

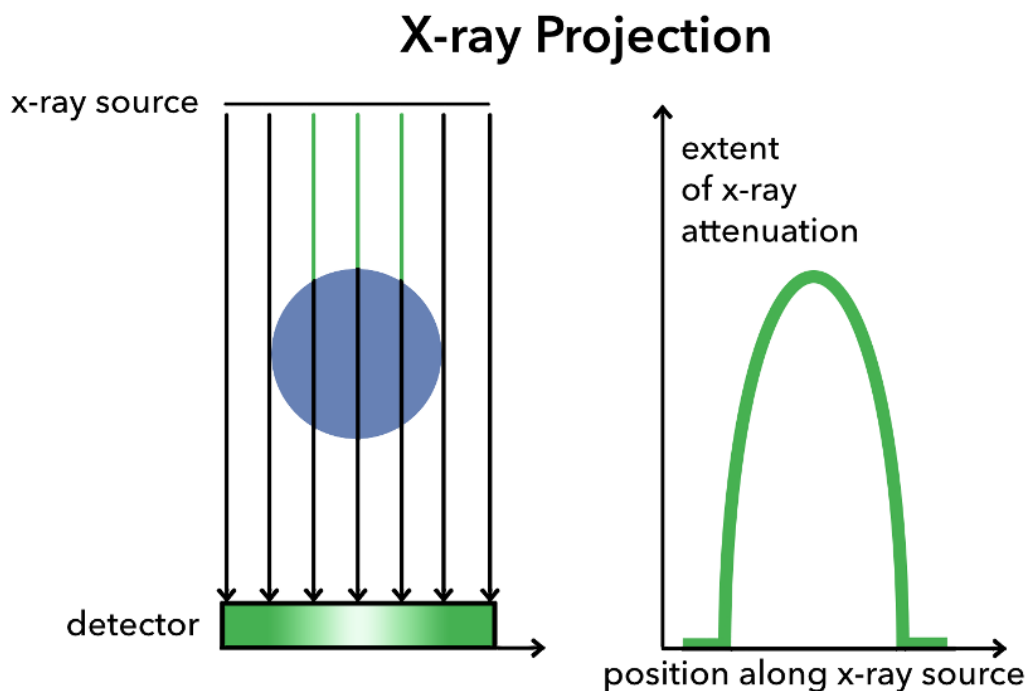


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## 1.2.3 Exploratory Quiz: Interpreting Projection Graphs

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Here's the example Margo Levine gave of a 2-dimensional object and its projection graph:



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In this example, we assume the object is made of a uniform material (such as bone) and is surrounded by air, a material which does not attenuate light.

### Question 1

1/1 point (graded)

How does what we see in the projection graph reflect the different materials (bone versus air) through which the x-rays travel?

Thickest / densest material in the center of the object, the materials become thinner at the periphery.



Thank you for your response.

#### Explanation

Different materials attenuate x-ray light differently:

- The x-rays through the air are not attenuated at all so we see zero on the projection graph.
- The x-rays through the object are attenuated (they lose some intensity). This shows up as non-zero values on the projection graph.

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**i** Answers are displayed within the problem

## Question 2

1/1 point (graded)

How does what we see in the projection graph reflect the circular shape of the object?

1-D projection of the image starts at zero, increases continuously, attains a peak in the middle and then decreases to zero.



Thank you for your response.

#### Explanation

Different thickness affect the amount of attenuation:

- X-rays which pass toward the left or right side of the circle have a lower projection graph value since the circle is less thick there so they are less attenuated.
- X-rays crossing near the middle of the circle have a higher value on the projection graph because they are more attenuated since the object is so much thicker there.

So the projection graph reflects different features of the object and surrounding materials. What you may still be wondering is why the projection graph is curved in the particular way it is and whether we could find the exact function which has this graph. By the end of this section of the course, we'll be able to answer this. Meanwhile, take a look at the next quiz to get practice interpreting projection graphs


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