



ABOUT THE BOOK

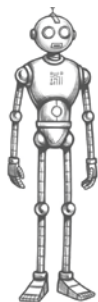
In a future when humans are believed to be extinct, what will one curious robot do when it finds a girl who needs its help?

In the future, robots have eliminated humans, and twelve-year-old robot XR_935 is just fine with that. Without humans around, there is no war, no pollution, no crime. Every member of society has a purpose. Everything runs smoothly and efficiently. Until the day XR discovers something impossible: a human girl named Emma.

Now, Emma must embark on a dangerous voyage with XR and two other robots in search of a mysterious point on a map. But how will they survive in a place where rules are never broken and humans aren't supposed to exist? And what will they find at the end of their journey?

Humorous, action-packed, and poignant, *The Last Human* tells a story about friendship, technology, and challenging the status quo no matter the consequences. It's not just about what it means to be a robot—it's about what it means to be a friend.

MEET THE CHARACTERS



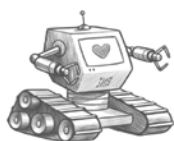
XR_935

Readers see the world through XR's robotic eyes. And it thinks this world is great. Now that humans are gone, Earth's problems are solved. XR has one—and only one—purpose: to install solar panels. It only begins to question this purpose when it meets a human named Emma.



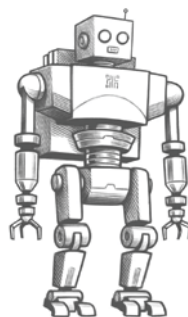
EMMA

Emma has lived her entire life underground, inside a bunker. But when a disease sweeps through the bunker, she's forced to leave, to seek out the point her father marked on a map. But her journey won't be easy. The world aboveground is unfamiliar—and filled with robots.



SKD

This robot has a very unique way of communicating. Instead of talking, its screen lights up with emojis.



CEERON

The huge, hulking robot carries solar panels in its metal backpack. It also has a fondness for human habits and sayings. And especially their jokes.



PRESIDENT

The leader of the Hive, the representative of all the robots on Earth. PRESIDENT shines with platinum skin and golden eyes.

PRE-READING ACTIVITIES

1. Take a look at the front cover. What do you think the book is about? When do you think it takes place? What from the illustration supports your answers?
2. Read the summary. What questions does it raise about the story?
3. Imagine yourself as the last human on Earth. Make a list of the important things you would want to have with you.
4. If a robot walked through the door right now, what would you say to it?
5. As you read *The Last Human*, keep a journal of words that you have not heard before. Also, make notes about ideas or concepts that you would like to discuss with your peer group.

DISCUSSION QUESTIONS

1. *The Last Human* begins with a bold statement: “The world is so much better off without humans.” Read this out loud and think about it. What does it tell us about the narrator? And about the world we are about to enter?
2. Describe XR_935’s home and its relationship with its FamilyUnit. How are they different from the average human’s situation today? How are they similar?
3. In an early chapter, XR describes a time when machines were “highly advanced in certain areas (chess/music/math), but lagged far behind humans in others.” In the book, this is a description of the distant past. But in reality, it offers a snapshot of our world today. Humans are still in charge (at least for now!), but artificial intelligence and robotics are advancing rapidly. This raises some interesting questions, such as the following:
 - Should we be excited about the future of technology? Worried? Or both?
 - What can be done to make sure Artificial Intelligence (AI) does not become a threat?
 - How has technology evolved in your lifetime? What about your parents’ lives?
4. When speaking with its FamilyUnit about movies, XR points out that the stories told in movies “were fake.” Parent_2 responds by saying: “That is the nature of a story. It is a lie that helps explain the truth.” XR is confused by this statement. What do you think it means?
5. When XR gets overwhelmed, it counts to a million in binary. What are some ways that human kids deal with stressful situations?
6. The Hive is a vast network that allows robots to connect with each other and share information. Sound familiar? The Internet certainly has many similarities. And with smartphones, we can be connected to our own “Hive” at all times, everywhere we go.
 - How has the Internet changed our world?
 - What consequences have been positive and what have been negative?

7. How does XR differ from SkD? How does it differ from Ceeron? And what do the three robots have in common?
8. XR offers this definition of a Paradox: “When two opposite ideas are true at the same time.” Why does XR call Emma a paradox?
9. The bunker where Emma grew up was designed to keep a community of humans alive beneath the surface of the Earth.
 - What items would you consider essential for a bunker?
 - If you were told you had to move into a bunker and you could only take three things with you, what would they be?
10. When the characters visit the abandoned electronics store, they encounter an area called the “ROBOT ZONE”. This offers an interesting opportunity to think about robots in our world. Name some examples of robots that exist today.
11. Emma and the robots discuss the different meanings of the word cool. Depending on the context, it can mean cold, exciting, fashionable—and more! What are other examples of words that have multiple meanings?
12. In the Mountain Pass Mall, XR assures Emma that humans were not all wasteful. XR even tries on human clothing. Describe how XR’s character has changed since beginning his adventure with Emma. At this point in the story, how is XR different from the robot we met at the beginning of *The Last Human*?
13. Inside the DigitalDome, we discover that PRESIDENT has only been sharing the negative data files about humans. Why do you think PRESIDENT hid the full truth about humans?
14. Near the end of the book, the Hive decided to “share the world with humans.” But there are still some robots that view humans as a terrible threat. And some humans that “continued to see all robots as metal monsters.” Clearly, this new society faces some major difficulties. What steps should the community of robots and humans in this story take to ensure they live together peacefully?
15. This story identifies a lot of differences between humans and robots, but there are some characteristics that Emma and her robot friends have in common. What words can you use to describe things that Emma and her robot friends have in common?
16. In the beginning of *The Last Human*, XR holds extremely negative views of humans. These views are reinforced by other robots, such as XR’s FamilyUnit and PRESIDENT. But when XR meets Emma—and it spends more time with her—its perspectives begin to change. XR sees the good in humanity and starts to question the opinions it once held.
 - What are the parallels to our world today?
 - What does this story tell us about prejudice in society? And about overcoming prejudice?

CLASSROOM ACTIVITIES

DESIGN YOUR OWN ROBOT

STEP 1: In *The Last Human*, XR states that “Each of us is built with a purpose.” Start this activity by answering the following: If you could build your own robot, what would its purpose be?

STEP 2: List all the features a robot would need to fulfill that purpose. It may help to think about the robot’s dimensions and anatomy:

- Size
- Head
- Body
- Legs, Wheels, or Treads?
- Shape
- Eye(s)
- Arms/Hands

STEP 3: On a blank sheet of paper, draw your robot. Make sure to include all the features you listed.

EXAMPLE:

1. **Purpose:** To Clean My Room
2. **Features:** Treads, for rolling over dirty laundry. Hands are adaptable claws, able to pick up empty soda cans, make a bed, organize shelves. Smell sensors to detect stinky socks and underwear.

WRITE A SECRET MESSAGE IN BINARY

Binary is an important concept in *The Last Human*. The chapters are numbered in binary code. When XR gets nervous, it counts to a million in binary. But machines don’t just use binary for counting. They also use it for spelling.

STEP 1: Each student should receive a copy of the chart below:

STEP 2: Each student should write out their name in binary. For example, the name “Lee Bacon” would look like this in binary:

01001100 01100101 01100101 00100000 01000010 01100001 01100011 01101111 01101110

STEP 3: Students break into groups of two. Each student writes a secret message (no more than twelve letters) in binary. It may help to write it out in English first. Just make sure the partner doesn’t see the message!

STEP 4: Partners exchange binary messages. Using the chart provided, translate the message from Binary into text.

STEP 5: Compare results!

Character	Binary Code	Character	Binary Code
A	01000001	a	01100001
B	01000010	b	01100010
C	01000011	c	01100011
D	01000100	d	01100100
E	01000101	e	01100101
F	01000110	f	01100110
G	01000111	g	01100111
H	01001000	h	01101000
I	01001001	i	01101001
J	01001010	j	01101010
K	01001011	k	01101011
L	01001100	l	01101100
M	01001101	m	01101101
N	01001110	n	01101110
O	01001111	o	01101111
P	01010000	p	01110000
Q	01010001	q	01110001
R	01010010	r	01110010
S	01010011	s	01110011
T	01010100	t	01110100
U	01010101	u	01110101
V	01010110	v	01110110
W	01010111	w	01110111
X	01011000	x	01111000
Y	01011001	y	01111001
Z	01011010	z	01111010
SPACE	00100000		

BITS, BYTES, AND BEYOND

Some of the terms used to measure the size of data will be familiar to those who use computers. Others probably won't. And some of them just sound like crazy made-up words! Let's start by looking at our terms.

- Bit: A bit (short for "binary digit") is the smallest unit of measurement of data. It contains a single binary digit: either a 0 or 1.
- Byte (B): Collection of eight bits. The basic unit of memory on many computers. In binary, numbers and letters are represented in bytes.

TIP: Take a look at the chapter numbering method in *he Last Human*. Each chapter is an eight-bit binary number. You can also look at the "Write a Secret Message in Binary" activity. Each letter is represented by eight bits.

At this point, the units of measurement start getting REALLY big.

- Kilobyte (KB): A thousand bytes.
- Megabyte (MB): A million bytes.
- Gigabyte (GB): A billion bytes.
- Terabyte (TB): A trillion bytes.
- Petabyte (PB): A thousand terabytes
- Exabyte (EB): A thousand petabytes
- Zettabyte (ZB): A thousand exabytes
- Yottabyte (YB): A thousand zettabytes

QUESTIONS:

1. Where have you seen these terms before?
2. What is the biggest unit of measurement that you have come across on computers at home or school?
3. How many bytes are in 650 MB? How many bits would that be?

CREATE A MOVIE POSTER

Congratulations! You have been selected to produce the film adaptation of *The Last Human*! But don't buy your fancy outfit for the premiere just yet. First, you have some work to do.

STEP 1: Pick your cast. Who should play Emma in the movie? Who will do the voices of the main robot characters: XR, Ceeron, and PRESIDENT?

STEP 2: How will the movie be filmed? Will you use computer animation (like Pixar movies or *Despicable Me*)? Or should you shoot the movie with real actors and special effects (like *Star Wars*)? Why did you make your choice?

STEP 3: What scene from the book are you especially excited to film?

STEP 4: Draw a movie poster. If you need inspiration, look up a few posters online.

RESOURCES

Below are some resources that educators and parents could find helpful for further exploration of themes and topics related to *The Last Human*.

Robots in Real Life!

- BOSTON DYNAMICS

Originally a spin-off of MIT, Boston Dynamics designs amazing animal and humanoid robots. Their videos are both entertaining and engaging.

Find out more: www.youtube.com/user/BostonDynamics

Computer History

- A BRIEF HISTORY OF COMPUTER SCIENCE

The World Science Festival presents an easy-to-read timeline of important events in the history of computers.

Find out more: www.worldsciencefestival.com/infographics/a_history_of_computer_science

Programming and Coding

- TYNKER: CODING FOR KIDS

With Tynker's revolutionary approach, kids learn to code using visual code blocks that represent real programming concepts. They progress to text languages like JavaScript and Python as they continue to play through 2,000+ interest-driven activities.

Find out more: www.tynker.com

- KHAN ACADEMY

Known for its extensive and challenging math games, Khan Academy has free basic programming tutorials that teach kids how to build graphics, animations, interactive visualizations, and more.

Find out more: www.khanacademy.org/computing/computer-programming

SELECT COMMON CORE STATE STANDARDS ADDRESSED BY THE DISCUSSION QUESTIONS AND ACTIVITIES IN THIS GUIDE

The suggested discussion questions and activities in this teaching guide can be modified for the appropriate grade level. Accordingly, the Common Core Standards are addressed across several categories and grade levels. Select standards met using this guide are shown below.

CCSS ELA-Literacy Reading

RL 5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

RL 6.2 Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.

RL 7.3 Analyze how particular elements of a story or drama interact (e.g., how setting shapes the characters or plot).

RL 8.6 Analyze how differences in the points of view of the characters and the audience or reader (e.g., created through the use of dramatic irony) create such effects as suspense or humor.

CCSS ELA-Literacy Writing

W 5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

W 6.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS ELA-Speaking and Listening

SL 6–7 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 6-7 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS ELA-Science and Technical Subjects

RST 6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

THE LAST HUMAN

By Lee Bacon



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PRAISE

“An amusing and upbeat adventure, with glimpses of a fading human footprint on the planet and a suggestion that there’s hope for a shared AI and human future.”

— *Kirkus Reviews*

“A tech-fueled friendship adventure ideal for fans of Peter Brown’s Wild Robot series.”

— *Booklist*

“Against a timely backdrop, Bacon explores messages of friendship, tolerance, and cooperation with wit and thoughtfulness.”

— *Publishers Weekly*

ABOUT THE AUTHOR

Lee Bacon is the author of the Joshua Dread and Legendtopia series, as well as the audio original children’s books *The Mystery of Alice* and *Interview with the Robot*. Lee has visited hundreds of schools, libraries, and bookstores across the country to talk about writing and books. His work has been translated into twenty-three languages.

Visit Lee online at leebaconbooks.com.