Dinosaur Train

Produced by The Jim Henson Company and others. 2009-present. PBS Kids.

It may seem odd to review a children's television series for a natural history journal. Television, after all, is often considered "the enemy" of getting kids outside to enjoy nature. It is even odder to review the biological accuracy of a series in which talking dinosaurs travel through time on a train. However, given the popularity of the series Dinosaur Train and its influence on children's understanding of palaeontology and appreciation for nature in general, it is appropriate to critically evaluate the series here.

About the show

Dinosaur Train is an animated children's series produced by The Jim Henson Company (of Muppets fame) and others, and broadcast on the PBS TV station. It has completed two seasons since its inception in 2009, consisting of 66 episodes at the time of writing. My review is based on Season One, which I watched with my three year old son over the span of several months.

Each 30 minute episode consists of two 11-minute stories involving a family of *Pteranodon* (large flying reptiles), with brief live action segments hosted by paleontologist "Dr. Scott" Sampson in which he discusses the biology of dinosaurs featured in the episode. The *Pteranodon* family consists of two parents, three children with distinct personalities, and adopted son Buddy the *Tyrannosaurus rex* (who, before hatching,

somehow ended up in the *Pteranodon* nest). Stories generally follow a pattern of Buddy and other members of the family being curious about the biology of other dinosaur, or non-dinosaur, species. They then travel on the Dinosaur Train, through a time tunnel, to the region and time period in which the species in question lived. They then play and sing with the species while finding out about its biology. For example, they play music with young Hadrosauridae who produce loud calls through their head crests, which is the leading explanation of the function of these dinosaurs' crests. The dinosaurs then go home and discuss what they have learned. Finally, Dr. Scott tells the viewer what paleontologists know about the episode's species, and how they compare to species alive today.

Biological accuracy

Aside from the obvious (we have not yet found evidence that dinosaurs built trains or time tunnels), the show is very accurate biologically. Not just accurate, in fact, but cutting-edge. Dr. Scott, the host and primary scientific consultant for Dinosaur Train, is not only a real paleontologist but in fact he is a big-shot young paleontologist. He is Vice President of Research and Collections at the Denver Museum of Nature and Science, has published paleontological research in leading journals (e.g., Nature and Science), and recently authored a book on dinosaur ecosystems (Sampson 2009). He also happens to be Canadian.

Adults, even those passionate about biology such as readers of The Canadian Field-Naturalist, will learn a great deal about dinosaurs from this cartoon. Dinosaurs you did not learn of as a child since they were undiscovered or poorly known scientifically, such as the terrifying giant carnivore *Spinosaurus*, are given prominence. Dinosaurs you did learn of as a child are shown with current nomenclature (e.g., *Brontosaurus* is now *Apatosaurus*) and behaviour reflecting modern interpretations of fossil evidence (e.g., dinosaurs were likely more lively than the lethargic tail-draggers we learned about years ago). Watching the show alongside your children will allow you to keep up with your children's knowledge of dinosaur biology.

In the interest of simplifying stories, Dinosaur Train sometimes takes liberties with accuracy. For example, one episode portrays *Lesothosaurus* as camouflaged, inspiring discussion of the reasons for animal camouflage. While modern techniques allow insights into the colour of some dinosaur feathers (Li et al. 2012), we cannot determine whether species were camouflaged because we do not know their microhabitats. These liberties are understandable from a story-telling perspective, and Dr. Scott often tells the viewer when the show takes these liberties.

In the interest of not scaring children, ferocious dinosaurs are also portrayed in a more friendly light. Giant carnivores dance and play with smaller herbivores, rather than ripping them to bloody shreds. At first I was disappointed with this puppyfication of dinosaurs, but after seeing how scared my son was of even a gentle version of *Spinosaurus*, and considering the sleep I was saving from him having fewer nightmares, I am now satisfied the accuracy sacrificed by having gentle dinosaurs is worthwhile. Dinosaur Train does discuss what each species ate; it just does not show carnivores hunting prey.

I did find two minor inaccuracies, neither concerning dinosaurs. In one episode a grasshopper is shown stridulating its wings to produce sounds (grasshoppers actually produce sounds from leg stridulations – crickets rub their wings), and a dragonfly is shown eating leaves (dragonflies are carnivorous). These inaccuracies are surprising for how basic they are, and how accurate the show generally is, but they are very minor.

The show's message

First, considering the non-biology messaging of the show, Dinosaur Train models appropriate behaviour for children. The characters are polite, curious, enthusiastic, and generally cooperate with each other. Children's shows often show characters engaging in bad behaviour (e.g., characters being unkind) before learning not to do those behaviours. Young children, however, have difficulty connecting characters' early behaviours to consequences and resolutions later in the show, and often engage in the types of bad behaviours they watch on television (Ostrov et al. 2013). Dinosaur Train provides a welcome relief to parents keen to avoid shows with bratty characters.

When it comes to biology-related messages, I know of no other kids' show that comes close to Dinosaur Train for promoting curiosity and exploration of our natural world. Many episodes involve the show's characters finding something unusual, developing hypotheses (yes, they even call them hypotheses!) about the finding, then exploring to find out more about it. Along the way, other biology-related themes are explored both subtly and explicitly. For example, an introvert character on the show (Don) keeps a collection of interesting objects such as feathers and bones. In one of Dr. Scott's segments he makes the link between Don's collection and the importance of museum collections to research. In sum, Dinosaur Train promotes naturalist-friendly messages at the small scale of individual discoveries, and at the broad scale of the joy of exploration that permeates the show.

Does the show's message trump its medium?

The very medium of TV poses a conundrum – is it possible for a children's TV show, even one with great naturalist messaging, to benefit children's naturalist tendencies more than it harms them? Some naturalists consider TV to be the enemy, responsible for keeping kids indoors instead of outside exploring nature (Pergams and Zaradic 2006). In my opinion, the merits of Dinosaur Train should not be compared against the merits of playing outside; this is a false dichotomy. Most parents are going to let their kids watch TV. Given this reality, I think it is appropriate for Dinosaur Train to be compared to other children's TV shows. In

such a comparison, Dinosaur Train comes out triumphant, being far superior in its biology-related and non-biology-related messaging than most other children's shows in my experience. The Dinosaur Train parents' website (www.pbs.org/parents/dinosaurtrain/) also provides ideas for parents and teachers on how to link episodes' main messages to children's activities (e.g., making a bedsheet cloak for the camouflage episode). Further, the Dinosaur Train Nature Trackers Club (www.pbs.org/parents/dinosaurtrain/more-dinosaur-train-fun/nature-trackers-club/) encourages kids to complete nature challenges outdoors (e.g., track animal footprints, organize a neighbourhood cleanup). Dinosaur Train thus attempts, successfully in my opinion, to be a TV show that encourages kids to turn off the TV.

In sum, Dinosaur Train is biologically accurate, contains positive role models, and encourages kids to "get outside, get into nature, and make your own discoveries," as Dr. Scott says as his signature sign-off at the end of every episode. I recommend it over any other children's TV series I have seen. Two examples illustrate the power of this show. First, my son has started a nature collection, consisting of some rocks and clam shells he's found, inspired by Don's collection. Second, I have read Dr. Scott's *Dinosaur Odyssey* and various dinosaur blogs, inspired in part by the paleontology I learned about from Dinosaur Train. Any children's show that encourages kids and even adults to discover more about nature is a good thing in my opinion.

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