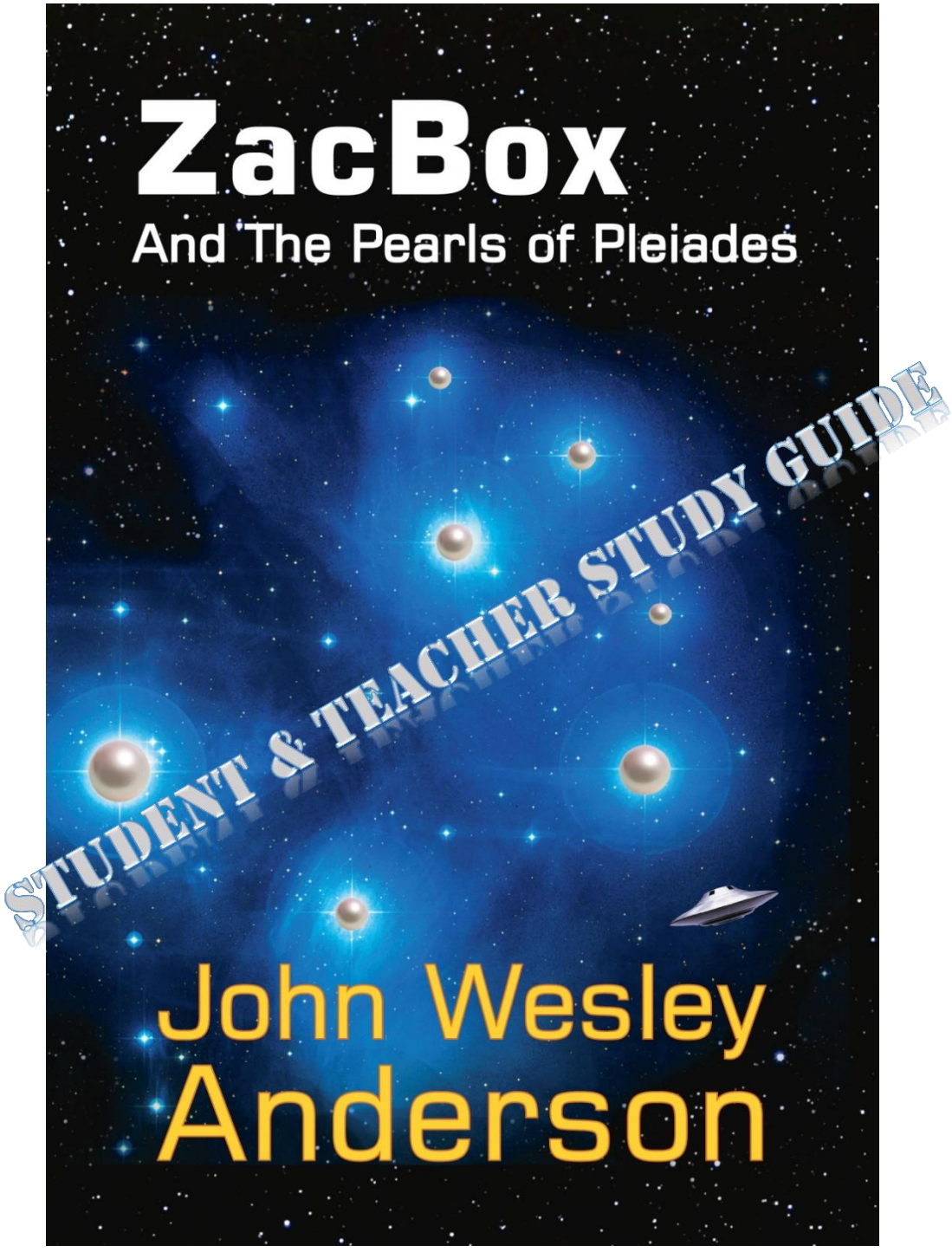
STEM STUDY GUIDE

For Students & Teachers

This guide serves as a companion for Book I in the *ZacBox Saucer Series*.



Introduction:

This study guide is intended to serve as a companion for Book 1 of 5 in the *ZacBox Saucer Series* written for young adults (YA ages 12-18). This science-fiction book series encourages students to explore a future career in aerospace while reinforcing the importance of science, technology, engineering and mathematics (STEM). The ZacBox book series introduces students to cultures different from their own and challenges them to imagine what adventure lies waiting to be discovered in space exploration. While the ZacBox books are copyrighted, the study guides are intentionally not copyrighted so they can be freely copied, downloaded as a PDF and shared to help advance student learning.

Students:

Have you ever thought about pursuing a career in space? If so, this book and study guide was written with you in mind. *ZacBox and the Pearls of Pleiades* is the first book in the *ZacBox Saucer Series* which are intended to be a fun way for you to learn about space. In this book you will meet 15-year-old ZacBox and his 4 adventurous teenage crew members as they leave Earth aboard a flying saucer. Their mission is to rescue a Pleiadian, stranded on one of the icy moons of Jupiter, and then travel to Pleiades.

Teachers:

This study guide serves as a curriculum to teach the STEM cross-discipline units of study for grades 8-12. The *ZacBox Saucer Series* was written for young adults (YA ages 12-18) with a Lexile level target for grades 10-12. Each book is intended to be read sequentially with the study guide applied at the end of each chapter so new content can be studied in context. ZacBox books can be a good extension for summer reading programs.

Book I - *ZacBox and the Pearls of Pleiades*

Chapter 1 – Fry Bread and a Stick Shift Page 1

Core Content & STEM Discussion Points:

- How can you say “Hi, hello, how are you” in the Ute language?
- What can satellite phones do that regular cellphones cannot do?
- How do satellites help facilitate remote credit card transactions?

Chapter 2 – Whole Lotta Shakin’ Going On Page 27

Core Content & STEM Discussion Points:

- How is the severity of an earthquake measured?
- What does GPS stand for and how is it used for navigation?
- How did Galileo change the way people thought about the Earth?

Chapter 3 – A Jump Drive Like no Other Page 33

Core Content & STEM Discussion Points:

- What is a USB Jump Drive and how can it be used?
- What numbers follow 33 and 54 in the Fibonacci Sequence?
- In which constellation is the Pleiades Star Cluster located?

Chapter 4 – Beep, Beep, Beep! Page 53

Core Content & STEM Discussion Points:

- What did Leonardo Fibonacci introduce to the Latin world?
- What two numbers or symbols are used to write binary code?

- Who is Neil deGrasse Tyson and why is he famous?

Chapter 5 – Rust Bucket Classic Page 89

Core Content & STEM Discussion Points:

- The author, Homer, wrote what two central works of Greek literature?
- Name two books or movies structured on a "Hero with a Thousand Faces."
- What is most fascinating about the Miraculous Staircase in Santa Fe, NM?

Chapter 6 – The von Braun Kilt Page 115

Core Content & STEM Discussion Points:

- What is the New General Catalogue (NGC) used to catalogue?
- When did the Bronze Age begin and why was it important?
- What are the advantages of UAV over manned aircraft or spacecraft?

Chapter 7 – From ZPE Drive to Zen Page 139

Core Content & STEM Discussion Points:

- What was "Operation Paperclip" and its impact on U.S. space programs?
- What are the distinctions between LEO and GEO and how are both used?
- How can the acronym SWaP be applied to designing aircraft or spaceships?

Chapter 8 – Get Your OODA Loop On Page 173

Core Content & STEM Discussion Points:

- What is a quark-jump and how could it be used?
- How does Electra's crew use their ECU in space?
- What does OODA Loop mean and how can it be used by pilots?

Chapter 9 – Ganymede or Bust Page 217

Core Content & STEM Discussion Points:

- What are the dimensions of modern U.S. aircraft carriers?
- What is the NGC number for the Omega Centauri Star Cluster?
- What is an Einstein-Rosen Bridge and could they be used for space travel?

Chapter 10 – A Puckster's Paradise Page 241

Learning Objectives & Discussion Points:

- What year did the Voyager Golden Records get launched into space?
- Was it a good or bad idea to send the Voyager Golden Records into space?
- When were the ancient pyramids of Tikal built and how were they laid out?

Chapter 11 – Pinned by the Queen Page 155

Core Content & STEM Discussion Points:

- What are the Seven Teachings ZacBox learned from White Elk?
- Where were the Lyres of Ur discovered and why are they important?
- Name three STEM subjects Leonardo da Vinci studied?

Chapter 12 – Homeward Bound Page 273

Core Content & STEM Discussion Points:

- How can astronauts avoid muscle atrophy while in space?
- Why did ZacBox not want his race time recorded at the finish line?
- What did ZacBox find hidden inside his great-grandfather's flute?

Additional Resources:

- **NASA STEM Engagement: www.nasa.gov**
- **Space Foundation: www.SpaceFoundation.org**
- **STEM U.S. Department of Education: www.ed.gov**

Space image provided courtesy of the NASA Hubble Space Telescope (HST): This is the Messier 106 spiral galaxy (also known as NGC 4258) located in the constellation Canes Venatici. Photo Credit: NASA, ESA, the Hubble Heritage Team (STScl/AURA), and R. Gendler (for the Hubble Heritage Team). Acknowledgement: J. GaBany.

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