACHING OBJECTIVES FOR K-12 STUDENTS.

THE MUSEUM OFFERS A UNIQUE SETTING FOR STUDY OF A WIDE RANGE OF SUBJECTS. THE OLD IRONMAKING SITE AFFORDS THE OPORTUNITY FOR STUDY OF SOCIAL HISTORY, CHEMISTRY, GEOLOGY, TECNOLOGY, PHYSICS, AND NATURAL HISTORY AND MANY OTHER SUBJECTS. TO FULLY EXPLORE THE SITE'S EDUCATIONAL POTENTIAL, WE SUGGEST COMBINING THE INFORMAITON INCLUDED IN THE HANDBOOK WITH A GUIDED TOUR OF THE LANDMARK

Just east of downtown Birmingham, the entrance to Sloss Furnaces National Historic Landmark is located at 32nd Street and 2nd Avenue, North. The museum's administrative staff is on site Monday through Friday from 8:00a.m. to 4:00p.m. Special community events at Sloss often take place after hours and on the weekends.



Mailing Address: Sloss Furnaces National Historic Landmark
 Twenty 32nd Street North
 Birmingham, AL 35222

Telephone: (205) 324-1911 Fax: (205) 324-6758

Website: www.slossfurnaces.com

Hours of Operation: Tuesday-Saturday: 10 a.m. to 4 p.m.
 Sunday: 12 p.m. to 4 p.m.
 Monday: Closed to Public

The Sloss Furnaces have graced the Birmingham skyline for more than a century. For almost ninety of those years, the furnaces produced pig iron, iron that fed the city's hungry foundries and steel mills. People once gathered in the smoke and fumes along the streets near Sloss to watch the molten iron and burning slag pour from the furnaces that filled the sky with a fiery orange glow. The collective memory of Birmingham is filled with stories of furnaces belching smoke and fire and of men who lived with the intense heat and back breaking labor.

These days, Sloss tells a different kind of story. The furnaces were closed in 1971, lost to obsolescence and declining markets for pig iron. But this was not the end. The towering furnaces and stoves, the huge old steam engines, have been preserved as an unusual new museum, one that tells the story of the dreams and sweat that built a "Magic City."



History of Sloss Furnaces



In 1876 a young railroad man from northern Alabama rode into Birmingham. The city was no industrial giant in those days, just a rowdy little town at the foot of Red Mountain, dotted with pine shacks and muddy roads. But Birmingham was destined to grow. The discovery of iron ore, coal, and limestone—all of the ingredients needed to make iron and all within a 4-mile radius—made the land rich beyond measure. It was the age of industrialization and iron was transforming America into a modern society. Iron railways carried iron locomotives across the continent and opened new lands for development. Iron steamships crossed the Atlantic, bringing millions of immigrants to live and work in the new world. The men who worked in the blast furnaces, rolling mills and foundries were making the iron to build a nation.

The young railroad man, Colonel James Withers Sloss, had a knack for turning ideas into businesses that made money. He also had a dream. Anxious to develop the Birmingham district as an iron making center, he invested heavily in railroads, coal mines, and blast furnaces. He founded the Sloss Furnace Company in 1881 and a year later completed two blast furnaces on the eastern edge of the new city. The Sloss Furnaces soon were matched by other furnaces and as word of Birmingham's ironmaking potential spread, money flowed in to build still more.



Birmingham's burgeoning iron and steel industries drew thousands of settlers into the area. Families moved in from the surrounding countryside, leaving farm communities like Hoke's Bluff and Slap Out, to take jobs in the coal mines or the city's pipe plants and rolling mills. Others came from England, Scotland, Wales, Greece, Italy, and Lebanon to name a few. Those who did not work in the iron and steel industries opened grocery and dry goods stores or other businesses to serve those who did.

As Birmingham flourished, so did Sloss. The colonel retired in 1886 and sold the company to a group of Virginian financiers who guided it through a period of rapid growth. With the acquisition of extensive ore and coal lands and several furnaces in northern Alabama, the company became the second largest in the Birmingham district. The Sloss Furnaces, oldest of the company's holdings, were rebuilt during this period and several massive stoves and boilers were added. Then, in the late 1920s, as the company approached its 50th birthday, those furnaces

were replaced with two new ones, each equipped with modern machinery to do some of the work once done by men and mules. The furnaces still ran day and night. And they created a fiery spectacle at each pour of iron. But now, they had almost doubled their earlier capacity, each producing 400 tons of iron a day, day after day.



Sloss Furnaces changed hands a number of times over the years. U.S. Pipe and Foundry, a Jim Walter Company, closed the furnaces in 1971. The company recognized the historic character of the old ironmaking plant however, and donated the Sloss property to the people of Birmingham. Ideas for using the site varied wildly, ranging from proposals to convert the furnaces into a Disney-like theme park to more modest visions of an industrial museum. Nobody could reach a decision. The furnaces stood neglected for years, until finally damage was so heavy that officials recommended they be torn down.

The threatened demolition of Sloss rallied Birmingham citizens to save the old furnaces. Why save Sloss? As one proponent said, “A lot more than iron flowed from those furnaces. Our whole culture did, a whole way of life.” Another supporter put it this way: “Sloss reminds us that Birmingham exists because it was here that everything came together—the railroads, the raw materials, and the men with the genius to make it all work.” Birmingham voters agreed and in 1977 they approved funds to preserve the historic landmark.



Many things has happened since then. Sloss has been recognized as one of the most important industrial historic preservation projects in the United States. The U. S. Department of the Interior, acknowledging the national significance of the site, named Sloss a National Historic Landmark in 1981. Workers have sandblasted, patched and painted, renewing the historic structures, but not changing them. And that’s important, because Sloss looks like what it was—a place where men worked.



In 1983 Sloss opened its gates to the public as a museum of history and industry. With its massive buildings and web of pipes, its tall, slender smokestacks, Sloss forms a powerful connection to the city’s past. Here, history is more than facts and figures, it’s something you can touch and smell. Guided tours give visitors an opportunity to explore the furnaces and experience the power and drama of modern industry. Special programs and exhibits turn old photographs, documents, and artifacts into stories about a city fashioned from mines and mills, furnaces and foundries. Yet Sloss is more than just a museum. It is a unique urban center, a quiet place near the heart of the city, where friends can meet for lunch or enjoy a walk. Sloss is also a performing arts center. In the giant East Cast Shed, where molten iron once was cast into ingots called pigs, a dramatic stage hosts symphonies and jazz bands, dancers and musicians, and also weddings and parties. Iron still flows from the West Cast Shed where the internationally recognized Metal Arts Program is housed. For informal events a smaller stage is nestled at the foot of the giant Sloss water tower.

Sloss Furnaces National Historic Landmark is an authentic symbol of Birmingham. Museum, performing arts center, meeting place...the furnaces represent the true character and spirit of the city. Sloss is alive again. Not making iron anymore, but still making magic.

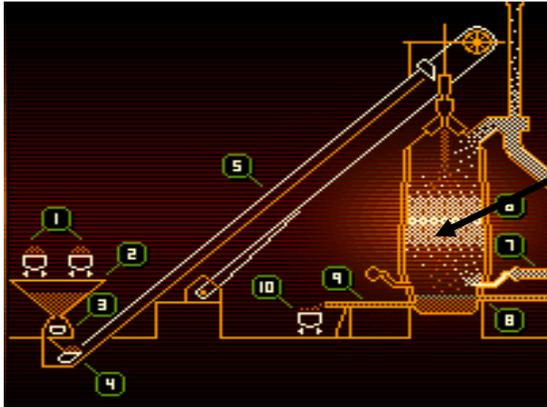


Sloss Company History Timeline

- 1881-1883** The Sloss Furnace Company organized and established by Colonel James Withers Sloss. The first furnace blown in on April 12, 1882, followed by the second furnace approximately one year later.
- 1886-1887** The company sold to John W. Johnston, president of the Georgia Pacific Railroad, and Joseph F. Johnston, president of the Alabama National Bank. Company changed to the Sloss Iron and Steel Company.
- 1887-1889** Two additional blast furnaces built in North Birmingham.
- 1891** Sloss began using convict labor only in its coal mines, and continued the practice until it was legally abolished in 1929.
- 1894** Sloss iron exported for the first time; 100 tons shipped to Liverpool via the port of New Orleans.
- 1898-1899** Sloss bought out twelve smaller companies and in the process acquired three blast furnaces in the Florence-Sheffield District, coal lands in Walker County, and ore lands in Franklin County. The company reorganized as the Sloss-Sheffield Steel and Iron Company, incorporated in New Jersey in 1899.
- 1902-1919** City Furnaces and North Birmingham Furnaces rebuilt, new blowing engine house built (still standing), Rust boilers built (still standing), additional stoves built.
- 1918-1920** A modern coke by-products plant built in North Birmingham. 1380 beehive coke ovens replaced by 120 Semet-Solvey and 30 Koppers by-products ovens.
- 1923-1924** Sloss acquired the Sheffield Iron Corporation, with one furnace in Sheffield, and the Alabama Company, with two furnaces at Gadsden, and two at Ironaton, near Talladega.
- 1926-1928** Sloss closed all its north Alabama furnaces, and concentrated efforts on the two City Furnaces and the two North Birmingham Furnaces. The City Furnaces totally rebuilt, doubling their capacity, and the North Birmingham Furnaces improved. A pig casting machine from Gadsden installed at North Birmingham.
- 1931** Pig casting machine installed at the City Furnaces.
- Late 1940s** Slag granulators installed.
- 1949-1951** Turbo blowers installed, replacing the reciprocating steam blowing engines.
- 1952** Sloss-Sheffield Steel and Iron Co. merged with U.S. Pipe Corporation.
- 1952-1958** The capacity of the North Birmingham coke works doubled.
- Late 50s-60s** North Birmingham Furnaces dismantled. Sloss began importing ores and discontinued mining operations on Red Mountain and at Russellville.
- 1969** The Jim Walter Corporation acquired control of U.S. Pipe.
- 1971** Sloss City Furnaces closed due to technological obsolescence, declining market for pig iron, and high cost of installing pollution control equipment. Furnace site donated to the Alabama State Fair Authority.
- 1974** Sloss Furnaces entered into the National Register of Historic Places. Bonds issued to convert the furnaces into an industrial museum.
- 1981** Sloss Furnaces designated a National Historic Landmark by the United States Department of the Interior.
- 1983** Labor Day, September 5th, Sloss Furnaces National Historic Landmark opened to the public.

The Science Behind Sloss Furnaces

Pig iron was made by melting iron ore in furnaces fired with coke (coal processed to produce extreme heat) and vast quantities of heated air. Molten iron separated from its ore's impurities and sank to the bottom of the furnace. The lighter waste material, combining with molten limestone, formed slag which floated above the iron. While slag was tapped every two hours, the liquid iron was tapped every four hours and run into the cast shed. Prior to the exclusive use of the pig casting machine, molten iron flowed down hand-formed sand channels into small sand molds. The resulting shape resembled piglets suckling a sow, hence the name "pig iron."

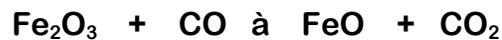


BLAST
FURNACE

The blast furnace is the core of the iron-making operation. Within the furnace iron ore, flux (limestone, dolomite, or a combination of the two), coke (processed coal), and hot air combine to produce pure molten iron and two waste products: molten slag and exhaust gas. The molten products collect in the bottom of the furnace and are drained off periodically. The gas leaves the furnace through the top and is routed to fuel the blast stoves and power boilers.

Sloss Furnaces consisted of two furnaces, known as No. 1 and No. 2. The original furnaces were built between 1881 and 1883 and operated until 1927 when they were replaced by the furnaces that stand today. From each furnace extends a long, open building called the cast shed, in which the molten iron was cast into bars, or "pigs."

The blast furnace worked 24 hours a day, seven days a week, so it was continually being charged with raw materials and drained of its molten products. New materials were added at the same rate at which iron and slag were produced. Iron ore, flux, and coke were charged into the top, through a stock channel just six feet above the blast, while hot air was blown into the bottom through openings called tuyeres (pronounced "tweers"). The hot air fueled the burning coke which released both carbon monoxide, $C + O_2 \rightarrow CO$, and an extreme amount of heat (over 2000 degrees Fahrenheit) which swept upward, heating the slowly descending stock. The carbon monoxide, hungry for oxygen atoms, drew them away from the molten ore, forming carbon dioxide and freeing pure iron.



The freed iron condensed and pooled in the hearth. Meanwhile, the flux soaked up the remaining byproducts (ore impurities and coke ash) to form slag. The slag ran into the hearth and floated on top of the molten iron. About every four hours workers tapped the furnace to remove the iron accumulated in the hearth. Iron was drained through the iron notch, a hole at the base of the furnace that was kept plugged with fireclay. A crew of workers drilled a hole through the clay, releasing the iron. Originally, the iron ran from the notch down hand-cut channels in the sand of the cast-shed floor and into hand-cut pig-molds, but later the molten product traveled down a curved runner and into a ladle car, which transported the iron to a pig casting machine. When the cast leveled, the notch was replugged with clay using a "mud gun." The slag was drained through a separate runner.

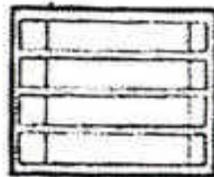
THE INGREDIENTS . . .

1. Coal is dumped into large ovens where it is heated to up to 2,400 degrees Fahrenheit, which removes most of coal's gases and converts it to coke. Coke is used because it burns with intense heat and little smoke.

2. The coke, along with iron ore and limestone (a cleanser) is sent to the blast furnace.



1



Coke Oven



Iron Ore



Limestone

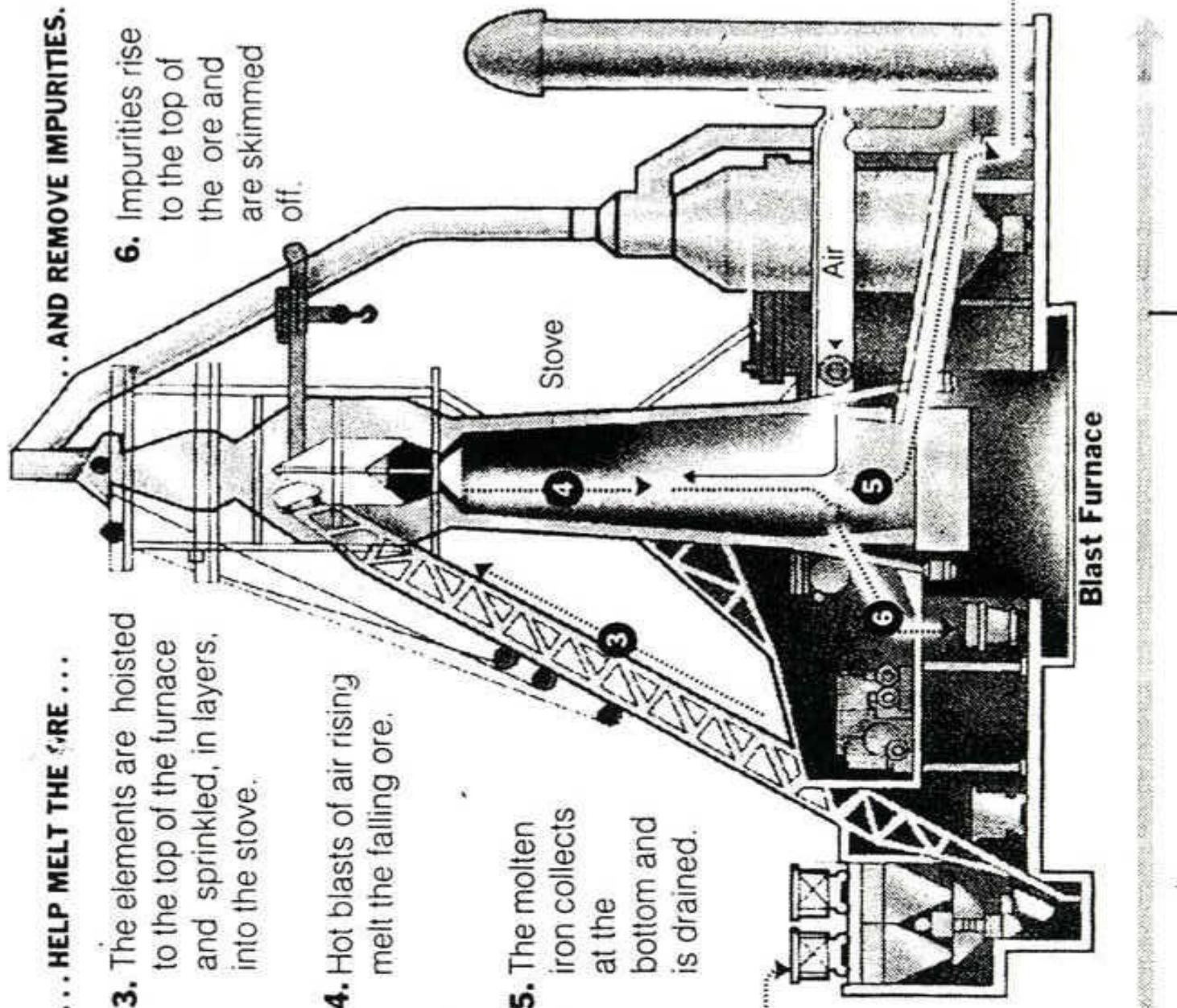
. . . HELP MELT THE CORE . . .

3. The elements are hoisted to the top of the furnace and sprinkled, in layers, into the stove.

4. Hot blasts of air rising melt the falling ore.

5. The molten iron collects at the bottom and is drained.

6. Impurities rise to the top of the ore and are skimmed off.



. . . AND REMOVE IMPURITIES.

Sloss Furnaces and its Minerals



Iron Ore



Coke (processed coal)

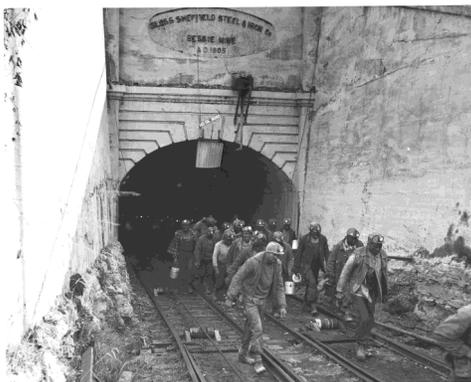


Limestone

Birmingham was founded in 1871 and its heritage is closely connected to the iron and steel industry. Because of the unique geology of the area, all the raw materials need to make iron—iron ore, coal, and limestone—are all found within a few miles of each other. This is the only place in the entire country that you can find this certain geological formation. So it was the minerals beneath the ground that enticed the city's founders to Jones Valley—eventually the city of Birmingham.

This unique geological formation existed millions of years before its industrial importance was realized. This formation began in the Paleozoic Era. In the earliest of the Paleozoic Era's seven periods, the Cambrian, which began 570 million years ago, an enormous shallow sea stretched across what is now Alabama. Sediments from a northwest area and volcanic debris from the islands to the southeast accumulated and caused the floor of the sea to sink. Then, in the Ordovician Period, 500 to 440 million years ago, these deposits changed into limestone and dolomite. During the Silurian Period, 440 to 400 million years ago, enormous amounts of iron were deposited into the same inland sea. By the Pennsylvanian Period, beginning 320 million years ago, much of the sea had turned into swamps. The swamps and sea teemed with plant and animal life, whose remains decayed and accumulated for many eons. The accumulation began a process where in the remains became weighty, causing heat and pressure that changed the remains into large amounts of peat, lignite, and bituminous coal.

Toward the end of the Paleozoic Era, about 280 million years ago, the earth itself groaned and roared. The tectonic plates that form the base of the North American and African continents had been drifting towards each other and finally collided. This collision heaved up deposits and caused them to fold and buckle eventually forming Red Mountain and Jones Valley. It was the formation of Red Mountain that made the mineral wealth within accessible to miners millions of years later.



Recycling at Sloss: The Past

To put it simply, Sloss did not waste a single thing. The ironmaking process creates various waste products and gases that can be used to make other products. The best example of a waste product at Sloss is Slag. As mentioned previously, the flux (or limestone) soaked up the remaining by-products (ore impurities and coke ash) to form slag.



The slag would be released from the furnaces about every 2 hours. It would flow into the slag pit for cooling or it would be sent through the granulator to be crushed into smaller pieces. Once the slag cooled, companies would purchase slag from Sloss and reuse this waste. Sloss also used slag and other waste gasses in its by-products plant to make products as well.

Slag can be used in a number of ways. Sloss used it to make concrete, but it can also be used to make cinder blocks, railroad bedding, road bedding, insulation, cement, dry wall, and fire proofing materials.

Other products were also made from waste gases produced in the ironmaking process. See the following Sloss product advertisements:



Recycling at Sloss: The Present

Although Sloss's furnaces sit quietly overlooking the Birmingham skyline today, Sloss continues to recycle. New furnaces, called cupolas, are now alive and carrying on Sloss's iron-making tradition of old. The No. 2 casting shed on the west end of the site is home to the innovative and nationally recognized Sloss Metal Arts Program. The cupolas are vastly smaller and cannot produce large amounts of waste like the furnaces once did in the past. Therefore, recycling at Sloss is much different today. The Sloss Metal Artists recycle old radiators, tire drums, and other scrap metal to make it into works of cast iron art. The process is much the same. The artists use scrap iron, coke, and a few pieces of limestone along with a hot blast of air. The furnaces heat to approximately 3000°F and is tapped every 10 to 45 minutes depending on the size of the cupola being used. The artists pour the molten iron into sand molds they design. Once the iron is cooled, the molds are opened. Something that was once discarded scrap iron is transformed into a beautiful and unique piece of metal art!



Touring Sloss Furnaces

Tour Options

Guided Walking Tour: Come learn about the history of Birmingham in a fun way; learn about its rocks and minerals, men and machinery. Walk through the underground railroad tunnel, blowing engine room, see the furnace and bring a brown-bag lunch to eat by the spray pond. Lasts approximately 1 hour; costs \$2 per person (teachers are free).

Guided Tour + Iron Pour: See molten iron poured into a mold **you design!** Feel, hear, and smell the heat! Experience what Sloss was like years ago. Take home a cast-iron tile souvenir you designed and created. Kids of *all* ages love this! After the walking tour and iron pour, have lunch by the spray pond. Lasts approximately 2 hours; costs \$16 per student/ \$5 per chaperone



Tour Reservations

Contact Sloss Furnaces Education Coordinator, Heather Guy, for tour reservations or information at 205.324.1911 or hguy@slossfurnaces.com.

Guided tours are available to groups by appointment. Reservations for group tours should be made at least two weeks in advance. To schedule a guided walking tour or iron pour + walking tour, please have the following information (there is a 15 person minimum):

- * Requested Tour Date/ Time (if you are scheduling an iron pour + tour, please note that we have pre-arranged dates and you must choose from those)
- * Organization/ School
- * Leader/ Teacher
- * Email Address/ Telephone Number
- * Age/ Grade Level
- * Approximate Number In Group
- * Special Requirements/ Interests

Should any changes occur, please let us know as soon as possible so adjustments can be made.

Tours also include a 15 minute film. If necessary, the tour route can be abbreviated.

Because much of the facility is outdoors, tour groups will need to come prepared for outside weather conditions. Close toed shoes are preferred. In the case of inclement weather, the tour may be rescheduled.

The Process of Making Pig Iron

Directions: Read the information below (take notes on each paragraph), the recipe for pig iron on the next page, and the diagram of the furnace on the next page. Then, answer the questions that follows.

Pig iron was made by melting iron ore in furnaces fired with coke (coal processed to produce extreme heat) and large quantities of heated air. Molten iron separated from its ore's impurities and sank to the bottom of the furnace. The lighter waste material, combining with molten limestone, formed slag which floated above the iron. While slag was tapped every two hours, the liquid iron was tapped every four hours and run into the cast shed. Prior to the exclusive use of the pig casting machine, molten iron flowed down hand-formed sand channels into small sand molds. The resulting shape resembled piglets suckling a sow, hence the name "pig iron". Sloss Furnaces consisted of two furnaces, known as No. 1 and No. 2. The original furnaces were built between 1881 and 1883 and operated until about 1920 when they were replaced by the furnaces that stand today. From each furnace extends a long, open building called the cast shed, in which the molten iron was cast into bars, or "pigs."

The blast furnace is the core of the iron-making operation. Within the furnace iron ore, flux (limestone, dolomite, or a combination of the two), coke (processed coal), and hot air combine to produce pure molten iron and two waste products: molten slag and exhaust gas. The molten products collect in the bottom of the furnace and are drained off periodically. The gas leaves the furnace through the top and is routed to fuel the blast stoves and power boilers. The blast furnace worked 24 hours a day, seven days a week, so it was continually being charged with raw materials and drained of its molten products. New materials were added at the same rate at which iron and slag were produced. About every four hours workers tapped the furnace to remove the iron accumulated in the hearth. Iron was drained through the iron notch, a hole at the base of the furnace that was kept plugged with fireclay. A crew of workers drilled a hole through the clay, releasing the iron.

Casting is the shaping of molten iron, and the technology of casting this iron into bars, called "pigs," has changed dramatically over the years. Prior to 1931, casting at Sloss took place inside the cast shed. Men cut molds and channels into the sand floor of the shed, and then tapped the molten iron to pour through the channels and into the individual molds. Because many ironworkers thought the configuration of molds feeding off troughs resembled an arrangement of pigs feeding at a sow, they called the iron bars "pigs."

QUESTIONS:

1. What are the five ingredients for making Pig Iron?
2. Where did "pig iron" get its name?
3. What phases of matter are involved in the process of making iron?
4. What is the melting point of iron ore?
5. After the iron is created, what happens to the impurities?
6. Describe casting.

SLOSS FURNACES WORD SEARCH

ADVANCED

T L C H W W A T I L E W E S Y L R P S S
 I H H O M Y I T B L O W E R S A E U B R
 R F E S E S H L E P K D D E B P X T L E
 O N A M F L A O C V L N E L E T A L T T
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 S A W L R G T P R O M I N O E E S U S A
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 S Y L A D L E C A R S I B C L T A P O G
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 A S R E T U L L O M U O A M I S B E O S
 J B O X E D E O B L A S T F U R N A C E

WORD LIST

BLAST FURNACE
 FOUNDRY
 PIG IRON
 BLOWERS
 HOT BLAST STOVES
 POWER HOUSE
 BLOWING ENGINE
 IRON ORE
 PYROMETER HOUSE
 BOILERS
 JAMES WITHERS SLOSS
 SLAG
 CAST SHED
 LADLE CAR
 STEAM
 COAL
 LIMESTONE
 TAP
 COKE
 METAL ART
 TRESTLE
 COOLING POND
 PIG CASTER
 THE MAGIC CITY

THE SLOSS SCRAMBLE

These are words associated with Sloss Furnaces National Historic Landmark.

hte agimc itcy	<input type="text"/>
scta edhs	<input type="text"/>
deall arc	<input type="text"/>
boignwl innege	<input type="text"/>
loca	<input type="text"/>
cloogin ndop	<input type="text"/>
ipg onri	<input type="text"/>
sajem ihwrets sssol	<input type="text"/>
etesnmoli	<input type="text"/>
amlet rat	<input type="text"/>
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slga	<input type="text"/>
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sssol ucfnares	<input type="text"/>
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batsl crenuaf	<input type="text"/>

SLOSS FURNACES WORD SEARCH

PRE K-5

TEST YOUR CAST IRON SKILLS!!

I	E	E	C	A	N	R	U	F	L
R	R	U	N	O	R	I	G	I	P
O	O	L	C	L	E	O	M	Y	E
N	R	O	S	I	M	E	R	N	C
O	L	A	A	O	S	L	A	G	I
R	A	C	E	T	E	T	G	R	R
E	G	A	O	S	I	T	R	O	T
I	R	N	T	A	C	I	E	O	C
N	E	C	E	T	L	I	M	I	G
R	Y	T	I	C	C	I	G	A	M

WORD LIST

ART
FURNACE
MAGIC CITY
SLAG

PIG IRON
LIMESTONE
COAL
IRON ORE

Activity

Write in the correct term to match the definition.

Sloss Glossary

_____ - owls that often live in barns and other buildings. Two barn owls live in a tall stove at the Sloss Furnaces.

_____ - a tall, brick-lined, steel structure in which coke, limestone and iron ore are heated by a blast of super-hot air and the combustion of coke to produce pig iron and slag. Two blast furnaces are on the Sloss site.

_____ - the solid substance left after coal gas and coal tar have been extracted from coal, used as a fuel. Samples may be found in rock piles along the tour route.

_____ - the museum guides who led walking tours at Sloss Furnaces.

_____ - keeping from decay that which is famous or important in history.

_____ - a solid rock, or mineral, containing iron, a hard metal capable of being magnetized. Birmingham's Red Mountain is named for the color of its iron ore.

_____ - also known as the ghost in the Sloss Furnaces.

_____ - a kind of rock containing lime.

_____ - a site judged by national experts to be "of exceptional value to the nation and an irreplaceable part of our national heritage."

_____ - metallic iron extracted from iron ore and cast into blocks called pigs. Pig iron may be refined to produce steel, wrought iron or ingot iron, or remelted and cast into molds.

_____ - a by-product of the blast furnace ironmaking process. Slag has a high lime content. It may be used for road beds, insulation and as a soil additive.

_____ - a successful businessman and railroad executive who founded the Sloss Furnace Company in 1881.

_____ - an educational journey on foot through the historic structures of the Sloss Furnaces.

James Withers Sloss
Walking Tour
Slag
Coke

Limestone
Pig Iron
Iron Ore
Docents

Barn Owls
Blast Furnace
Historic Preservation

Theophilus Calvin Jowers
National Historic Landmark

