To complete this worksheet, see the instructions in the textbook (Chapter 5 Investigation).

Table 1. Interpretation of Features, Tectonic Settings, and Causes of Melting

For each site on figure 5.15.a1 in the Chapter 5 Investigation in the textbook (also page 3 of this worksheet), identify the following:

- the type of plate boundary or other setting. Possible choices include: (1) oceanic divergent, (2) continental rift, (3) ocean-ocean convergent, (4) ocean-continent convergent, (5) continental collision, (6) hot spot in an ocean, or (7) hot spot in a continent. All of these settings are not present in this area;
- the most likely cause of melting. The options are (1) decompression melting either beneath a mid-ocean ridge or near a rising mantle plume, (2) melting by adding water along a subduction zone, and (3) melting of continental crust caused by an influx of mantle-derived magma. More than one of these causes might apply to a site.

Site	Name of Feature	Type of Plate Boundary or Other Feature (circle the best answer)	Likely Cause of Melting (circle all that apply)
A	Linear island chain	(a) oceanic divergent, (b) ocean-ocean convergent, (c) ocean-continent convergent, (d) hot spot in an ocean	(a) decompression melting as the mantle rises, (b) melting by adding water along a subduction zone, (c) melting of continental crust caused by an influx of mantle-derived magma
B	Circular volcanic depressions, called calderas	(a) continental rift, (b) ocean-continent convergent, (c) continental collision, (d) hot spot in a continent	(a) decompression melting as the mantle rises, (b) melting by adding water along a subduction zone, (c) melting of continental crust caused by an influx of mantle-derived magma
C	Mid-ocean ridge	(a) oceanic divergent, (b) ocean-ocean convergent, (c) ocean-continent convergent, (d) hot spot in an ocean	(a) decompression melting as the mantle rises, (b) melting by adding water along a subduction zone, (c) melting of continental crust caused by an influx of mantle-derived magma
D	Continental magmatic arc	(a) continental rift, (b) ocean-continent convergent, (c) continental collision, (d) hot spot in a continent	(a) decompression melting as the mantle rises, (b) melting by adding water along a subduction zone, (c) melting of continental crust caused by an influx of mantle-derived magma
E	Island arc	(a) oceanic divergent, (b) ocean-ocean convergent, (c) ocean-continent convergent, (d) hot spot in an ocean	(a) decompression melting as the mantle rises, (b) melting by adding water along a subduction zone, (c) melting of continental crust caused by an influx of mantle-derived magma

Table 2. Characterization of Rock Samples

For each of the samples, choose the answer that best indicates the rock's texture, composition, name, and interpreted cooling and solidification history.

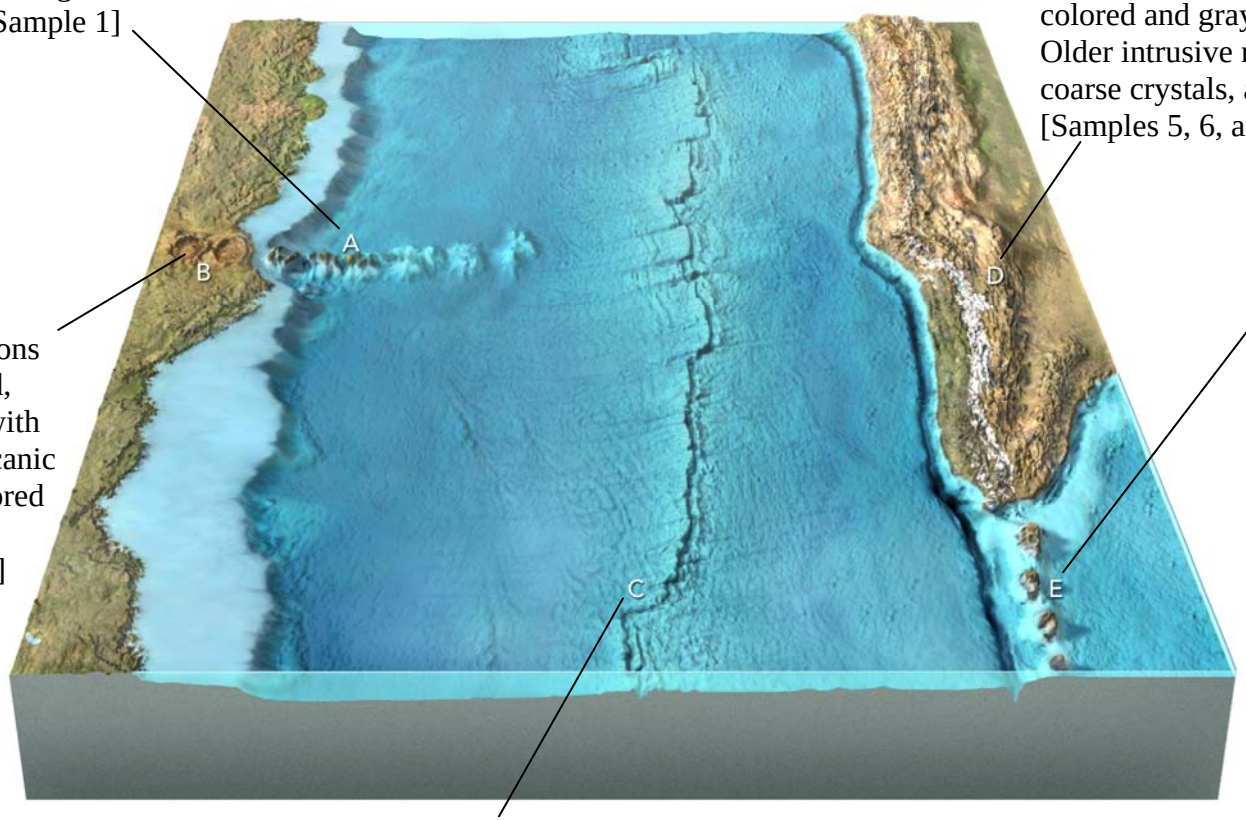
Sample	Crystal Size or Other Texture (circle all that apply)	Composition (circle one)	Name of Rock (circle one)	Cooling and Solidification History (circle one)
1	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) granite (b) rhyolite (c) basalt	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
2	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) granite (b) rhyolite or tuff (c) basalt	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
3	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) flattened pieces of pumice (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) welded tuff (b) basalt (c) gabbro	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
4	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) basalt (b) scoria (c) pegmatite	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
5	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) andesite (b) gabbro (c) pumice	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
6	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) pegmatite (b) basalt (c) welded tuff	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
7	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) between granite and diorite (b) rhyolite (c) scoria	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
8	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) andesite (b) tuff (c) obsidian	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water
9	(a) large crystals, (b) medium-sized crystals, (c) no visible crystals and not vesicular, (d) no visible crystals but vesicular (e) porphyritic	(a) felsic (b) intermediate (c) mafic	(a) basalt (b) gabbro (c) rhyolite	(a) slow, (b) moderate, (c) fast, (d) slow then fast, (e) slow cooling in the presence of water

Tectonic Settings of Igneous Activity

Use this figure to help you answer the questions in Table 1. The area shown has five sites, labeled A, B, C, D, and E, where igneous activity has been observed. For each site, consider the igneous processes responsible for the activity, such as the type of plate boundary or other feature. After observing this figure, answer the questions in Table 1.

Site A: A line of volcanic islands and submarine mountains. Broad volcanoes on the islands are forming dark volcanic rocks. [Sample 1]

Site D: A continental magmatic arc, where volcanoes are on top of a mountain belt near the edge of the continent. The volcanoes erupt light-colored and gray volcanic rocks. Older intrusive rocks, some with coarse crystals, are also exposed. [Samples 5, 6, and 7]



Site B: Circular volcanic depressions (calderas) on land, which are filled with light-colored volcanic ash and light-colored volcanic rocks. [Samples 2 and 3]

Site E: An island arc, which is a chain of volcanic islands adjacent to an oceanic trench. The volcanoes erupt gray volcanic ash and lava flows. There are also some intrusive rocks. [Samples 8 and 9]

Site C: A mid-ocean ridge that zigzags across the ocean floor. The rock sample is dark colored and is from a lumpy lava flow on the seafloor. [Sample 4]

Table 3. Description of Rock (Optional)

Use this table if your instructor asks you to describe the photographs in the textbook or actual hand samples of rocks.

Sample	Description
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2	
3	
4	
5	
6	
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8	
9	