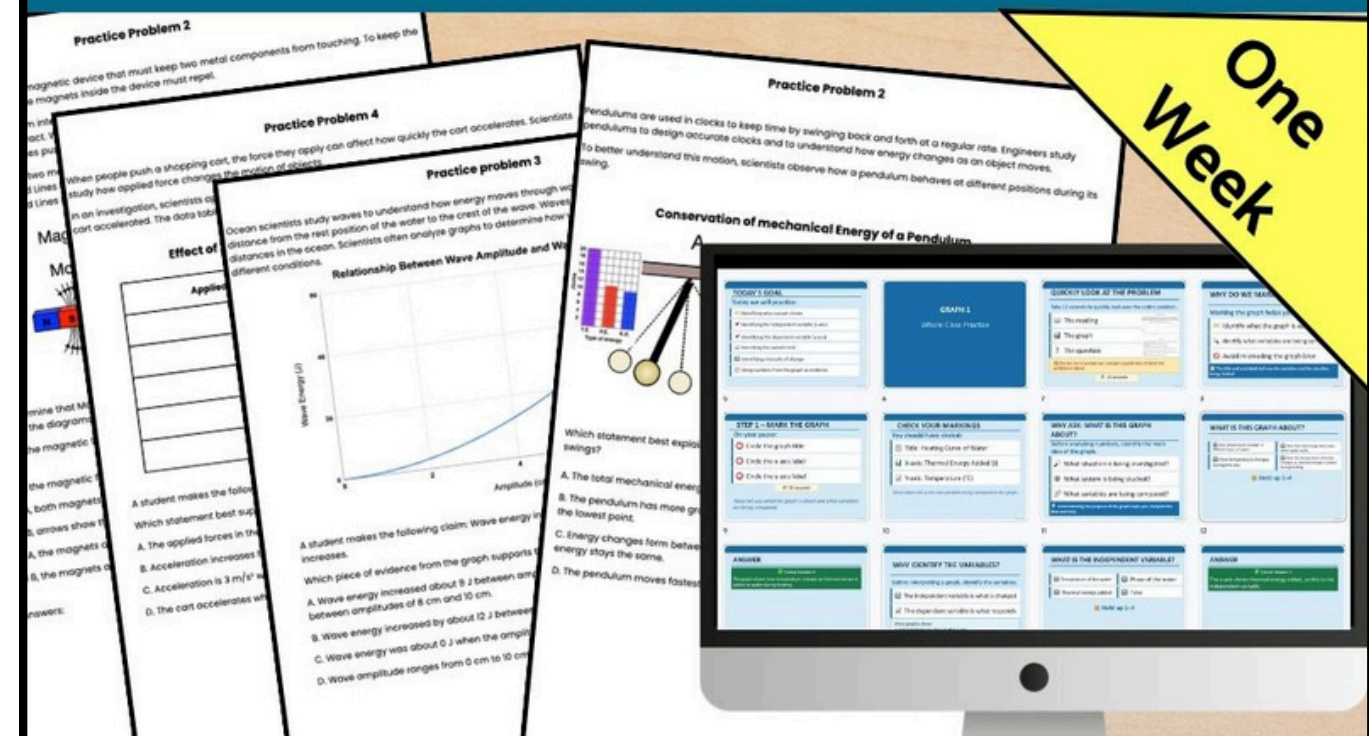


SCIENCE TEST PREP

Physical Science

NGSS Test Prep
Test-Taking Strategies



One Week

20 NGSS Style Physical Science Practice Problems
Analyze Data • Models • Graphs

Scroll Through

To take a peek inside!

**Help students learn
the test taking
strategies they need
to pass the state
science test**

DO YOUR STUDENTS STRUGGLE WITH



Identifying what the prompt is asking



Finding the key details in passages



Analyzing graphs and data tables



Interpreting diagrams

Practice problem 3

Ocean scientists study waves to understand how energy moves through water. The amplitude of a wave is the distance from the rest position of the water to the crest of the wave. Waves can transfer energy across long distances in the ocean. Scientists often analyze graphs to determine how wave properties change under different conditions.

Relationship Between Wave Amplitude and Wave Energy

Amplitude (cm)	Wave Energy (J)
0	0
2	9
4	36
6	81
8	144

A student makes the following claim: Wave energy increases more rapidly as wave amplitude increases.

Which piece of evidence from the graph supports the student's claim?

A. Wave energy increased about 9 J between amplitudes of 2 cm and 4 cm, but increased about 36 J between amplitudes of 8 cm and 10 cm.

B. Wave energy increased by about 18 J between amplitudes of 4 cm and 6 cm, but increased about 72 J between amplitudes of 6 cm and 8 cm.

Practice Problem 2

Scientists are used in clocks to keep time by swinging back and forth at a regular rate. Engineers study pendulums to design accurate clocks and to understand how energy changes as an object moves. To understand this motion, scientists observe how a pendulum behaves at different positions during its swings.

Conservation of mechanical Energy of a Pendulum

Which statement best explains why the total mechanical energy of the pendulum remains the same as it swings?

A. The total mechanical energy is 100 J at each position shown in the model.

B. The pendulum has more gravitational potential energy at the highest points and more kinetic energy at the lowest point.

C. Energy changes form between gravitational potential energy and kinetic energy, but the total amount of energy stays the same.

D. The pendulum moves fastest at the lowest point because it gains additional energy.

What does the word "relationship" mean in this question? 1 point

1 Identify the highest number

2 Describe how one variable changes as the other changes

3 Explain why the experiment was done

4 Choose the correct data value

Which sentence BEST helps you understand what to look for in the data table? 1 point

1 An engineer is testing how different winter conditions affect how easily a sled moves.

2 The engineer investigates how surface type and mass affect the pull force required to move a sled.

3 The sled is tested in winter conditions.

4 The results are recorded.

WHAT IS THE INDEPENDENT VARIABLE? 1 point

1 Pull force

2 Friction level

3 Mass

4 Surface temperature

I've Got You Covered

- ✓ 5 Days of strategies focusing on one key strategy a day
- ✓ Guided release moving from whole class to individual practice
- ✓ 4 NGSS-aligned practice problems a day (with a Google Form for the last practice problem)
- ✓ Explanation of the strategy and why it is important
- ✓ Identifying and understanding the prompt, reading and analyzing diagrams, graphs, and data tables



"This resource is exactly what I was looking for. Worth the purchase!" - Shannon

SCIENCE TEST PREP

Physical Science

Practice Problem 4

When people push a shopping cart, the force they apply can affect how quickly the cart accelerates. Scientists study how applied force changes the motion of objects.

In an investigation, scientists applied different amounts of force to the same cart and measured how quickly the cart accelerated. The data table shows the results of the investigation.

Effect of Applied Force on the Acceleration of a Cart

Applied Force (N)	Acceleration (m/s^2)
2	
4	
6	
8	
10	

A student makes the following claim: As the applied force increases, acceleration increases for both carts more than the cart with greater mass.

Which statement best supports the student's claim?

A. The applied forces in the investigation range from 2 N to 10 N.

B. Acceleration increases from $1 m/s^2$ at 2 N to $5 m/s^2$ at 10 N.

C. Acceleration is $3 m/s^2$ when the applied force is 6 N.

D. The cart accelerates when a force is applied.

Practice Problem 4

Carts that must move quickly across a factory floor. To test how the carts behave, engineers apply different amounts of force to two carts with different masses. The results of the investigation are shown in the graph below.

Relationship Between Net Force and Acceleration for Objects of Different Masses

Legend:
— Acceleration (m/s^2) – 2 kg Object
- - - Acceleration (m/s^2) – 4 kg Object

As the applied force increases, acceleration increases for both carts more than the cart with greater mass.

Which statement best supports the student's claim?

A. The applied forces in the investigation range from 2 N to 10 N.

B. Acceleration increases from about $1 m/s^2$ at 4 N to about $2.5 m/s^2$ at 10 N, while the acceleration of the 2 kg cart increases from about $2 m/s^2$ at 4 N to about $5 m/s^2$ at 10 N.

C. Acceleration is $3 m/s^2$ when the applied force is 6 N.

D. The cart accelerates when a force is applied.

What Are *students* Doing?

- Marking the text**
- Analyzing and interpreting data, graphs, and diagrams**
- Identifying what the question is asking**
- Identifying the correct answer to the question**

SCIENCE TEST PREP

Physical Science

Practice Problem 3

Ocean scientists study waves to understand how energy moves through water. The amplitude of a wave is the distance from the rest position of the water to the crest of the wave. Waves can transfer energy across long distances in the ocean. Scientists often analyze graphs to determine how wave properties change under different conditions.

Relationship Between Wave Amplitude and Wave Energy

Amplitude (cm)	Wave Energy (J)
0	0
2	10
4	40
6	90

A student makes the following claim: Wave energy increases as amplitude increases.

Which piece of evidence from the graph supports the student's claim?

A. Wave energy increased by about 9 J between amplitudes of 8 cm and 10 cm.
B. Wave energy increased by about 12 J between amplitudes of 8 cm and 10 cm.
C. Wave energy was about 0 J when the amplitude was 0 cm.
D. Wave amplitude ranges from 0 cm to 10 cm on the graph.

Practice Problem 2

Scientists use waves to design technologies such as sound systems, medical imaging tools. Different types of waves have different structures, which affect how they travel.

Compare the structures of transverse waves and longitudinal waves.

Parts of a wave

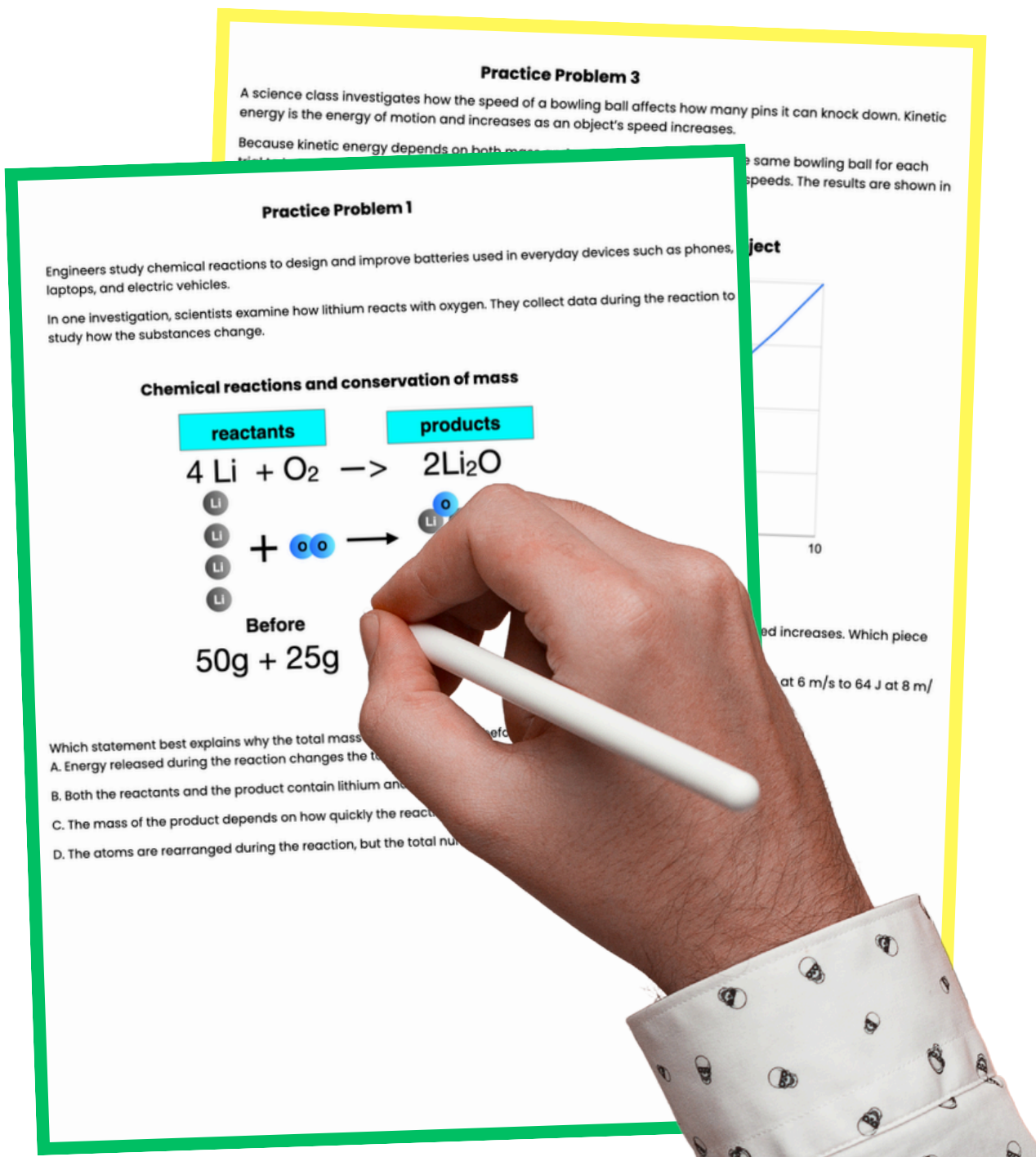
The diagram illustrates the parts of a wave. For a transverse wave, the crest is the highest point, the trough is the lowest point, the amplitude is the distance from the rest position to the crest, and the wavelength is the distance between two consecutive crests. For a longitudinal wave, the rarefaction is the region of low particle density, and the wavelength is the distance between two consecutive rarefactions.

Different ways to use the test prep lessons

- ✓ **One strategy a day for one week of test prep**
- ✓ **Google Form Option for Problem 4: Individual practice for analytics**
- ✓ **One question a week, 5-10 minutes a day, focusing on one strategy a week**

SCIENCE TEST PREP

Test taking Strategies



Check out what teachers just like you have said about my other test prep activities:



This was a great resource to use to prep for our state science test! It really helps to be able to explain the purpose behind each strategy so that they are able to become better test takers. Thanks!- Leslie B



Worked well for what I needed with middle school students. Test prep is hard to come by. I used this to prepare them for Illinois State Testing prep. - Emily



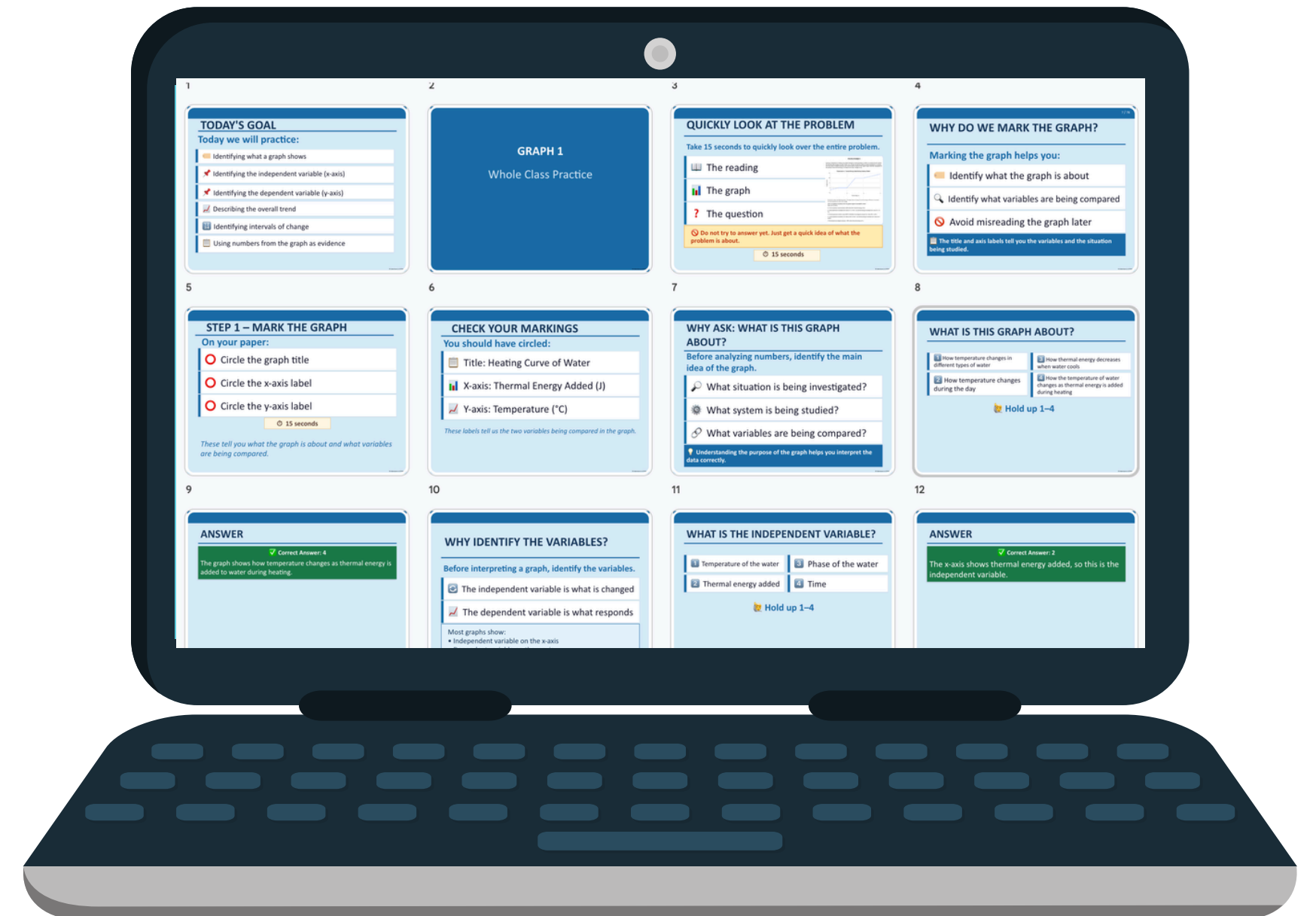
This was an awesome resource! Thank you so much for putting your time into creating this to make life easier and more stress free! Used it with each bell-Thanks!-Trish Bruw and her Science Crew

Resource *includes*

- ✓ 20 practice problems with science passages, data and diagrams to interpret
- ✓ Google Form for each Problem 4 to see how well each student understands the strategy
- ✓ Teacher presentation to guide students step-by-step on how to break down the question, identify key parts, and then answer the questions
- ✓ Answer key

SCIENCE TEST PREP

Test taking Strategies



HOW TO USE THE RESOURCE IN

3 simple steps

1

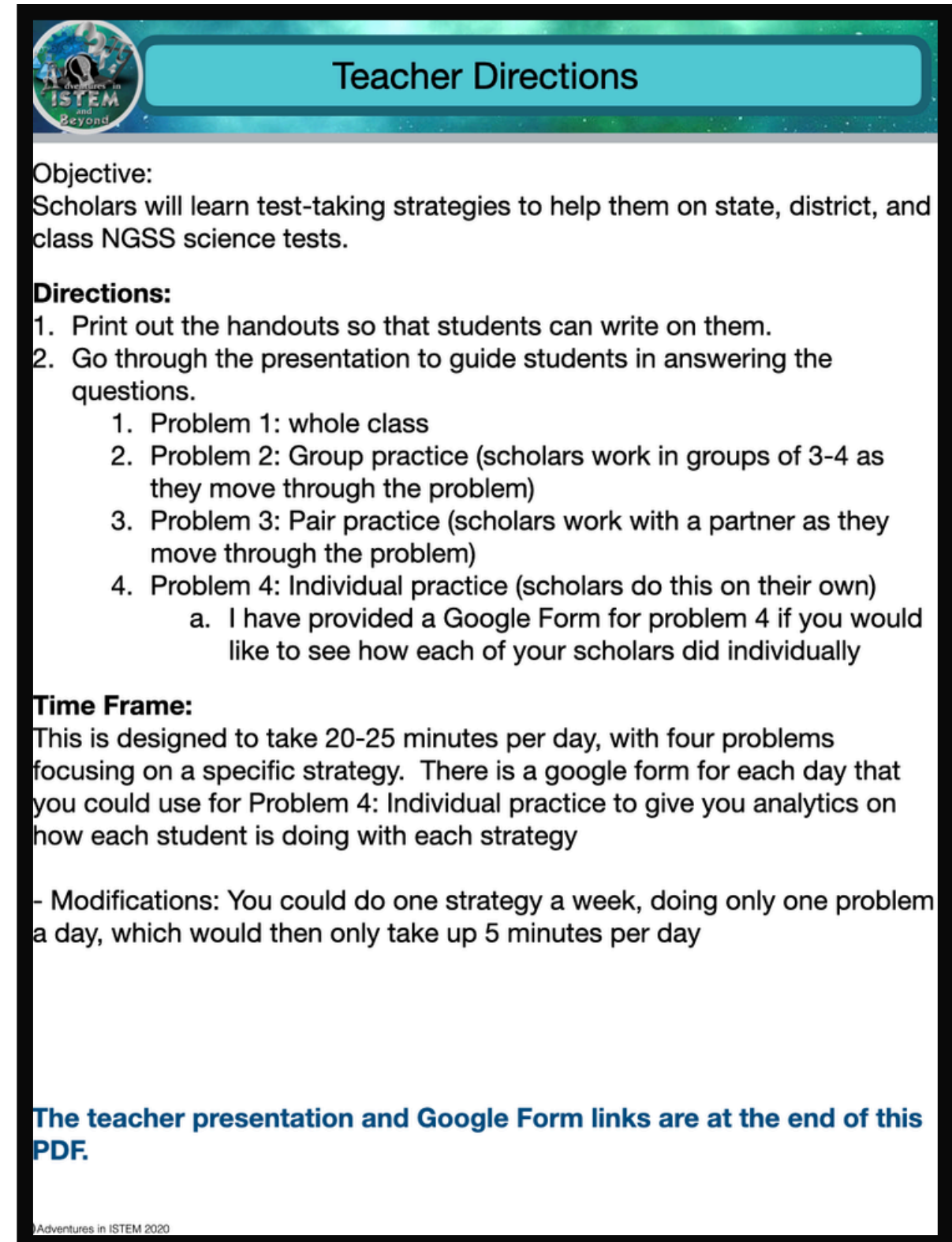
Print the PDF version, make copies, and hand out to students

2

Use the digital version by clicking the titles in the RED BOX to make your own copy (found at the end of the PDF)

3

Share the resource with your students using your favorite LMS (Google Classroom, Powerschool (schoolology), Canva...)



Teacher Directions

Objective:
Scholars will learn test-taking strategies to help them on state, district, and class NGSS science tests.

Directions:

1. Print out the handouts so that students can write on them.
2. Go through the presentation to guide students in answering the questions.
 1. Problem 1: whole class
 2. Problem 2: Group practice (scholars work in groups of 3-4 as they move through the problem)
 3. Problem 3: Pair practice (scholars work with a partner as they move through the problem)
 4. Problem 4: Individual practice (scholars do this on their own)
 - a. I have provided a Google Form for problem 4 if you would like to see how each of your scholars did individually

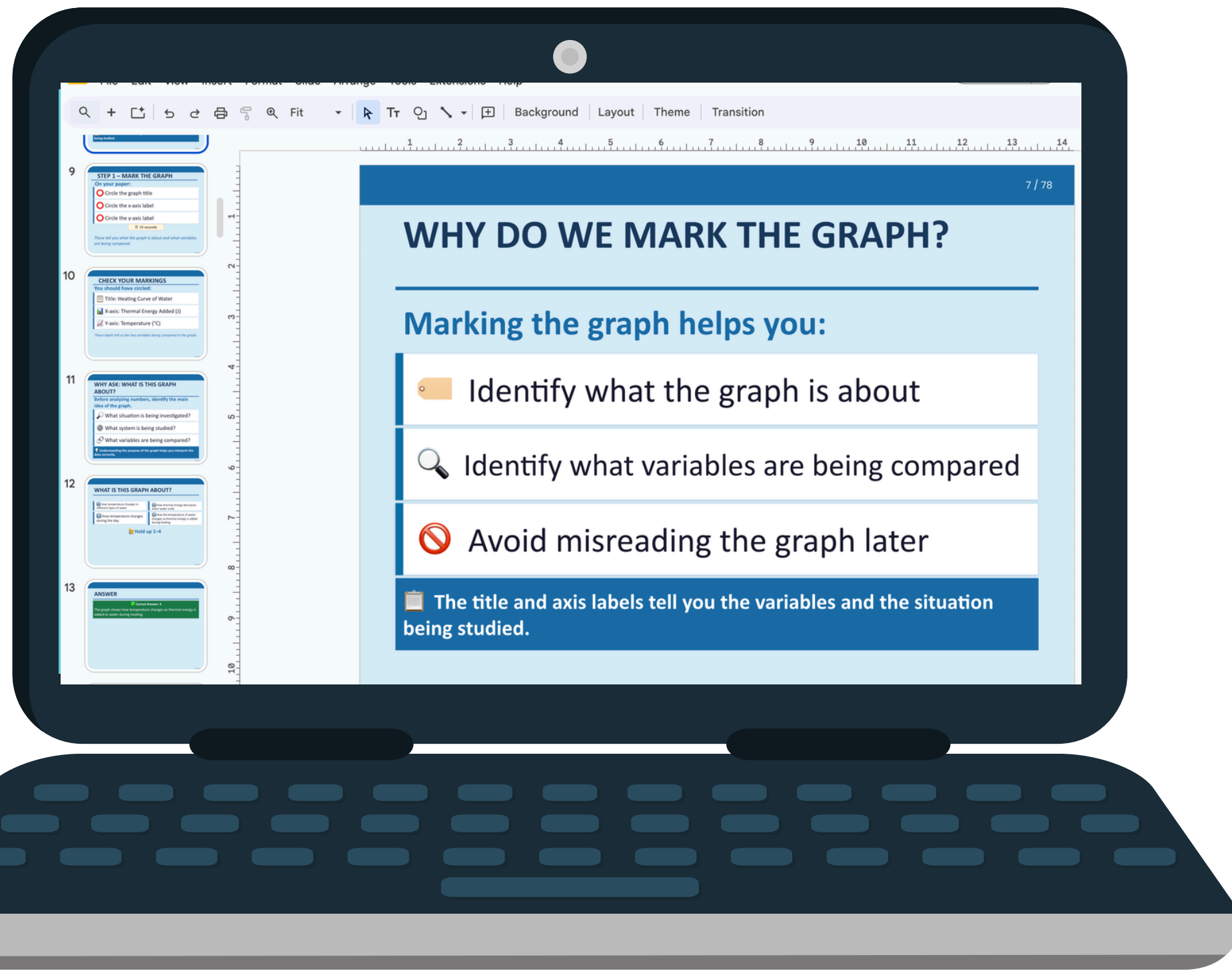
Time Frame:
This is designed to take 20-25 minutes per day, with four problems focusing on a specific strategy. There is a google form for each day that you could use for Problem 4: Individual practice to give you analytics on how each student is doing with each strategy

- Modifications: You could do one strategy a week, doing only one problem a day, which would then only take up 5 minutes per day

The teacher presentation and Google Form links are at the end of this PDF.

Adventures in ISTEM 2020

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4. Use with your class

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Leave a review

NGSS Test Prep Bundle

This test-taking strategies activity includes:

21 practice questions with graphs, data tables, and diagrams

Multiple-choice, multi-answer, and short (CER) questions

Teacher slide presentation to guide the students with the strategies and how they can help them

Answers for the example questions

“ This resource is exactly what I was looking for. Worth the purchase!- Shannon ”

NGSS TEST PREP BUNDLE

Practice 6

In 2004, the coast of Sumatra experienced a tsunami that was 50 m tall and reached 5 km inland. It caused an estimated \$10 billion in damages and resulted in the deaths of around 230,000 people. Today, we have tsunami warnings to help reduce the number of lives lost.

A tsunami is a series of waves that come from the ocean. Tsunamis are caused by earthquakes near the ocean floor. The 2004 tsunami was caused by an earthquake that was 6 earthquakes.

Earthquake	Location
Earthquake A	Coastline
Earthquake B	Mid-continent
Earthquake C	Ocean
Earthquake D	Mid-continent
Earthquake E	Mid-continent
Earthquake F	Mid-continent

(A) Earthquake A
(B) Earthquake B
(C) Earthquake C
(D) Earthquake D
(E) Earthquake E
(F) Earthquake F

Practice 3: Part A

An invasive species entering an ecosystem can disrupt it because they have no natural predators. The crown-of-thorns starfish is protected by its toxic spines and is naturally located in the Indo-Pacific region. However, it is described as an invasive species because it is causing the Great Barrier Reef to die.

Crown-of-thorns starfish

What question are the scientists trying to answer?

(A) What species are in the Indo-Pacific ecosystem?
(B) How many crown-of-thorn starfish are in the Indo-Pacific region?
(C) What does the crown-of-thorn starfish eat?

Digital and Print

Analyze Data, Interpret Data, Test-taking Strategies, NGSS state test Practice Questions

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