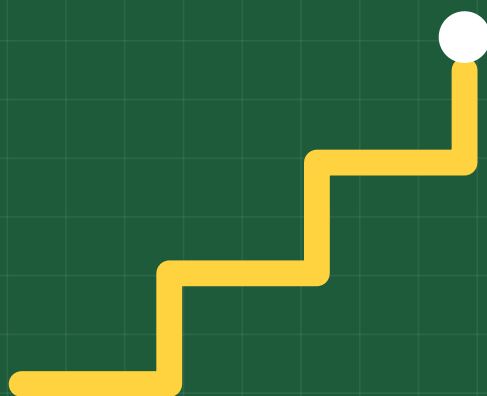




UpOnly Learning



GRADE 7

FREE SAMPLE WORKBOOK

Science Grade 7

One step at a time. · Ages 12–13 · Free sample: 1 of 8 topics

UO-SCI-7

One step at a time

I'm Dr. Evan J. Hasson. I've run a specific chiropractic practice for over twelve years, and I'm a dad of three. My work is about alignment: get the structure right, and everything else works better.

At home, nothing was aligned. I was spending thousands a month on tutors, extracurriculars and programs, and when I asked about enrolling a second or third child the answer was always the same: that'll be double, that'll be triple. The charter school had a waiting list. The good public school had a waiting list. The private schools had the kind of list where it helps to know someone, or to give generously first.

And underneath all of it, the same quiet threat: if you don't pay for this, your child will fall behind. Not sold with evidence. Sold with fear.

So I did my own research, and here is what I found: none of it is secret. The standards are published. The order a child should learn in is written down and freely available. It is just scattered. Nobody had done the work of pulling it together, putting it in order and handing it over. So I did.

When every step has its place, confusion has nowhere to hide.

I built this for my own kids. I'm giving it to yours.

Dr. Evan J. Hasson, DC

Founder and dad of three

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No guaranteed results, and mistakes happen. Every student learns differently. We write and review every question and answer key carefully, and we still get things wrong — an answer key can be wrong, and a question can be worded badly or have two defensible answers. Check the answer key before you hand it over, and trust your own judgement over ours. Found a problem? **Photograph the page and email it to support@uponlylearning.com** — the picture tells us more than a description, and we fix it for every family.

Safety. Some activities use household items such as scissors, coins or food. An adult should supervise and skip anything unsafe for the student.

Not professional advice. This workbook does not replace an evaluation by a qualified educator or specialist. The founder is a Doctor of Chiropractic; UpOnly Learning does not provide medical or health advice.

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How to use this workbook

Each topic follows the same steps, so your student always knows what comes next.

1. ① **Quick Check.** 10 questions before you teach. Read them aloud for younger students. A high score means you can move faster.
2. ② **Learn It.** Key words, step-by-step teaching with lines you can read aloud, worked examples and the mistakes to watch for.
3. ③ **We Do It Together.** 10 questions you do side by side. The answer and the "why" are printed right after each question, so you can talk it through.
4. ④ **You Try.** 10 questions your student does alone.

Answers with short explanations for every question are in the **Answer Key** at the end of each topic, so students can work without peeking. Go over each wrong answer together using the explanation.

This workbook is printed in full color. To save ink, choose "Black and white" or "Grayscale" in your printer settings; every page still works in black and white.

Want online checks that score themselves and track each student's progress? Visit uponlylearning.com.



How to use this Science book in Grade 7

Pace

Plan on 1 to 2 weeks for each of the 8 topics, about 8 to 16 weeks for the book, in 2 to 4 sessions a week.

A typical session

A 40 to 45 minute session runs Quick Check, Learn It, We Do It Together, and a block of You Try questions, with Show What You Know saved for its own day at the end of the topic.

Tips for this book

- Signs of a chemical reaction and Conservation of mass work well as kitchen experiments; use safety goggles and an adult nearby, and weigh everything before and after.
- Photosynthesis and Cellular respiration and using food go together; have your student draw matter and energy moving in and out of each one.
- The rock cycle is easier with real rocks; sort a few into igneous, sedimentary, and metamorphic and talk about how each could change.
- Encourage your student to check their own work with the answer key and add one sentence explaining each corrected answer.

Your seventh grader is learning how matter and energy move through living and nonliving systems, and your curiosity makes the experiments more fun.

GRADE 7

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Science: Grade 7

Free Sample Workbook · Ages 12–13 · 1 of 8 topics, with a Quick Check, a lesson, We Do It Together, You Try and an answer key

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Compare properties of substances before and after they interact to decide if a reaction occurred MS-PS1-2

Quick Check 7 · Learn It 9 · We Do It Together 11 · You Try 13 · Answer Key 14



Signs of a chemical reaction

The student will compare properties of substances before and after they interact, such as density, melting point, solubility, flammability and odor, to decide whether a chemical reaction occurred.

① Quick Check

Do this before the lesson. It shows what your student already knows. Score: ____ / 10

1. What does it mean when a substance's properties after an interaction are different from before?
A Nothing happened **B** The substance disappeared completely **C** The substance became a mixture
D A new substance probably formed
2. Is mixing blue and yellow paint to make green a chemical reaction?
A No, they explode **B** Yes, a gas forms **C** No, the pigments are just mixed
D Yes, a new substance with a new color forms
3. Which property tells you whether a substance can burn?
A Solubility **B** Flammability **C** Density of the sample
4. What can you do to get dissolved salt back from salt water?
A Stir the water for a long time **B** Evaporate the water **C** Freeze the water
5. A substance melts at 0 degrees C. After mixing with another substance, the result melts at 80 degrees C. What does this suggest?
A It is the same substance **B** It evaporated **C** Nothing changed in the sample
D A new substance likely formed
6. Which statement best describes the mass of the products of a reaction in a sealed container?
A More than the reactants **B** Equal to the mass of the reactants **C** Less than the mass of the reactants **D** Zero
7. Aria heats sugar in a pan and it turns brown, smells like caramel and will not turn back. What is the best conclusion?
A A physical change occurred **B** The sugar dissolved in the pan **C** A chemical reaction occurred
8. A cube of metal has a mass of 80 g and a volume of 10 mL. What is its density?
A 8 g per mL **B** 0.125 g per mL **C** 800 g per mL **D** 70 g per mL
9. A student puts an iron nail in a sealed jar with no air. After weeks it does not rust. What does this show?
A Rust is a mixture **B** Iron never reacts with air or water **C** Iron dissolves **D** Rusting needs oxygen from air

10. Leaves are burned and leave ash. Ash does not burn again, but leaves do. How does this show a reaction occurred?

- A** The mass of the leaves stayed the same afterward **B** Flammability changed, so a new substance formed
C Ash is warmer than the leaves **D** Leaves are green

② Learn It

Key words

- **property:** a trait used to identify a substance, like color, density, or how it dissolves
- **physical change:** a change in form or state where the substance stays the same, like ice melting
- **chemical reaction:** a process where substances change into new substances with different properties
- **reactant:** a starting substance in a chemical reaction
- **product:** a new substance made by a chemical reaction
- **solubility:** how well a substance dissolves in another, such as in water
- **density:** how much mass is packed into a given volume

Warm-up

1. Show a torn piece of paper and a burned match (already burned). Ask which one became a new substance.
2. Discuss that tearing changes shape, but burning makes ash and gases.

Some changes make brand new substances, and some don't. Today you're the detective who figures out which is which.

Teach

1. Explain that every substance has characteristic properties. If the properties after an interaction differ from the properties before, a new substance formed.
2. List evidence that may signal a reaction: a gas forms (bubbles not from boiling), a precipitate (solid) forms, a color change, an unexpected temperature change, a new odor.
3. Explain that evidence is a clue but must be checked against properties; for example, bubbles in boiling water are not a reaction, and color change from mixing paint is not a reaction.
4. Wearing goggles, mix a spoon of baking soda with a little vinegar. Observe bubbles. Explain the gas is carbon dioxide, a new substance with different properties from either reactant.
5. Dissolve salt in water and point out it can be recovered by evaporation: a physical change, no new substance.

Look for new properties. If what you end up with behaves differently from what you started with, a reaction happened.

Guided practice

1. Add a few spoons of vinegar to warm milk in a cup and stir. Observe white clumps (curds) forming. Discuss: a new solid appeared.
2. Dissolve sugar in water. Ask: is it a reaction? Discuss that sugar is still sugar and the water tastes sweet (kitchen sugar is food, so a taste is safe here; in a lab, never taste a substance).
3. Make a table: interaction, observations before, observations after, reaction yes or no, evidence.

Write down the properties before and after. Then decide like a scientist.

Worked examples

Iron nails left outside turn reddish-brown and flaky. Is this a chemical reaction?

Yes. Rust is a new substance (iron oxide) with different properties from iron: it is brittle, reddish and not magnetic like the iron was.

Butter melts in a hot pan. Is this a chemical reaction?

No. Melting is a physical change. When the butter cools it becomes solid again and is still butter.

Watch for these mistakes

Mistake: Any bubbles mean a chemical reaction.

Fix: Boiling water bubbles because liquid water becomes water vapor, the same substance in a different state. Bubbles are a clue only when a new gas is made.

Mistake: When something dissolves, it disappears and becomes a new substance.

Fix: Dissolved sugar or salt is still there, spread out among water particles. You can taste it and get it back by evaporating the water.

③ We Do It Together: 10 questions

Do these side by side. Read each question together, let your student answer, then read the answer and the "why" right below it and talk it through.

1. Which of these is a chemical property?

- A** Flammability **B** Density **C** Color of the sample

Answer: **A** Flammability

Why: Flammability describes how a substance reacts with oxygen when burning.

2. What is the evidence that baking soda and vinegar reacted?

- A** The spoon melted **B** The cup got larger as it filled **C** The liquid got dimmer
D Bubbles of a new gas appeared

Answer: **D** Bubbles of a new gas appeared

Why: A gas formed that was not there before.

3. What temperature does water boil at?

- A** 212 degrees C **B** 100 degrees C **C** 50 degrees C

Answer: **B** 100 degrees C

Why: Pure water boils at 100 degrees Celsius at sea level.

4. Which property helps tell sugar from salt?

- A** Color, since one is white and one is not **B** Being solid at room temperature **C** Solubility or melting point
D The shape of the cup it is in

Answer: **C** Solubility or melting point

Why: Sugar and salt differ in characteristic properties such as solubility and melting point. Never taste substances in a lab test.

5. Why does mixing blue and yellow paint to make green not count as a chemical reaction?

- A** The pigments are melted together and then cooled **B** The pigments are mixed and no new substance forms
C The pigments become hot **D** The pigments make a gas as they mix

Answer: **B** The pigments are mixed and no new substance forms

Why: The pigments are only mixed together.

6. A student mixes two solids and sees no change. What is the best conclusion?
- A** A reaction definitely occurred in the cup **B** The solids evaporated **C** There is no evidence of a reaction
D A gas formed in the mixture

Answer: **C** There is no evidence of a reaction

Why: No new substance is shown by the observations.

7. A sample has a mass of 54 g and a volume of 20 mL. What is its density?
- A** 0.37 g per mL **B** 74 g per mL **C** 34 g per mL **D** 2.7 g per mL

Answer: **D** 2.7 g per mL

Why: 54 divided by 20 is 2.7 g per mL.

8. A rock sinks in water. What can you conclude?
- A** Its density is less than 1.0 g per mL **B** Its density is greater than 1.0 g per mL
C Its density is exactly 1.0 g per mL like water

Answer: **B** Its density is greater than 1.0 g per mL

Why: Objects with greater density than water sink.

9. A student says any bubbling means a reaction. What is a counterexample?
- A** Boiling water makes bubbles of water vapor **B** Baking soda and vinegar makes bubbles
C Zinc and acid makes bubbles of hydrogen gas

Answer: **A** Boiling water makes bubbles of water vapor

Why: Boiling changes state only.

10. How could you show that rust is not iron?
- A** Look at it **B** Smell it **C** Test whether it is attracted to a magnet
D Weigh it on a balance and compare the mass

Answer: **C** Test whether it is attracted to a magnet

Why: Iron is magnetic, but rust is not.

④ You Try: 10 questions

Now your student works alone. Check answers in the Answer Key at the end of this topic. Score: ____ / 10

- What is a reactant?
A A solid that sinks **B** A starting substance in a chemical reaction
C A new substance made when the reaction is done
- Which mixture is NOT a chemical reaction?
A Salt in water **B** Iron rusting **C** Baking soda and vinegar **D** Burning wood
- What is rust?
A A mixture formed when iron is melted into water **B** A new substance formed when iron reacts with oxygen
C Iron that is magnetized **D** Iron that is dissolved in the water
- A clear liquid mixed with another clear liquid makes a cloudy white solid that sinks. What is the solid called?
A A precipitate **B** A product gas **C** A solute **D** A reactant
- What is the mass of 25 mL of a liquid with a density of 0.8 g per mL?
A 200 g **B** 0.032 g **C** 20 g **D** 31.25 g
- Sofia bakes a cake. The batter was runny and the cake is spongy and brown. Which evidence shows a reaction?
A The cake is larger than the pan it was baked in **B** The cake is hot **C** The batter is still wet
D New texture, color and smell that cannot be undone
- A student heats ice until it becomes water and then steam. Which statement is correct?
A It is a mixture **B** It is a new substance at each state **C** It is three different substances in three states
D It is the same substance in three states
- A student heats a white powder and it releases a gas and leaves a gray solid. How can the student decide whether a reaction occurred?
A Check only the color of the powder **B** Compare the properties of the gray solid with the original powder
C Look only at the gas that escaped from the powder
- A sample of 150 mL has a mass of 120 g. What is its density, and could it be water?
A 1.0 g per mL, water **B** 1.25 g per mL, so it is water **C** 1.25 g per mL, not water **D** 0.8 g per mL, not water
- A student says that because a new color appears, a reaction occurred. What is a better statement?
A A color change is a clue that must be checked with other properties **B** Color change is proof of a reaction
C Color change is meaningless **D** Color change is a state change

Signs of a chemical reaction: Answers and explanations

① Quick Check

1. What does it mean when a substance's properties after an interaction are different from before?
D A new substance probably formed
Different properties suggest a chemical reaction.
2. Is mixing blue and yellow paint to make green a chemical reaction?
C No, the pigments are just mixed
No new substance with new properties forms.
3. Which property tells you whether a substance can burn?
B Flammability
Flammability is a property that describes whether a substance burns.
4. What can you do to get dissolved salt back from salt water?
B Evaporate the water
The water leaves as vapor and the salt is left behind.
5. A substance melts at 0 degrees C. After mixing with another substance, the result melts at 80 degrees C. What does this suggest?
D A new substance likely formed
Melting point is a characteristic property, so a change suggests a new substance.
6. Which statement best describes the mass of the products of a reaction in a sealed container?
B Equal to the mass of the reactants
Mass is conserved in a closed system.
7. Aria heats sugar in a pan and it turns brown, smells like caramel and will not turn back. What is the best conclusion?
C A chemical reaction occurred
The new color, smell and irreversibility show new substances.
8. A cube of metal has a mass of 80 g and a volume of 10 mL. What is its density?
A 8 g per mL
80 divided by 10 is 8 g per mL.
9. A student puts an iron nail in a sealed jar with no air. After weeks it does not rust. What does this show?
D Rusting needs oxygen from air
Without oxygen, the reactants for rust are missing.
10. Leaves are burned and leave ash. Ash does not burn again, but leaves do. How does this show a reaction occurred?
B Flammability changed, so a new substance formed
A different characteristic property means a new substance formed.

④ You Try

1. What is a reactant?
B A starting substance in a chemical reaction
Reactants are what you start with before the reaction.

2. Which mixture is NOT a chemical reaction?
A Salt in water
Salt dissolves and can be recovered.
3. What is rust?
B A new substance formed when iron reacts with oxygen
Rust is iron oxide, with properties different from iron.
4. A clear liquid mixed with another clear liquid makes a cloudy white solid that sinks. What is the solid called?
A A precipitate
A precipitate is a solid that forms in a liquid reaction.
5. What is the mass of 25 mL of a liquid with a density of 0.8 g per mL?
C 20 g
Mass is density times volume: 0.8 times 25 is 20 g.
6. Sofia bakes a cake. The batter was runny and the cake is spongy and brown. Which evidence shows a reaction?
D New texture, color and smell that cannot be undone
Different properties that cannot be undone point to new substances.
7. A student heats ice until it becomes water and then steam. Which statement is correct?
D It is the same substance in three states
Water changes state, but remains H₂O.
8. A student heats a white powder and it releases a gas and leaves a gray solid. How can the student decide whether a reaction occurred?
B Compare the properties of the gray solid with the original powder
Comparing characteristic properties shows whether a new substance formed.
9. A sample of 150 mL has a mass of 120 g. What is its density, and could it be water?
D 0.8 g per mL, not water
120 divided by 150 is 0.8 g per mL.
10. A student says that because a new color appears, a reaction occurred. What is a better statement?
A A color change is a clue that must be checked with other properties
Color alone does not prove a new substance formed.

Keep going with the full Science workbook

You just tried one topic. The full Grade 7 workbook has every topic below, each with a Quick Check, a lesson, We Do It Together, up to 90 You Try questions, Show What You Know and a full answer key.

- | | |
|---|-----------|
| 1. Signs of a chemical reaction | MS-PS1-2 |
| 2. Conservation of mass | MS-PS1-5 |
| 3. Heat, mass and temperature change | MS-PS3-4 |
| 4. Photosynthesis | MS-LS1-6 |
| 5. Cellular respiration and using food | MS-LS1-7 |
| 6. Food webs: matter and energy in ecosystems | MS-LS2-3 |
| 7. The rock cycle | MS-ESS2-1 |
| 8. Resources and population size | MS-LS2-1 |

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— Dr. Evan J. Hasson, founder

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