The Newtons' Workshop Study Guides

"The Bug Safari"

Episode 5
Entomology

Welcome to the unique world of Grandpa Newton's workshop, where kids can experience exciting new adventures in God's world. Each episode is power packed with science learning and exploration…the world as you've never seen it before. The quirky and lovable Newtons are certainly not your ordinary set of grandparents. In each adventure, the Newtons show their devotion to God and unusual ways to uncover more about God's incredible world. And you are invited along!

"Go to the ant, you sluggard; consider its ways and be wise!" (Proverbs 6:6)

Exploring with the Newtons

What is all the commotion? A strange insect, bigger than life, is roaming the neighborhood. Trisha's phone call shows that something is really bugging Grandma and Grandpa Newton! The mystery of Grandma's ruined prize squash and Grandpa's hole-riddled baseball cap is solved quickly. With a little detective work the culprits are discovered . . . bugs! A few blocks away, Wendell is on a mission on behalf of all bug kind. Are the Newtons likely to be swayed? One man's pest is another man's project.

Wendell's promotion of the First Annual Bug Olympics sparks yet another learning adventure. Grandpa's workshop is the perfect place to discover the purpose and plan of God's creation of insects. Why did God make bugs? Do we really need them?

As you watch this episode, look for the answers to these questions:

- Who is known as the "father of entomology"?
- Are insects and bugs the same thing?
- What are the three main body parts of insects?
- What role do insects play in the "food chain"?
- What animals depend on insects for food?
- Do insects that pester mankind have a purpose in God's world?

For Thought—and Action

"For everything God created is good." (1 Timothy 4:4a)

Fabre's keen sense of observation allowed him to see wonders that others had missed. Take a closer look at God's creation of insects. Choose a specific insect to investigate. With research, you could reproduce a poster-size food chain for your insect of choice. Does this tiny creature fit more than one portion of the food chain? What other living things are connected to this insect in the food chain? No doubt your insect detective work will allow you to further marvel at God's intricate design of all living things.

More to Explore

"Come and see what God has done, how awesome his works in man's behalf!" (Psalm 66:5)

Max's reaction to Tim's insect facts says it all: "So cool!" It is quite overwhelming to think about the approximately 750,000 to one million species of insects that share our world. In fact, some experts believe there are more than twice that many in the world. New insect species are discovered each year. How incredible to think that each of these insects was masterfully designed by our Heavenly Father!

Jean-Henri Fabre spent almost his entire life studying, writing, and teaching about these smallest of God's creatures. He wrote more than 70 books about insect behavior. His years of research proved again what he knew to be true: God was the author of all creation. Because Fabre didn't make much money, he had to be creative and invent new tools to help his observation of insects. Jean-Henri Fabre was a dedicated teacher. His life and work are definitely worth further study.

"Without God, I understand nothing. You can take my skin from me more easily than my faith in God." Jean-Henri Fabre, 1823-1915

Eagle Eye

Were you viewing with a watchful eye? Test your knowledge!

In their zeal to prepare for Wendell's Bug Olympics, Tim and Max uncovered some very interesting bug facts. Did you catch the fantastic information about the ants that Tim gave? How many different species of ants are there? How do they communicate with one another?

If you miss it the first time . . . rewind, watch it again. See what new facts you discover the second time around.

Devotional Reflection

"And we know that in all things God works for the good of those who love him, who have been called according to his purpose." (Romans 8:28)

Trisha was troubled with the news of Megan's grandmother's cancer. How could this happen? Megan's grandmother was a faithful Christian woman! This didn't seem fair. It didn't fit into Trisha's understanding of her loving God. "If creation is so great, why does this stuff have to happen?" Dad's words of comfort from Scripture were wise indeed. Throughout our lifetimes many things may not seem to make sense, but God's promises are true. Even when we can't see the good, God's purposes are at work.

"Now we see but a poor reflection as in a mirror; then we shall see face to face. Now I know in part; then I shall know fully, even as I am fully known." (1 Corinthians 13:12)

After Thoughts
(Post-Viewing Suggestions)

God is the designer of all living things. Jean-Henri Fabre spent his lifetime observing God's intricate insect creatures in their natural surroundings. Wendell's idea of a Bug Safari might be a great way to appreciate God's handiwork on display. You can organize a Bug Safari of your own. You could journey to the deepest corners of your own backyard or to your local park. Using your keen sense of observation, along with an insect examination box, you are well on your way to becoming the neighborhood entomologist. For safety, be sure to consult an insect book or your parents before you handle any insects you do not recognize. You may want to chronicle your insect observations in a journal.

Words/People to Know

Arthropods

Invertebrates that have external skeletons and jointed legs. More than 900,000 creatures, including insects, are arthropods.

Entomology

The science that studies insects and their behavior.

Jean-Henri Fabre (1823-1915)

The French entomologist who pioneered the study of insects in their natural surroundings. Born in poverty, Fabre struggled to get an education. Fabre wrote many books detailing his years of observing insects' habits and instincts. He received many honors, including the French Legion of Honor award. He is known as "the father of entomology."

Food Chain

The cycle of life powered by the sun's energy. It is composed of three divisions of living things. Producers (plants) get energy directly from the sun. Consumers (most animals, a few plants, and people) get energy by eating plants or other animals. Decomposers are living things that draw energy from dead animals or plants.

Habitat

A physical place, such as a desert, forest, single tree, or even a manmade house, where a plant or animal lives.

Insects

A sub-group of arthropods. They have three main body parts (head, thorax, and abdomen) along with six legs, antennae, and usually wings.

Invertebrates

Animals that do not have backbones.

Protozoans

A type of single-celled animal. Some protozoans live in the intestines of termites and help them to digest cellulose (wood fiber).

If you enjoyed this video, look for these other great videos for the whole family from your friends at Moody: "Moody Science Adventures-Treasure Hunt, " "The Moody Science Classics-City of the Bees," and "The Wonders of God's Creation-Animal Kingdom."

NOTES:

The Newtons' Workshop

STUDY GUIDES

The "Cell-a-bration"

Episode 6

Cytology

Welcome to the unique world of Grandpa Newton's workshop, where kids can experience exciting new adventures in God's world. Each episode is power packed with science learning and exploration…the world as you've never seen it before. The quirky and lovable Newtons are certainly not your ordinary set of grandparents. In each adventure, the Newtons show their devotion to God and unusual ways to uncover more about God's incredible world. And you are invited along!

"For you created my inmost being; you knit me together in my mother's womb." (Psalm 139:13)

Exploring with the Newtons

Hoping to land the "big one" for their pond animal project, Trisha, Tim, and Max go on a frog-hunting expedition to the pond. The trip leaves them feeling quite soggy and empty-handed. But is the jar really empty? The events that follow will prove a surprise for all involved. Meanwhile, Grandpa Newton is at it again! Another useful gadget is under construction at the Newton home.

An empty jar, a missed test question, a mail contraption . . . what learning adventures are in store in this episode of Newtons' Workshop? As you watch the video, look for the answers to these thought-provoking questions:

- What is the smallest living thing?
- How is a cell like a functioning city?
- In what ways did the scientist Antonie van Leeuwenhoek revolutionize science?
- Describe how a cell functions.
- How are Grandma's ruined cookies like God's plan for people?

For Thought—and Action

"And whatever you do, whether in word or deed, do it all in the name of the Lord Jesus, giving thanks to God the Father through him." (Colossians 3:17)

Being faithful with the small things is often a bigger challenge than it appears. Certainly, all people have areas in their life that need growth. As Mom pointed out to Tim, "God gives us responsibilities and talents in the amount He thinks we can handle." Whether it be working carefully through school assignments, striving for excellence in sports, or keeping your bedroom clean, God should be the center of all you do—even the smallest issues of life. Select an area of personal growth to commit to the Lord. Ask a parent or friend to help you be accountable to your commitment. With care God designed the smallest single-cell life, and with that same care and a special love He created you!

More to Explore

"Remember the wonders He has done." (Psalm 105:5a)

As Tim, Max, and Trisha discovered with the help of Grandpa, there is definitely more than meets the eye where pond water is concerned. The "empty" pond jar turned out to contain a whole menagerie of God's tini-

est creations. Through the aid of a microscope, what once seemed empty now was seen to contain lots of creatures that would go undetected by the naked eye.

Modern science owes much to the life and work of Antonie van Leeuwenhoek. What began as a hobby in his youth turned the science world upside down. Leeuwenhoek's fascination with tiny objects motivated him to experiment with grinding different types of viewing lenses to produce a clearer type of magnification than had been previously seen. Leeuwenhoek was the first person to prove that the tiny organisms viewed through the microscope lens were actually tiny animals—what he called "animalcules." His work proved that living things could not grow out of non-living matter. Once again evidence pointed to our great Creator. The life and work of Antonie van Leeuwenhoek would be fascinating to study further.

Eagle Eye

Were you watching with a watchful eye? Test your knowledge!

Grandpa revealed the largest cell in the world. What was it? How does Grandpa use a light bulb, food processor, and card file to teach the children about the cell city? How many cells can line up to measure an inch?

If you missed it the first time…rewind, watch it again. See what new facts you discover the second time around!

Devotional Reflection

"You are the light of the world. A city on a hill cannot be hidden." (Matthew 5:14)

Grandpa described the function of a cell as being like a working miniature city. Each part of the cell does its part to keep the city functioning the way it was designed. The image of a city was also used by Jesus when teaching His followers in His Sermon on the Mount. Consider your role in God's city . . . like a city on a hill that is lit up to draw others to Jesus. The life choices we make either aid our "spiritual city" or cause an interruption in our ability for this "city" to bring glory to our incredible Creator. Is your city shining brightly for others to see? Recharge your "electricity" by re-reading the parable of the talents in Matthew 25.

Words/People to Know

Cell

The smallest unit of living matter in any living organism. Some cells are actually complete animals, and some are not.

Cell Membrane

Similar to a wall around a fortress, the membrane surrounds and protects the cell.

Cell Nucleus

Most often located in the center of the cell. The nucleus directs the workings of the cell.

Cytoplasm

The fluid-filled, jellylike portion of the cell. This is the largest cell part. Tiny organs, "organelles," move around in the jellylike substance to carry on the processes of cell life.

Paramecium

Any of a genus of slipper-shaped protozoans that move by cilia (tiny hairlike parts).

Protoplasm

Living material that makes up a cell. It is divided into three basic parts: cell membrane, cytoplasm, and nucleus.

Protozoans

The smallest possible forms of animal life. They are each made up of one single cell. There are about 45,000 different kinds of miniature invertebrates known as protozoans. Amoebas and parameciums are examples of protozoan life.

Antonie van Leeuwenhoek (1632-1723)

A Dutch amateur scientist, one of the first researchers to record observations of microscopic life. His adaptations to the compound microscope allowed him to recognize the smallest living organisms, which he called "animalcules." (Now they are known as bacteria,

protozoans, and rotifers.) His work denied the concept of spontaneous generation (life coming from things that aren't alive) and pointed to the work of an intelligent Creator.

After Thoughts
(Post-Viewing Suggestions)

It is simply amazing to think our bodies contain 50 to 75 trillion cells. Our brain cells are with us for a lifetime, but other cells don't live as long. White blood cells only live for about 10 hours, and bone cells last 25 to 30 years. God's intricate design of creation is certainly evident in even the tiniest living thing. Perhaps you would enjoy sponsoring a "cell-a-bration" of your own. Invite your friends and family. Create three-dimensional plant and animal cell diagrams. Perhaps you could use a few kitchen items to demonstrate the workings of a cell city, just like Grandpa did. Think about serving your own "cell" cookies. Encourage your guests to identify the different parts of the cell before eating their cookies. It will be a "cell-a-bration" that no one is likely to forget.

If you enjoyed this video, look for these other great videos for the whole family from your friends at Moody: "The Wonders of God's Creation-Human Life," and "The Moody Science Adventures-The Wonder of You."

NOTES: