

# Talk Science Challenge

How do we engineer deep engagement with web-based PD resources?

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[inquiryproject.terc.edu](http://inquiryproject.terc.edu)

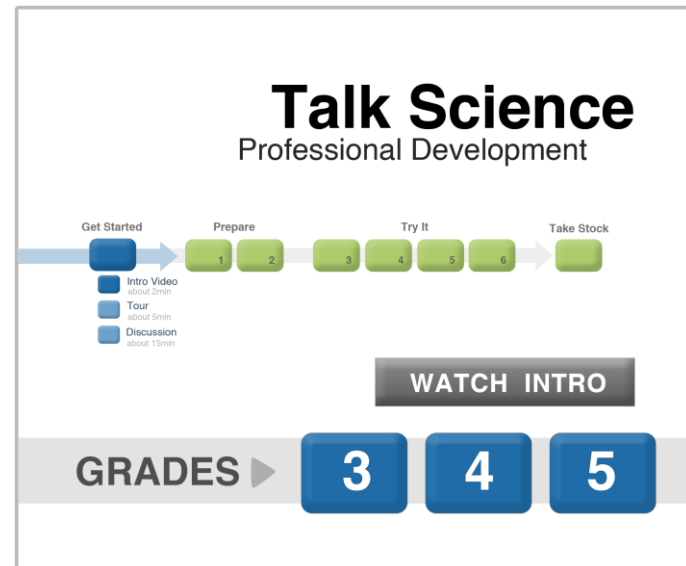


# What is Talk Science?

Professional development to increase the productivity of science discussions

**Hybrid model** that blends:

1. Web-based study
2. Grade level study group meetings
3. Implementation of teaching strategies into classroom practice
4. Criterion-based self-assessment



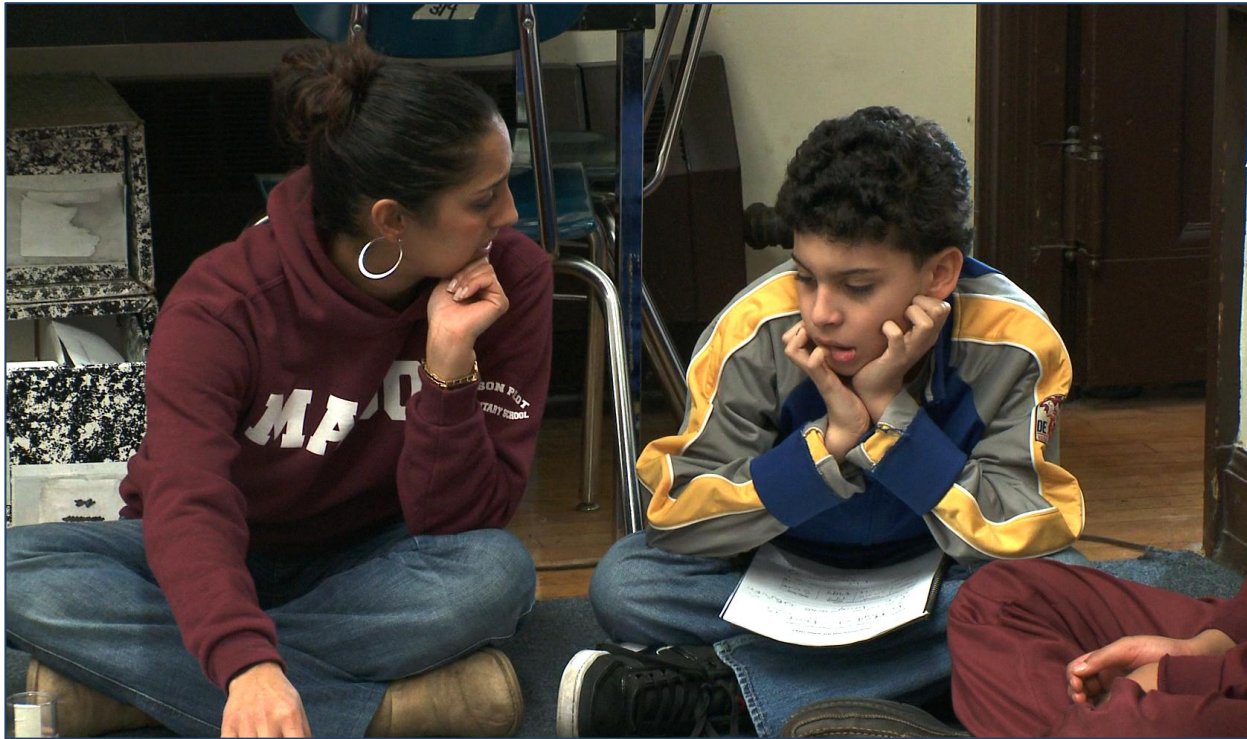
# Expected Change

Teachers orchestrate more productive science discussions in which students reason with evidence.

# Four Features (contributing to stickiness)

1. **Alignment** with the curriculum
2. **Vivid video** cases of the same discussions teachers will lead and of scientists thinking aloud about the science investigations students do
3. **Sharp focus** on nine doable teaching strategies
4. School-based learning **community**

# Based on a Problem



(Teacher belief: Stickiness factor)

# PD Aligned with the Curriculum

The Inquiry Project BRIDGING RESEARCH & PRACTICE

HOME CURRICULUM ASSESSMENT PD FOR TEACHERS RESEARCH ABOUT

## The Curriculum

GRADES 3 4 5

## Talk Science Professional Development

Get started Prepare Try it Take stock

WATCH INTRO

GRADES 4 5

**Implementation**  
a workshop for teachers

**Assessment**  
follow student learning

**Research**  
the research

## Welcome to the Inquiry Project

The Inquiry Project is a research and curriculum development effort that engages students in grades 3–5 in science inquiry about the nature of matter. In Inquiry Project classrooms, children work collaboratively with their classmates and teachers, using measurement, mathematical and graphical representations, and discussion to build scientific explanations about objects and materials in the world around them.

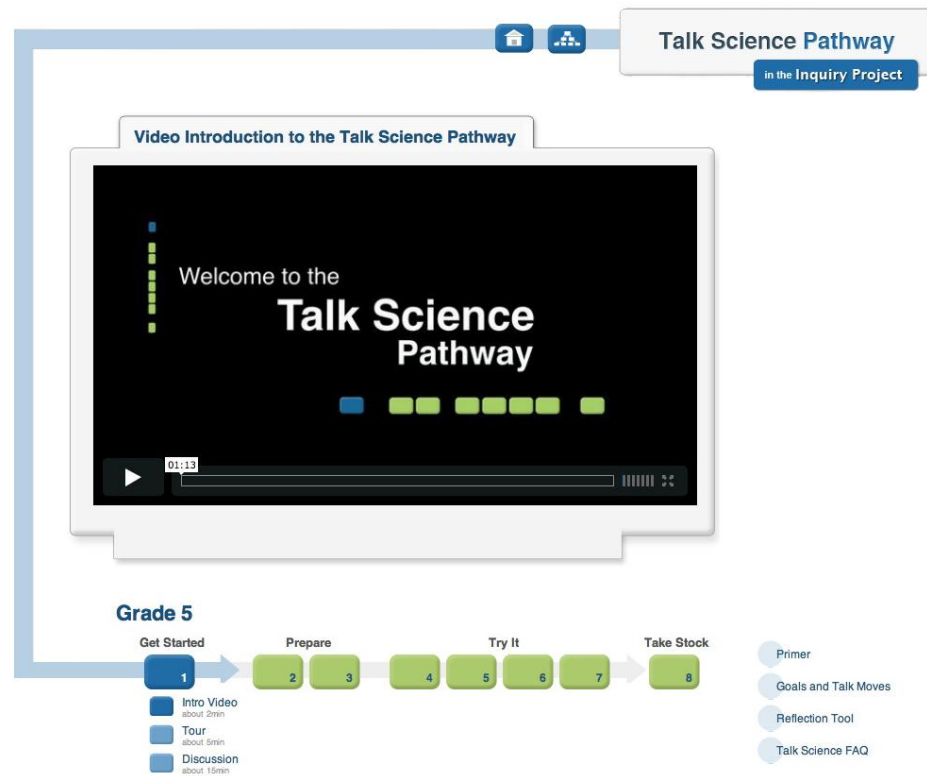
A joint partnership of

NSF TERC Tufts

The Inquiry Project: Bridging Research & Practice  
Research | Grade 3 | Grade 4 | Grade 5 | Teacher Resources | Assessment | Professional Development | About  
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# Professional Development Pathway

“Game Like” (stickiness factor)





# Talk Science Pathway

in the Inquiry Project

## Video Introduction to the Talk Science Pathway



- Primer
- Goals and Talk Moves
- Reflection Tool
- Talk Science FAQ







# Talk Science Pathway

in the Inquiry Project

## Video Introduction to the Talk Science Pathway



### Grade 5

Get Started



- Intro Video  
about 2min
- Tour  
about 5min
- Discussion  
about 15min

Prepare



Try It



Take Stock



Primer

Goals and Talk Moves

Reflection Tool

Talk Science FAQ



# Talk Science Pathway

in the Inquiry Project

## Video Introduction to the Talk Science Pathway



## Grade 5

### Get Started

1

- Intro Video  
about 2min
- Tour  
about 5min
- Discussion  
about 15min

### Prepare

2

3

4

### Try It

5

6

7

### Take Stock

8

Primer

Goals and Talk Moves

Reflection Tool

Talk Science FAQ

# Video to Demystify How Scientists Think



# Video to Reveal

## Productive Science Discussion



# a Sharp Focus on 9 Strategies

## Goals for Productive Discussions and Nine Talk Moves



### Goal One: Help individual students share, expand and clarify their own thinking

- |    |  |  |
|----|--|--|
| 1. | <b>Time to Think:</b><br>- Partner Talk<br>- Writing as Think Time<br>- Wait Time  |  |
| 2. | <b>Say More:</b><br>"Can you say more about that?"<br>"What do you mean by that?"<br>"Can you give an example?"  |  |
| 3. | <b>So, Are You Saying...?:</b><br>"So, let me see if I've got what you're saying. Are you saying...?"<br>(always leaving space for the original student to agree or disagree and say more) |  |

### Goal Two: Help Students listen carefully to one another

- |    |  |  |
|----|--|--|
| 4. | <b>Who Can Rephrase or Repeat?</b><br>"Who can repeat what Javon just said or put it into their own words?"<br>(After a partner talk) "What did your partner say?" |  |
|----|--|--|

### Goal Three: Help Students deepen their reasoning

- |    |   |  |
|----|---|--|
| 5. | <b>Asking for Evidence or Reasoning:</b><br>"Why do you think that?"<br>"What's your evidence?"<br>"How did you arrive at that conclusion?"                                 |  |
| 6. | <b>Challenge or Counterexample:</b><br>"Does it always work that way?"<br>"How does that idea square with Sonia's example?"<br>"What if it had been a copper cube instead?" |  |

### Goal Four: Help Students think with others

- |    |   |  |
|----|---|--|
| 7. | <b>Agree/Disagree and Why?:</b><br>"Do you agree/disagree? (And why?)"<br>"What do people think about what Ian said?"<br>"Does anyone want to respond to that idea?"  |  |
| 8. | <b>Add On:</b><br>"Who can add onto the idea that Jamal is building?"<br>"Can anyone take that suggestion and push it a little further?"  |  |
| 9. | <b>Explaining What Someone Else Means:</b><br>"Who can explain what Aisha means when she says that?"<br>"Who thinks they could explain why Simon came up with that answer?"<br>"Why do you think he said that?" |  |

# Video to Unpack

## Effective Strategies



**Talk Strategies**  
Who Can Rephrase or Repeat?



# Continued Engagement

**The Inquiry Project** BRIDGING RESEARCH & PRACTICE

HOME CURRICULUM ▾ ASSESSMENT PD FOR TEACHERS ▾ RESEARCH ABOUT


**In Grade 5 Curriculum:**

- Overview
- Curriculum at a Glance
- 1. Water, a Liquid
- 2. Water to Vapor**
  - Investigation 6
  - Investigation 7
  - Investigation 8
  - Investigation 9
- 3. Water to Ice
- 4. Air, a Gas
- 5. Two Scales
- Student Notebook
- Resource Quick Links
- Concept Cartoons
- Science Concepts Grades 3–5
- The Child and the Scientist Kit
- Easy Print

## 2. Water to Vapor

This set of investigations focuses on what happens to water when it evaporates.

When water evaporates from a paper towel, what happens to it? Does it go somewhere else, or is it destroyed, gone forever? A closed system of two connected bottles allows students to investigate this question. The system also highlights the cycling from liquid water to water vapor and back to liquid water again (condensation). After it has become obvious that every drop of water in the lower bottle has evaporated, it reappears in a different part of the system.





At the same time students start tracking evaporation in the 2-bottle system, they uncover and keep track of changes in their mini-lakes.

**Investigations:**


- Investigation 6: [What happens to the water?](#)
- Investigation 7: [What happened to the water?](#)
- Investigation 8: [What is happening in the 2-bottle system?](#)
- Investigation 9: [Why do the water drops form?](#)

**The Child and the Scientist**

 **The Child:** [The Challenges of Learning about Evaporation and Condensation](#)

 **The Scientist:** [What's important about evaporation and condensation?](#)

**Scientist Case**



**Water to Vapor**

Watch Roger Tobin doing the Water to Vapor Investigations

# Enact Professional Learning in the Classroom





# Meet with Colleagues to Reflect and Plan “Book Club Like”



STUDY GROUP: TRY IT 5 PREPARING TO TEACH SECTION 2: WATER TO VAPOR SUGGESTED GUIDE (1 HOUR)	
<b>ORGANIZATION</b>	
To make the most of your time with colleagues, arrive on time and stay till the close of the meeting, come prepared to share ideas from the video cases and your own “in your Classroom” experiences, remain focused on the agenda, and support each other in sharing ideas and resolving challenges.	
<b>Date and time:</b>	<b>Web study prior to meeting:</b>
<b>Location:</b>	Scientist Case: The Water to Vapor Investigations Classroom Case: The Role of Explanation Discussions Strategy: Goal 2— Listening Carefully
<b>Group facilitator:</b>	<b>What to bring:</b>
Host the meeting, send out time/place/agenda reminder, prepare resources, introduce and facilitate discussion, encourage all to contribute, role may rotate among members.	Transcripts with annotations for Scientist and Classroom Cases
<b>Time keeper and recorder:</b>	<b>Study group resources:</b>
Keep track of time, subordinate the discussion, and send appropriate summary, role may rotate among members.	
<b>AGENDA &amp; DISCUSSION QUESTIONS</b>	
<b>Classroom Video Case</b>	
In science, explanations depend on observation, measurement, and well-established scientific principles. What is it that Colleen does to support her students in generating explanations that are based on data and evidence?	
Colleen asks the question: “How do we know the salt is still there?” What makes this a particularly good organizing question for the discussion? (You may want to revisit Clip 2.)	
In the video case (clip 3) students struggle to explain why they can’t see the salt. Does someone put forward an idea Colleen might build on? What might she do next?	
In Try It 5 we focus on the skill of listening. This skill is important as students need to know what their peers’ ideas are in order to build understanding together. But scientists do even more than listen to each other. They listen with careful attention to the data. They ask, What data supports this explanation? How robust is the data? How else might the data be interpreted? What moves does Colleen use to encourage students to listen with a scientific ear? What moves could you use?	
Is there something from this case that you might want to incorporate into your discussions?	
<b>Plan for “In Your Classroom”</b>	
The second section of the curriculum focuses on ideas about: <u>patterns</u> , <u>water vapor</u> , <u>condensation</u> , and <u>evaporation</u> . Look at the learning goals for Investigations 4-9 to see what ideas are highlighted. Based on your review of the goals and the Scientist Case, what ideas will you emphasize during class discussions?	
<b>Summary</b> —Insights from this meeting:	
<b>PLANS FOR OUR NEXT STUDY GROUP MEETING (Try It 5)</b>	
<b>Date and time (1 hour):</b>	Before the next meeting, study the following cases
<b>Location:</b>	• Scientist Case: The Water to Vapor Investigations
<b>Group Facilitator:</b>	• Classroom Case: The Role of Data Discussions
	• Strategy: Deepen their Reasoning
	<b>What to bring:</b>
	• Your annotated transcripts from the video cases

Inquiry Project - Talk Science Grade 5 Pathway

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# Our Next Challenge

So, technology is creating solutions and raising new problems ---

How do we engineer deeper engagement with web-based PD?