

# Career Exploration Centre

Online



 **SAIT**  
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ORIGINALS**

# Medical Radiological Technician

## Career Description

Medical radiologic technologists (MRTs) operate radiographic equipment to produce images of body structures for diagnosing and treating injury and disease.

## They are employed in:

- Hospitals
- Clinics
- Radiological laboratories

## Working conditions:

MRTs work shifts, are sometimes on-call and may have to work some evenings and weekends. This career is physically demanding. Radiologic technologists are on their feet most of the time. They lift accessory equipment weighing up to 10 kilograms. They also help position patients. MRTs must follow strict radiation safety rules for themselves and their patients. They must be prepared to respond to and manage emergencies.

## Skills & Abilities:

MRTs need to be:

- accurate, patient, and adaptable
- sensitive to the needs of others; able to put people at ease
- willing to continually update their knowledge and skills
- able to reach a minimum height of 180 cm (to move overhead equipment)

## Stats:

Average salary in Alberta: \$72,279.00\*

Average wage: \$42.20\*

Minimum education: 2 years post-secondary

\*Statistics from 2016, [alis.alberta.ca](http://alis.alberta.ca)

For more Alberta career information and stats:

<https://alis.alberta.ca/occinfo/occupations-in-alberta/occupation-profiles/radiological-technologist/>

# Activity Mission

In this activity, you will:

1. Assess x-ray quality
2. Determine x-ray equipment adjustments

## Tools:

Pen or pencil and paper

## Task 1: Assess X-Ray Quality

### Background

Below are the 4 properties of a good x-ray:

- **Detail** (sharpness of the image): should be clear and defined, not fuzzy or blurry.
- **Density** (overall darkness of the image): should not be too bright or too dark.
- **Contrast** (difference in the degree of grayness between areas of the x-ray image): should be able to accurately identify different body parts, including subtle (small) details.
- **Distortion** (whether areas of the object are out of proportion in the image): x-rays should be as close to the true size of the object as possible.

### Instructions

1. On the next 4 pages, review the ***X-Ray Challenge Cards***.
2. Examine each card and decide whether there is a problem (related to detail, density, contrast, or distortion). Choose one answer per card.
3. If possible, discuss each x-ray with someone that you could appoint as your 'intern' or 'co-worker'.

**Check the Task 1 answer key at the end of this activity.**

# X-Ray Challenge Cards

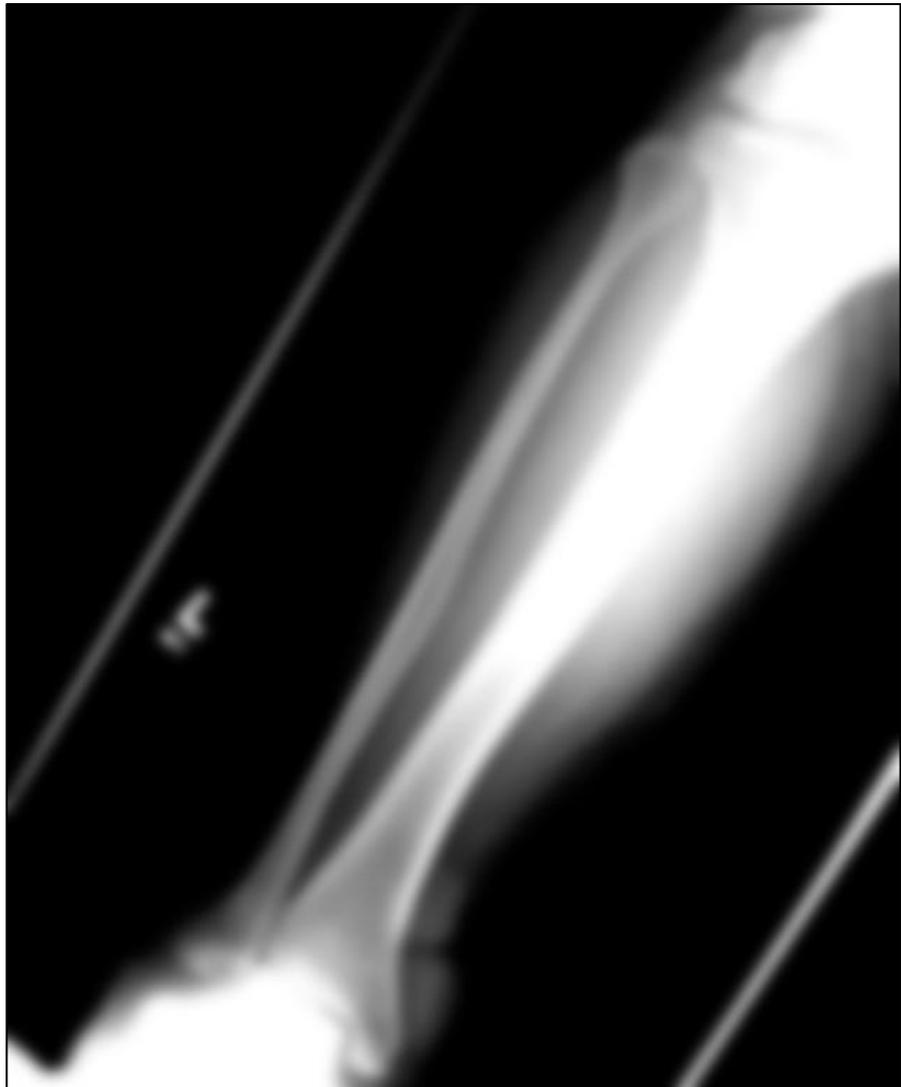
## What's wrong with this x-ray?

### Challenge 1

This is an x-ray of the lower leg (calf).

The problem with this x-ray is:

1. Distortion
2. Detail
3. Contrast
4. Nothing



# X-Ray Challenge Cards

## What's wrong with this x-ray?

### Challenge 2

This is an x-ray of the lower leg (calf).



The problem with this x-ray is:

1. Distortion
2. Detail
3. Density
4. Nothing

# X-Ray Challenge Cards

## What's wrong with this x-ray?

### Challenge 3

This is an x-ray of the lower leg (calf).



The problem with this x-ray is:

1. Contrast
2. Density
3. Detail
4. Nothing

# X-Ray Challenge Cards

## What's wrong with this x-ray?

### Challenge 4

This is an x-ray of the lower leg (calf).



The problem with this x-ray is:

1. Contrast
2. Density
4. Distortion
5. Nothing

Check the Task 1 answer key at the end of this activity.

## Task 2: Equipment Adjustments

### Background

MRTs need to know how to properly adjust the machines to produce high quality x-rays. They pay attention to these 3 key factors:

- Distance
- Exposure time
- Energy level

### Instructions

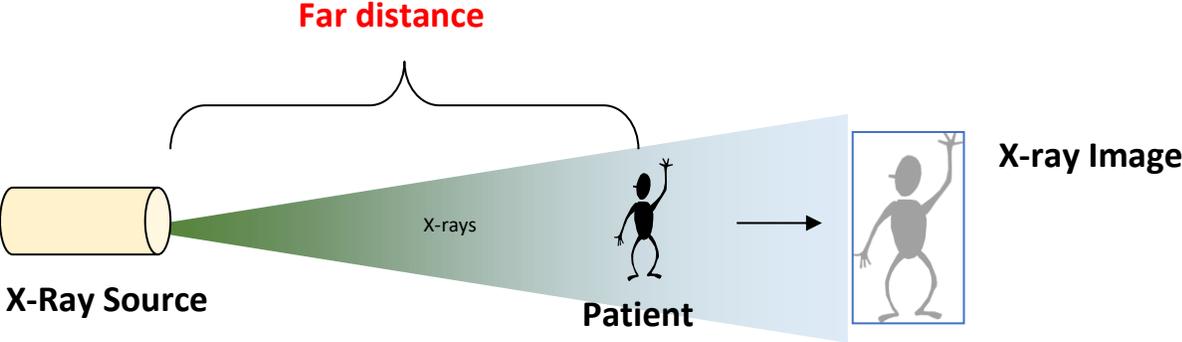
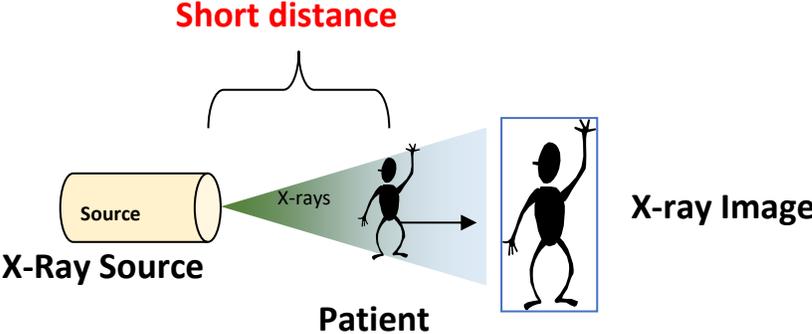
1. On the next 3 pages, review the definitions and diagrams explaining distance, exposure time, and energy level.
2. Once you understand how MRTs make equipment adjustments, read the 4 **Equipment Challenge Cards** following the explanations. Try to determine the best answer for each card.
3. If possible, discuss the challenge cards with your appointed 'intern' or 'co-worker'.
4. Check the Task 2 answer key at the end of the activity to see how you did.

For information on a SAIT program connected to this activity, please visit:

<https://www.sait.ca/programs-and-courses/full-time-studies/diplomas/medical-radiologic-technology>

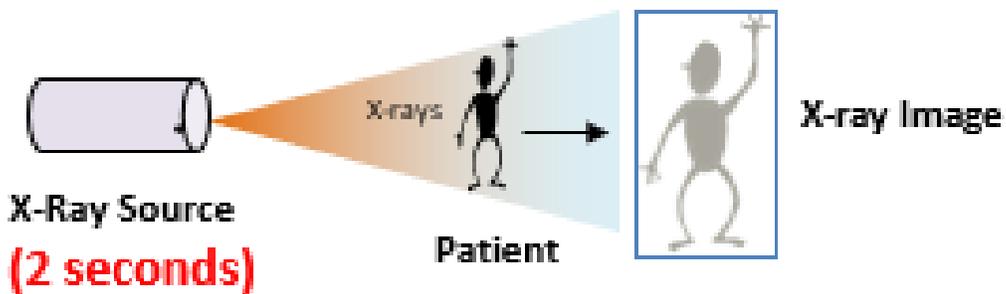
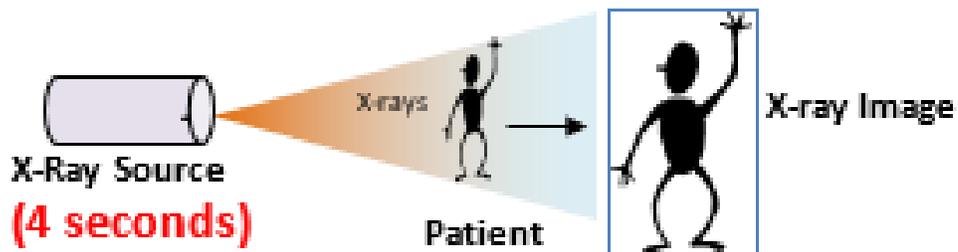
# Distance

The distance between the x-ray and the patient



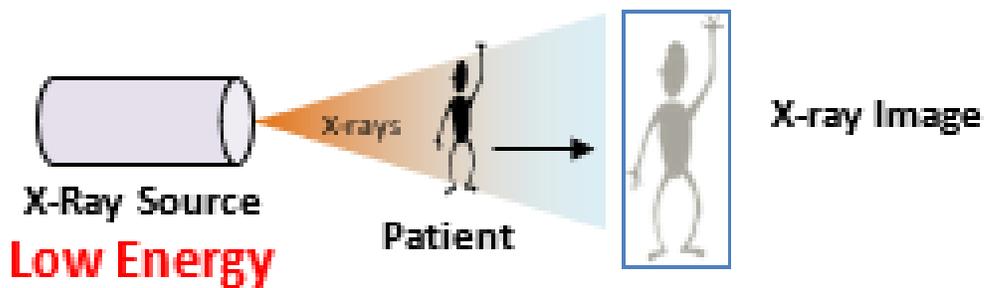
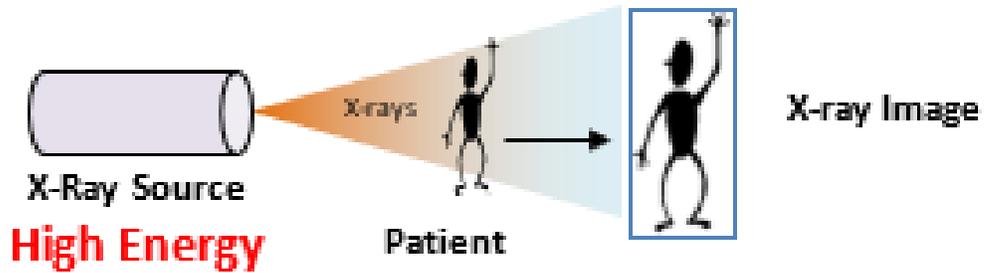
## Exposure Time

Length of time the x-rays are on the patient. Longer exposure time creates a darker Image.



## Energy Level

The higher the energy emitted by the x-ray machine, the more it is able to penetrate the body and produce a darker image.



The equipment challenge cards are on the next few pages.

# Equipment Challenge Cards

## Equipment Challenge 1

The x-ray image is too light (not enough density), and the x-ray source cannot be moved closer to the patient. How can the MRT make the image darker? (1 answer.)

1. Increase the exposure time
2. Move the x-ray source further away from the patient
3. Decrease the energy level

## Equipment Challenge 2

There isn't enough detail in the x-ray because it's too dark. How can the MRT fix the problem if he/she can't decrease the energy level? (2 answers.)

1. Decrease the exposure time
2. Move the x-ray source closer to the patient
3. Move the x-ray source further away from the patient

### **Equipment Challenge 3**

The doctor wants the x-ray taken very close to the patient. What can the MRT do to make sure the image isn't too dark? (2 answers.)

1. Shorten the exposure time
2. Decrease the energy level
3. Increase the energy level

### **Equipment Challenge 4**

An x-ray must be taken as far away from the patient as possible. What 2 things can the MRT do to make the image dark enough? (1 answer.)

1. Increase the energy level and make the exposure time longer
2. Decrease the energy level and make the exposure time longer
3. Decrease the energy level and make the exposure time shorter

**Check the Task 2 answer key Is at the end of this activity**

## Task 1 Answer Key

### X-Ray Challenge 1

The answer is B: Detail

This lower leg x-ray is too blurry for the radiologist to see enough detail. The MRT will have to take another x-ray that shows the bone more clearly.

### X-Ray Challenge 2

The answer is C: Density

This lower leg x-ray is too dark for the radiologist to see enough detail. The patient will need to return for another x-ray and will likely not be very happy.

### X-Ray Challenge 3

The answer is C: There is nothing wrong with this image

There is a good amount of contrast and the right amount of light (density) so you can identify where one part ends and one begins. Details of the bones are visible as well.

### X-Ray Challenge 4

The answer is A: Contrast

There is too much contrast (too much black and white and not enough grey) which means you can't see any of the subtle (small) detail in the bone. The radiologist could miss something important and give an incorrect diagnosis.

## Task 2 Answer Key

<p><b>Adjustment Challenge 1</b></p> <p>The answer is A.</p>	<p><b>Adjustment Challenge 2</b></p> <p>Both A and C are correct.</p>
<p><b>Adjustment Challenge 3</b></p> <p>Both A and B are correct.</p>	<p><b>Adjustment Challenge 4</b></p> <p>The answer is A.</p>