WARD'S INDUSTRIAL MINERAL AND ROCK COLLECTION
Student Set

45-8115

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METALLIC MINERAL DEPOSITS

Native Metals

1.	Gold nugget	Duncan Creek, Yukon Territory, Canada
2.	Silver	Batopilas, Chihuahua, Mexico
3.	Niobium	St-Honore, Quebec, Canada

Non-Ferrous Metals

Copper

4.	Copper	Houghton County, Michigan, USA
5.	Chalcopyrite	Durango, Mexico
6.	Chalcocite	Messina, Transvaal, Republic of South Africa
7.	Azurite	Morenci, Arizona, USA
8.	Malachite	Katanga, Zaire
9.	Covellite	Butte, Montana, USA
10.	Antlerite	Chuquicamata, Chile
11.	Linarite	Soccorro, New Mexico, USA
12.	Bornite	Ajo, Arizona, USA
13.	Cuprite	Ray, Arizona, USA

Lead

14.	Galena	Brushy Creek, Missouri, USA
15.	Galena	Park City, Utah, USA
16.	Cerussite	Coeur D'Alene, Idaho, USA
17.	Boleite	Santa Rosilia, Baja, California, USA
18.	Pyromorphite	Santa Cruz County, Arizona, USA

Zinc

19.	Sphalerite	Elmwood, Tennessee, USA
20.	Sphalerite	Balmat, New York, USA
21.	Willemite	Franklin, New Jersey, USA
22.	Zincite in Franklinite	Franklin, New Jersey, USA
23.	Smithsonite	Kelly, New Mexico, USA
24.	Hemimorphite	Mapimi, Durango, Mexico

Non-Ferrous Metals (continued)

Tin

25. Cassiterite in pegmatite	Keystone, South Dakota, USA

Aluminum

26. Bauxite	Little Rock, Arkansas, USA
27. Wavellite	Little Rock, Arkansas, USA
28. Diaspore	Mexico, Missouri, USA
29. Anorthite	Grass Valley, California, USA

Ferroalloy Metals

Iron

30. Magnetite	Ishpeming, Michigan, USA
31. Magnetite, variety Lodestone	Iron County, Utah, USA
32. Hematite	Ironton, Minnesota, USA
33. Hematite, micaceous	Republic, Michigan, USA
34. Hematite, oolitic	Clinton, New York, USA
35. Limonite	Alexandria Bay, New York, USA
36. Goethite	Cartersville, Georgia, USA
37. Pyrite	Huanzala, Peru
38. Pyrite	Zacatecas, Mexico
39. Siderite	Mt. St. Hilaire, Quebec, Canada
40. Pyrrhotite	Sudbury, Ontario, Canada

Manganese

41. Psilomelane	Dona Ana County, New Mexico, USA
42. Pyrolusite	Alberta, Michigan, USA
43. Astrophyllite	Mt. St. Hilaire, Quebec, Canada

Nickel

44. Nickeline (Niccolite)	Cobalt, Ontario, Canada
45. Garnierite	near Riddle, Oregon, USA
46. Pentlandite in Pyrrhotite	Sudbury, Ontario, Canada

Chromium

47. Chromite	Stillwater, Montana, USA

Ferroalloy Metals (continued)

Molybdenum

48. Molybdenite — Chihuahua, Mexico

Tungsten

49. Scheelite in rock — Stowe, Maine, USA

Vanadium

50. Vanadinite on barite — Globe, Arizona

Cobalt

51. Smaltite — Cobalt, Ontario, Canada

Minor Metals and Related Non-Metals

Antimony

52. Stibnite — Tonaskett, Washington, USA

Arsenic

53. Realgar — near Manhattan, Nevada, USA
54. Orpiment — near Manhattan, Nevada, USA
55. Arsenopyrite — Gold Hills, Utah, USA

Beryllium

56. Beryl — Black Hills, South Dakota, USA

Bismuth

57. Bismuth — Wolfram Camp, Northern Queensland, Australia

Magnesium

58. Brucite — Lodi, Nevada, USA
59. Dolomite — Essex County, New Jersey, USA
60. Magnesite — Reisterstown, Maryland, USA

Minor Metals and Related Non-Metals (continued)

Mercury

61. Cinnabar — Winnemucca, Nevada, USA

Titanium

62. Ilmenite — St. Urbain, Quebec, Canada

Zirconium

63. Zircon in pegmatite — Saranac Lake, Quebec, Canada

Miscellaneous Minor Metals

Barium

64. Barite — Potosi, Missouri, USA
65. Barite — Cartersville, Georgia, USA
66. Benitoite — San Benito County, California, USA

Calcium

67. Limestone — Solnhofen, Germany

Lithium

68. Lepidolite — Keystone, South Dakota, USA
69. Spodumene — Keystone, South Dakota, USA
70. Amblygonite — Keystone, South Dakota, USA

NON-METALLIC MINERAL DEPOSITS

The Mineral Fuels

71.	Peat	Glastonbury, England
72.	Peat moss	Junius Ponds, New York, USA
73.	Lignite coal	Bowman, North Dakota, USA
74.	Anthracite coal	Hazelton, Pennsylvania, USA
75.	Bituminous coal	Wheeling, West Virginia, USA
76.	Oil shale	Garfield County, Colorado, USA
77.	Bituminous sandstone	Santa Cruz, California, USA
78.	Tar sand	Alberta, Canada
79.	Petroleum (crude oil)	Rose Run, Ohio, USA

Ceramic Materials

80.	Montmorillonite (Bentonite)	Clay Spur, Wyoming, USA
81.	Montmorillonite	Cheto, Arizona, USA
82.	Kaolinite	Dry Branch, Georgia, USA
83.	Kaolinite	Mesa Alta, New Mexico, USA
84.	Dickite	St. George, Utah, USA
85.	Illite shale	Rochester, New York, USA
86.	Sepiolite	Nairobi, Kenya
87.	Microcline	Madawaska, Ontario, Canada
88.	Albite	near Bancroft, Ontario, Canada
89.	Bytownite	Crystal Bay, Minnesota, USA
90.	Kyanite	Union County, Georgia, USA

Structural and Building Materials

91.	Biotite granite	St. Cloud, Minnesota, USA
92.	Biotite granite	Barre, Vermont, USA
93.	Muscovite-biotite granite	Concord, New Hampshire, USA
94.	Granitoid gneiss	Salisbury, North Carolina, USA
95.	Limestone, coquina	St. Augustine, Florida, USA
96.	Limestone, dolomitic	Kasota, Minnesota, USA
97.	Limestone, shell	Austin, Texas, USA
98.	Tuff, rhyolitic	Ennis, Montana, USA
99.	Dolomite, variegated	Beacon, Michigan, USA
100.	Dolostone	Penfield, New York, USA
101.	Marble	Tate, Georgia, USA
102.	Marble	Rutland, Vermont, USA
103.	Limestone, breccia	Boulder County, Colorado, USA
104.	Serpentine marble (verde antique)	Roxbury, Vermont, USA

Structural and Building Materials (continued)

105. Sandstone	Potsdam, New York, USA
106. Sandstone	Berea, Ohio, USA
107. Brownstone	Portland, Connecticut, USA
108. Basalt	Somerset County, New Jersey, USA
109. Talc, variety soapstone	Alberene, Virginia, USA
110. Slate, red	Granville, New York, USA
111. Slate, gray	Bangor, Pennsylvania, USA
112. Gypsum, massive	Tawas City, Michigan, USA
113. Gypsum, variety selenite	Washington County, Utah, USA
114. Gypsum, variety satin spar	Hot Springs, Arkansas, USA
115. Gypsum, alabaster	Pomaia, Italy
116. Anhydrite	Balmat, New York, USA
117. Gravel	Webster, New York, USA
118. Sand	Rochester, New York, USA

Mineral Pigments and Fillers

119. Vermiculite	Libby, Montana, USA
120. Diatomite	Lompoc, California, USA
121. Pumice	Hildalgo, Mexico
122. Flake mica (muscovite)	Spruce Pine, North Carolina, USA
123. Wollastonite	Keeseville, New York, USA
124. Hematite, red ochre	Custer, South Dakota, USA

Metallurgical and Refractory Materials

125. Fluorite	Madoc, Ontario, Canada
126. Graphite	Colombo, Sri Lanka
127. Pyrophyllite	Robbins, North Carolina, USA
128. Dolomite	Butte, Montana, USA
129. Zircon sand	Green Cove Springs, Florida, USA
130. Cryolite	Ivigtut, Greenland

Industrial and Manufacturing Materials

Mica

131. Muscovite	Madras, India
132. Phlogopite	Notre Dame-du-laus, Quebec, Canada
133. Biotite	Bancroft, Ontario, Canada

Industrial and Manufacturing Materials (continued)

Talc

134. Talc	Balmat, New York, USA
135. Talc, steatite	Cameron, Montana, USA

Miscellaneous

136. Calcite, variety Iceland spar	Chihuahua, Mexico
137. Quartz, variety rock crystal	Minas Gerais, Brazil
138. Glass sand	Klondike, Missouri, USA
139. Tourmaline (schorl)	Custer, South Dakota, USA

Chemical Minerals / Fertilizers

140. Halite	Windsor, Ontario, Canada
141. Sulfur (frasch)	Gulf Coast, USA
142. Apatite, variety collophanite	Conda, Idaho, USA
143. Fluorapatite	Wilberforce, Ontario, Canada
144. Peat	Junius, New York, USA

Abrasives

145. Diamond	Kimberly, Rep. of South Africa
146. Corundum	Zoutspanberg, Transvaal, Rep. of South Africa
147. Corundum, variety emery	Peekskill, New York, USA
148. Garnet, variety andradite	Willsboro, New York, USA
149. Quartz, Novaculite	Hot Springs, Arkansas, USA
150. Quartz, Flint	Dover, England

References:

Economic Mineral Deposits - by A.M. Bateman
Geology of Industrial Rocks and Minerals - by R.L. Bates
Mineral Facts and Problems - U.S. Bureau of Mines

SENSITIVE GEOLOGICAL MATERIALS

Minerals, rocks, and soils as regularly supplied by Ward's are generally raw, unprocessed, naturally-occuring materials and are safe to examine and handle in normal use. However, it is important to follow some basic safety procedures when handling a number of potentially hazardous substances.

Several samples contained in this collection include ores of lead, arsenic, mercury, and other metals that bear special attention, not because they are suddenly poisonous or toxic, but rather they could be if improperly handled. **In no instance** should these or any other specimen items be inhaled, tasted, or ingested. Do **NOT** create specimen dust by careless handling or crushing of these materials. Use protective gloves and/or wash hands thoroughly after handling and use of specimen items. Store safely away from food supplies and eating areas.

When responsibly used, these specimen materials pose no hazard in their natural form. To avoid creating a potential dust hazard, these materials should never be ground or powdered. Handling of potentially hazardous substances should be limited to responsible, trained, or well-supervised personnel only. We recommend the use of proper safety equipment when handling any sensitive geological materials. Consult your Ward's catalog for a wide range of suitable safety products.

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WARD'S INDUSTRIAL MINERAL AND ROCK COLLECTION
45-8115 LIST
50 C. TRAY

METALLIC MINERAL DEPOSITS

Native Metals

49-2927	1. Gold nugget
49-6122	2. Silver
49-D 616	3. Niobium

Non-Ferrous Metals

Copper

346-9872	4. Copper
0902	5. Chalcopyrite
1777	6. Chalcocite
0982	7. Azurite
4892	8. Malachite
49-Rack 33	9. Covellite
49-D060	10. Antlerite
49-D669	11. Linarite
346-1237	12. Bornite
2452	13. Cuprite

Lead

346-3332	14. Galena
49-D148	15. Galena (Joplin, MO)
346-1702	16. Cerussite
49-D047	17. Boleite
49-CT14	18. Pyromorphite

Zinc

346-7622	19. Sphalerite
7627	20. Sphalerite
8772	21. Willemite
9592	22. Zincite in Franklinite
7452	23. Smithsonite
49-CT10 (or Rack 33)	24. Hemimorphite

Tin

346-1532	25. Cassiterite in pegmatite

Aluminum

346-1097	26. Bauxite
8720	27. Wavellite
2605	28. Diaspore
0555	29. Anorthite

Ferroalloy Metals

Iron

346-4847	30. Magnetite
4872	31. Magnetite, variety Lodstone
3862	32. Hematite
3877	33. Hematite, micaceous
3867	34. Hematite, oolitic
4682	35. Limonite
3672	36. Goethite
6407	37. Pyrite
6447	38. Pyrite
49-D302	39. Siderite
6497	40. Pyrrhotite

Manganese

346-6397	41. Psilomelane
6427	42. Pyrolusite
49-Rack 33	43. Astrophyllite

Nickel

346-5602	44. Nickeline (Niccolite)
3430	45. Garnierite
6132	46. Pentlandite in Pyrrhotite

Chromium

346-0077	47. Chromite

Molybdenum

346-5302	48. Molybdenite

Tungsten

346-0662	49. Scheelite in rock

Vanadium

49-4410	50. Vanadinite on barite

Cobalt

346-7432	51. Smaltite

Minor Metals and Related Non-Metals

Antimony

346-7790 52. Stibnite

Arsenic

346-6842 53. Realgar
5912 54. Orpiment
49-D028 55. Arsenopyrite

Beryllium

346-1122 56. Beryl

Bismuth

49-D163 57. Bismuth (Aust.)

Magnesium

346-1330 58. Brucite
2707 59. Dolomite
4832 60. Magnesite

Mercury

346-1982 61. Cinnabar

Titanium

346-4117 62. Ilmenite

Zirconium

346-9617 63. Zircon in pegmatite

Miscellaneous Minor Metals

Barium

346-1022 64. Barite
1012 65. Barite
49-D146 66. Benitoite

Calcium

347-4607 67. Limestone

Lithium

346-4617 68. Lepidolite
7682 69. Spodumene
0300 70. Amblygonite

NON-METALLIC MINERAL DEPOSITS

The Mineral Fuels

347-6085 71. Peat
6080 72. Peat moss
2132 73. Lignite coal
2102 74. Anthracite coal
2112 75. Bituminous coal
7475 76. Oil shale
7087 77. Bituminous sandstone
BUCKETS 78. Tar sand
346-0525 79. Petroleum (crude oil)

Ceramic Materials

346-0437 80. Montmorillonite (Bentonite)
49-2603 81. Montmorillonite
346-4332 82. Kaolinite
49-1435 83. Kaolinite
48-0516 84. Dickite
347-7402 85. Illite shale
346-6995 86. Sepiolite
5122- 87. Microcline
0232 88. Albite
1382 89. Bytownite
4482 90. Kyanite

Structural and Building Materials

347-3637 91. Biotite granite
3617 92. Biotite granite
3652 93. Muscovite-biotite granite
3542 94. Granitoid gneiss
4637 95. Limestone, coquina
4692 96. Limestone, dolomitic
4642 97. Limestone, shell
347-8370 98. Tuff, rhyolitic
347-0207 99. Dolomite, variegated
0202 100. Dolostone
4807 101. Marble
4802 102. Marble
1312 103. Limestone breccia
4862 104. Serpentine marble (verde antique)
7057 105. Sandstone
7032 106. Sandstone

Structural and Building Materials (cont.)

347-7102	107. Brownstone
1035	108. Basalt
346-0717	109. Talc, variety soapstone
347-7602	110. Slate, red
7607	111. Slate, gray
346-3797	112. Gypsum, massive
3792	113. Gypsum, variety selenite
3787	114. Gypsum, variety satin spar
3782	115. Gypsum, alabaster
0537	116. Anhydrite
348-0215	117. Gravel (Pea pebbles in vial)
348-0050	118. Sand (Beach)

Mineral Pigments and Fillers

49-D839	119. Vermiculite
0487	120. Diatomite
347-6447	121. Pumice
BAGS	122. Flake mica (muscovite)
346-8882	123. Wollastonite
0947	124. Hematite, red ochre

Metallurgical and Refractory Materials

49-D471	125. Fluorite
346-3702	126. Graphite
6432	127. Pyrophyllite
2717	128. Dolomite
348-0075	129. Zircon sand
346-2337	130. Cryolite

Industrial and Manufacturing Materials

Mica

346-5472	131. Muscovite
6192	132. Phlogopite
1192	133. Biotite

Talc

346-8002	134. Talc
8027	135. Talc, steatite

Miscellaneous

49-D087	136. Calcite, variety Iceland spar
6567	137. Quartz, variety rock crystal
347-7042	138. Glass sand
346-0797	139. Tourmaline (schorl)

Chemical Minerals / Fertilizers

346-3822	140. Halite
7962	141. Sulfur (frasch)
0642	142. Apatite, variety collophanite
0622	143. Fluorapatite
47-6080	144. Peat

Abrasives

346-0161	145. Diamond
2241	146. Corundum
2262	147. Corundum, variety emery
3382	148. Garnet, variety andradite
6550	149. Quartz, Novaculite
6527	150. Quartz, Flint