

Manhattan Project National Historical Park  
Oak Ridge, Tennessee

National Park Service  
U.S. Department of the Interior



MANHATTAN PROJECT NATIONAL HISTORICAL PARK  
OAK RIDGE SITE

**JUNIOR RANGER BOOK**

This book belongs to:

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Manhattan Project National Historical Park is a partnership park, with both the Department of Energy and the National Park Service. Together, they tell the stories of Los Alamos, NM; Hanford, WA; and Oak Ridge, TN. These three sites played a unique and crucial role during the Manhattan Project. We encourage you to visit all three locations.

## Junior Ranger Program

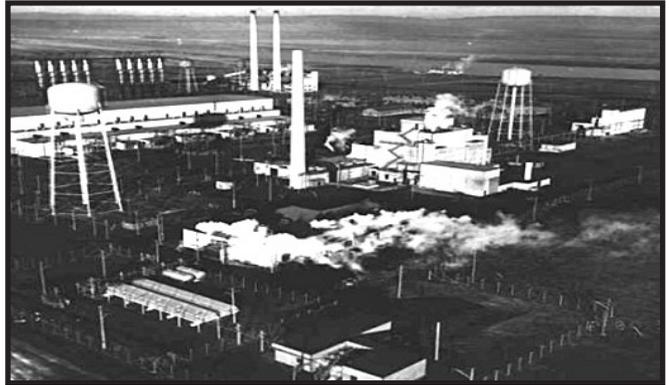
Americans protect national parks so everyone can experience our heritage. This handbook will help you discover why Manhattan Project National Historical Park is one of these special places. Allow about 3 hours to earn a Junior Ranger badge. We suggest starting at Manhattan Project National Historical Park Visitor Center Desk at:

Children's Museum of Oak Ridge  
461 W. Outer Drive  
Oak Ridge, Tennessee 37830

Several activities can be done nearby. Pick up a park map and get some advice from a park ranger. The Visitor Center Desk is open daily from 9 am to 5 pm Eastern Time.

Some other historic spots are:

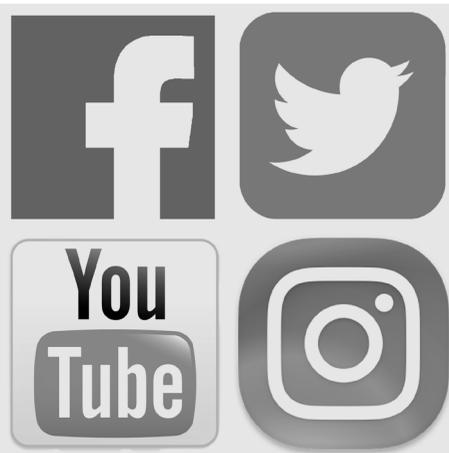
- Alexander Guest House
- Rotary Commemorative Walk
- Friendship Bell
- K-25 Overlook
- K-25 History Center
- Midtown Community Center
- Chapel on the Hill
- American Museum of Science and Energy
- X-10 Graphite Reactor
- Y12 Visitor Services New Hope Center



## Questions?

Call Manhattan Project National Historical Park Visitor Center Desk at (865) 482-1942, located at:

Children's Museum of Oak Ridge  
461 W. Outer Drive  
Oak Ridge, TN 37830



**Visit us online at [www.nps.gov/mapr](http://www.nps.gov/mapr) or join us on social media through one of the following links:**

**Twitter@MnhtnProjectNPS**

**Facebook.com/ManhattanProjectNPS**

**Instagram.com/ManhattanProjectNPS**

**Look for the Manhattan Project National Historical Park Channel on YouTube**



## **What is a Junior Ranger?**

Someone like you who completes Junior Ranger activities and promises to care for our national parks. Have fun exploring! You can earn your badge in a few hours. When you are done, take this handbook to the Visitor Center and show it to a park ranger.

**To earn a badge, complete at least 8 handbook activity pages.**



## 1st Activity Page



Designed in 1951, the arrowhead is the National Park Service symbol. Look at it carefully. Each part represents something that park rangers protect. Fill in these words to decode the Arrowhead.

**bison      sequoia tree      lake      arrowhead      mountain**

The \_\_\_\_\_ represents plants.

The \_\_\_\_\_ represents animals.

The \_\_\_\_\_ represents scenic landscapes.

The \_\_\_\_\_ represents water resources and recreation.

The \_\_\_\_\_ represents history and culture.



## 2nd Activity Page

### Did You Know?

Yellowstone National Park became the world's first national park in 1872. In the early years, most national parks were in the western states. This is why the badge has western symbols. Today, the National Park System includes seashores, battlefields, monuments (like the Statue of Liberty), huge wetlands, scenic rivers, islands, and urban parks (like Manhattan Project National Historical Park). Record how many arrowheads you see during your visit. Can you spot them on signs, cars, brochures, and uniforms?

List any other national parks you have visited.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
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- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



## 3rd Activity Page

# Manhattan Project National Historical Park Kids in Action Challenge:

There are many fun ways to get moving in this national park. Here's our challenge.

Do one activity for every year of your life. For example, if you are 8 years old, **you must complete 8 things on our list.** Check the square when you finish each one.

- I hiked on \_\_\_\_\_ Trail.
- I found a historic marker along Emory Road.
- I took a picture of myself in the park.
- I climbed 20 steps.
- I found a trail sign.
- I ran for more than one minute.
- I rode a bike in a park.
- I crossed a footbridge.
- I had a picnic in a park.
- I took the bus tour of the Oak Ridge Facilities.
- I saw my first \_\_\_\_\_.
- I played \_\_\_\_\_ in the park.
- I found a trail map on a park bulletin board.
- I visited \_\_\_\_\_.
- I went to the Linden School Wetlands.
- I found a stick shaped like the letter \_\_\_\_\_.
- I think \_\_\_\_\_ counts too!





## 4th Activity Page

### Secret City Challenge

What is the real name of the Secret City? \_\_\_\_\_

Who was president in 1941? \_\_\_\_\_

What happened in Hawaii on December 7, 1941?

\_\_\_\_\_

Which president authorized the dropping of an atomic bomb on Japan to end World War II? \_\_\_\_\_

Why was the Manhattan Project developed in 1942?

\_\_\_\_\_

What was an Alphabet House?

\_\_\_\_\_

How many people lived in the Secret City in 1945? \_\_\_\_\_

Many unmarried people moved to the Secret City right after college. What was their housing called? \_\_\_\_\_

Find out how many schools - from elementary through high school - were in operation serving children in the Secret City in 1945. \_\_\_\_\_

Why did people walk on boardwalks instead of sidewalks?

\_\_\_\_\_

The Secret City had seven gates during the years 1942-1949. Circle the name of the locations of two of them from this list:

Solway   Edgemoor   Elza   Oliver Springs   Blair Road   Gallaher Road   White Oak



## 5th Activity Page

Who was the official Manhattan Project of Oak Ridge photographer?

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What were the Secret City workers doing that was so secretive?

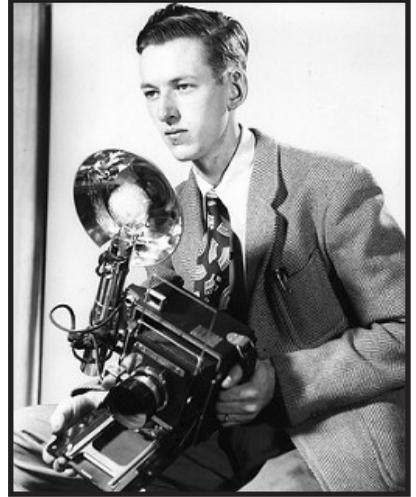
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Who was the army general leading the Secret City project in 1942 and can you name the project? \_\_\_\_\_

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What was the first youth organization in the Secret City in the 1940s?

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Can you find a Secret City elementary school that is now a museum for children?

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# 6th Activity Page

What was so important about the number 92 on the Periodic Table to many women who worked at the Manhattan Project?

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## Periodic Table of Elements

Atomic Number → 7

N

Chemical Symbol ←

Chemical Name → NITROGEN

Atomic Weight → 14

**NON-METALS**

**METALS**

1	2											3	4														
H 1.008 HYDROGEN	He 4.0026 HELIUM											Li 6.941 LITHIUM	Be 9.0122 BERYLLIUM														
3	4											11	12														
B 10.811 BORON	C 12.011 CARBON	N 14.007 NITROGEN	O 15.999 OXYGEN	F 18.998 FLUORINE	Ne 20.180 NEON											Ar 39.948 ARGON											
5	6	7	8	9	10											17	18										
Al 26.982 ALUMINUM	Si 28.086 SILICON	P 30.974 PHOSPHORUS	S 32.06 SULFUR	Cl 35.453 CHLORINE	Ar 39.948 ARGON											Kr 83.80 KRYPTON											
13	14	15	16	17	18											35	36										
Ga 69.723 GALLIUM	Ge 72.64 GERMANIUM	As 74.922 ARSENIC	Se 78.96 SELENIUM	Br 79.904 BROMINE	Kr 83.80 KRYPTON											Xe 131.29 XEON											
19	20	21	22	23	24											37	38										
K 39.098 POTASSIUM	Ca 40.078 CALCIUM	Sc 44.956 SCANDIUM	Ti 47.88 TITANIUM	V 50.942 VANADIUM	Cr 52.00 CHROMIUM	Mn 54.938 MANGANESE	Fe 55.845 IRON	Co 58.933 COBALT	Ni 58.69 NICKEL	Cu 63.546 COPPER	Zn 65.38 ZINC	Ga 69.723 GALLIUM	Ge 72.64 GERMANIUM	As 74.922 ARSENIC	Se 78.96 SELENIUM	Br 79.904 BROMINE	Kr 83.80 KRYPTON										
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54										
Rb 85.468 RUBIDIUM	Sr 87.62 STRONTIUM	Y 88.906 YTIORIUM	Zr 91.224 ZIRCONIUM	Nb 92.906 NIOBIUM	Mo 95.94 MOLYBDENUM	Tc 98.906 TECHNETIUM	Ru 101.07 RHODIUM	Rh 101.07 RHODIUM	Pd 106.36 PALLADIUM	Ag 107.868 SILVER	Cd 112.411 CADMIUM	In 114.818 INDIUM	Sn 118.710 TIN	Sb 121.757 ANTIMONY	Te 127.60 TELLURIUM	I 126.905 IODINE	Xe 131.29 XEON										
55	56											72	73	74	75	76	77	78	79	80							
Cs 132.905 CAESIUM	Ba 137.327 BARIUM											Hf 178.49 HAFNIUM	Ta 180.948 TANTALUM	W 183.84 WOLYBDENUM	Re 186.207 RHENIUM	Os 190.23 OSMIUM	Ir 192.222 IRIDIUM	Pt 195.084 PLATINUM	Au 196.967 GOLD	Hg 200.59 MERCURY	Tl 204.384 THALLIUM	Pb 207.2 LEAD	Bi 208.980 BISMUTH	Po 209 POLONIUM	At 210 ASTATINE	Rn 222 RADON	
87	88											104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119
Fr 223 FRANCIUM	Ra 226 RADIUM											Rf 261 RUFORMIUM	Db 262 DUBNIUM	Sg 263 SEBORGIIUM	Bh 264 BOHRIUM	Hs 265 HASSIUM	Mt 266 MEITNERIUM	Ds 267 DUBNIUM	Rg 268 ROSGOLDIUM	Cp 269 COPECHEVIIUM	Uu 270 UNUNBIUM	Uuq 271 UNUNQUADIUM	Uup 272 UNUNPENTIUM	Uuh 273 UNUNHEXTIUM	Uus 274 UNUNSEPTIUM	Uuo 275 UNUNOCTIUM	

**KEY**

☐ SOLID at room temp

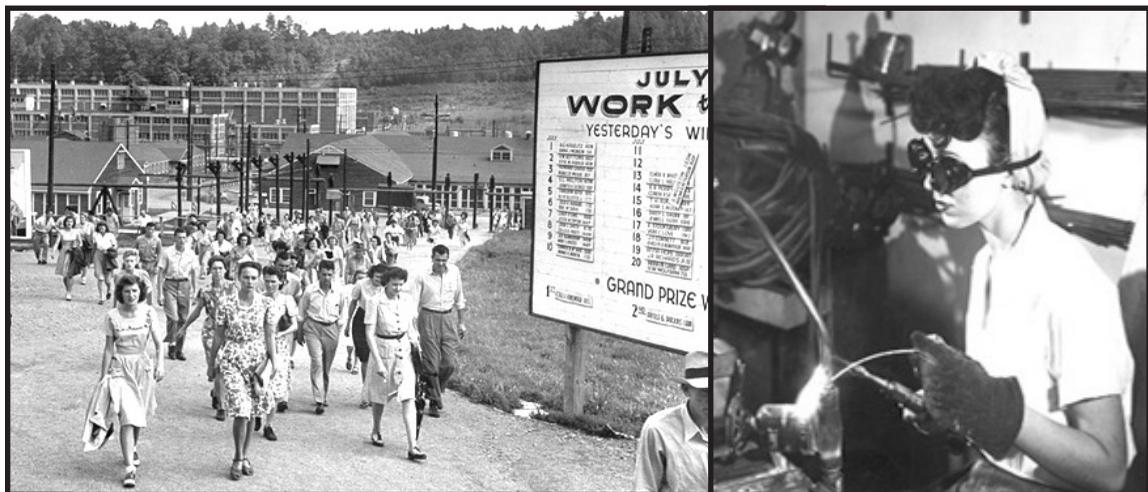
☒ LIQUID at room temp

☒☒ GAS at room temp

☒ RADIOACTIVE

☒ Artificially created

57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
La 138.905 LANTHANUM	Ce 140.12 CELESIUM	Pr 140.908 PRASEODYMIUM	Nd 144.24 NEODYMIUM	Pm 145 PROMETHIUM	Sm 150.36 SAMARIUM	Eu 151.964 EUROPEIUM	Gd 157.25 GADOLINIUM	Tb 158.925 TERBIUM	Dy 162.50 DYSPROSIUM	Ho 164.930 HOLEMIUM	Er 167.259 ERBIUM	Tm 168.930 THULIUM	Yb 173.054 YBBIUM	Lu 174.967 LUTETIUM
89	90	91	92	93	94	95	96	97	98	99	100	101	102	103
Ac 227 ACTINIUM	Th 232 THORIUM	Pa 231 PROTACTINIUM	U 238 URANIUM	Np 237 NEPTUNIUM	Pu 244 PLUTONIUM	Am 243 AMERICIUM	Cm 247 CURIUM	Bk 247 BERKELEIUM	Cf 251 CALIFORNIUM	Es 252 EINSTEINIUM	Fm 257 FERMIUM	Md 258 MENDELIUM	No 259 NOBELIUM	Lr 262 LAWRENCIUM





# 7th Activity Page

Who were the Calutron Girls?

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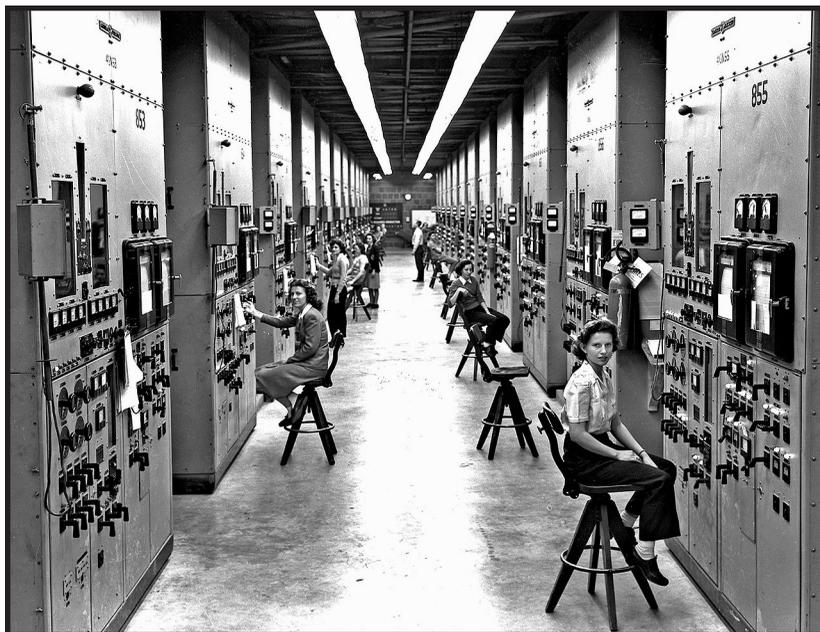
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# 7th Activity Page (continued)

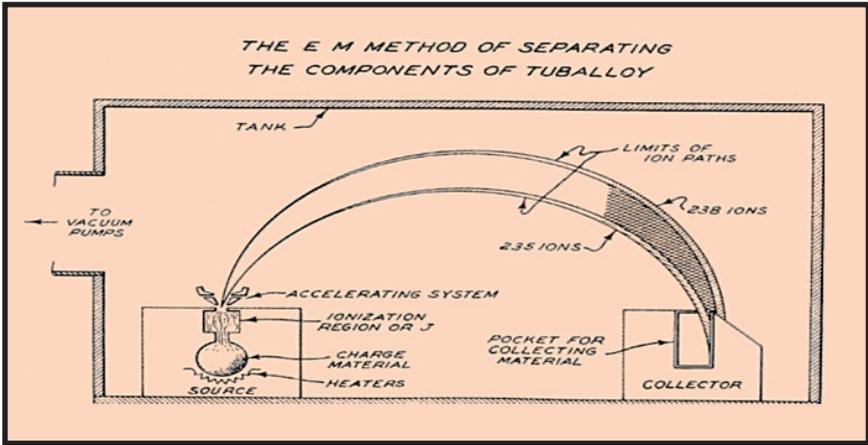


Diagram of uranium isotope separation in the calutron.

Alpha I Racetrack. The calutrons are located around the ring. What did the calutron separation produce?

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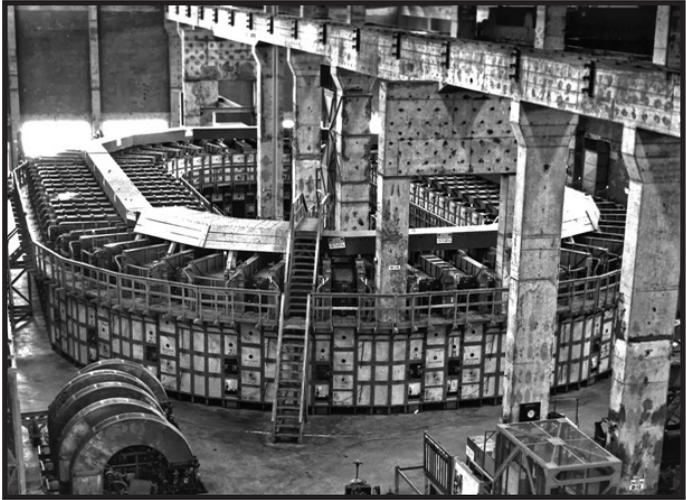
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## 8th Activity Page

Describe what a day in a kid's life was like in the Secret City in 1945.

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Describe the kind of activities or sports that kids could do in the Secret City in 1945-46.

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# 9th Activity Page

## Manhattan Project NHP Hidden Word Search

Can you find the words that are important to the Manhattan Project and the Oak Ridge Unit of the Park?

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

- |             |            |           |           |                |
|-------------|------------|-----------|-----------|----------------|
| MANHATTAN   | PLUTONIUM  | REACTOR   | ROOSEVELT | GROVES         |
| PROJECT     | CALUTRON   | SCIENTIST | ATOM      | ALPHABET HOUSE |
| SECRET CITY | LOS ALAMOS | OAK RIDGE | URANIUM   | HANFORD        |



### Junior Ranger Pledge

As a Junior Ranger of Manhattan Project National Historical Park, I promise to keep learning more about the nature and history of the Manhattan Project and help preserve the park for future generations.

This certifies that \_\_\_\_\_, age \_\_\_\_\_, has successfully completed the requirement of a Junior Ranger on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Reviewed by Ranger \_\_\_\_\_  
NPS /Name of Ranger

If you can't return to the Visitor Center, mail your handbook to:

**Manhattan Project National Historical Park**  
**461 W. Outer Drive**  
**Oak Ridge Tennessee, 37830**

Tell us where to mail your badge:

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_ Zip \_\_\_\_\_



This certificate is proudly presented to

\_\_\_\_\_

please print name

for completing the

# Manhattan Project National Historical Park Junior Ranger Activity Booklet

Dated this \_\_\_\_\_ day of \_\_\_\_\_

\_\_\_\_\_

Park Ranger Signature