ENG LANGUAGE ARTS (CCSS.ELA-LITERACY)

Skills	Strategies	Support	Watch	Nurture
Reading Efficiency (RL.2-12)				✓
Reading: Literature (RL.2-12)				✓
Reading: Informational Text (RI.2-12, RH)				✓
Vocabulary (L...)				✓
Writing (W.2...)				✓

⚛ MATH AND SCIENCE (CCSS...TH.CON...)

Skills	Strategies	Support	Watch	Nurture
Expressions & E... HSN.Q.A)				✓
Problem Solving (MP, SP.A, MODELING)	• Provide Stepped Examples of Worked/Solved Problems • Use Visual Representations for Word Problems • Word Problems: Student Checklist (A)		✓	
Geometry & Functions (F.A, G.A-C, EE, MD.A-C, HSN.Q-R, NS)	• Create Math & Science Vocabulary Walls • Geometry: Student Checklist (MH,A) • Talk Through Visual Math Concepts		✓	

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STUDY SKILLS (COLLEGE & CAREER READINESS)

Skills	Strategies	Support	Watch	Nurture
Initiation	• Coach Problem Solving Skills • Guided Choice: 3 Good Options • Multi-Step Assignments: Student Checklist (A)	✓		
Organization & Time Management				✓
Sustained Focus				✓
Decision Making	• Check Work on Tests • Help Students Build Awareness of Pace		✓	

Provide Stepped Examples of Worked/Solved Problems

If your student might struggle to learn a complex new topic in math or science

Teach It!

☐ **Objective:** Provide "worked" or partially solved problems in steps, so students can work through the example and then transfer the knowledge in manageable steps.

☐ **Direct Instruction: a)** Provide examples of solved problems in steps. Teach and model how to approach a worked example carefully. Students should read and then re-do each step on their own so they are actively solving the example problem. In multi-step problems, give students different steps to solve in each example so they know how to approach each interim step. Don't assume they will âknow how toâ finish the restâ. Give a different problem for each step will minimize the feeling of being overwhelmed and provide more of a sense of accomplishment.

☐ **Teaching Notes: a)** As students grow more advanced in a specific topic, the presented solved problems should be gradually phased out. **b)** Worked examples might show interim solutions, or they could include step-by-step explanations. The amount of information will vary by the student's needs and topic.

☐ **OER Resource:** Worked Examples (Digital Promise Learner Variability Project)

Why it Works (the Science of Learning)!

Research suggests that a layered approach provides instructional guidance that is more effective than formally teaching a lesson, using examples, and then giving a problem set for the student to complete. By alternating between worked example problems and then solving problems themselves, students pay more attention to the example because they know they are going to need to use the strategies or steps to solve the next problem independently. They also do a better job of recognizing what they do not know and learning from any mistakes.

Best-suited for students with weaker: Attention, Long-term Memory, Metacognition, Working Memory, Processing Speed (Source: Digital Promise Learner Variability Project)

Use Visual Representations for Word Problems

If your student dives into word problems without fully understanding what is being asked or having a plan for solving

Instruction and Practice

☐ **Objective:** Students will draw models or use pictures to solve word problems so they can visualize what is being asked and more easily identify what to do.

☐ Explain why pictures help. *Word problems are like stories with math. You need to figure out which math operation(s) to do to understand the outcome of the story. Drawing out pieces of the problem will help you picture that information like a story.*

☐ **Model** the class. **a)** ...d a word prob... ... oud without d... ... **b)** Ask and dis... ... *What is ... problem about* ... Next, ... d the problem a 2nd ... , stopping to draw a bar model, diagra... or representatio... each piece ... for...ion (i.e. peop...ot...ts or spatial ... c...s) invol... Use lines and s...ools to ...resent words where ...sible. Refer to vocabulary that indicate... hich operation they might use ... Solv... e problem t... he...sing the vis... s.

☐ **Class Activity:** Give ...ts a word ...olem to dr... Working i...airs, ...dents s...re th...rawing ...at was help...n the drawings and w...they might adopt next time. Repeat regularly for word problem... class. ...resentat...part o...e ass...ment...aving sp...e for it on any worksheets...

☐ **Teache...s:** Keep ...ngs s...e. Use basic shap...uch a...ars, rec...s, circles...stick fi...es. Use arrows and includ...bels as needed. Rer...students that neatness and clarity are far mo...n art sk... This is particularly ...rtan... r student...n weaker ...ual mer...y or spatial perception.

Teacher Resources

☐ **OER Resource:** Creating Visual Representations (Digital Promise Learner Variability Project)

PRINT Student Checklist: Drawing Word Problems

☐ Read the problem one time through.

☐ Read through the problem again and stop to draw each new piece of information into a model, picture, or diagram of the story.

☐ Keep the picture simple and neat. Use basic shapes such as bars, rectangles, circles or stick figures. Use arrows, labels or words to help you make connections to the problem you will solve.

☐ Use your model, picture or diagram to help you create an equation and solve.

Why it Works (the Science of Learning)!

Picturing a problem offers a concrete way for students to organize the information, understand the question and identify a solution. Pictures enable students to more effectively visualize math problems. Note

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that students with a learning disability often do not create accurate visual representations or use them strategically to solve problems, so providing a picture or visual for them will be important in helping them effectively use visual representations when solving.

Best-suited for students with weaker: Attention, Inhibition/Impulsivity, Long-Term Memory, Reasoning, Working Memory, Processing Speed (Source: Digital Promise Learner Variability Project)

Word Problems: Student Checklist (A)

If your student struggles with math word problems

Before I Begin:

☐ Read assignment instructions. Do I understand what I need to do?

☐ Get scrap/graph paper, ruler, colored pencils, eraser, formula sheets, calculator and text book

☐ Review the example problems from my notes or textbook

While I Solve:

☐ Mark up the question: Underline what I need to find, circle numbers I will use, cross out what I don't need

☐ Estimate an answer before solving (to confirm after that my final answer is reasonable)

☐ Write out all my steps and calculations. Draw a picture to visualize if helpful

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Create Math & Science Vocabulary Walls

If your student often forgets, or is reluctant to use, subject-specific vocabulary in math and science

Teach It!

☐   **Objective:** Students will refer to word walls or vocabulary sheets to find subject-specific vocabulary as they encounter it in their reading or problem solving.

☐   **Teacher Takeaways: a)** Create word walls, an organized wall display of key terms and definitions, (as well as pictures and examples), for students to reference throughout a topic you are teaching. Remind students to look at the word wall to find a term they need. **b)** Even students who understand concepts well might forget the vocabulary. Teach and quiz math and science vocabulary as you would in ELA to improve systematic recall. **c)** An alternative to the wall display is giving each student a sheet of terms for easy reference

☐   **Teach Notes:** Sheets can be a better option when students are solving problems that are vocabulary heavy. They might have a good understanding of how to solve the problem if they could just remember what the term means. When you want students to connect key terms to memory, you also do not want to let any missing vocabulary interfere with their ability to understand the concept or problem solve.

☐   **OER Resource: Word w (Digita Variabi Proje**

Why it Works (the Science of Learning)!

As with all vocabulary words, students need ongoing reinforcement and spaced practice to commit terms to long term memory. Since students often only need to "speak math" in math class, it is essential that teachers reinforce math terminology throughout their lessons and provide students the exercises they need to memorize key terms.

Best-suited for students with weaker: Long-term Memory, Short-Term Memory, Working Memory (Source: Digital Promise Learner Variability Project)

Geometry: Student Checklist (MH,A)

Before I Begin Solving:

☐ Get scrap paper, pencils, notes/formulas, textbook, and additional materials such as graph paper, ruler, calculator, and protractor

☐ Read the directions. Do I understand what I need to do?

☐ Review the example problems from my teacher, notes, or book

While I Solve:

☐ Read the problem twice

☐ If I'm given a picture, check marks up with numbers and labels. If picture is too small draw the problem

☐ If I'm stuck, talk through or describe what I see in the problem out loud or use a 3-D object to help me visualize

☐ Carefully write out each step so I can go back and check my work

☐ Check my answers to make sure they are complete and make sense. Re-solve if needed. If I am unsure, check my notes or ask for help

Talk Through Visual Math Concepts

If your student struggles with conceptual understanding in math and science, particularly if their verbal skills are stronger

Instruction and Practice

☐ **Objective:** Students will take the time to explain or talk through visual math concepts and problems to increase their understanding. This approach is especially helpful for students with stronger verbal skills.

☐ Discuss how explaining one's thinking out loud as you work through a problem helps you understand what you're doing and why. Model how to talk through and describe what you are seeing in a problem or material. Have students practice a simple problem after you've modeled a few. (Examples on the next slide).

☐ Use numberless word problems or cover up numbers in word problems so students don't focus on computing and getting an answer, but focus on what the problem is asking.

☐ **Teachers Note:** ... for students the difference between explaining their own thought process and ... describing what they have read or heard. ... descriptions. This approach applies to any type of math problem, not just visual, but can be especially helpful ... problems ... graphs, charts and geometric concepts.

Examples

Younger Students: ... geometry concepts, students can make comparisons between what they already know and what they are ... example ... student describe a parallelogram out loud. *A parallelogram is really just a diamond (rhombus). It looks like a square that someone pulled and stretched.*

Older Students: Visual problems might require understanding a graph. Students can talk through the two axes and describe the data points in terms of what they see, as well as positioning, directionality and spatial relationships between the data points. *I see that there is 1 inch of space between point A and point B, but then the space to point C is about 3 times that.*

Teacher Resources

☐ **OER Resource:** Think-alouds (Digital Promise Learner Variability Project)

☐ **OER Resource:** Guided Inquiry (Digital Promise Learner Variability Project)

Why it Works (the Science of Learning)!

Taking the time to explain or talk through a problem will help understanding and retention. Self-explanation takes time and effort, as students must really think through and explain in their own words. However, much research by Koedinger and others on self-explanation suggests that prompting students to provide verbal explanations of problem solving can aid in more robust learning.

Best-suited for students with weaker: Attention, Flexible Thinking, Inhibition, Long-term Memory, Metacognition, Working Memory, Visual Processing (Source: Digital Promise Learner Variability Project)

Coach Problem Solving Skills

If your student struggles to prioritize time or make choices

Teach It!

☐ **Objective:** Students will learn to step back, brainstorm and evaluate options when they feel "stuck" or encounter a problem.

☐ **Define It:** Define the problem with the student so there is understanding. It is important to validate and empathize to help the student work through it and make a good decision.

☐ **Brainstorm:** Think through solutions together. Include all ideas without judgment. Ideally, student should do most of the brainstorming, but help as much as needed to get him started. Write, type, or use sticky notes to write ideas down. The goal is to have a few good choices, even if one feels "perfect". Helping students accept less than perfect is an important life skill and harder for some students.

☐ **Eliminate:** Let your student cross off the options that simply won't work. (Dad helping to solve the messy room problem might just not be an option.) The act of crossing out will ease anxiety, as there are fewer items and a list of reasonable options.

☐ **Prioritize:** Write down pros and cons next to each option. Have the student prioritize the options, ideally selecting one in the process. Keep the goal of having at least one or two reasonable alternatives that aren't perfect. For a student who struggles with decisions, you might need to help. As you use this process with more decisions, they will become more independent.

☐ **Teacher Notes:** Keep in mind that the problem could be picking a topic for a school project, deciding what to wear for Halloween, or understanding how to solve a physics problem. Students vary on when and how they have difficulty making decisions.

print student checklist: Decision-making Strategies

☐ When you feel stuck, try to define the problem you're having.

☐ Brainstorm all solutions you can think of. You can write down, type, or use sticky notes to keep track of your ideas.

☐ Even if your choices are not "perfect", it is still okay to keep the good choices.

☐ Cross off any options that don't work.

☐ Write down the pros and cons next to each option.

☐   From the list, choose one that feels comfortable to try first.

Why it Works (the Science of Learning)!
Going through a structured process of brainstorming and evaluating alternative approaches can help some students overcome concerns about making bad decisions or having a less than perfect outcome.

Guided Choice: 3 Good Options

If your student struggles to choose a topic or make decisions independently

Teach It!

☐ **Objective:** Students will learn how to make good decisions without feeling overwhelmed when they can choose from a limited number of options

☐ **Direction Instruction: 1)** Narrow down the list of options to three reasonable choices, whether it is a book to read, a game to play, or a project topic **2)** Make sure that the student knows that the limitation is not a punishment, but rather a way to help make the decision easier. Remind them that all the choices are good, otherwise they would not be on the list **3)** Ensure that the student knows that the final choice is theirs alone. This will ensure the student feels empowered and responsible **4)** Help the student make a list of criteria to evaluate the choices, prioritizing what criteria is most important **5)** Have the student make a list of pros and cons of each option based on the criteria and then choose among the three options based on the criteria. Make sure the student makes the decision but provide reassurance that there are good options other than you would not have offered them. **7)** For future decisions give the student more and more independence each time as they progressively learn to make decisions.

☐ **Teacher Tip:** Making a decision and living with the consequences is a key life skill. For assessments or other classroom decisions, provide students with a limited set of acceptable options (usually three) so the student has control but is not overwhelmed by many choices. Teach them to weigh the pros and cons of each option before deciding.

☐ **OER Resource:** Student Choice (Digital Promise Learner Variability Project)

Why it Works (the Science of Learning)!

Many children get overwhelmed by having too many choices and either freeze entirely or make an impulsive choice. When students practice making decisions and realize that even a bad decision does not result in devastating consequences they will grow increasingly comfortable making decisions on their own. Build up to the number of choices your child can handle based on age, judgment, anxiety, and impulsivity.

Best-suited for students with weaker: Attention, Metacognition (Source: Digital Promise Learner Variability Project)

Multi-Step Assignments: Student Checklist (A)

If your student struggles on challenging or long assignments

Before I Begin:

- ☐ Read the instructions. Do I fully understand what to do?

- ☐ Write a list of the steps to complete the assignment

- ☐ Review my list and highlight the absolute "must" items on the list so I can do those first

- ☐ If this is a multi-day assignment, plan how much time I will spend each day

While I Work:

- ☐ Start with the most interesting task(s) on my highlighted items

- ☐ If I feel stuck, move to another highlighted task or ask for help

- ☐ Check off items as I complete them

- ☐ If I have time after I finish the highlighted items, go back and work on any remaining items

Check Work on Tests

All students but particularly if your student has a lot of scattered errors or inconsistent performance

Teach It!

☐ **Objective:** Students will learn strategies for checking their work based on how much time they have, so they can use their time efficiently and effectively.

☐ **Instruction and Practice:** Introduce and model the approaches for checking work on the next slide. Offer practice with each assignment so students can become comfortable gauging which checking strategies to use in different situations.

☐ **OER Resource:** Checking Work (Teacher Pay Teachers)

Student Guide: Approaches to Checking Work

☐ Gauge which approach to use depending on time remaining after finishing an assignment or test. (Note: Find specific strategies to double-check math problems here.)

☐ **Limited Time Remaining:** After completing a test or assignment, go back and scan to be sure that every question is answered.

☐ **Medium Time Remaining:** Go back to the first question, cover the answer, and ask yourself what the correct answer should look like, in general terms. Should it be a fraction? A large number? A name? Then uncover your answer and see if it makes sense. If the answer makes sense move to the next problem. If the answer does not make sense, re-work the problem. Continue for each problem.

☐ **Plenty of Time Remaining:** There's no better way to check work than to re-do a problem from scratch. Cover your answer and re-work or re-think the problem. Then, compare your new answer to the first attempt and see if they match. This approach might be most beneficial if you tend to rush through your work or finish well ahead of time.

Why it Works (the Science of Learning)!

Adults often tell students to check their work. However, they might be surprised to know that many students have never been taught how to check their work efficiently. Add to that, the approach will change somewhat depending on the subject, the amount of time, and the student's learning profile. Knowing how and when to use each checking strategy will help all students improve the quality of their work.

Help Students Build Awareness of Pace

If your student's performance is inconsistent and you notice that there are times when he works too quickly and/or very slowly

Teach It!

☐   **Objective:** Students who work too quickly or too slowly will build a greater awareness of the nature and patterns of their pacing and identify strategies to support their working efficiency.

☐   **Teacher Takeaways:** If a student builds awareness of how fast or slow he is working, and what factors seems to affect him the most (time of day, order of assignments, etc.), he can make small changes which can lead to big improvements. Some students benefit from timers or alarms to keep track of time spent. Sometimes that awareness is all they need to stay on track.

☐   **Student Activity: a)** Help students create a and track time on homework or al tasks. Consider charting a week two before changing thing. Keep notes of anything special ing on that day big test, a lon am as well as the e day homework wa one an what order. **b)** the st ent, look for trends. M be math went more quickly when it was fir the night's homework sched Or m e it was har to wer reading ue ns whe blings were in th oom. ased on the trends, h the student create a homework routine. dent can use a timer an art pro s until he i onfi t the sche e w s. **d)** T hers might be to hel th a similar tracking p ess for test preparation if the student has ishing or loses us on tes

☐   **OER Source:** Timers (al Pro e Learning va lity Pro

Why it Works (the Science of Learning)!

If a student builds awareness of how fast or slow he is working, and what factors seems to affect him the most (time of day, noise, ordering of assignments, etc.), he can make small changes which can lead to big improvements. However, it is important to balance the need to be self-aware with the risk of adding stress that can have an adverse effect on performance. If using a timer or discussing pacing adds stress, consider stepping back and focus on quality over quantity.