

# TEACHER GUIDANCE DURING SCIENCE INVESTIGATION AND ENGINEERING DESIGN

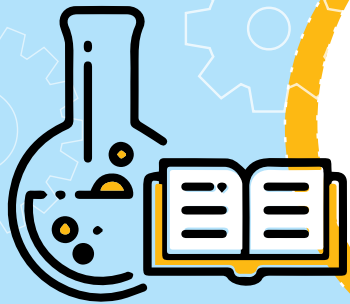


STUDENTS

**MAKE SENSE OF  
PHENOMENA  
AND DESIGN  
CHALLENGES**

TEACHERS

- ✓ Select and present real and relevant phenomena or challenges
- ✓ Guide observation and development of student questions
- ✓ Facilitate students developing and using meaningful and relevant questions

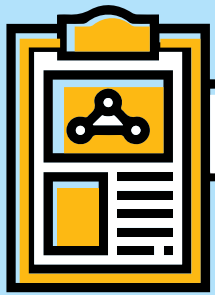


STUDENTS

**GATHER  
AND ANALYZE  
DATA AND  
INFORMATION**

TEACHERS

- ✓ Communicate clear expectations for use of information as evidence
- ✓ Facilitate connections between relevant ideas and crosscutting concepts

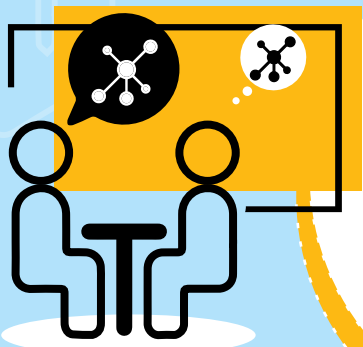


STUDENTS

**CONSTRUCT  
EXPLANATIONS  
AND DESIGN  
SOLUTIONS**

TEACHERS

- ✓ Communicate clear expectations for students to develop evidence-based explanations and models
- ✓ Set clear expectations for students to develop arguments for how their evidence supports explanations
- ✓ Support design and testing of solutions to challenges, including re-design and re-testing as students refine their approach



STUDENTS

**COMMUNICATE  
REASONING TO  
SELF AND  
OTHERS**

TEACHERS

- ✓ Provide opportunities for students to produce multiple models and other artifacts that communicate their reasoning
- ✓ Establish a classroom culture of respect and guide productive and inclusive discourse
- ✓ Reflect on student and teacher learning

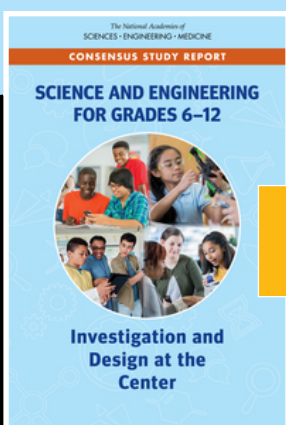


STUDENTS

**CONNECT  
LEARNING  
THROUGH  
MULTIPLE  
CONTEXTS**

TEACHERS

- ✓ Highlight connections to experiences and phenomena students have encountered in previous learning environments
- ✓ Plan coherent support for students to connect learning to phenomena beyond the classroom



Learn more about the report at  
[www.nap.edu/25216](http://www.nap.edu/25216)

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