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# Designing Schoolwork that Builds Study Skills & Executive Function of Lifelong Learners

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# Study Objectives

1. Identify best practices for staff in **assigning and integrating homework** into the learning process.
2. Equip students with effective strategies for studying, note-taking, executive functioning, and related **skills that promote independent learning**.

Include: Connections to current brain research and the potential role of artificial intelligence in supporting best practices

*Findings will guide the district in aligning homework expectations with research-based strategies while helping students develop the skills needed to be successful, self-directed learners.*



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# We Will Be Covering:

- ▣ Methodology ▣
- ▣ District Homework Policies ▣
- ▣ Teacher Survey Findings ▣
- ▣ Independent Research Findings ▣
- ▣ Recommendations ▣



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# Recommendations

1. Design of Homework
2. Teaching Study Skills and Executive Functioning Skills
3. Teaching Note-taking
4. Aligning Study Practices with Evidence-Based Strategies
5. Supporting Use of Technology and AI



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# Methodology



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- **District Homework Policies:** Obtained current district homework policies.
- **Teacher Survey:** Collected and analyzed responses from 25 district teachers (K-12):
  - Current homework practices and openness to changing these practices
  - Principles and beliefs that guide current homework practices
  - The skills explicitly taught in the classroom
  - The skills they deem underdeveloped in students
  - The role of AI in learning and homework
  - Questions related to homework
- **Research:** Divided research into 4 areas to dive deeply into recent and historical cognitive science research and proven high-impact teaching strategies:
  - Study skills to maximize retention and engagement
  - Notetaking to make information “stick”
  - Homework to build understanding
  - Executive functioning to build habits for success

# District Homework Policies

## **From the Wyoming Primary Schools Student and Parent Handbook:**

Quality homework assignments are extensions of the classroom. The amount and consistency of homework depends on the subject or unit being studied and the grade level:

- First, second, and third grade students generally have thirty minutes (or less) per day.
- Fourth graders may have approximately thirty to sixty minutes depending on individual assignment and class projects.

## **From the Wyoming Middle School Student and Parent Handbook:**

Homework is an extension of the classroom. Each child should keep a record of their assignments in their assignment notebook. The amount and consistency of homework depends on the unit and subject being studied.

**Homework is not addressed in the Wyoming High School Student and Parent Handbook.**



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# Teacher Survey Key Findings (n=25)

## Teaching Practices:

- Taught most often: Test-taking skills
- Taught less often: Notetaking, studying, and planning/time management
- Most underdeveloped skills:
  - Primary and Middle: Planning/time management
  - High School: Studying

## Interest in the Research:

Teachers across all grade levels express desire for research to clarify effective homework practices & inform decision-making.

- 84% of teachers (n=25) are open to changing or modifying homework policies and practices if research supports them
- Belief that homework should serve a clear educational purpose



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# Teacher Survey Key Findings (n=25)

## **Concerns About Accountability:**

Relevant to teachers at all levels

Areas of concern include:

- Potential for cheating, especially with ungraded assignments
- Role of technology (including AI) - potential dependency and the need for responsible use of tools

## **Balancing Workload:**

- Acknowledgement of homework's impact on student well-being.
  - Busy schedules, extracurricular commitments, and overall student stress
- Teachers express a desire for a balanced approach to homework.
  - Workload across different classes and grades, aiming for consistency and equity in homework expectations.



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# Key Research Findings

## Enhancing Student Learning

### 1. Impactful Study Strategies (Hattie, Dunlosky)

**John Hattie's Visible Learning:** Effect size  $> 0.40$  = significant impact on achievement. High-impact strategies: **Peer Learning, Feedback, Metacognition, Spaced Practice / Interleaving, Retrieval Practice**

### 2. Homework and Academic Achievement

Homework benefits increase with age: small effect in elementary, moderate in secondary (Cooper)

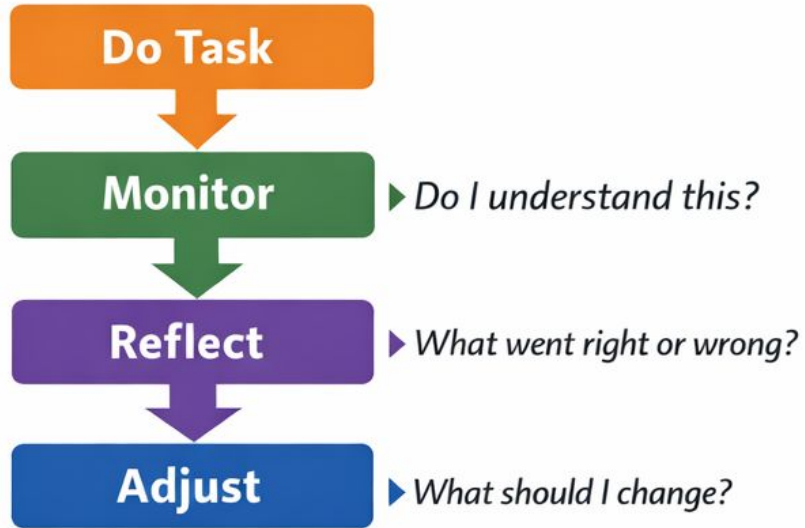
**Quality > Quantity:** Purposeful, aligned, and developmentally appropriate tasks

**Four purposes of homework:** **Practice** – build fluency, **Preparation** – activate prior knowledge, **Extension** – apply learning in new contexts, **Reflection** – metacognition, consolidation.



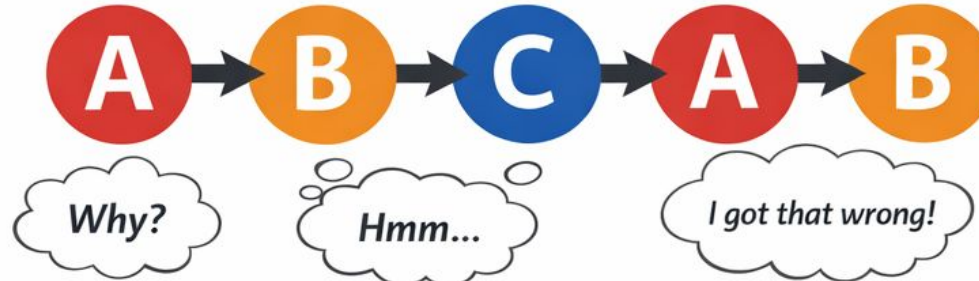
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## Metacognition



*Think About Your Thinking*

## Interleaving



*Switch Between Problems*



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# Key Research Findings

## 3. Cognitive Load & Homework Design

Align assignments with students' working memory limits (Sweller)

### Effective supports:

- Clear instructions & modeled examples
- Scaffolded tasks: Guided → Independent Practice
- Chunked assignments



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# Key Research Findings



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## High-Utility Study Strategies (Dunlosky et al.)

**Active strategies** improve long-term retention:

- Retrieval practice (self-testing)
- Spaced practice (distributed over time)
- Interleaving (mixing topics)
- Elaboration / Self-explanation

**Low-utility methods:** highlighting, rereading, passive summarizing

## Note-Taking & Knowledge Retention

**Generative notes** > verbatim transcription (Mueller & Oppenheimer), handwriting encourages deeper processing, Structured methods and reviewing within 24 hours boost retention

## Keywords

- Written after class or after reading
- Extracted from notes
- Short & simple
- Vocabulary Words, Essential Questions, or Topic Sentences

## Notes

- Taken during class or while reading a text
- Detailed
- Taken in students' preferred style: free form, bulleted, even doodled!
- Intended to be re-read later

## Summary

- Written after class or after reading

## CORNELL NOTES

Name :	Skill or standard for focus /Objective :
Date:	

QUESTIONS

NOTES

SUMMARY

TemplateLAB



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# Key Research Findings

## Executive Function & Academic Success

**Core skills:** Planning, Working Memory, Inhibition, Cognitive Flexibility

Supports for students:

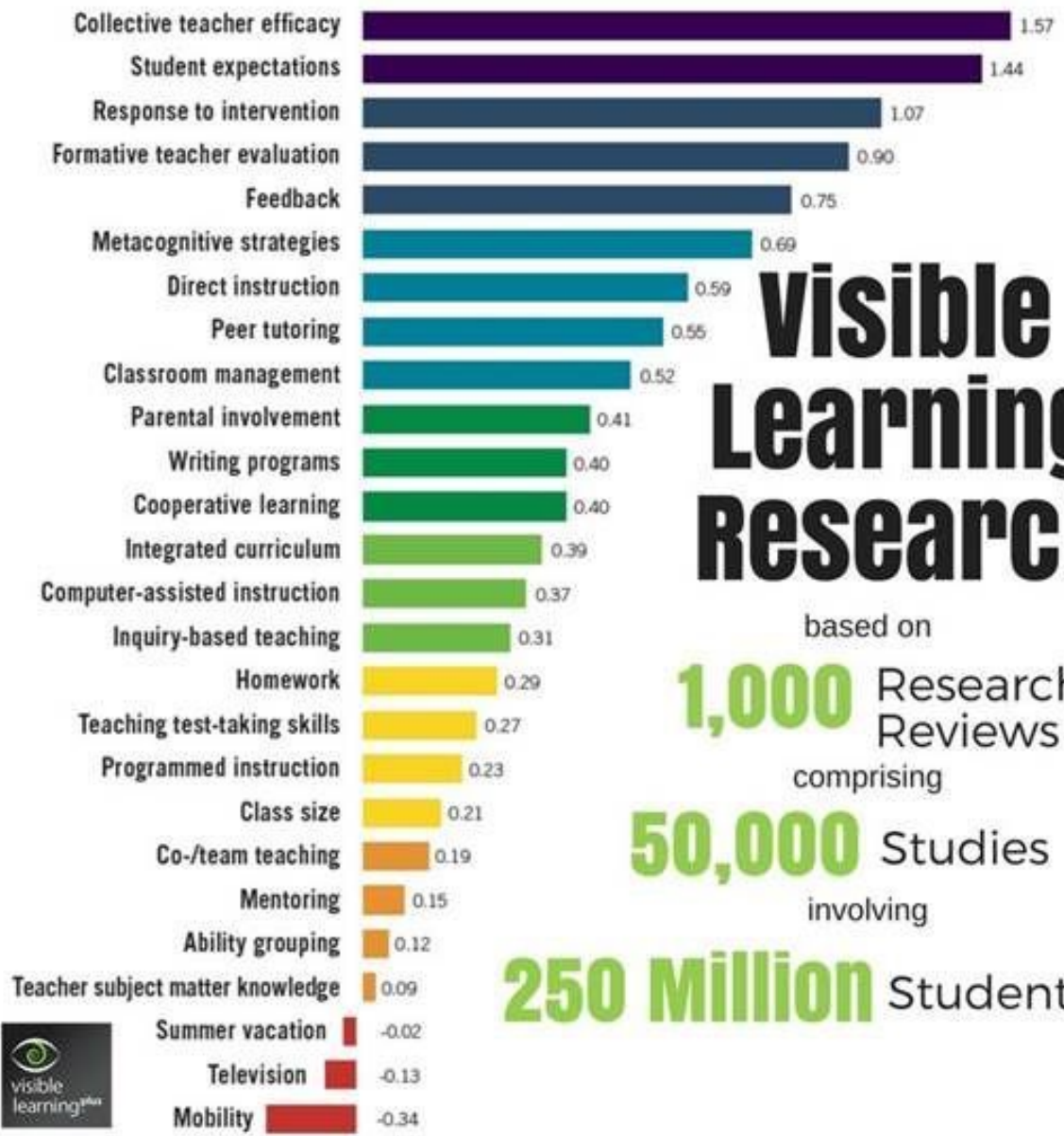
- Break tasks into steps
- Use routines, checklists
- Model planning & organization strategies
- Provide guided practice before independent work

**Students learn best when homework and study strategies *focus on how to learn, not just what to complete.***

**Incorporating retrieval practice, spaced practice, feedback, scaffolds for executive function maximizes long-term achievement**



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# Visible Learning Research

based on  
**1,000** Research Reviews  
 comprising  
**50,000** Studies  
 involving  
**250 Million** Students



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# Incorporating AI in Teaching & Learning

Teachers are aware of AI and recognize the need to **integrate it responsibly**.

- **Concerns:** Academic integrity, over-reliance, loss of critical thinking.
- **Opportunity:** Students can gain competency & develop learning attributes important for future success:
  - Digital citizenship
  - Academic honesty & integrity
  - Critical thinking
  - Responsible innovation

*Students should use AI to support their thinking, not to do the thinking for them.*

## **Responsible Uses for Students**

- Enhance study skills
- Support note-taking & reflection
- Encourage metacognition

## **Responsible Uses for Teachers**

- Instructional support
- Professional growth



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# Can I Use AI on this Assignment?

## AI Acceptable Use Scale



AI refers to any of the thousands of Artificial Intelligence tools in which the model generates new content (text, images, audio, video, code, etc.). This includes, but is not limited to, Large Language Models such as ChatGPT, Google Gemini, etc.; image creators such as Canva and Adobe; and any tools with built-in generative AI capabilities.

	Level of AI Use	Description	Citation Requirements
<b>0</b>	<b>No AI Use</b>	<ul style="list-style-type: none"> <li>This assignment is completed entirely without AI assistance.</li> <li>AI may not be used at any point during the assignment.</li> <li>Students will rely solely on their own knowledge, understanding, and skills.</li> </ul>	<ul style="list-style-type: none"> <li>No AI disclosure required.</li> <li>May require an integrity statement that AI was not used.</li> </ul>
<b>1</b>	<b>AI-Assisted Idea Generation and Structuring</b>	<ul style="list-style-type: none"> <li>No AI content is allowed in the final submission.</li> <li>AI can be used in the assignment for brainstorming, creating structures, and/or generating ideas for improving work.</li> </ul> <p><i>Example: With teacher permission, use AI to create an outline.</i></p>	<ul style="list-style-type: none"> <li>May require an integrity statement about how AI was used.</li> <li>AI citation required per teacher instructions.</li> </ul>
<b>2</b>	<b>AI-Assisted Editing</b>	<ul style="list-style-type: none"> <li>AI can be used to make improvements to the clarity or quality of student created work to improve the final output.</li> </ul> <p><i>Example: With teacher permission, use AI to edit the tone within an essay.</i></p>	<ul style="list-style-type: none"> <li>May require an integrity statement about how AI was used.</li> <li>AI citation required per teacher instructions.</li> </ul>
<b>3</b>	<b>AI for Specified Task Completion</b>	<ul style="list-style-type: none"> <li>AI is used to complete certain elements of the assignment, as specified by the teacher.</li> <li>You are responsible for evaluating AI output for credibility and accuracy.</li> </ul> <p><i>Example: With teacher permission, use AI to generate images for a presentation.</i></p>	<ul style="list-style-type: none"> <li>May require an integrity statement about how AI was used.</li> <li>AI citation required per teacher instructions.</li> </ul>
<b>4</b>	<b>Full AI Use with Evaluation</b>	<ul style="list-style-type: none"> <li>You may use AI throughout your assignment to support your own work.</li> <li>AI should be used to enhance your creativity.</li> <li>You are responsible for evaluating AI output for credibility and accuracy.</li> </ul> <p><i>Example: With teacher permission, use AI to generate a cover letter and then revise and edit the document yourself.</i></p>	<ul style="list-style-type: none"> <li>May require an integrity statement about how AI was used.</li> <li>AI citation required per teacher instructions.</li> </ul>



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Source: Wyoming City Schools AI Guidance

# AI DISCIPLINARY POLICY

\*VIEW THE STUDENT HANDBOOK FOR COMPLETE POLICY INFORMATION

## Level I

General violations of classroom, bus, and school rules.

- Cheating (minor assignment)
- Inappropriate use of AI/Plagiarism

### Example Consequences:

- Student/teacher conversation
- Teacher/parent conference
- Class or lunch detention
- Loss of privilege
- Writing assignment
- Restorative consequence
- Teacher discretion may allow additional consequences
- Office Referral if repeated offenses
- Teachers not limited to these options.

## Level II

These offenses require an administrator to address the situation.

- Cheating (test, major project)
- Inappropriate use of AI/Plagiarism
- Misuse of technology (personal or school)
- Inappropriate website/obscene website, inappropriate communication, etc.

### Example Consequences:

- Any consequence from Level I
- In School Detention (ISD)
- Out-of-school suspension
- Administrator-student-parent conference
- Exclusion from activity

## Level III

These offenses significantly disrupt the educational process, school environment, and/or school-related activities.

- Bullying/threatening behavior
- Repeated/egregious misuse of technology (personal or school): Inappropriate website/obscene website, inappropriate communication, etc.
- Harassment based on gender, race, sex, etc.

### Example Consequences:

- Any consequence from Level I or II
- Behavioral contract
- Expulsion



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Source: Wyoming City  
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# Transparency

Responsible use of AI includes being honest about how and when it is used. Teachers may ask you to answer questions like the ones listed below during a conversation, in writing, or after completing an assignment. Teachers may also ask you to write or sign an integrity statement regarding AI use.

Grades K–4	Grades 5–8	Grades 9-12
<ul style="list-style-type: none"><li>• “Did I do the thinking, or did the computer/AI?”</li><li>• “What did I ask the AI to help me with?”</li></ul>	<ul style="list-style-type: none"><li>• “How did AI help me? Did I still do the learning myself?”</li><li>• “What did AI do and what did I do?”</li></ul>	<ul style="list-style-type: none"><li>• “Is this my own thinking and work? How much did AI do and how much did I?”</li><li>• “Have I clearly cited how AI helped me?”</li></ul>
<p>✔ Integrity Statement: “I use my brain to do my work and only use the computer in ways my teacher says are okay.”</p>	<p>✔ Integrity Statement: “I use AI to support my work, not to do it for me. I’ll tell my teacher how I used it.”</p>	<p>✔ Integrity Statement: “I take responsibility for my learning. I use AI as a tool to help, but not substitute, my own thinking. I cite all AI use.”</p>



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Source: Wyoming City  
Schools AI Guidance

# Recommendations

1. Design Purposeful Homework
2. Explicitly Teach Study Skills and Executive Functioning (EF)
3. Teach Note-taking as an Overt Skillset
4. Align Study Practices with Evidence-Based Learning Strategies
5. Support Responsible and Productive Use of Technology and AI



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# Recommendations

## 1. Design Purposeful Homework

Homework is **most effective when it reinforces core learning processes**. Clearly labeling the purpose of assignments can help students understand the why and the how. Teachers may **consider identifying for students one of these four processes** when assigning homework:

- **Practice** – Build accuracy and fluency with recently learned skills
- **Preparation** – Activate background knowledge for upcoming lessons
- **Extension** – Apply learning in new contexts
- **Reflection** – Support metacognition and consolidation of learning



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# Recommendations

## 1. Design Purposeful Homework (continued)

**Proposal: Refine K-4 homework policy** to align with high-impact instructional practices and cognitive science.

- Shift from task completion to thinking, retention, and independence
- Traditional worksheets & volume-based practice shows minimal to low impact in elementary grades
- An approach emphasizing retrieval practice, feedback, and metacognition significantly improves learning outcomes. (Hattie)

Key Principles: Short, purposeful, repeatable routine, and thinking over volume

- Parents play the role of a supporter or listener vs. an instructor
- Limited choice-based practice builds autonomy and foundation for executive function
- Spaced practice with finite timing is critical (K-1: 10 minutes; Grade 2: 15 minutes; Grade 3-4: 20 minutes)

**Building retrievable foundational knowledge that is stored in long-term memory allows students to use the full capacity of their working memory to learn new things and expand skills now and in years to come. (Willingham)**



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# Recommendations

## 2. Explicitly Teach Study Skills and Executive Functioning (EF)

EF skills include planning, working memory, cognitive flexibility, and self-regulation.

- These skills are **strong predictors of academic success**
- These skills can continue to develop throughout adolescence
- Research shows **these skills do not develop automatically**

Students benefit from explicit instruction and structured practice in:

- Planning study schedules
- Breaking assignments into smaller tasks
- Organizing materials
- Monitoring their understanding

Provide scaffolds such as checklists, routines, and guided practice to help students develop independence in these areas.



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## 3. Teach Note-taking as an Overt Skillset

This can transform passive transcription into an active, long-term learning skillset.

Consider adopting a **district-wide note-taking approach**:

- Explicitly teach a generative, handwritten Cornell-style approach
- Prioritize quality over quantity
- Mandate a 24-review cycle



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## 4. Align Study Practices with Evidence-Based Learning Strategies

Research identifies **several strategies that significantly improve long-term learning outcomes**. These align with the high-impact strategies in Hattie's Effect.

Teachers may therefore consider designing [study] assignments that include:

- **Retrieval Practice** (self-testing)
- **Spaced Practice** (practice distributed over time, not concentrated in a single session)
- **Interleaving of Topics** (mixing subject matter)
- **Elaboration and Self-explanation** (encourage students to explain their reasoning)
- **Feedback and Reflection** opportunities



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# Recommendations

## 5. Support Responsible and Productive Use of Technology and AI

Continue work that has already begun in the district to guide AI usage.

- Teach AI usage explicitly to **both teachers and students**.
- Align AI tools with **high-utility strategies**: retrieval practice, spaced practice, interleaving, feedback.
- Maintain **academic integrity**: Students critically evaluate AI outputs. Use AI as a **learning partner**, not a shortcut.
- Teachers should take AI tools in consideration when making homework decisions.



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# Thank You

A special thank you to our district resources:

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