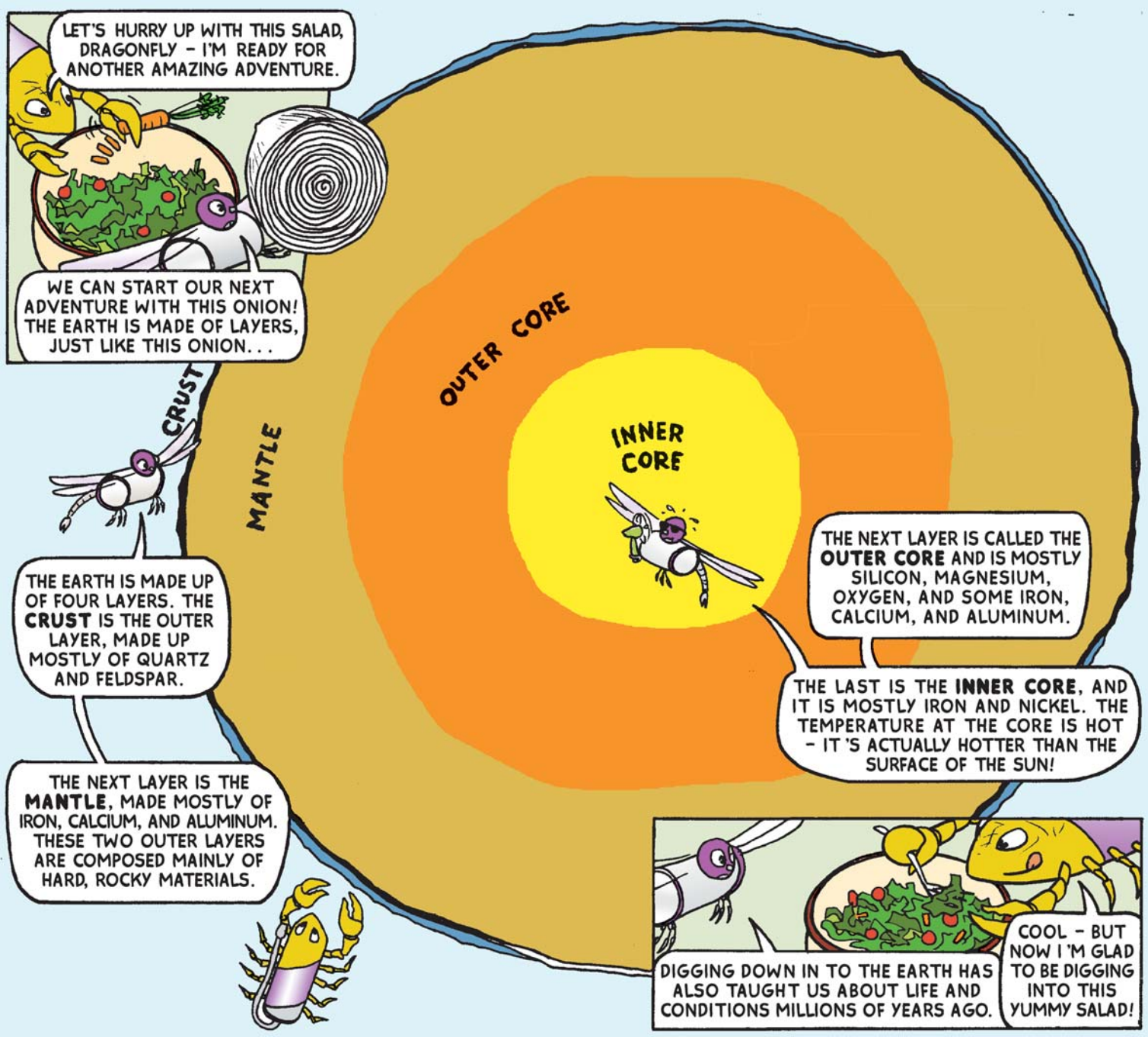
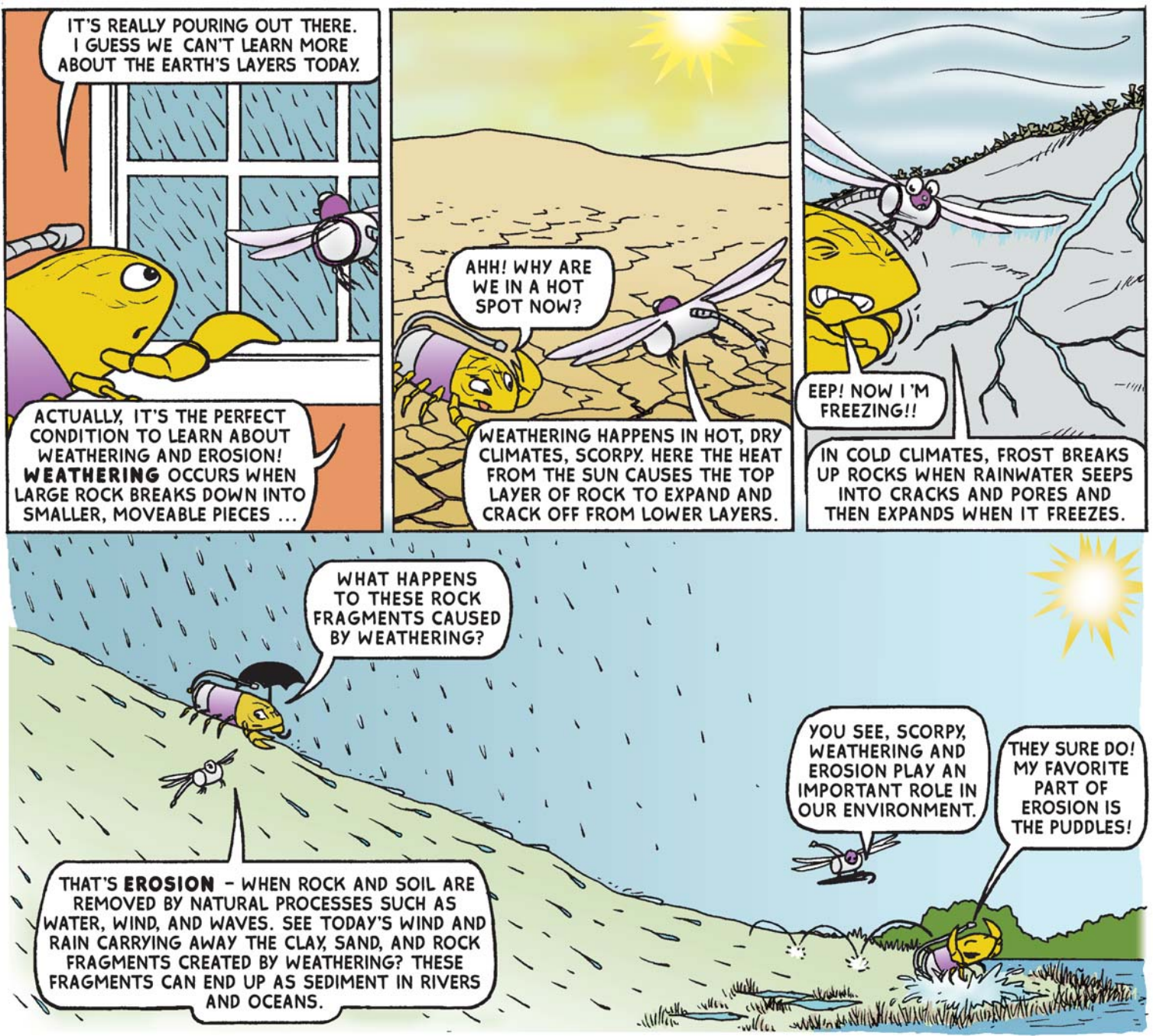
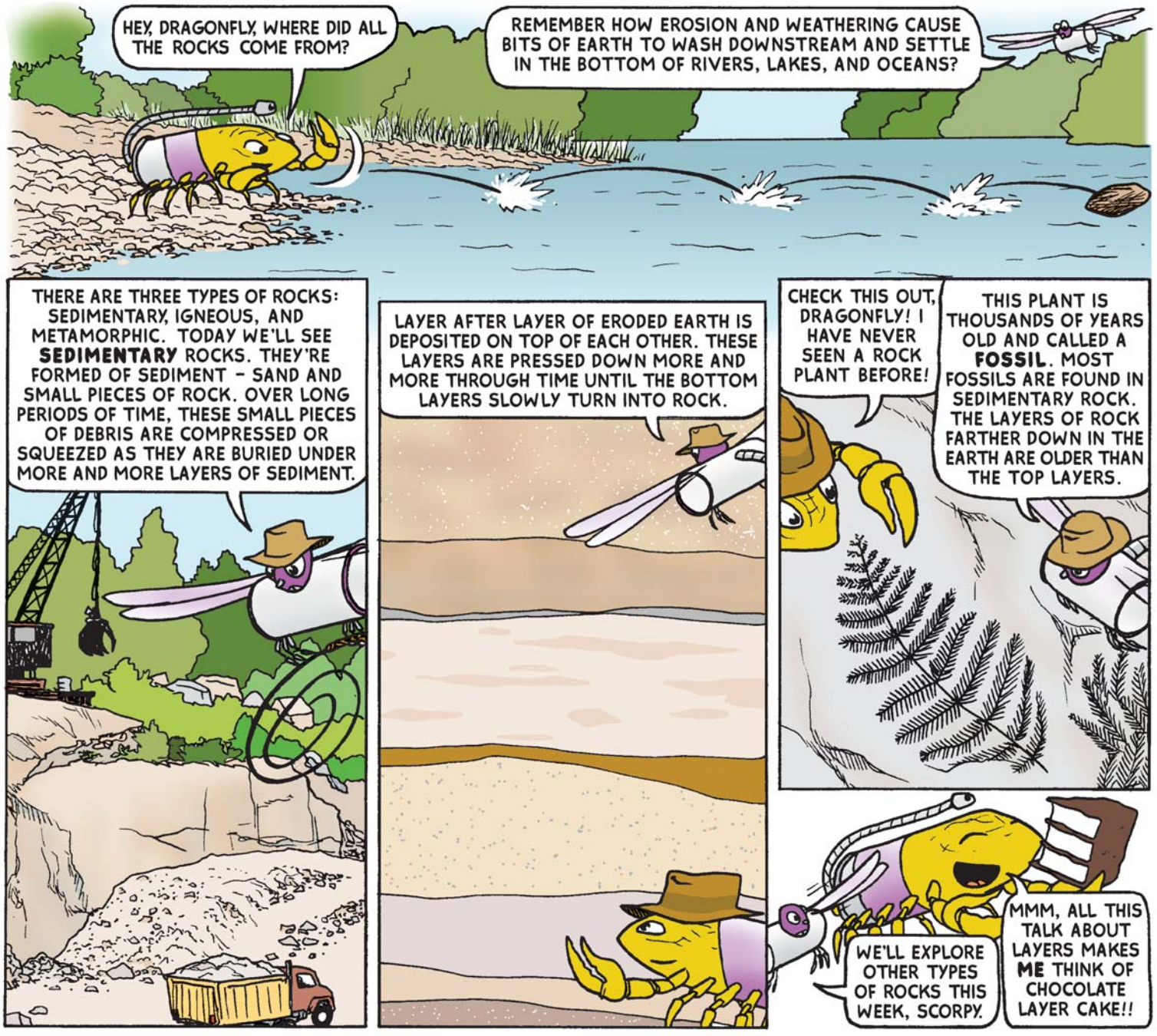
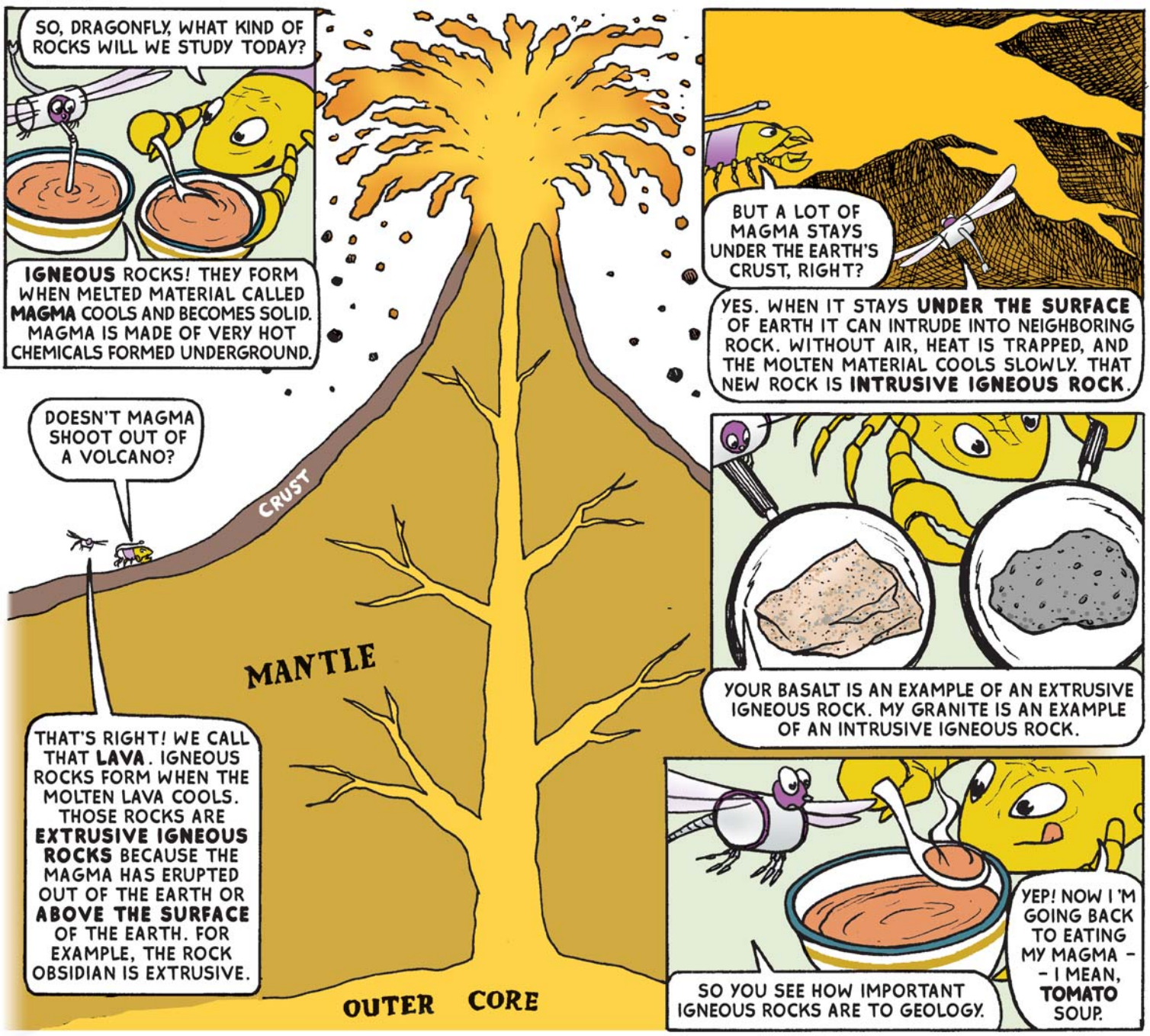
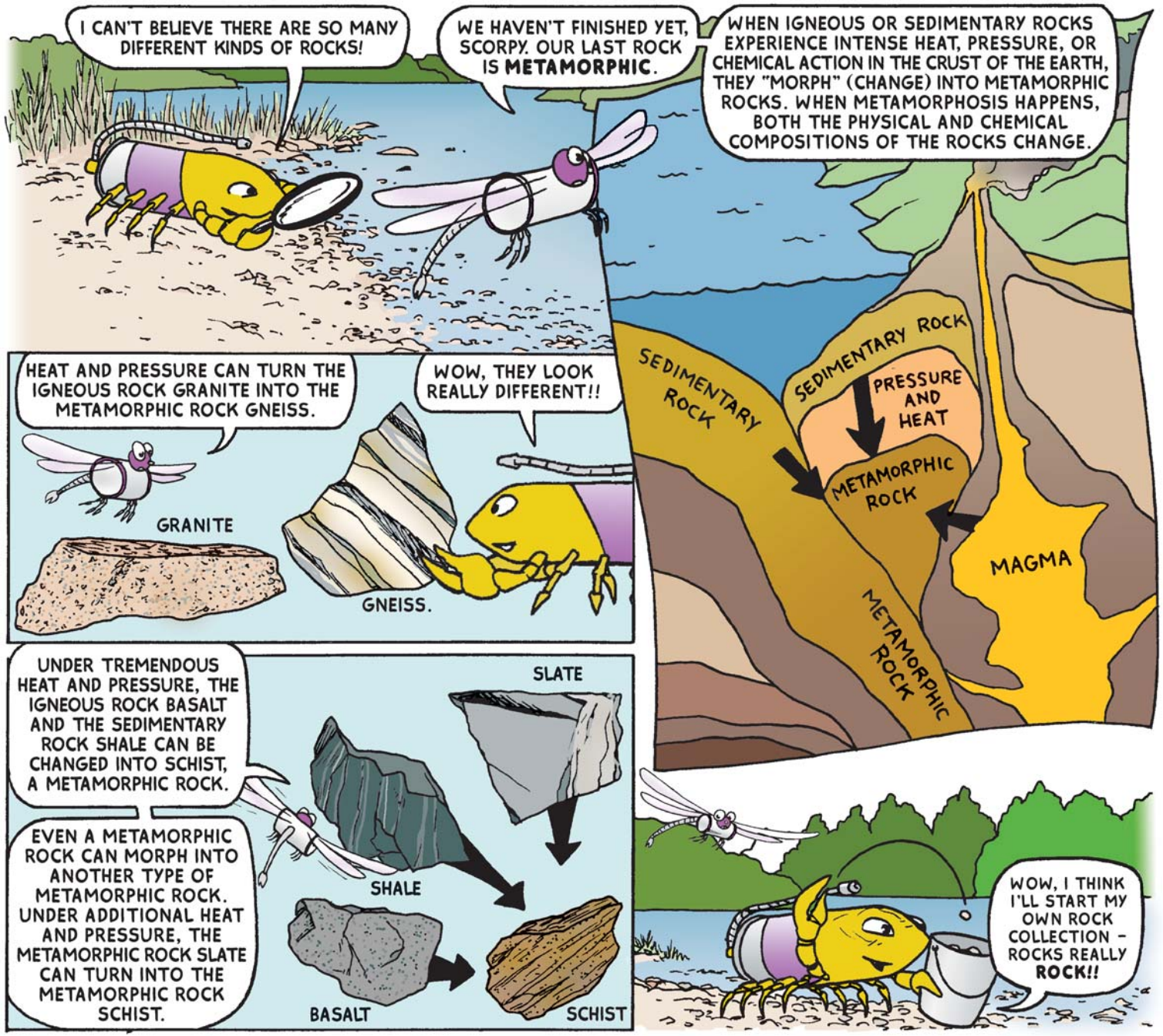

LET'S HURRY UP WITH THIS SALAD, DRAGONFLY – I'M READY FOR ANOTHER AMAZING ADVENTURE.
WE CAN START OUR NEXT ADVENTURE WITH THIS ONION! THE EARTH IS MADE OF LAYERS, JUST LIKE THIS ONION...
CRUST
MANTLE
OUTER CORE
INNER CORE
THE EARTH IS MADE UP OF FOUR LAYERS. THE **CRUST** IS THE OUTER LAYER, MADE UP MOSTLY OF QUARTZ AND FELDSPAR.
THE NEXT LAYER IS THE **MANTLE**, MADE MOSTLY OF IRON, CALCIUM, AND ALUMINUM. THESE TWO OUTER LAYERS ARE COMPOSED MAINLY OF HARD, ROCKY MATERIALS.
THE NEXT LAYER IS CALLED THE **OUTER CORE** AND IS MOSTLY SILICON, MAGNESIUM, OXYGEN, AND SOME IRON, CALCIUM, AND ALUMINUM.
THE LAST IS THE **INNER CORE**, AND IT IS MOSTLY IRON AND NICKEL. THE TEMPERATURE AT THE CORE IS HOT – IT'S ACTUALLY HOTTER THAN THE SURFACE OF THE SUN!
DIGGING DOWN IN TO THE EARTH HAS ALSO TAUGHT US ABOUT LIFE AND CONDITIONS MILLIONS OF YEARS AGO.
COOL – BUT NOW I'M GLAD TO BE DIGGING INTO THIS YUMMY SALAD!


IT'S REALLY POURING OUT THERE. I GUESS WE CAN'T LEARN MORE ABOUT THE EARTH'S LAYERS TODAY.
ACTUALLY, IT'S THE PERFECT CONDITION TO LEARN ABOUT WEATHERING AND EROSION! **WEATHERING** OCCURS WHEN LARGE ROCK BREAKS DOWN INTO SMALLER, MOVEABLE PIECES ...
AHH! WHY ARE WE IN A HOT SPOT NOW?
WEATHERING HAPPENS IN HOT, DRY CLIMATES, SCORPY. HERE THE HEAT FROM THE SUN CAUSES THE TOP LAYER OF ROCK TO EXPAND AND CRACK OFF FROM LOWER LAYERS.
EEP! NOW I'M FREEZING!!
IN COLD CLIMATES, FROST BREAKS UP ROCKS WHEN RAINWATER SEEPS INTO CRACKS AND PORES AND THEN EXPANDS WHEN IT FREEZES.
WHAT HAPPENS TO THESE ROCK FRAGMENTS CAUSED BY WEATHERING?
THAT'S **EROSION** – WHEN ROCK AND SOIL ARE REMOVED BY NATURAL PROCESSES SUCH AS WATER, WIND, AND WAVES. SEE TODAY'S WIND AND RAIN CARRYING AWAY THE CLAY, SAND, AND ROCK FRAGMENTS CREATED BY WEATHERING? THESE FRAGMENTS CAN END UP AS SEDIMENT IN RIVERS AND OCEANS.
YOU SEE, SCORPY, WEATHERING AND EROSION PLAY AN IMPORTANT ROLE IN OUR ENVIRONMENT.
THEY SURE DO! MY FAVORITE PART OF EROSION IS THE PUDDLES!


HEY, DRAGONFLY, WHERE DID ALL THE ROCKS COME FROM?
REMEMBER HOW EROSION AND WEATHERING CAUSE BITS OF EARTH TO WASH DOWNSTREAM AND SETTLE IN THE BOTTOM OF RIVERS, LAKES, AND OCEANS?
THERE ARE THREE TYPES OF ROCKS: SEDIMENTARY, IGNEOUS, AND METAMORPHIC. TODAY WE'LL SEE **SEDIMENTARY** ROCKS. THEY'RE FORMED OF SEDIMENT - SAND AND SMALL PIECES OF ROCK. OVER LONG PERIODS OF TIME, THESE SMALL PIECES OF DEBRIS ARE COMPRESSED OR SQUEEZED AS THEY ARE BURIED UNDER MORE AND MORE LAYERS OF SEDIMENT.
LAYER AFTER LAYER OF ERODED EARTH IS DEPOSITED ON TOP OF EACH OTHER. THESE LAYERS ARE PRESSED DOWN MORE AND MORE THROUGH TIME UNTIL THE BOTTOM LAYERS SLOWLY TURN INTO ROCK.
CHECK THIS OUT, DRAGONFLY! I HAVE NEVER SEEN A ROCK PLANT BEFORE!
THIS PLANT IS THOUSANDS OF YEARS OLD AND CALLED A **FOSSIL**. MOST FOSSILS ARE FOUND IN SEDIMENTARY ROCK. THE LAYERS OF ROCK FARTHER DOWN IN THE EARTH ARE OLDER THAN THE TOP LAYERS.
WE'LL EXPLORE OTHER TYPES OF ROCKS THIS WEEK, SCORPY.
MMM, ALL THIS TALK ABOUT LAYERS MAKES **ME** THINK OF CHOCOLATE LAYER CAKE!!


SO, DRAGONFLY, WHAT KIND OF ROCKS WILL WE STUDY TODAY?
IGNEOUS ROCKS! THEY FORM WHEN MELTED MATERIAL CALLED MAGMA COOLS AND BECOMES SOLID. MAGMA IS MADE OF VERY HOT CHEMICALS FORMED UNDERGROUND.
BUT A LOT OF MAGMA STAYS UNDER THE EARTH'S CRUST, RIGHT?
YES. WHEN IT STAYS UNDER THE SURFACE OF EARTH IT CAN INTRUDE INTO NEIGHBORING ROCK. WITHOUT AIR, HEAT IS TRAPPED, AND THE MOLTEN MATERIAL COOLS SLOWLY. THAT NEW ROCK IS INTRUSIVE IGNEOUS ROCK.
DOESN'T MAGMA SHOOT OUT OF A VOLCANO?
CRUST
MANTLE
OUTER CORE
THAT'S RIGHT! WE CALL THAT LAVA. IGNEOUS ROCKS FORM WHEN THE MOLTEN LAVA COOLS. THOSE ROCKS ARE EXTRUSIVE IGNEOUS ROCKS BECAUSE THE MAGMA HAS ERUPTED OUT OF THE EARTH OR ABOVE THE SURFACE OF THE EARTH. FOR EXAMPLE, THE ROCK OBSIDIAN IS EXTRUSIVE.
YOUR BASALT IS AN EXAMPLE OF AN EXTRUSIVE IGNEOUS ROCK. MY GRANITE IS AN EXAMPLE OF AN INTRUSIVE IGNEOUS ROCK.
SO YOU SEE HOW IMPORTANT IGNEOUS ROCKS ARE TO GEOLOGY.
YEP! NOW I'M GOING BACK TO EATING MY MAGMA -- I MEAN, TOMATO SOUP.


I CAN'T BELIEVE THERE ARE SO MANY DIFFERENT KINDS OF ROCKS!
WE HAVEN'T FINISHED YET, SCORPY. OUR LAST ROCK IS METAMORPHIC.
WHEN IGNEOUS OR SEDIMENTARY ROCKS EXPERIENCE INTENSE HEAT, PRESSURE, OR CHEMICAL ACTION IN THE CRUST OF THE EARTH, THEY "MORPH" (CHANGE) INTO METAMORPHIC ROCKS. WHEN METAMORPHOSIS HAPPENS, BOTH THE PHYSICAL AND CHEMICAL COMPOSITIONS OF THE ROCKS CHANGE.
HEAT AND PRESSURE CAN TURN THE IGNEOUS ROCK GRANITE INTO THE METAMORPHIC ROCK GNEISS.
WOW, THEY LOOK REALLY DIFFERENT!!
GRANITE
GNEISS.
SEDIMENTARY ROCK
SEDIMENTARY ROCK
PRESSURE AND HEAT
METAMORPHIC ROCK
MAGMA
METAMORPHIC ROCK
UNDER TREMENDOUS HEAT AND PRESSURE, THE IGNEOUS ROCK BASALT AND THE SEDIMENTARY ROCK SHALE CAN BE CHANGED INTO SCHIST, A METAMORPHIC ROCK.
SLATE
SHALE
EVEN A METAMORPHIC ROCK CAN MORPH INTO ANOTHER TYPE OF METAMORPHIC ROCK. UNDER ADDITIONAL HEAT AND PRESSURE, THE METAMORPHIC ROCK SLATE CAN TURN INTO THE METAMORPHIC ROCK SCHIST.
BASALT
SCHIST
WOW, I THINK I'LL START MY OWN ROCK COLLECTION - ROCKS REALLY ROCK!!