



Inspired Instruction

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Standards Solution Holding**

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T (Title)	
H (Headings)	
I (Introduction)	
E (Every first paragraph sentence)	
V (Visuals and vocabulary)	
E (End of chapter questions)	
S (Summary)	

THIEVES Pre-Reading Template

Who: This pre-reading activity is effective for all grade levels and all levels of readers. For struggling readers or ELL students, use this as a group activity to “prime the pump” for reading. For more advanced readers, it can be used as an independent activity ahead of reading.

What: Students interact with the text before they read it.

1. In the first box (T), students record information about the title (ex: predictions, inferences, etc.). Then, they can discuss or consider these questions:

- a. What is the title?
- b. What do I already know about this topic?
- c. What does this topic have to do with the preceding chapter?
- d. Does the title express a point of view?
- e. What do I think I will be reading about?

2. In the second box (H), students write down the different section headings from the text. Then, they can discuss or consider these questions:

- a. What does this heading tell me I will be reading about?
- b. What is the topic of the paragraph beneath it?
- c. How can I turn this heading into a question that is likely to be answered in the text?

3. In the third box (I), students write a summary or bulleted list of information presented in the introduction of the text. Then, they can discuss or consider these questions:

- a. Is there an opening paragraph, perhaps italicized?
- b. Does the first paragraph introduce the chapter?
- c. What does the introduction tell me I will be reading about?
- d. Do I know anything about this topic already?

4. In the fourth box (E), students write down the first sentence of every paragraph. Then, they can discuss or consider these questions:

- a. What do I think this chapter is going to be about based on the first sentence in each paragraph?

5. In the fifth box (V), students summarize any visuals and write down any highlighted/important vocabulary words. Then, they can discuss or consider these questions:

- a. Does the chapter include photographs, drawings, maps, charts, or graphs?
- b. What can I learn from the visuals in a chapter?
- c. How do captions help me better understand the meaning?
- d. Is there a list of key vocabulary terms and definitions?

- e. Are there important words in boldface type throughout the chapter?
 - f. Do I know what the boldfaced words mean?
 - g. Can I tell the meaning of the boldfaced words from the sentences in which they are embedded?
6. In the sixth box (E), students write down any questions that are presented at the end of each section. Then, they can discuss or consider these questions:
- a. What do the questions ask?
 - b. What information do they earmark as important?
 - c. What information do I learn from the questions?
7. In the seventh box (S), students write a summary or bulleted list of the entire text. Then, they can discuss or consider these questions:
- a. What do I understand and recall about the topics covered in the summary?

Where: This activity can be used for language arts, science, social studies, or any subject. The editable document can be easily modified for textbooks, articles or short stories.

When: This before reading activity guides students to preview a text effectively by drawing their attention to important textual elements, and helping them to make predictions and anticipate meaning. Students use the acronym THIEVES:

T: Title

H: Headings

I: Introduction

E: Every first paragraph sentence

V: Visuals and vocabulary

E: End of chapter questions

S: Summary

Why: It will help activate students' background knowledge and help them to make predictions. It will also help set a purpose before reading.

*****Please see the sample of a 5th grade informational text and how THIEVES can be applied to it. Note that student answers will vary.*****

ADHESIVE FROM TREES COULD MAKE TAPE MORE ECO-FRIENDLY

Researchers used plant wastes, instead of petroleum, to make the glue for tape

by Tyler Berrigan 2018

When you have to wrap a gift or mend the ripped page of a book, you probably reach for a piece of tape. The sticky stuff is everywhere. But tape has a downside. Its adhesive — the substance that makes it stick — is made from a **fossil fuel**. Now a team of scientists has come up with a greener solution. They've made a new glue from chemicals found in trees.

They described their **innovation** in the May 15 online journal, *ACS Central Science*.

Sticky tape has been around for more than 80 years. It relies on a special kind of glue. As you push down on a piece of tape, the adhesive on the sticky side seals tightly. But you can easily peel it back off. Some adhesives even come off without leaving anything behind.

Tape adhesives are polymers. These are long molecules made from chains of repeating chemical building blocks. To make polymers, researchers can use ingredients from many different sources. One common source is **crude oil**. Companies today use the hydrocarbons that make up this oil for their tape adhesives.

But crude oil is a fossil fuel. It takes millions of years to develop. So once people **extract** fossil fuels from the Earth, they can't be quickly replaced. Processing them also emits pollution, including **greenhouse gases**.

A team of researchers at the University of Delaware, in Newark, thought they could find a greener option — one friendlier to the environment. "We wanted to make polymers from natural, renewable resources," says Shu Wang. She is a materials scientist who now works at Bridgestone Americas in Nashville, Tenn.

Lignin is a natural polymer. It makes woody plants strong and stable. And viewed up close, lignin's chemical structure resembles that of oil's hydrocarbons. So Wang and her colleagues wondered whether they could substitute plants for oil as a starting ingredient. And their new data confirm that they can.

TURNING TREES INTO TAPE

Wang's team started with poplar trees. They soaked their wood in chemicals to break the lignin's long, chain-like molecules into smaller bits. They collected these small pieces. Then they made some minor chemical tweaks. This gave their polymer the chemical traits that they wanted. Finally, the team linked these altered fragments to build new polymers. They designed these chains to **mimic** the oil-based types used for today's tape adhesives.

They coated a thin, tape-like piece of plastic with the new glue. Then they conducted "peel tests." They measured the force needed to peel off the tape after it had been pressed down flat. The researchers compared this test tape to types that you can buy today in the store.

And their new tape performed well. "The force needed to pull up tape with our adhesive on it was similar to the force needed to pull up Scotch tape, or Fisherbrand labeling tape," Wang says. (Keep in mind, you don't want tape to peel up too easily. If it does, those ripped book pages won't stay mended.)

If this new adhesive were someday used for store-bought tapes, it could help the environment in more than one way. Lignin is a waste from making paper and ethanol from trees. So this glue wouldn't just replace adhesives made from crude oil. It also would prevent lignin from going in the trash.

Thomas Epps III is a chemical engineer and materials scientist at the University of Delaware. He led the team that invented the new glue. "We have taken a renewable material that is normally thrown away," he notes, "and turned it into something useful."

Zhuohua Sun agrees. A chemist at the University of Groningen in the Netherlands, he did not take part in the new research. "They've made something useful from a renewable and widely available material," he says.

Epps hopes that he and his colleagues can use different plants to make even more adhesives. "Could we use corn or switchgrass as an alternative to trees?" he asks. "If this is possible, it would certainly expand the types of glues we can create."

<p style="text-align: center;">T (Title)</p>	<p><i>The title is “Adhesive from Trees Could Make Tape More Eco-Friendly: Researchers used plant wastes, instead of petroleum, to make the glue for tape”</i></p> <p><i>I know that an adhesive holds things together.</i></p> <p><i>I think this article will be about how scientists are improving how to make adhesives.</i></p>
<p style="text-align: center;">H (Headings)</p>	<p><i>There’s only one heading in this article: Turning Trees Into Tape</i></p> <p><i>I think the topic of this section will be how trees can be turned into tape.</i></p>
<p style="text-align: center;">I (Introduction)</p>	<p><i>The introduction gives an example of how we use tape.</i></p> <p><i>It shows that how tape is made can hurt the environment.</i></p> <p><i>It tells me that I will be reading about new ways scientists are creating adhesives.</i></p>
<p style="text-align: center;">E (Every first paragraph sentence)</p>	<ol style="list-style-type: none"> <i>1. When you have to wrap a gift or mend the ripped page of a book, you probably reach for a piece of tape.</i> <i>2. They described their innovation in the May 15 online journal, ACS Central Science.</i> <i>3. Sticky tape has been around for more than 80 years.</i> <i>4. Tape adhesives are polymers.</i> <i>5. But crude oil is a fossil fuel.</i> <i>6. A team of researchers at the University of Delaware, in Newark, thought they could find a greener option – one friendlier to the environment.</i> <i>7. Lignin is a natural polymer.</i> <i>8. Wang’s team started with poplar trees.</i> <i>9. They coated a thin, tape-like piece of plastic with the new glue.</i> <i>10. And their new tape performed well.</i> <i>11. If this new adhesive were someday used for store-bought tapes, it could help the environment in more than one way.</i> <i>12. Thomas Epps III is a chemical engineer and materials scientist at the University of Delaware.</i> <i>13. Zhuohua Sun agrees.</i>

	<p>14. Epps hopes that he and his colleagues can use different plants to make even more adhesives.</p>
<p>V (Visuals and vocabulary)</p>	<p>There are no visuals in this text.</p> <p>Important Vocabulary</p> <ol style="list-style-type: none"> 1. <i>Fossil Fuel</i>: a type of fuel, such as gas or coal, that contributes to air pollution 2. <i>Innovation</i> : a new idea or product 3. <i>Crude Oil</i>: natural oil before it has been changed 4. <i>Extract</i> : to remove or take out 5. <i>Greenhouse Gases</i>: gases that contribute to the warming of the planet 6. <i>Mimic</i>: to copy
<p>E (End of chapter questions)</p>	<p>“Could we use corn or switchgrass as an alternative to trees?”</p> <p>This question tells me that scientists are looking for even more ways to make adhesives.</p>
<p>S (Summary)</p>	<p>Normal tape is made from fossil fuels and can be harmful to the environment.</p> <p>Scientists have created a new tape made from trees.</p> <p>They used lignin from plants to create adhesive.</p> <p>The scientists did tests and made changes to their tape until it worked well.</p> <p>Using this tape could help the environment by not using crude oil and not wasting lignin.</p> <p>Scientists think there may be other plants that can be used to make adhesives.</p>