

The Deadly Device Overview



Discover true facts about Nikola Tesla, an eccentric physicist and inventor

Danger and suspicion in a tech lab! Fear lingers in a remote laboratory after a physicist's suspicious demise. A police investigation resulted in nothing except a case as cold as the secretive personalities and steel walls that enshroud a top-secret Tesla-inspired facility. That's why the lab owner asked you, as detective Nancy Drew, to expose the terrifying truth about The Deadly Device!

Overview for Learn & Play

Nancy Drew: The Deadly Device is a fictional game that offers engaging gameplay and learning while solving a Nancy Drew mystery. The story is a great mystery with a **focus on science** that relates to technologies and systems we use today. The story, theme, and setting offer numerous facts and learning opportunities.

The following are ideas for learning while playing that the HeR Interactive team hopes will **encourage discussions** and **offer points of learning** in the **listed subject areas**.

In addition to this subject overview, we have created a **worksheet** with **questions for students to complete while playing the game** for added learning and engagement.

Subjects that tie-in with facts and themes in the game:

Science

1. Energy

What is electricity?

- Define alternate and direct currents.
- Who was Nikola Tesla and what is the Tesla Coil?
- Discuss the information about electricity in the game that is found on the wall board "Things You Never Knew About Electricity."

• Focus on a discussion about ways we can conserve energy in our everyday lives. Why is energy conservation important to the world?

• Talk about safety and electricity.



2. Principles of Chemistry - Periodic Table of Elements

- Discuss the Russian chemist and scholar who formulated the Periodic Table, Dmitri Mendeleev (1834-1869).
- What element is named after him?

• In "The Deadly Device" the Periodic Table is used for creating an etching solution in the photo lithography lab. Why is it important to learn about the Periodic Table? (Answer: it helps predict the types of chemical reactions that can take place.)

...continues

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3. STEM - Computer Science Basics

- Binary code used in computer programming and making circuit boards.
- Photolithography In the "The Deadly Device" there is a photolithography lab. What is photolithography and how is it used in computers and for circuit designs? Discuss the steps and formulas used for this process.
- Discuss 3D printing as an invention, its uses in technology and the world.
- What are Biometrics? Biometrics involves the use of many aspects of STEM. In the game, you get to make a fingerprint, discuss that and other uses for biometrics.

Math

• Binary code: What is the Binary system of numbers and why is it important to the design of computers? What number symbols are in the binary code?

• In the game, there are binary correlations between the sign on the wall and the use of decimal numbers and the color code. Look for the binary code panels on Gray's computer for added practice in understanding binary code.

History & the History of Science and Innovators in the 1800's

Many of the real-world items we use day-to-day, that we often take for granted, would not exist if not for the brave pioneers, and inventors who never gave up on their ideas and formulations.

Researching the history of science is very important, especially when it comes to the history of electricity, binary codes and basic origins of chemistry concepts.

In *Nancy Drew: The Deadly Device*, the lab is inspired by Nikola Tesla. Have some enhanced fun and learning by researching and discussing the following:

- What was Benjamin Franklin's (1706-1790) role in the science of electricity?
- Who was Nikola Tesla (1856-1943) and what was his invention/contribution to electricity?
- What is Tesla's tie to Niagara Falls?
- Who was Thomas Edison (1846-1931) and what did he invent?
- Who was Michael Faraday (1791-1867) and what was his contribution to electrochemistry?

A "shocking" power struggle: Was Edison or Tesla the more important scientist?

• Take a "travel in time" trip back to the 1880's and review the life and times of these two greats in science and their inventions.

- How did Tesla and Edison know each other?
- What about their relationship caused such a battle for supremacy? Which one held the most patents?
- Discuss other luminaries of the era that were associates of Tesla such as Mark Twain.

• Discuss the differences and needs for AC and DC throughout history. What are they and why are they important today?

• Family project: Just for fun, try having an "electricity-free" period one day as an opportunity to trace the history and inventors tied to everyday electrical items.

Teacher's Guide

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The Deadly Device Worksheet

As your student plays through the game Nancy Drew: The Deadly Device, they can find information about Nikola Tesla, the War of the Currents, and other science tidbits. This worksheet provides questions (and answers on the teacher version here) for your student to fill out as they work on solving the mystery. Encourage your student to also take hand-written notes for playing the game in order to solve the mystery. If you or the student gets stuck in the game, please refer to the official game strategy guide (free pdf included with the game purchase from HeR Interactive). For additional questions and resources, please visit herinteractive.com or email us at feedback@herinteractive.com. Additionally, please review the next page for the reference and answer guide to the circuit board activity.

Q1: Who bought Nikola Tesla's Alternating Current (AC) polyphase patents?A: George Westinghouse

Ω2: Who originally invented radio? *A: Nikola Tesla*

Ω3: Who received the credit as the inventor of radio?(Circle one.)A) Guglielmo Marconi

- B) Thomas Edison
- C) George Westinghouse
- D) Alexander Graham Bell
- A: A-Guglielmo Marconi

Q4: What is Element #50 on the periodic table of elements? A: Tin (Sn)

 Ω 5: List three of Nikola Tesla's inventions mentioned in the game. (Not the patents).

A: Radio, Tesla Coil, induction motor, remote controlled toy boat, blade-less waterwheel (an early version of the Tesla turbine), fluorescent lights, Wardenclyffe Tower, plans for radar, a proposed death beam.

 $\ensuremath{\Omega6}\xspace$: To get nitric acid, you must mix together water and

07: George Westinghouse and Thomas Edison vied for the right to illuminate what big Exposition in 1893? *A: The World's Columbian Exposition* Q8: What are the four common biometric indicators used today for security methods? *A: Iris and retina scans (eyes), Voice recognition, facial shape, and fingerprints.*

Q9: In the game, you must make a chemical solution for etching a silicon wafer. The composition HF:HNO3:H2O is made up of what three components? Hint: Look in the solutions book for the Silicon (Si) solution. *A: 3 parts Hydrofluoric acid, 1 part nitric acid, 4 parts water.*

Binary Code

 $\Omega10:$ Fill in the row here in binary to make the value of 11 (eleven).

8	4	2	1	Total
				Value
-			5	11

A:

8	4	2	1	Total Value
1	0	1	1	11

Or written out: 1011 = 11

A: nitrogen dioxide.

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The Deadly Device Worksheet

For the last part of the student worksheet, the student can cut out the components and place them on the green circuit board according to the line schematic. Note: there are two areas below where a diode and a resistor can be swapped in place. The answers and reference guide are here below. Optional: provide a glue stick or tape to keep their answers in place.







Note: G can be swapped with D, and Q can be swapped with P.

The Deadly Device Worksheet

Answer the questions as you play and explore Nancy Drew: The Deadly Device! It helps to take hand-written notes, too!

Q1: Who bought Nikola Tesla's Alternating Current (AC) polyphase patents?

Q2: Who originally invented radio? A:

Q3: Who received the credit as the inventor of radio? (Circle one.)

A) Guglielmo Marconi

A:_____

- B) **Thomas Edison**
- C) **George Westinghouse**
- D) Alexander Graham Bell

Q4: What is Element #50 on the periodic table of elements? A:

Q5: List three of Nikola Tesla's inventions mentioned in the game. (Not the patents). A: _____

Q6: To get nitric acid, you must mix together water and _____.

Q7: George Westinghouse and Thomas Edison vied for the right to illuminate what big Exposition in 1893? A:

Q8: What are the four common biometric indicators used today for security methods? A: ______

Q9: In the game, you must make a chemical solution for etching a silicon wafer. The composition HF:HN03:H20 is made up of what three components? Hint: Look in the solutions book for the Silicon (Si) solution.

A:_____

Binary Code

Take a look at the example grid to the right. The top row represents the place value of each vertical column. If a "1" is in that column, the horizontal values of that number is added. For example below: The first horizontal row is worth 2 because a "1" is placed only in the "2" value column. The third row is worth 3 because there is a 1 in the 2 column. and a 1 in the 1 column. 1+2=3.

8	4	2	1	Total Value
0	0	1	0	2
0	1	0	0	4
0	0	1	1	3
1	1	0	0	12

8	4	2	1	Total
				Value
	2 E			11

Q10: Fill in the row here in binary to make the value of 11.

Just like in the game, cut out and place the components on the circuit board according to the schematic (sketch reference). The dotted lines on the circuit board shows the solder points. Note: There are two ares where a diode and resistor can be swapped.



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Play these other great educational Nancy Drew Games and download the accompanying worksheets for added learning!



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