

# CONTENTS

## HOW TO USE THIS BOOK 4

Characters	8
Introduction	10

## UNIT 1: ENERGY

1: Energy of Motion	12
2: Types of Energy	30
3: Energy Transfer	48
4: Losing Energy	68
5: Thermal Energy	88
6: Energy Conservation	106

## UNIT 2: LANDFORMS

7: Rocks	126
8: Erosion	146
9: Features	166
10: Continents	186
11: Mountains & Volcanoes	204

## UNIT 3: BODY SYSTEMS

12: Living Things	224
13: Movement	244
14: Metabolism	264
15: Transport	284
16: Balance	304

## HINTS 324

## SOLUTIONS 328



## QUESTION TYPES

Every question students are expected to answer is numbered and has an answer or brief discussion in the back, beginning on page 328.

There are a wide variety of question types including ones marked by the icons below:

### ★ CHALLENGE:

Starred questions and tasks have hints in the back starting on page 324.

### 💬 DISCUSSION:

Find a partner or group and work through these questions together.

### 🖥️ RESEARCH:

Students will need access to online resources to answer these questions.

### 📝 JOURNAL:

Collect answers to these questions in a separate science journal notebook.

## STANDARDS

BA Science 4A content is aligned to the Next Generation Science Standards (NGSS), but often goes well beyond what is typically expected of students. Together with 4B, Level 4 will cover all of the concepts, practices, and standards outlined for grade 4.

Among the NGSS standards covered in this book are:

### Energy (Unit 1: Chapters 1-6)

Explore the relationship between speed and energy. (4-PS3-1)

Observe how energy is transferred between objects. (4-PS3-2)

Predict changes in energy during collisions. (4-PS3-3)



### Processes that Shape Earth (Unit 2: Chapters 7-11)

Explain evidence for changes in landscapes over time. (4-ESS1-1)

Observe the effects of weathering and erosion. (4-ESS2-1)

Explore patterns in Earth's features with maps and data. (4-ESS2-2)



### Structure and Function (Unit 3: Chapters 12-16)

Explore the functions of plant and animal structures. (4-LS1-1)



# MATERIALS

## SCIENCE JOURNAL

Every student should collect their work in a science journal. Any notebook will do.

## COMMON ITEMS (Used in several activities)

- Scissors
- Water
- Colored pencils
- Tape
- Disposable straws
- Centimeter ruler
- Glue
- Cereal boxes
- Video camera (optional)

## CHAPTER 1

- Marble
- Dry sand or similar material
- Meter stick or tape measure
- Bucket

## CHAPTER 2

- 5 coins or similar tokens

## CHAPTER 3

- 3 red and 3 black checkers or similar
- Small flat table
- Bowl
- Plastic wrap

## CHAPTER 4

- Various balls
- Meter stick or tape measure

## CHAPTER 5

- Balloon
- Paperclip or metal coat hanger
- Plastic spoon
- Plastic bag
- Metal spoon
- Napkins
- Dry laundry powder
- Ice cubes

## CHAPTER 6

- Digital kitchen scale
- Sugar
- Basketball or similar
- Measuring cups
- Spoon
- Tennis ball or similar

## CHAPTER 8

- New sidewalk chalk
- Plastic food container
- Salt
- Flour
- Plastic bags
- Small glass bottle
- Disposable foil pan
- Dirt
- Small shovel
- Gallon jug
- Nail
- Wood, bricks, or other scrap materials
- Video camera (optional)

## CHAPTER 10

- Tangerine

## CHAPTER 11

- Juice and smoothie (optional)

## CHAPTER 12

- Ends from celery, cabbage, sweet potatoes, or onions
- Shoe box
- Small pot of soil
- 3-5 beans or seeds
- 2 coins

## CHAPTER 13

- String
- Beads

## CHAPTER 14

- Foods with nutrition labels

## CHAPTER 15

- Funnel or plastic water bottle
- Paper towel tube
- Balloon
- Stopwatch or timer
- White fresh cut flowers
- Paper towel
- Liquid food coloring
- Eye dropper
- Paperclip
- Vegetable oil

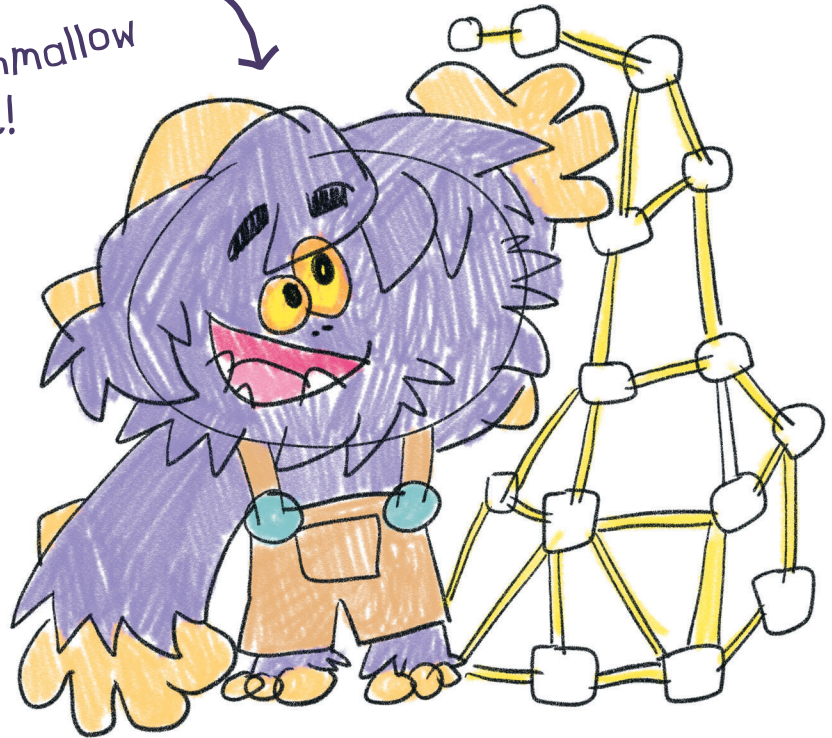
## CHAPTER 16

- 6-sided die
- 2 small game tokens
- 16 dry beans or corn kernels
- Rubbing alcohol (optional)

Grogg (me)

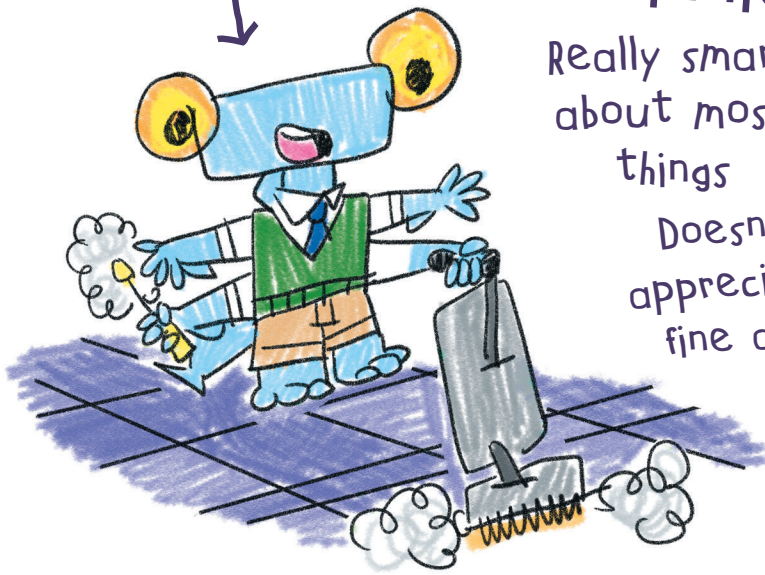
Built a spaghetti-and-marshmallow tower taller than me!

(Works best with uncooked ingredients)



Alex

His room is waadaday cleaner than mine  
makes neat vacuum patterns in his rug



Winnie

Really smart about most things  
Doesn't appreciate fine art



This does NOT look like me!

Lizzie

Loves to read  
writes book reviews on her own  
SCALES TALES website



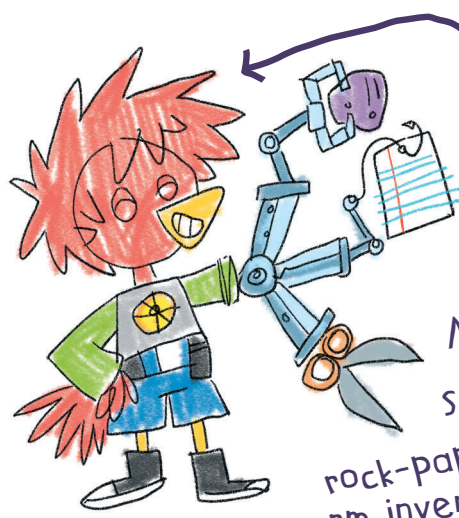


**Mr. E.**  
school substitute  
Also in a band!  
Says his music style is  
"xylo-funk meets prog-polka"

**Ms. Y.**  
Has the world's  
second-biggest  
collection of sand-filled  
bottles!



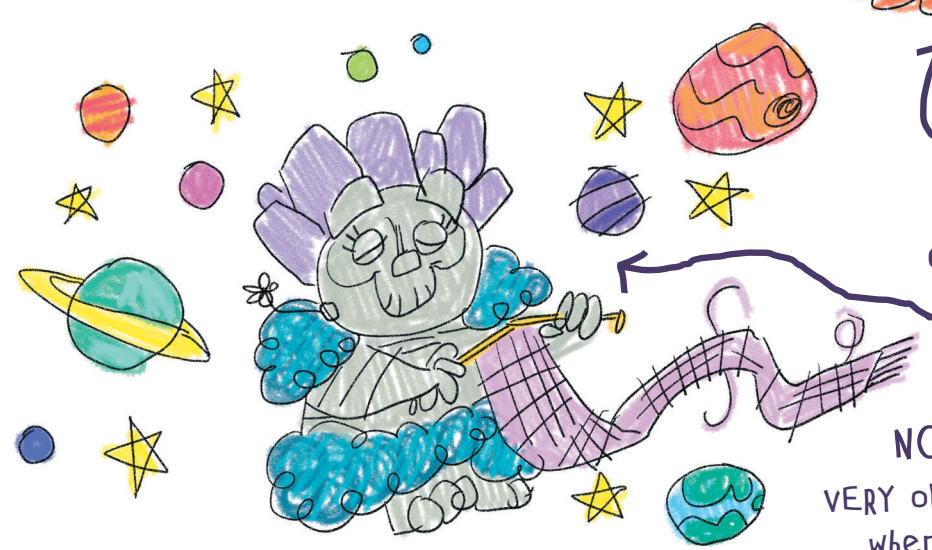
(they're from all the places  
she's gotten lost)



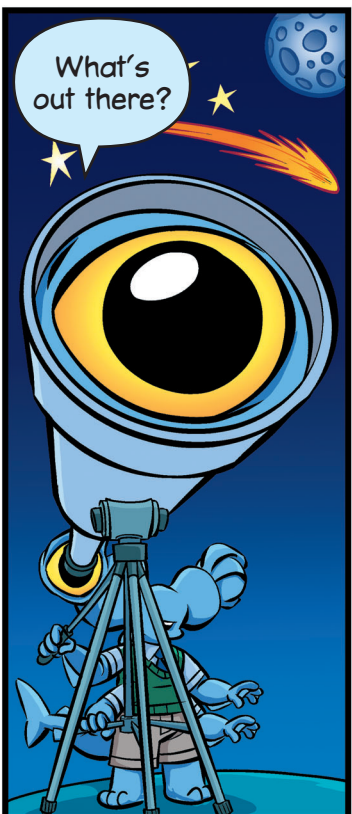
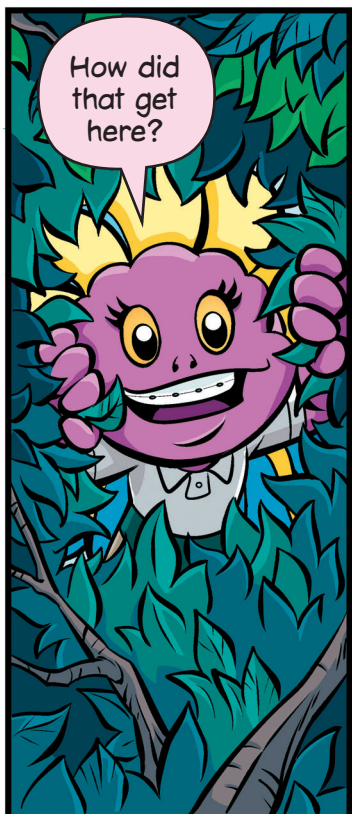
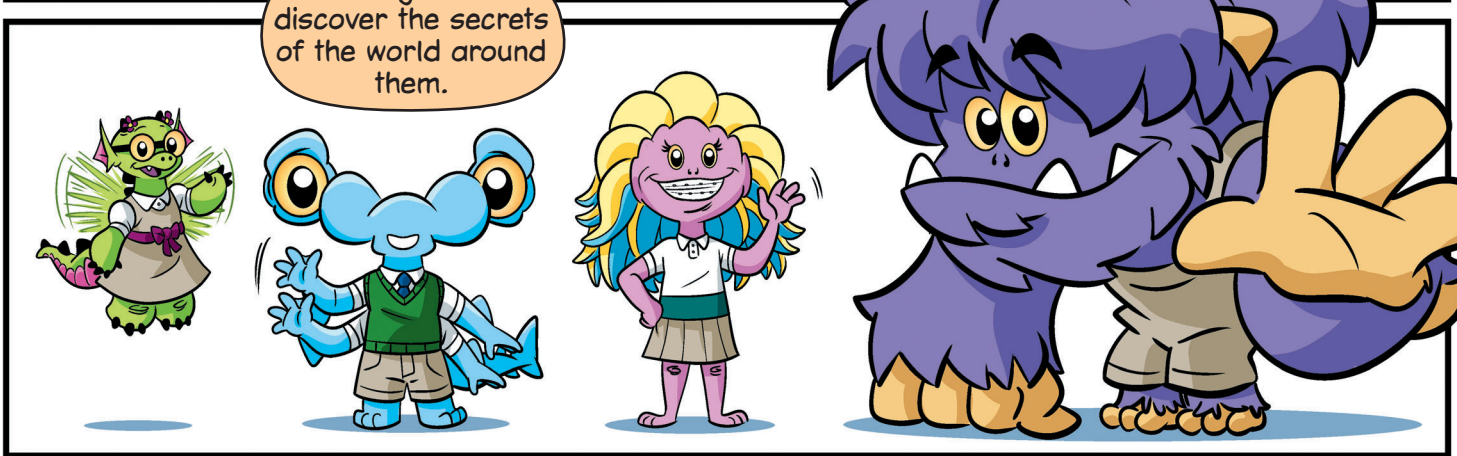
**Zak**  
ALWAYS  
in the  
Makerspace  
Said my  
rock-paper-scissors  
arm invention was  
"VERY creative"



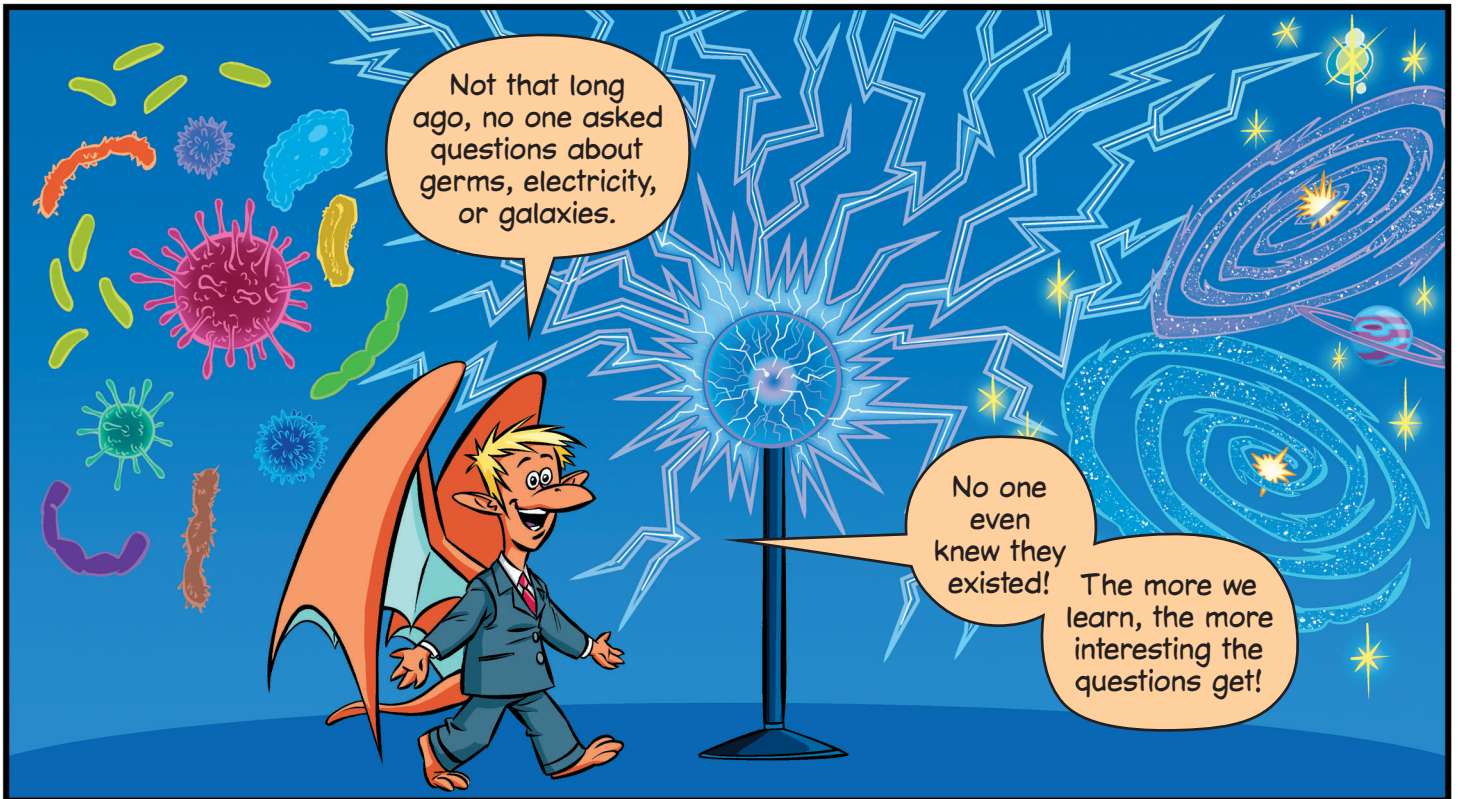
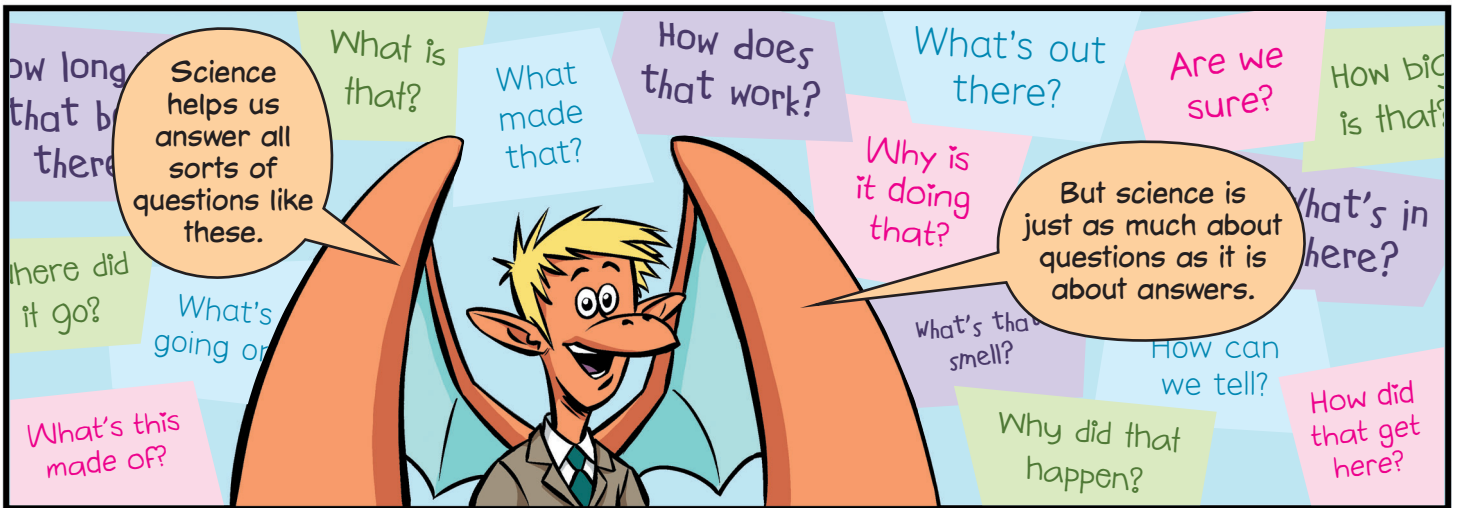
**R&G**  
School  
custodian(s)  
~~has~~ ~~have~~  
totals:  
1 tail  
2 heads  
3 eyes  
4 arms



**Dr. Hau**  
NOT a real rock.  
VERY old - old enough to remember  
when there were NINE planets!







THE BEAST ACADEMY WORLD WORKS JUST LIKE OURS. THE CREATURES MAY LOOK DIFFERENT, BUT THE WAY THINGS WORK AND WHAT THEY'RE MADE OF ARE THE SAME AS HERE ON EARTH!