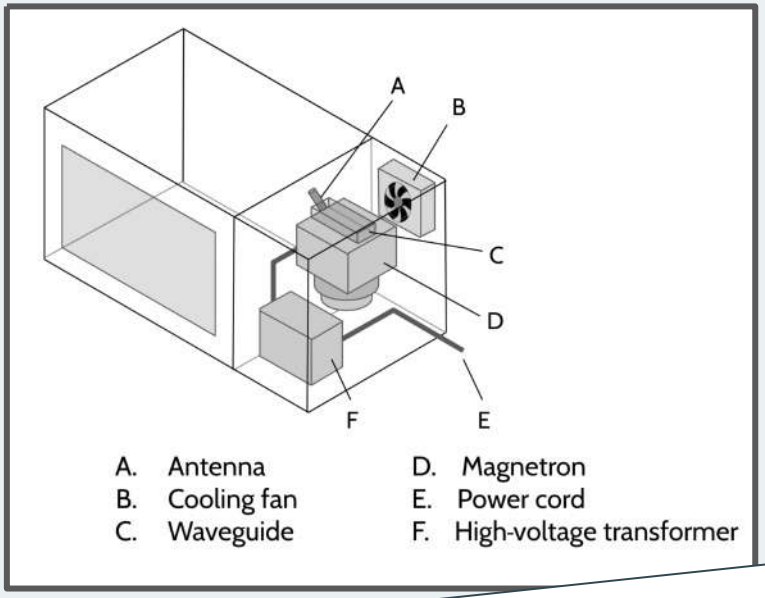
WARNING

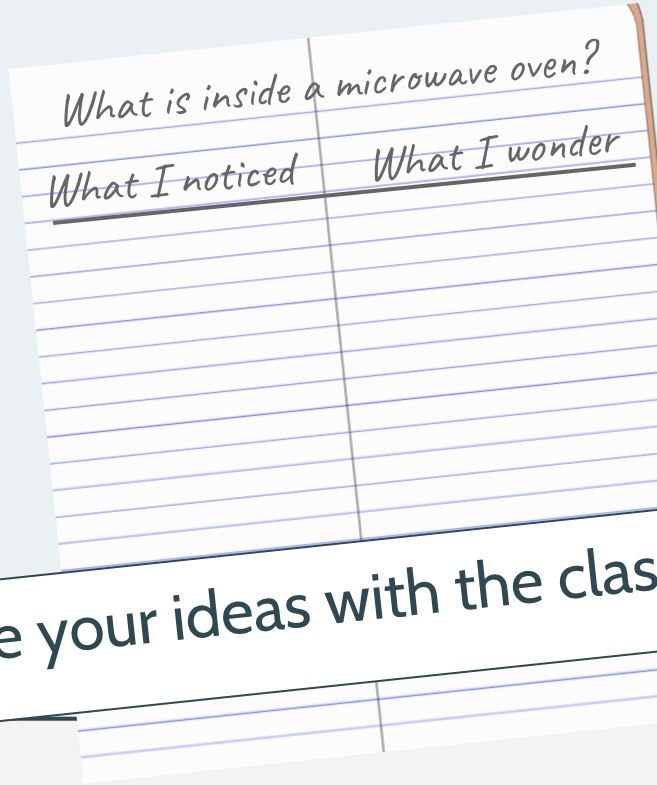
This lesson requires the use of a microwave oven, which can pose safety risks when done improperly. Before teaching this lesson, please review the safety precautions in the front matter and the *Teacher Guide* for setting up and running each investigation, as well as for taking down, disposing of, and storing materials.

What is inside a microwave oven?

On your own

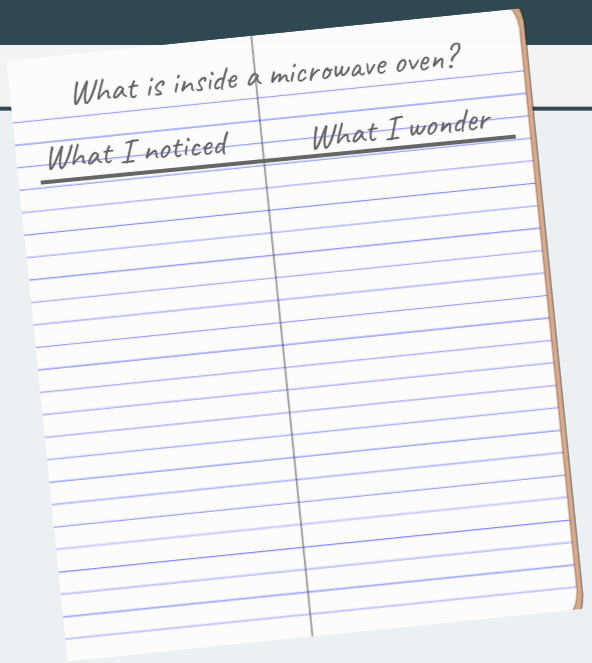
As you look through the manual, record what you notice and wonder in your science notebook.





Be ready to share your ideas with the class.

What does the magnetron do?



On your own

Continue to notice and wonder as we watch a video of a magnetron being dissected.

- What **parts or materials** seem especially important?

Slide C

Look Inside the Microwave Oven

Turn and Talk

How might the parts of the magnetron work together to produce electromagnetic radiation?

Read about the Magnetron

With your class

- Read Part I together as a class.
- Where have you seen parts or materials with these names before (magnets, copper, antenna, filament)?
- What have they been used to do?

Be ready to share your ideas with the class.

Slide E

Analyze the Design of the Magnetron

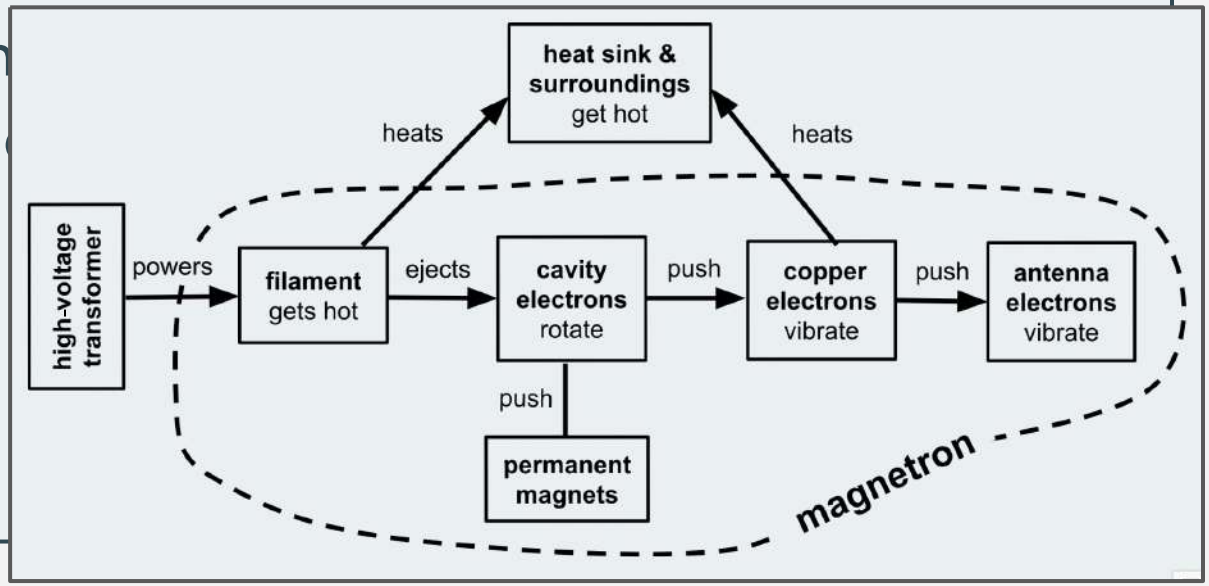
With a partner

- Read Part II and Part III of the magnetron reading.
- Answer the questions in each section.

Discuss the Reading about the Magnetron

With your class

- IIIa: How do moving charged particles affect electric fields?
- IIIb: Where might electric fields cause energy to transfer, either inside or outside the magnetron?
- IIIc: How might th
  inside the oven's



Investigate Energy in the Microwave Oven

Turn and Talk

Consider your answers throughout the reading to help you discuss these questions:

- What ideas or questions do you have about how electric fields transfer energy from the magnetron antenna into the matter inside the microwave oven?
- What objects have we worked with that could show us evidence of electric fields changing inside the oven's cooking area?

Be ready to share your ideas with the class.

Plan an Investigation: Safety Guidelines

With your class

Placing metal in a microwave oven can be very dangerous. We need to take adequate safety precautions.

How can we ensure that...

- ...we heat food or liquid that we know will absorb some of the microwave radiation?
- ...metal objects aren't within 1 inch of the oven's walls, floor, or ceiling?
- ...objects inside do not reach dangerous temperatures?

Investigate Energy in the Microwave Oven

With your class

- What do you notice happens to the bulb when the microwave oven is running?
- What does this evidence tell us is happening in the middle of the microwave oven?

Navigate

Exit Ticket

- What do you think is happening between the magnetron antenna and the light bulb to transfer energy all the way across the microwave oven?

Answer by sketching a model with pictures and words.

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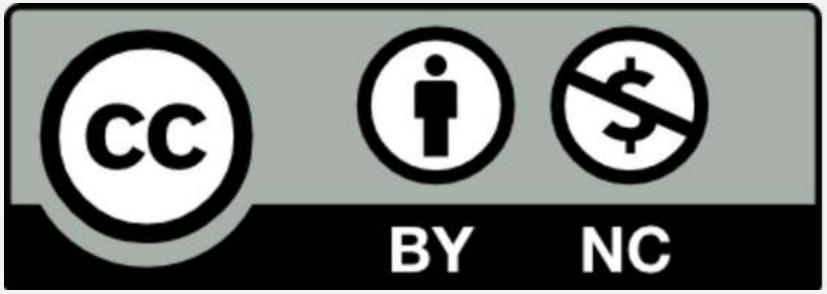

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