PBS Lesson Series

ELA: Grade 8, Lesson 14, Parasites

Lesson Focus: The focus of today's lesson will be on the informational text, "Top 10 Real-Life Body Snatchers."
Practice Focus: Students will analyze an informational text to determine the main ideas and study author's craft.
Objective: Students will use "Top 10 Real-Life Body Snatchers" to determine the main ideas with a focus on author's craft.
Academic Vocabulary: barnacle, surrogate mother, pilfers, sterilized, maternal, alliteration, crustacean, serotonin, surreptitiously, fertile
TN Standards: 8.RI.KID.1, 8.RI.KID.3, 8.RI.CS.4, 8.W.TP.2
Teacher Materials:

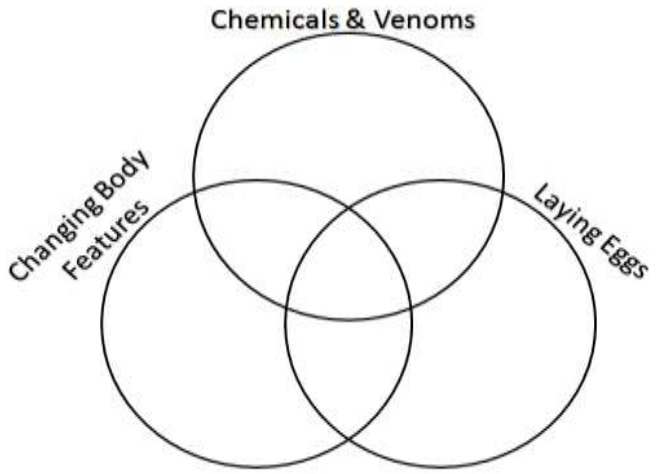
- The Teacher Packet for ELA, Grade 8, Lesson 14
- Chart paper (will need to have Venn diagram drawn on chart paper and ready to display)
- Independent work prompt written on chart paper

Student Materials:

- Paper and a pencil, and a surface to write on
- The Student packet for ELA, Grade 8, Lesson 14 which can be found on www.tn.gov/education

Teacher Do	Students Do
Opening (1 min) **Hello! Welcome to Tennessee's At Home Learning Series for literacy! Today's lesson is for all our 8th graders out there, though everyone is welcome to tune in. This lesson is the fourth in this week's series.** **My name is ____ and I'm a ____ grade teacher in Tennessee schools. I'm so excited to be your teacher for this lesson! Welcome to my virtual classroom!** **If you didn't see our previous lesson, you can find it on www.tn.gov/education. You can still tune in to today's lesson if you haven't seen any of our others. But it might be more fun if you first go back and watch our other lessons, since today we'll be talking about things we learned previously.** **Today we will continue learning about real-life body snatchers! Before we get started, to participate fully in our lesson today, you will need:** • **Paper and a pencil, and a surface to write on** • **The Student packet for ELA, Grade 8, Lesson 14 which can be found on www.tn.gov/education** **Ok, let's begin!**	Students gather materials for the lesson and prepare to engage with the lesson's content.
Intro (1 min)	Students listen to the teacher and learn an overview of the lesson. If

[Show Slide 1]. **Today our goal is to read the informational text called "Top 10 Real-Life Body Snatchers" so that we can analyze the information in the text to determine its meaning. We will begin with me reading a portion of the text and then we will reread it and pause along the way for deeper understanding. At the end of the lesson, I will assign you independent work that you can complete after the video ends.** **Speaking of which: if you tuned in to the previous lesson, you may have completed the independent work assigned at the end of that one. Remember? We asked you to write a brief essay comparing and contrasting the parasitic relationships we discussed: the wasp and the spider, and then the other wasp and the caterpillar. Take a moment now to reread what you wrote.** [Pause.] **How did you do? Does your writing help you remember key details from the previous lesson? I hope you explained both similarities and differences between the two parasitic relationships. You may have used your Venn diagram to explain that something the two relationships had in common was they involved chemicals and laying eggs. You could have said that both hosts die after they are infected with the parasite. You may also have said that in both cases, the wasp parasite controls its host's behavior—but with the spider, the wasp parasite causes it to spin a special type of web, while with the caterpillar, the wasp parasite causes it to swing its head around and scare off predators. There were other differences, too: for example, the first wasp attached its egg to the spider's belly, but with the caterpillar the wasp eggs are actually inside its body.** **If you didn't tune in to the previous lesson and none of this makes sense to you, don't worry! We'll learn about different parasites today.** [Show Slide 2.]	applicable, they also recall what they learned in the previous lesson and assess the work they did for independent practice.
<u>Teacher Model/Read-Aloud</u> (20 min) **Now, let's dig in to the informational text we will be studying, which is an article about real-life "body snatchers." As a reminder, historically, people who were called "body-snatchers" were people who stole dead bodies from graves in order to study or sell them.** [Show Slide 3.] **But these aren't the type of body-snatchers we'll be reading about. We're going to read about certain types of parasites, or living things that survive by using or hurting other living things, which we call their hosts.** [Show Slide 4.] As **a reminder, we will be hearing a lot of scientific names in this text, like *Glyptapanteles sp* from the previous lesson. Don't worry**	Students recall the concepts of body-snatchers, parasites, and hosts; use the Venn diagram to anticipate the types of information they will be hearing during the lesson; and comprehend key details about specific parasitic relationships.

about understanding or remembering them; just know they're names scientists use to refer to different species. I'll be clear about what we are referring to. **The text we are studying has a number of different sections in it - one section on each real-life body-snatcher, or parasite. Today, we will study in-depth two of the sections.** [Show Slide 5.] **As a reminder from yesterday, we will use the information we learn today to complete the Venn Diagram on the article. Here is what the diagram looks like.**  **This Venn diagram shows some of the things parasites do when they infect their hosts. Some change body features, some use chemicals and venoms, some lay eggs in their hosts, and many do a combination of two or even all three of these things.** **As we continue to read about different parasites this week, we're going to be sorting them into the various sections of this Venn diagram. For example, if we read about a parasite that uses venom and changes body features but does not lay eggs, we'll put it in this upper left section where the circles overlap** [point] **to show that it is in the "chemicals and venoms" and "changing body features" circles but not in the "laying eggs" circle. If we read about a parasite that changes body features, uses chemicals or venoms, *and* lays eggs, we'd write its name in the very center. Don't worry about this just yet, though, as we will complete this exercise further into the lesson.** **So let's begin the text! I will begin by reading a section of the text about parasites and their hosts. We will then reread the**	

section and analyze it on a deeper level. As I read the text, please take notes on your paper. Try to focus on the relationship between each parasite and its host and write down key details about them. Let's begin: [Show Slide 6.] **"*Sacculina carcini* This is a barnacle, a small sea creature with a shell, that sticks very tightly and in large numbers to rocks and the bottom of boats. But this particular barnacle is a parasitic barnacle. It invades crabs and turns them into surrogate mothers."** [Show Slide 7.] **Ok, let's pause. We know that the parasite is a barnacle, which is a small sea creature with a shell that usually hangs out on rocks or the bottoms of boats. The host for the barnacle is a crab.** [Show Slide 8.] **We also know that the barnacles are invading crabs to turn them into surrogate mothers. What in the world does that mean? Any ideas?** [Pause.] **Well, let's keep reading to see:** [Show Slide 9.] **"A surrogate mother is basically a female that bears a child on behalf of another female. In the larval stage, these female barnacles swimming in seawater are able to sniff out crabs."** [Show Slide 10.] **Ok, so a surrogate mother is a female that serves as a mom on behalf of another female. So we now know the barnacle's strategy, to find a substitute mom. Why would the barnacle need a substitute mom?** [Pause.] **Because that's what parasites do! They use their host to do things like eat, reproduce, etc. Notice that the text also says that in the larval stage, when they're young, the female barnacles that swim around in seawater are able to smell around to find the crabs. Let's see why they're smelling around for them.** [Show Slide 11.] **"They tend to latch onto European green crabs, an invasive species native to the northeast Atlantic. Once the parasite lands on a crab, it makes its way to a joint in the crustacean's, or the crab's, exoskeleton."** [Show Slide 12.] **So the barnacles smell around and find the European green crabs. Once they find them, they search around on the crab's exoskeleton to find a joint. Why do you think it went to a joint in the exoskeleton? You may remember that, while we humans have skeletons on our insides, some living things have skeletons on their outsides, and those are called exoskeletons.** [Pause.]	

Exactly, the exoskeleton is hard and impenetrable, which means you can't go through it. So the parasite had to find a joint, an area where the crab may be more vulnerable, or where it has fewer defenses. Let's see exactly how it gets inside: [Show Slide 13.] **"The barnacle sheds a good portion of its body and, slim as a slug, slips into the hole at the base of one of the crab's hairs. The parasite travels to the tail end of the crab, where it camps out."** [Show Slide 14.] **So there is nothing about that situation that sounds appealing to me. But let's make sure we understand it because there's more to the story. After the parasite gets in through the joint of the crab's exoskeleton, it sheds a good portion of its body and then slips into the hole at the base of one of the crab's hairs. Then, for whatever reason, it decides that the tail end is the place to camp out inside the crab. I think I would have chosen a different option. But let's see what the barnacle has in mind:** [Show Slide 15.] **"The *Sacculina,* or parasitic barnacle, grows tendrils that wrap like vines around the inside of the crab, and it pilfers, or steals, nutrients from the crab's blood. If a male barnacle locates the bulge on the crab's underside where the female resides, he too squeezes in and fertilizes the female's eggs."** **This just keeps getting grosser. The barnacle now grows tendrils, or long threadlike arms, that wrap around and latch onto the crab. It then takes the crab's blood and uses it for food! So we know for sure one reason why the barnacle is in there - food. But the text also says that the male barnacle locates a spot on the crab's underside where the female is hanging out. The barnacle then fertilizes the female's eggs. So how is this going to work? Let's read on and see.** [Show Slide 16.] **"Crabs infected with *Sacculina* are essentially sterilized by it. But since the parasite's eggs sit in the same place where the crab would carry an egg pouch, the crab cares for them as if they were its own."** **So I'm tracking this myself. In my notes, I wrote down that the parasite lays eggs in the same place inside the crab that the mother crab would normally lay eggs. But the mother crab can't lay eggs because she is sterilized? What does sterilized mean?** [Pause.]	

[Show Slide 17.] **Right! She is not able to lay eggs due to the parasite being inside her. But she really does not know what's going on so she takes care of the parasite's eggs as if they were her own! And that's the trick! The parasite is using the crab not only for food but also to reproduce. Let's learn some more about it:** [Show Slide 18.] **"Even if the crab is a male, it takes on the maternal role. When the larvae, or young barnacles, have developed enough to exist on their own, the crab goes to a high rock, where it bobs up and down as it pushes the *Sacculina* larvae out."** **So that's crazy. Even if the host crab is a male, it takes on a maternal role. What does maternal role mean?** [Pause.] [Show Slide 19.] **Yep, maternal means "like a mother" so even the male thinks it's a mother when the parasite is inside of it. The text also says that when the barnacle larvae have developed enough to be on their own, the crab goes to a high rock, does a dance, and pushes the larvae out. Let's read on:** [Show Slide 20.] **"The crab flails its claws in the water to spread the parasite, as it would its own young."** **So this helps the parasitic barnacle too. The crab flails, or waves, its claws in the water to spread the parasite, as it would do if it were its own babies. This is all just too hard to believe. Let's go through the text one more time and make sure we have all of this in our notes as we will need the information to complete the Venn diagram.** [Show Slide 21.] **"*Sacculina carcini* This is a barnacle, a small sea creature with a shell, that sticks very tightly and in large numbers to rocks and the bottom of boats. But this particular barnacle is a parasitic barnacle. It invades crabs and turns them into surrogate mothers. A surrogate mother is basically a female that bears a child on behalf of another female. In the larval stage, these female barnacles swimming in seawater are able to sniff out crabs. They tend to latch onto European green crabs, an invasive species native to the northeast Atlantic."** **Let's pause. What do you have in your notes so far?** [Pause.] [Show Slide 22.] **Here's what I have in mine: A parasitic barnacle invades crabs to turn them into surrogate mothers.**	

A surrogate mother is basically a substitute mom. In the larval stage, the female barnacles swimming around in seawater use their sense of smell to locate crabs. Do you have this in your notes? If not, go ahead and add it. [Pause.] **Now, let's read on a bit more so we can keep taking notes.** [Show Slide 23.] **"Once the parasite lands on a crab, it makes its way to a joint in the crustacean's, or the crab's, exoskeleton. The barnacle sheds a good portion of its body and, slim as a slug, slips into the hole at the base one of the crab's hairs."** [Show Slide 24.] **So the parasite finds the crab and finds its way to a joint in the crab's exoskeleton. It says that the "barnacle sheds a good portion of its body and, slim as a slug, slips into the hole at the base of one of the crab's hairs." Notice the phrase "slim as a slug." Let's take a pause from all the gross stuff and think about what the author is doing here. Do you know what the name of this particular figure of speech is? What is it called when the author uses the phrase "slim as a slug"?** [Pause.] [Show Slide 25.] **A simile! Remember that a simile is a figure of speech that directly compares two unlike things using the words "like" or "as." For what purpose do you think the author used a simile here? Take a moment and write your answer onto your paper.** [Pause.] **The main purpose of a simile is to help us to understand something better. We can visualize, or see, it better. In this case, it helps us to see that, after the barnacle sheds a good portion of its body, it becomes thin and slick, like a slug. That is how the barnacle is able to slip into the hole at the base of one of the crab's hairs.** **Now, interestingly enough, the phrase "slim as a slug" is an example of another literary device, or tool, used by authors. Do you know what it is?** [Pause.] [Show Slide 26.] **It's called alliteration! This is basically when authors use words closely together that have the same initial consonant sound. The "s" sound at the beginning of "slim" and "slug" is an example of a trick of sorts that authors use. It's similar to why authors use rhyming. It sounds cool and the words roll off the tongue in a certain way to keep you interested. A lot of musicians use the same trick in songs; they just may not call it alliteration!**	

Ok, now back to the crazy story of the barnacle and the crab. We know that the barnacle, being "slim as a slug," snuck into the crab. Let's keep reading to remind ourselves what happens next. Be sure to add to your notes as I read. [Show Slide 27.] **"The parasite travels to the tail end of the crab, where it camps out. The *Sacculina,* or parasitic barnacle, grows tendrils that wrap like vines around the inside of the crab, and it pilfers, or steals, nutrients from the crab's blood. If a male barnacle locates the bulge on the crab's underside where the female resides, he too squeezes in and fertilizes the female's eggs."** **Here is what I have in my notes to summarize this section:** [Show Slide 28.] **Now that the barnacle has invaded the crab, it travels to the tail end of the crab. There it grows tendrils or threadlike arms that wrap around the inside of the crab to steal its blood. If there happens to be a male barnacle, it find a spot on the crab's underside where the female is camped out and he fertilizes the female's eggs. Did you have this in your notes? If not, please take a moment to add it to them.** [Pause.] **Ok, let's reread the final paragraph about the barnacle and the crab.** [Show Slide 29.] **"Crabs infected with *Sacculina* are essentially sterilized by it. But since the parasite's eggs sit in the same place where the crab would carry an egg pouch, the crab cares for them as if they were its own. Even if the crab is a male, it takes on the maternal role. When the larvae have developed enough to exist on their own, the crab goes to a high rock, where it bobs up and down as it pushes the *Sacculina* larvae out. The crab flails its claws in the water to spread the parasite, as it would its own young."** [Show Slide 30.] **Let me make sure my notes have everything in it. The crabs infected with the parasite cannot have babies. But since the parasite's eggs sit in the same place that the crab usually holds its eggs, the crab takes care of them as if they were her own. Like a substitute mom, or a surrogate mom. I also noted that this happens even when the crab is male. It acts like a mom too. Then, when the larvae are big enough to be on their own, the crab goes to a rock, waves its claws in the water, and pushes the parasite larvae out.**	

Now, if you didn't have all of this information in your notes, make sure you add to them as you will need this information to add to the Venn diagram. I'll pause to allow you to catch up. [Pause.] [Show Slide 31.] **While it's fresh on our memory, let's go ahead and add it to the Venn Diagram. Go ahead and take out your copy of the Venn Diagram you drew yesterday. If you were not able to draw it yesterday, go ahead and draw a fresh copy.** [Display the Venn diagram on chart paper.] **Now, I know that you may not have the text in front of you, but I think your notes will help. So far today, we have read only about the parasitic relationship of the barnacle and the crab. Take a moment now to think about where this fits on the Venn diagram.** [Pause.] **Ok, I'll show you what information I identified and you can see how it matches up with your thoughts. If I include information that is not on your Venn Diagram, please add what I tell you to it. Here is what I added to it.** [Write "barnacle and crab" in the Laying Eggs circle.] **I added some notes into the Laying Eggs circle. I wrote that the parasitic barnacle invades the crab and lays eggs where the crab would carry an egg pouch, so the crab cares for and births the larvae. Did you have this on your diagram?** [Pause.] **If not, take a moment and add it to your diagram.** [Pause.] **Thank you, and keep this handy as we will add more to it today.** [Show Slide 32.] **Now, let's read about the next parasitic relationship, one between a thorny-headed worm and a crustacean. A crustacean is any type of animal that lives in water and that has a hard shell and many legs. A crab is one type of crustacean. Let's read about what happens between this thorny-headed worm and a crustacean.** [Show Slide 33.] **"*Polymorphus paradoxus.* Pond- and river-dwelling crustaceans called *Gammarus* lacustris typically dart deep into the water, away from light, when ducks are at the surface. But when the crustaceans are infected with *Polymorphus paradoxus,* a type of thorny-headed worm, they practically throw themselves at their predators."**	

[Show Slide 34.] **So this parasitic relationship involves a thorny-headed worm and a crustacean. It says that crustaceans typically go deep into the water, away from light, to stay away from predators like ducks that want to eat them. It's hard to think of a duck as a predator, but to a crustacean it definitely is. The odd part is that when the crustaceans are infected with the parasite, they start acting weird. Let's see what they do:** [Show Slide 35.] **"Oddly attracted to light, the parasitized crustacean swims to the surface and clings to a rock or plant. There, fully exposed, the crustacean is more likely to get eaten by a duck."** [Show Slide 36.] **Clearly, this is not normal behavior on the crustacean's part. Instead of going away from light, like it normally does, the parasite makes the crustacean swim toward light and cling to a rock or a plant. They are now fully exposed to predators. Remember from the lesson earlier this week that "exposed" means you are out in the open for everyone to see. So the crustaceans are in full view of the hungry duck. Again, we as humans think ducks are cute and friendly but when you're a crustacean, ducks are not cute and friendly because they like to eat you. And I can't think of a circumstance where being eaten is good. But the parasite disagrees. Let's see why:** [Show Slide 37.] **"Inside a duck is exactly where the parasite needs to be to reach adulthood. The clinging position of the crab on the rock is the same one that the male crustacean takes while mating. Scientists speculate that the parasite increases serotonin, or hormone, levels in the crustacean, perhaps making it think it is mating."** [Show Slide 38.] **Apparently, this particular parasite needs to be inside a duck in order to reach adulthood. The short passage does not explain the reasons why but we will trust that the scientists know what they're talking about.** **Now, there is one other interesting piece of information we learned from these sentences. Apparently, when the infected crustacean goes up to sit on the rock, it makes the same movements that it would when it is mating. How does the parasite get the crustacean to do that?** [Pause.] **Right. The passage says that it increases the serotonin, or hormone, levels in the crustacean, which makes the crustacean think it is mating. But still, I wonder why would**	

the parasite make the crustacean do this? What do you think? [Pause.] **I think the fact that the crustacean is making a lot of movement on the rock makes it a lot more likely that the duck will easily spot it and choose it for dinner! It's all part of the parasite's plan to get inside the duck.** **Ok, let's reread the passage one more time to make sure we are getting everything we need into our notes so we can add information to the Venn diagram. As I read, add any missing information to your notes.** [Show Slide 39.] **"*Polymorphus paradoxus.* Pond- and river-dwelling crustaceans called *Gammarus* lacustris typically dart deep into the water, away from light, when ducks are at the surface. But when the crustaceans are infected with *Polymorphus paradoxus,* a type of thorny-headed worm, they practically throw themselves at their predators. Oddly attracted to light, the parasitized crustacean swims to the surface and clings to a rock or plant. There, fully exposed, the crustacean is more likely to get eaten by a duck. Inside a duck is exactly where the parasite needs to be to reach adulthood. The clinging position of the crab on the rock is the same one that the male crustacean takes while mating. Scientists speculate that the parasite increases serotonin, or hormone, levels in the crustacean, perhaps making it think it is mating."** [Show Slide 40.] **So this one was a bit shorter but I still had several things written down in my notes. I'll read to you what I have and you can add information that might be missing to your notes. This parasitic relationship involves a thorny-headed worm and a crustacean. A crustacean is a sea-dweller with a hard shell. They usually like to stay in places out of the light so they are not spotted by predators, like ducks. But when a parasite infects the crustacean, it literally does the opposite. It swims toward the light and makes itself more visible to ducks. Why?** [Pause.] **Because that's the parasite's plan! It needs to be inside the duck! It is there where they reach adulthood. There is one more piece of really important information so make sure you include this in your notes. When the crustacean is clinging to the rock and basically begging the duck to eat it, it is making the same motion that it does while mating. Scientists think that the parasite increases serotonin, or hormone levels, in the crustacean, possibly making it think it is mating.**	

Do you have everything in your notes? I'll give you a moment to finish writing in case you need more time. [Pause.] **Ok, great. I hope you have enjoyed learning about another interesting parasitic relationship today. Let's take what we have learned and continue adding information to the Venn diagram we have been working on this week.**	
<u>Guided Practice</u> (10 min) [Show Slide 41.] [Display the Venn diagram on chart paper.] **We have read about two parasitic relationships today: the barnacle and the crab, and the thorny-headed worm and the crustacean. Take a moment now to think about where the new information that we just learned about the thorny-headed worm and the crustacean fits on the Venn diagram.** [Pause.] **Ok, I'll show you what information I identified and you can see how it matches up with your thoughts. If I include information that is not on your Venn Diagram, please add what I tell you to it. Here is what I added to it.** [Write "worm and crustacean" in the Chemicals & Venoms circle.] **I added some notes into the Chemicals & Venoms circle. I wrote that the parasite worm increases serotonin, or hormone levels, in the crustacean to make it feel like it is mating instead of preparing to get eaten by a duck. Did you have this on your diagram?** [Pause.] **If not, take a moment and add it to your diagram.** [Pause.] **Ok, that's all that I am adding today but I am looking forward to reading about more parasitic relationships tomorrow so I can add more details to it. Please keep your diagram handy so we can reuse it tomorrow.** **I hope that you found this exercise to be helpful. The purpose is to make sure we are categorizing the examples and ideas we have read about today as well as observing the relationships among them.**	Students copy the Venn Diagram onto their paper and complete each circle, including the overlaps. In doing so they consolidate and organize their understanding of the text and make sure they have the information they need to complete the independent practice.
<u>Independent Work</u> (1 min) [Show Slide 42.] **Let's reflect on today's lesson. Today we learned about some parasites and the creative ways that they take advantage of their hosts. For your independent work, please respond in writing to the following prompt: In a brief essay, compare and contrast the parasitic relationships we discussed today. What are the similarities between the barnacle and the crab relationship, and the thorny-headed worm and the crustacean relationship? What are the**	Students will use their notes to articulate similarities and differences between the two parasites studied in a more coherent and connected way.

important differences between them? Be sure to use specific details from your notes to support your answers. **Students, please write the prompt down on your notebook paper so you will have it handy for when you are responding in writing. I'll read it to you one more Time. In a brief essay, compare and contrast the parasitic relationships we discussed today. What are the similarities between the barnacle and the crab relationship, and the thorny-headed worm and the crustacean relationship? What are the important differences between them? Be sure to use specific details from your notes to support your answers.** [Pause.]	
Closing (1 min) **Thank you. I enjoyed working on the Body Snatchers informational text with you today! Thank you for inviting me into your home. I look forward to seeing you in our next lesson in Tennessee's At Home Learning Series! Bye!**	