



Lesson 3

Identifying Disease with the MRI Machine | Unit Overview

As students familiarize themselves with the concept of MRI machines, the lesson will further expand on how imaging works with different parts of the body, including: the brain, bones and soft tissue, abdomen and pelvis, and the heart. Students will learn how doctors analyze imaging from the body to diagnose patients.

Recommended Grade Levels: 6-8

Learning Objectives:

- The discussion and analysis in presenting and interpreting MRI images to the class work well with this standard as students are effectively comparing and evaluating the usefulness of MRI technology in diagnosing various conditions
- By examining real-life case studies and engaging in class activities about MRI diagnosis, students are working with models of medical input (MRI) and output
- The discussion about how MRIs work, given that they rely on radio waves to create images, fits neatly under this standard

Lesson Approaches:

The materials and group setups used for the lesson can vary based on three approaches. Each approach uses the interactive online lesson with worksheets and a Google Form available. Supplemental materials and assessments are available for teachers and students to expand on each lesson.

Lecture approach: A lecture style class session that uses one device to show the students the interactive lesson and a correlated worksheet for each student. A Google Form can also be answered as a whole class to both assess and discuss what the students have learned.

Materials used:

- A computer with internet access
- A large screen to project to the class
- A worksheet or access to Google Form for each student



Small group approach: A cooperative student learning approach that organizes the class into small groups, each with their own device to learn from the interactive lesson and fill out a worksheet that highlights areas of focus in the lesson. A Google Form can also be used, either within those groups or as a whole class, to elicit engagement and discussion.

Materials used:

- A computer with internet access for each group of several students
- A worksheet or access to Google Form for each student or group

Individual approach: An individual learning approach that allows students to engage with the interactive lesson at school or at home, answering questions on a worksheet along the way. This approach may be supported with classroom discussions after each lesson.

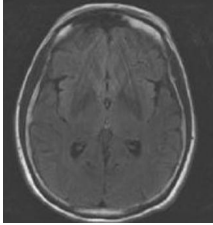
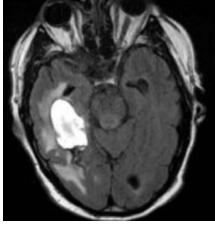


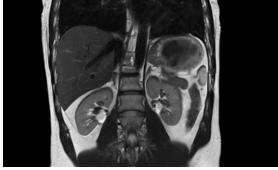
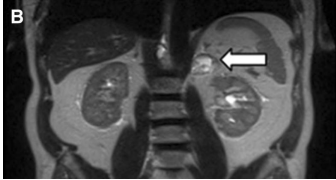
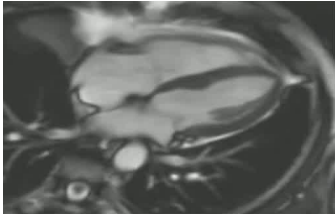
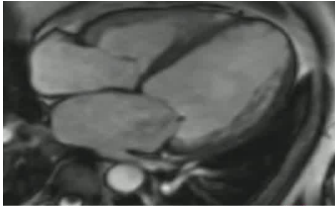
Materials used:

- A computer with internet access for each student, either a school computer or personal computer at home
- A worksheet or access to Google Form for each student



Analysis Activity:

This activity will cover an essential aspect of MRI imaging. Allow students to compare normal and abnormal MRI images and write about the differences. This can be done individually, in small groups, or as an entire class. Students should discuss their answers before the explanation is revealed.

Normal Image	Abnormal Image	Explanation
		The white shape on the left hemisphere is a hemorrhage, a bleeding inside the brain. The high intensity signal from the hemorrhage creates a very light shape in the scan image.
		The light mark on the patient's back is a spinal cord contusion, or injury to the spine.
		The round mass is a tumor in one of the adrenal glands above the kidneys. This specific tumor is called ganglioneuroblastoma.
		The heart has an unusual shape and abnormal blood flow, causing difficulty in normal function.

Resources:

- Worksheet: [PDF]



Supplemental Videos

Small videos that may help teachers and students establish a basic understanding of the lesson topics.

- <https://youtu.be/G2YsuVzg-Gg?feature=shared> : reading brain scans
- <https://youtu.be/Mzvy1-2JWvc?feature=shared> : bone tumor scan
- https://youtu.be/9IEtIWE_gIQ?feature=shared : abdomen scan and anatomy
- <https://youtube.com/shorts/wPNivXJpGu8?feature=shared> : heart scan and anatomy

Supplemental Reading:

- Chan, S. T., Evans, K. C., Rosen, B. R., Song, T. Y., & Kwong, K. K. (2015). A case study of magnetic resonance imaging of cerebrovascular reactivity: a powerful imaging marker for mild traumatic brain injury. *Brain injury*, 29(3), 403–407.
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<https://doi.org/10.1148/rg.242035168>



- Sartoretti, T., Sartoretti, E., Wyss, M., Schwenk, Á., van Smoorenburg, L., & Sartoretti-Schefer, S. (2019). Modern MRI techniques in neuroradiology. *European Radiology Experimental*, 3(1), 1-11.
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<https://www.auntminnie.com/clinical-news/mri/article/15628246/ai-proves-effective-for-triaging-abnormal-brain-mri-results>