



Isolate
 Iron oxidation (cyo2)
 Respiratory H2-uptake NiFe hydrogenase 2b (hupUV)
 H2-sensing hydrogenase 2b (hupUV)
 CBB Cycle Form I RubisCO
 Form II RubisCO
 Cyt c oxidase cbb3-type (ccoNOP)
 Cyt bd ubiquinol oxidase (cydAB)
 Nitrate reductase (napAB)
 Optimum Growth Temperature (Predicted)

GEM_3300014060_32, freshwater, USA: Crystal Geyser near Green River, Utah
 CG1_02_64_396, USA: Crystal Geyser near Green River, Utah (GCA_001872725.1)
 CG_4_10_14_0_2_um_filter_63_37, USA: Crystal Geyser near Green River, Utah (GCA_002793495.1)
 UBA1541, USA: Crystal Geyser near Green River, Utah (GCA_002323185.1)
HC21_M1423, Aurora vent field, Arctic Mid-Ocean Ridges
 IMG_2836459607, 665-MMA12, TAG, Mid-Atlantic Ridge
 J098, Japan: Tokyo Prefecture, Shikinejima Island, Jinata Onsen (GCA_003694935.1)
 GCA_027075525.1, Pacific Ocean: Brothers volcano
 S012_25, Pacific Ocean (GCA_015487905.1)
 GCA_027071995.1, Pacific Ocean: Brothers volcano
 S012_60, Pacific Ocean (GCA_015487951.1)
 J009, Japan: Tokyo Prefecture, Shikinejima Island, Jinata Onsen (GCA_003696765.1)
 AMOR20_M1324, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1322, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 S009_29, Pacific Ocean (GCA_015489095.1)
 AMOR20_M1129, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0558, Aurora vent field, Arctic Mid-Ocean Ridges
 IMG_2836477973, 665-MMA4, TAG, Mid-Atlantic Ridge
 IMG_2836470896, 665-MMA4, TAG, Mid-Atlantic Ridge
 AMOR20_M1323, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 GEM_3300029827_15, Marine sediment, USA: Barataria Bay
 GEM_3300027799_6, lake sediment, Lake Totouti, South Sulawesi, Indonesia
 S6_FULL_Zeta6_3_0_85, Loihi Seamount, Hawaii: Spillway (Marker 34)
 S6_FULL_Zeta13_1_5_88, Loihi Seamount, Hawaii: Spillway (Marker 34)
 SZUA-181, Deyin-1, Atlantic Ocean: Mid-Atlantic Ridge (GCA_003228735.1)
 AMOR20_M1318, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 S6_FULL_Zeta4_4_1_98, Loihi Seamount, Hawaii: Spillway (Marker 34)
HC21_M0151, Aurora vent field, Arctic Mid-Ocean Ridges
 IMG_2836464167, 665-MMA4, TAG, Mid-Atlantic Ridge
 S6_FULL_Zeta3_4_2_96, Loihi Seamount, Hawaii: Spillway (Marker 34)
 S1_FULL_Zeta5_1_1_66, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 IMG_2836462403, 665-MMA12, TAG, Mid-Atlantic Ridge
 IMG_2836439678, 664-BS3, Rainbow, Mid-Atlantic Ridge
 GCA_027035825.1, Pacific Ocean: Lau Basin
 GCA_027019495.1, Pacific Ocean: Lau Basin
 S009_15, Pacific Ocean (GCA_015489085.1)
 S012_65, Pacific Ocean (GCA_015487545.1)
 S19_FULL_Zeta1_10_0_100, Loihi Seamount, Hawaii: Crop Circle (U Marker 31)
 S1_FULL_Zeta8_0_5_75, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 S1_FULL_Zeta6_1_1_96, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 AMOR20_M1312, Fåvne vent field, Arctic Mid-Ocean Ridges
 S1_FULL_Zeta4_2_7_85, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 AMOR20_M1311, Fåvne vent field, Arctic Mid-Ocean Ridges
 IMG_2836451291, 664-SC8, Rainbow, Mid-Atlantic Ridge
 SZUA-26, Deyin-1, Atlantic Ocean: Mid-Atlantic Ridge (GCA_003232325.1)
 AMOR20_M1314, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 AMOR20_M1315, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0685, Aurora vent field, Arctic Mid-Ocean Ridges
 Dive96_bin2.244, Indian Ocean: Longqi vent field, Southwestern Indian Ridge (GCA_021545645.1)
 AMOR20_M1316, Fåvne vent field, Arctic Mid-Ocean Ridges
 UBA1543, USA: Crystal Geyser near Green River, Utah (GCA_002323755.1)
 CG08_land_8_20_14_0_20_55_17, USA: Crystal Geyser near Green River, Utah (GCA_002774215.1)
 CG_4_10_14_0_2_um_filter_55_20, USA: Crystal Geyser near Green River, Utah (GCA_002791885.1)
 CG12_big_fil_rev_8_21_14_0_65_55_124, USA: Crystal Geyser near Green River, Utah (GCA_002783435.1)
 CG_4_9_14_0_8_um_filter_55_31, USA: Crystal Geyser near Green River, Utah (GCA_002789595.1)
 CG_4_10_14_0_8_um_filter_55_43, USA: Crystal Geyser near Green River, Utah (GCA_002784305.1)
 CG1_02_55_237, USA: Crystal Geyser near Green River, Utah (GCA_001871195.1)
 AMOR20_M1317, Fåvne vent field, Arctic Mid-Ocean Ridges
 GEM_3300014060_46, freshwater, USA: Crystal Geyser near Green River, Utah
 UBA9303, groundwater (GCA_003524495.1)
 UBA1538, USA: Crystal Geyser near Green River, Utah (GCA_002323725.1)
 CG11_big_fil_rev_8_21_14_0_20_59_439, USA: Crystal Geyser near Green River, Utah (GCA_002786925.1)
 CG2_30_59_37, USA: Crystal Geyser near Green River, Utah (GCA_001873825.1)
 CG_4_8_14_3_um_filter_59_5, USA: Crystal Geyser near Green River, Utah (GCA_002788155.1)
 CG06_land_8_20_14_3_00_59_53, USA: Crystal Geyser near Green River, Utah (GCA_002779605.1)
 CG_4_10_14_0_8_um_filter_59_127, USA: Crystal Geyser near Green River, Utah (GCA_002784885.1)
 CG_4_9_14_0_2_um_filter_59_191, USA: Crystal Geyser near Green River, Utah (GCA_002789095.1)
 CG03_land_8_20_14_0_80_59_51, USA: Crystal Geyser near Green River, Utah (GCA_002779855.1)
 CG23_combo_of_CG06-09_8_20_14_all_59_86, USA: Crystal Geyser near Green River, Utah (GCA_002771735.1)
 AMOR20_M1706, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0321, Aurora vent field, Arctic Mid-Ocean Ridges
HC21_M0768, Aurora vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1523, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 J030, Japan: Tokyo Prefecture, Shikinejima Island, Jinata Onsen (GCA_003695905.1)
 GCA_027059125.1, Pacific Ocean: Brothers volcano
 GCA_027016785.1, Pacific Ocean: Brothers volcano
 S146_97, Pacific Ocean (GCA_015492085.1)
 S012_148_esom, Pacific Ocean (GCA_015488115.1)
 J005, Japan: Tokyo Prefecture, Shikinejima Island, Jinata Onsen (GCA_003696795.1)
 S6_FULL_Zeta19_1_2_85, Loihi Seamount, Hawaii: Spillway (Marker 34)
 GCA_027005975.1, Pacific Ocean: Brothers volcano
 S144_69, Pacific Ocean (GCA_015493815.1)
 GCA_027008465.1, Pacific Ocean: Brothers volcano
 S012_125, Pacific Ocean (GCA_015488375.1)
 Dive96_bin10.335, Indian Ocean: Longqi vent field, Southwestern Indian Ridge (GCA_021545625.1)
 Dive96_bin1.284, Indian Ocean: Longqi vent field, Southwestern Indian Ridge (GCA_021545585.1)
 AMOR20_M1325, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 Mariprofundus erugo P7, USA: North Creek, Bath, NC (GCA_005818885.1)
 Mariprofundus erugo P3, USA: Mallard Creek, Washington, NC (GCA_005818865.1)
 AMOR20_M1620, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1283, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 CG23_combo_of_CG06-09_8_20_14_all_54_7, USA: Crystal Geyser near Green River, Utah (GCA_002771755.1)
 CG_4_10_14_3_um_filter_54_28, USA: Crystal Geyser near Green River, Utah (GCA_002782825.1)
 CG_4_9_14_3_um_filter_54_145, USA: Crystal Geyser near Green River, Utah (GCA_002791575.1)
 CG12_big_fil_rev_8_21_14_0_65_54_13, USA: Crystal Geyser near Green River, Utah (GCA_002781905.1)
 Mariprofundus ferrooxydans M34, Loihi Seamount, Hawaii (GCA_000379405.1)
 Mariprofundus ferrooxydans O1, USA: Pamlico Sound, Rodanthe, Hatteras Island, NC (GCA_011947535.1)
 Mariprofundus ferrooxydans JV-1, Lower Jet Vents, Marker 11 (GCA_000123615.1)
 Mariprofundus ferrooxydans PV-1, Loihi Seamount, Hawaii (GCA_000153765.1)
 S6_FULL_Zeta15_1_3_92, Loihi Seamount, Hawaii: Spillway (Marker 34)
 S6_FULL_Zeta19_0_9_74, Loihi Seamount, Hawaii: Spillway (Marker 34)
 OFTM148, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772795.1)
 GCA_027071575.1, Pacific Ocean: Brothers volcano
 Mariprofundus sp. KV, Denmark: Kalo Vig, Aarhus Bay (GCA_013387475.1)
 Mariprofundus sp. NF, Denmark: Norsminde Fjord, Aarhus Bay (GCA_013387455.1)
 Mariprofundus ferrinatatus CP-8, USA: Chesapeake Bay (GCA_002795825.1)
 Mariprofundus aestuarium CP-5, USA: Chesapeake Bay (GCA_002795805.1)
 OFTM123, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772835.1)
 Mariprofundus micogutta ET2, Japan: Izu-Ogasawara Arc (GCA_001895085.1)
 CG_4_9_14_3_um_filter_53_7, USA: Crystal Geyser near Green River, Utah (GCA_002791535.1)
 CG1_02_53_45, USA: Crystal Geyser near Green River, Utah (GCA_001871925.1)
 GCA_027018975.1, Pacific Ocean: Lau Basin
 NORP257, Atlantic Ocean: North Pond (GCA_016764685.1)
 IMG_2836467541, 665-MMA4, TAG, Mid-Atlantic Ridge
 AMOR20_M1284, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0722, Aurora vent field, Arctic Mid-Ocean Ridges
 OFTM252, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772775.1)
 OFTM13, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772845.1)
 AMOR20_M1282, Fåvne vent field, Arctic Mid-Ocean Ridges
 Mariprofundus sp. EBB-1, USA: East Boothbay, Maine (GCA_003665155.1)
 S6_FULL_Zeta22_0_9_91, Loihi Seamount, Hawaii: Spillway (Marker 34)
 S1_FULL_Zeta2_4_8_94, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 GCA_027019785.1, Pacific Ocean: Lau Basin
 GCA_027080955.1, Pacific Ocean: Lau Basin
 GCA_027013105.1, Pacific Ocean: Lau Basin
 Kolumbo Volcano mats, Greece (GCA_913056285.1)
 AMOR20_M1313, Fåvne vent field, Arctic Mid-Ocean Ridges
 IMG_2836447438, 664-SC8, Rainbow, Mid-Atlantic Ridge
 IMG_2836431279, 664-BS3, Rainbow, Mid-Atlantic Ridge
 IMG_2836455305, 665-MMA12, TAG, Mid-Atlantic Ridge
 IMG_2836443206, 664-SC8, Rainbow, Mid-Atlantic Ridge
 AMOR20_M1281, Fåvne vent field, Arctic Mid-Ocean Ridges
 IMG_2836500517, Urashima, Golden Horn chimney, Mariana Backarc
HC21_M1160, Aurora vent field, Arctic Mid-Ocean Ridges
 IMG_2836457517, 665-MMA12, TAG, Mid-Atlantic Ridge
 AMOR20_M1280, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0139, Aurora vent field, Arctic Mid-Ocean Ridges
 IMG_2836491939, S7_B4, Urashima, Golden Horn chimney, Mariana Backarc
 GCA_027067325.1, Pacific Ocean: Brothers volcano
 S6_FULL_Zeta2_5_1_96, Loihi Seamount, Hawaii: Spillway (Marker 34)
 GCA_027053605.1, Pacific Ocean: Brothers volcano
 GCA_027060005.1, Pacific Ocean: Brothers volcano
 S139_64, Pacific Ocean (GCA_015485035.1)
 S6_FULL_Zeta11_2_2_88, Loihi Seamount, Hawaii: Spillway (Marker 34)
 AMOR20_M1296, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 Tobar13m-G51, Lake water, Spain: Laguna del Tobar (GCA_021734365.1)
 Dive96_bin10.324, Indian Ocean: Longqi vent field, Southwestern Indian Ridge (GCA_021545595.1)
 GLR120, New Zealand: Hikurangi Margin (GCA_013139875.1)
 S6_FULL_Zeta8_2_7_72, Loihi Seamount, Hawaii: Spillway (Marker 34)
 OFTM395, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772895.1)
HC21_M1157, Aurora vent field, Arctic Mid-Ocean Ridges
 AMOR20_M0283, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 AMOR20_M1300, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 AMOR20_M1349, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M0763, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 AMOR20_M0762, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 IMG_2836454158, 664-SC8, Rainbow, Mid-Atlantic Ridge
 AMOR20_M1302, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1301, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 GEM_3300014060_42, freshwater, USA: Crystal Geyser near Green River, Utah
 UBA1536, USA: Crystal Geyser near Green River, Utah (GCA_002323245.1)
 UBA3091, USA: near Green River, Utah (GCA_002366535.1)
 CG2_30_46_52, USA: Crystal Geyser near Green River, Utah (GCA_001873795.1)
 AMOR20_M1309, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 D100SM bin.5, marine sediment (GCA_021647305.1)
 AMOR20_M1306, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1305, Fåvne vent field, Arctic Mid-Ocean Ridges
 IMG_2836489347, S7_B4, Urashima, Golden Horn chimney, Mariana Backarc
 MC-14, Pacific Ocean deep sea mooring chain biofilm (GCA_021721715.1)
 AMOR20_M1304, Fåvne vent field, Arctic Mid-Ocean Ridges
 Ghiorsea bivora TAG-1, Mid-Atlantic Ridge: TAG (GCA_000744415.1)
 IMG_2836486931, S7_B4, Urashima, Golden Horn chimney, Mariana Backarc
 GCA_027080845.1, Pacific Ocean: Lau Basin
 GCA_027019685.1, Pacific Ocean: Lau Basin
 GCA_027080505.1, Pacific Ocean: Lau Basin
 GCA_027035925.1, Pacific Ocean: Lau Basin
 GCA_026998195.1, Pacific Ocean: Brothers volcano
 GCA_027059005.1, Pacific Ocean: Brothers volcano
 GCA_027057975.1, Pacific Ocean: Brothers volcano
 OFTM145, subsea tunnel biofilm, Norway: Oslofjord Tunnel (GCA_021772875.1)
 AMOR20_M1310, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 GCA_027053695.1, Pacific Ocean: Brothers volcano
 GCA_027053995.1, Pacific Ocean: Brothers volcano
 GCA_027041295.1, Pacific Ocean: Brothers volcano
 GCA_026990695.1, Pacific Ocean: Lau Basin
 GCA_027082795.1, Pacific Ocean: Lau Basin
 GCA_027010815.1, Pacific Ocean: Lau Basin
 GCA_027055255.1, Pacific Ocean: Brothers volcano
 TAG_MAG_00014, shrimp Rimicaris exoculata cephalothorax, TAG, Mid-Atlantic Ridge
 RB_MAG_00008, shrimp Rimicaris exoculata cephalothorax, Rainbow vent field, Mid-Atlantic Ridge
HC21_M0961, Aurora vent field, Arctic Mid-Ocean Ridges
 GCA_026982535.1, Atlantic Ocean: Mid Atlantic Ridge
 SZUA-1372, Atlantic Ocean: Mid Cayman Rise (GCA_015662325.1)
 UWMA-0204, Atlantic Ocean: Mid Cayman Rise (GCA_012962225.1)
 Faavne_M6_B18, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1307, Fåvne vent field, Arctic Mid-Ocean Ridges
 NORP148, Atlantic Ocean: North Pond (GCA_002401135.1)
 pPChin1, Australia: Painkalac Creek (GCA_015231855.1)
 PChin4, Australia: Painkalac Creek (GCA_002753275.1)
 GCA_027075825.1, Pacific Ocean: Brothers volcano
 GCA_027072275.1, Pacific Ocean: Brothers volcano
 S012_146, Pacific Ocean (GCA_015488125.1)
 AMOR20_M1293, Fåvne vent field, Arctic Mid-Ocean Ridges
 S6_FULL_Zeta1_5_2_98, Loihi Seamount, Hawaii: Spillway (Marker 34)
 IMG_2836479923, 665-MMA4, TAG, Mid-Atlantic Ridge
 IMG_2836441327, 664-SC8, Rainbow, Mid-Atlantic Ridge
 AMOR20_M1294, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0959, Aurora vent field, Arctic Mid-Ocean Ridges
 UBA1571, USA: Crystal Geyser near Green River, Utah (GCA_00232395.1)
 CG02_land_8_20_14_3_00_50_9, USA: Crystal Geyser near Green River, Utah (GCA_002781245.1)
 CG17_big_fil_post_rev_8_21_14_2_50_50_13, USA: Crystal Geyser near Green River, Utah (GCA_002771715.1)
 CG_4_10_14_0_8_um_filter_49_80, USA: Crystal Geyser near Green River, Utah (GCA_002784325.1)
 CG_4_9_14_3_um_filter_49_83, USA: Crystal Geyser near Green River, Utah (GCA_002791545.1)
 CG1_02_49_23, USA: Crystal Geyser near Green River, Utah (GCA_001871355.1)
 AMOR20_M1303, Jan Mayen vent fields, Arctic Mid-Ocean Ridges
 GCA_027072135.1, Pacific Ocean: Brothers volcano
 GCA_027019745.1, Pacific Ocean: Lau Basin
 AMOR20_M1292, Fåvne vent field, Arctic Mid-Ocean Ridges
 NORP31, Atlantic Ocean: North Pond (GCA_002746295_2)
 AMOR20_M1291, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1290, Fåvne vent field, Arctic Mid-Ocean Ridges
 AMOR20_M1289, Fåvne vent field, Arctic Mid-Ocean Ridges
 GCA_027080835.1, Pacific Ocean: Lau Basin
 GCA_027061385.1, Pacific Ocean: Brothers volcano
 GCA_027031245.1, Pacific Ocean: Lau Basin
 GCA_026994965.1, Pacific Ocean: Lau Basin
 AMOR20_M1299, Fåvne vent field, Arctic Mid-Ocean Ridges
 IMG_2836445533, 664-SC8, Rainbow, Mid-Atlantic Ridge
 AMOR20_M1297, Fåvne vent field, Arctic Mid-Ocean Ridges
 GEM_3300011013_31, White mat submarine volcano, Kolumbo volcano, Aegean Sea
 NORP263, Atlantic Ocean: North Pond (GCA_016764555.1)
 AMOR20_M1298, Fåvne vent field, Arctic Mid-Ocean Ridges
HC21_M0885, Aurora vent field, Arctic Mid-Ocean Ridges
HC21_M0697, Aurora vent field, Arctic Mid-Ocean Ridges
HC21_M0328, Aurora vent field, Arctic Mid-Ocean Ridges
HC21_M0971, Aurora vent field, Arctic Mid-Ocean Ridges
 NORP111, Atlantic Ocean: North Pond (GCA_002401635.1)
 GCA_027041865.1, Pacific Ocean: Brothers volcano
 GCA_027018935.1, Pacific Ocean: Lau Basin
 S6_FULL_Zeta10_2_2_90, Loihi Seamount, Hawaii: Spillway (Marker 34)
 S1_FULL_Zeta1_79_4_95, Loihi Seamount, Hawaii: Pohaku (Marker 57)
 IMG_2772190966, S1, Loihi Seamount, Hawaii: Pohaku (Marker 57)

Tree scale: 0.2