



Carnegie Foundation
for the Advancement of Teaching

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#CarnegieSummit

Introduction to Improvement Science: A Learning-By-Doing Simulation

Sessions AI & BI

Wednesday, April 4, 2018

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Session Overview

Objectives:

- Understand on a basic level what it feels like to apply improvement science techniques to solving educational problems
- Reflect on the skills and capacities required to do improvement work in educational contexts

Agenda:

1. Introduction
2. Mini-Lessons + Simulation
 - *Short break included*
3. Reflection

Learn by **DOING**.



Teaching Team



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Core Districts*



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Improvement Science*



Dissatisfaction with
the Status Quo

Skills and Tools

Management
Theory

**Improvement
Science**

Habits of Mind

“Quality Improvement”

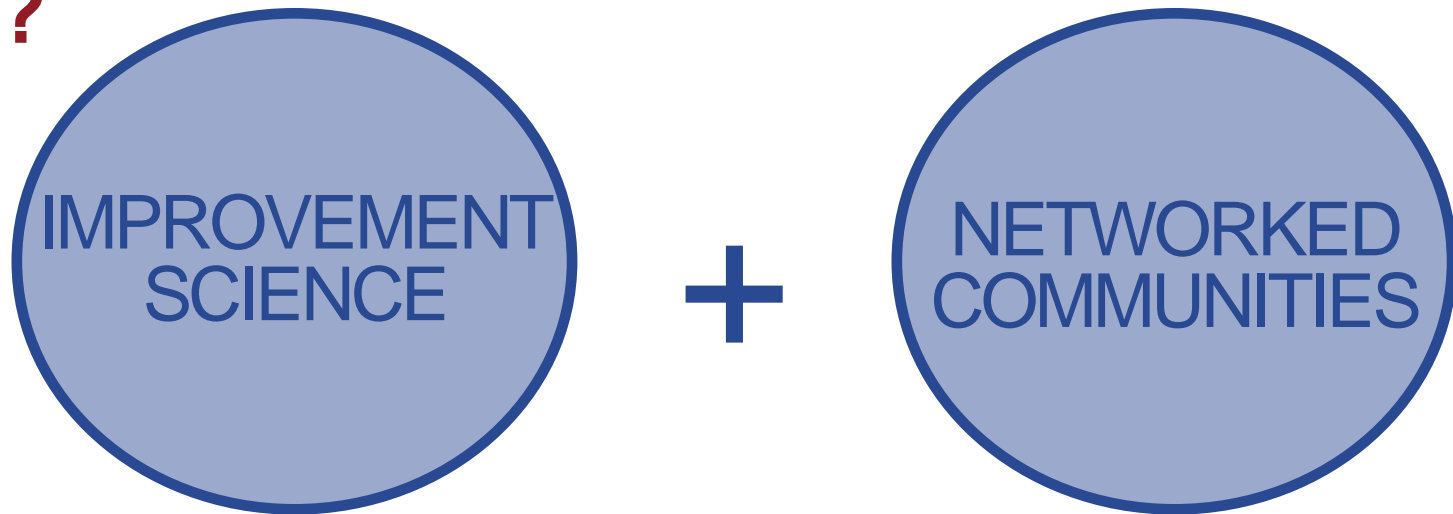
*A formal approach to the analysis of performance &
systematic efforts to improve it.*

The Carnegie Foundation

Why?

Support the education field to
get better at getting better

What?



**Networked Improvement Communities
(NICs)**

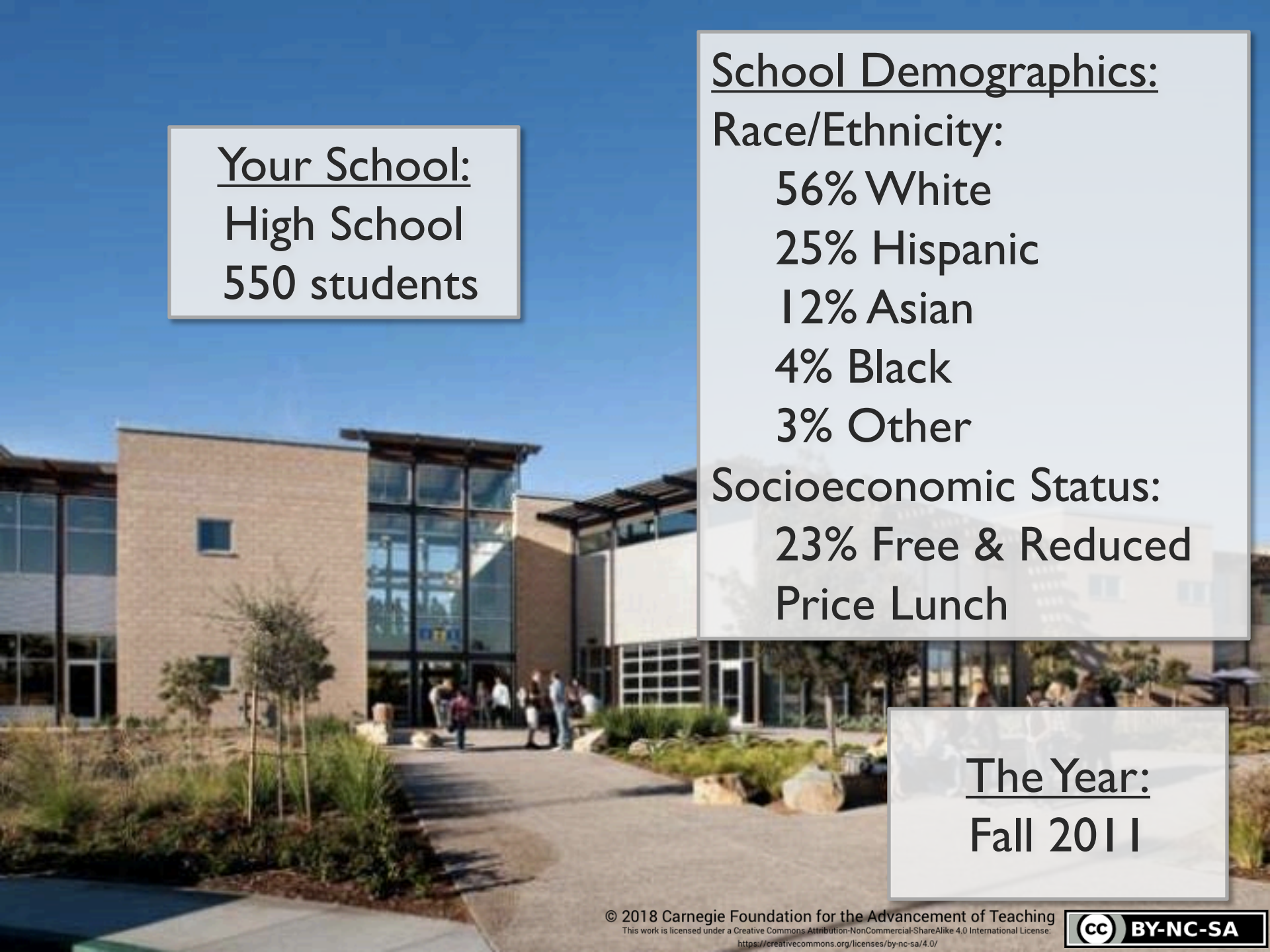


SIMULATION LAUNCH: Your Context



District

- 5 high schools
- 4 middle schools
- 4 elementary schools



Your School:
High School
550 students

School Demographics:

Race/Ethnicity:

56% White

25% Hispanic

12% Asian

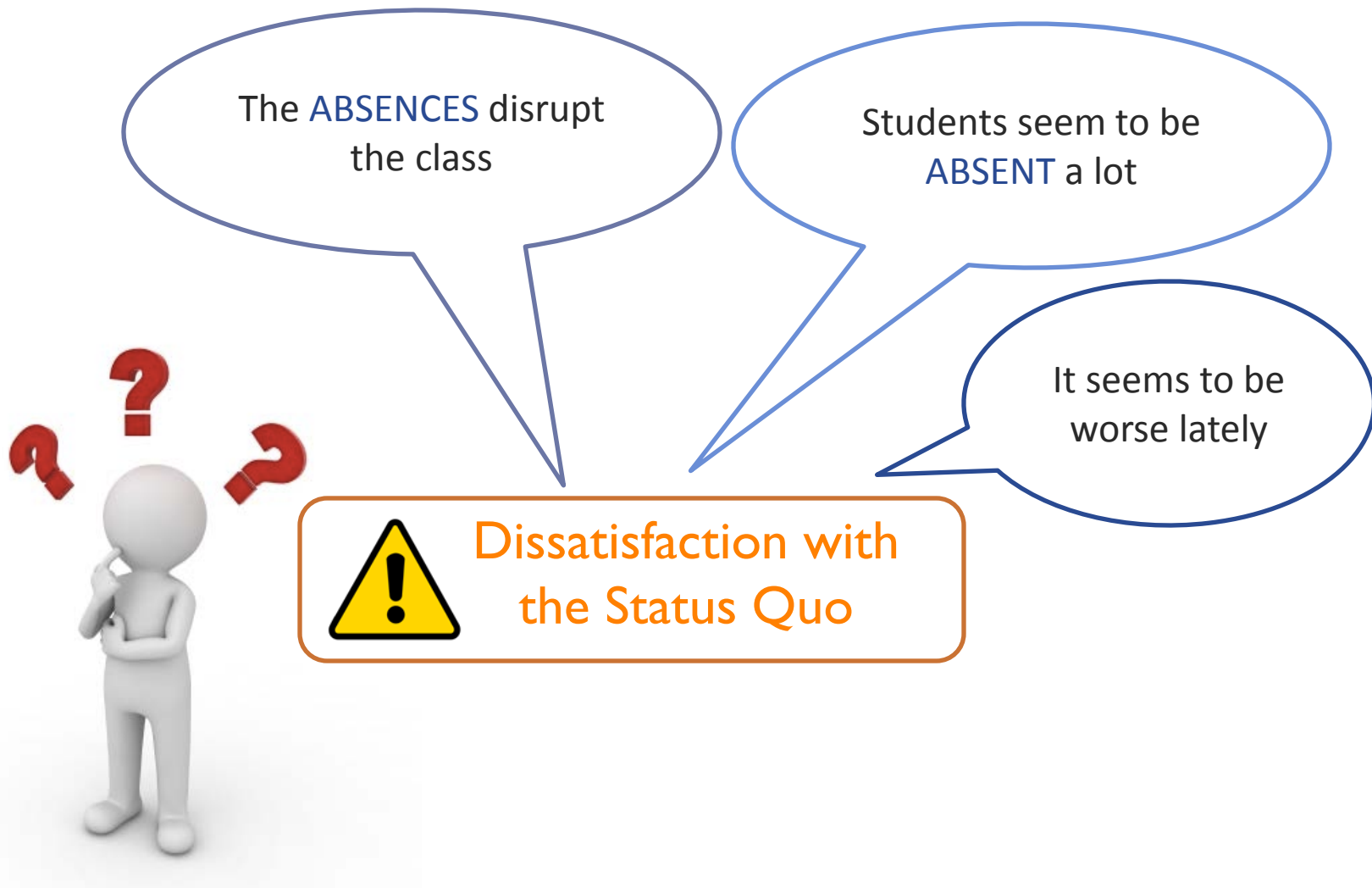
4% Black

3% Other

Socioeconomic Status:

23% Free & Reduced
Price Lunch

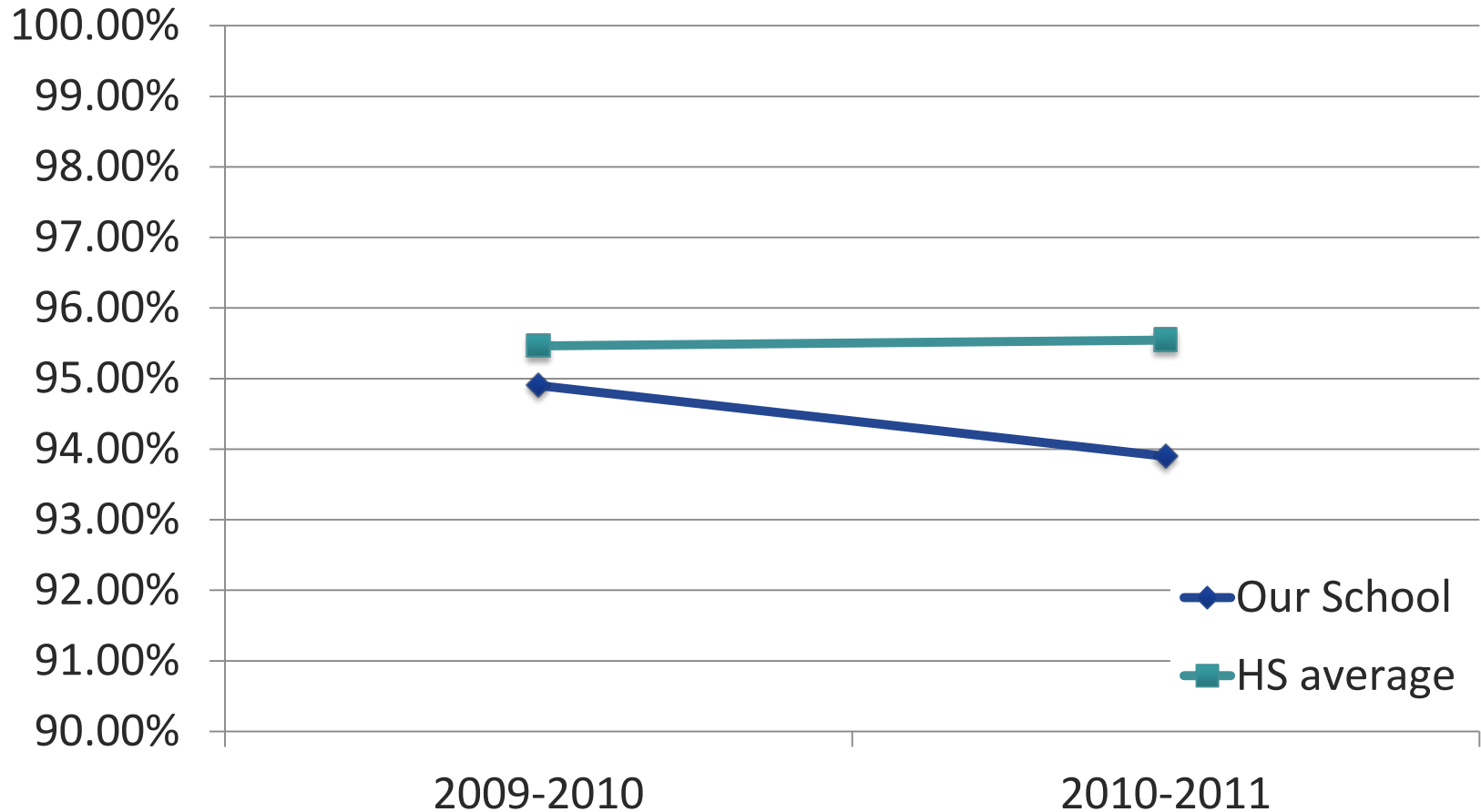
The Year:
Fall 2011

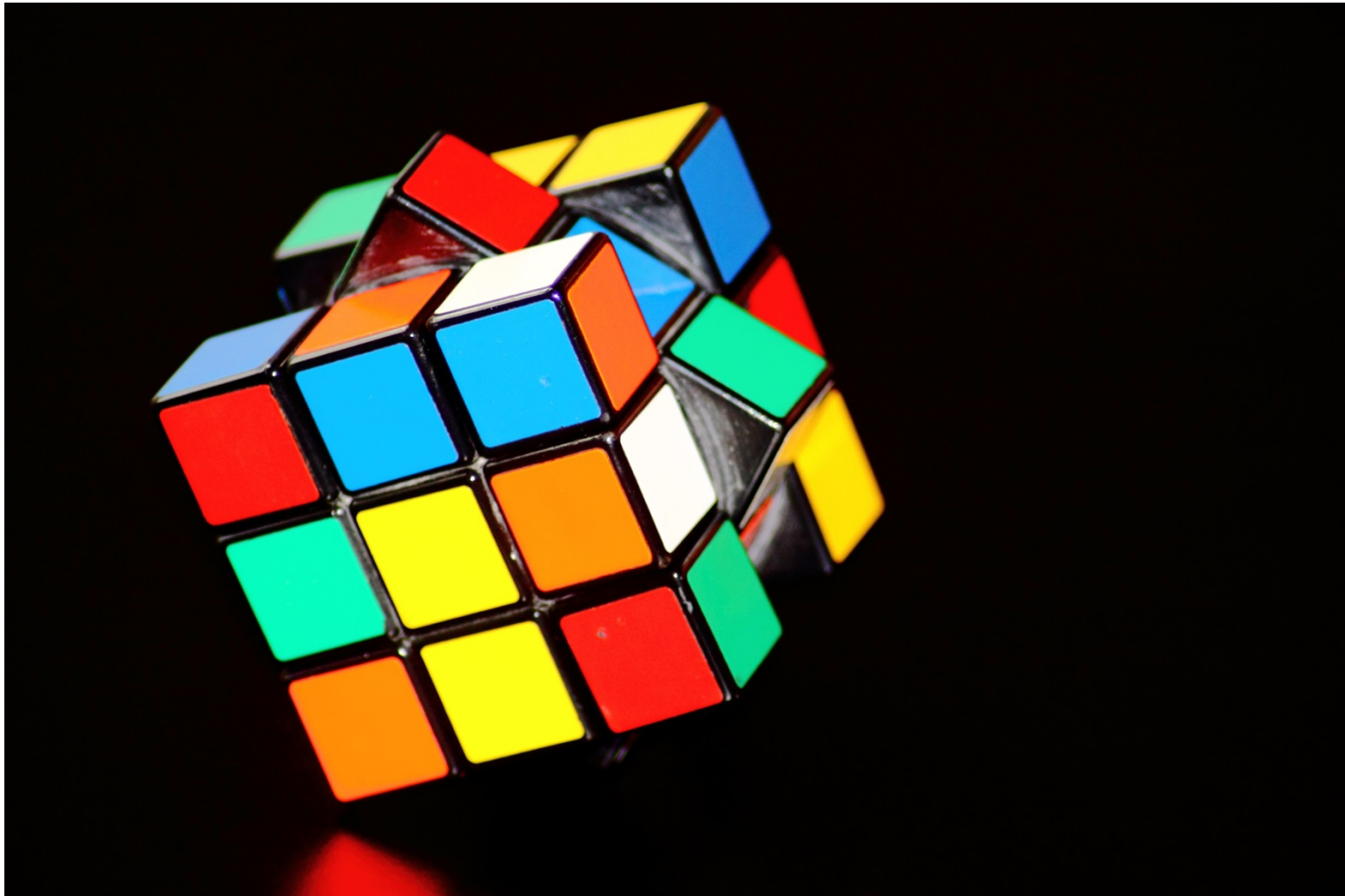


You (the administrative team)... decide to look into it.

This is the first graph you create...

Average Daily Attendance (over the year)





Data Conversation Protocol

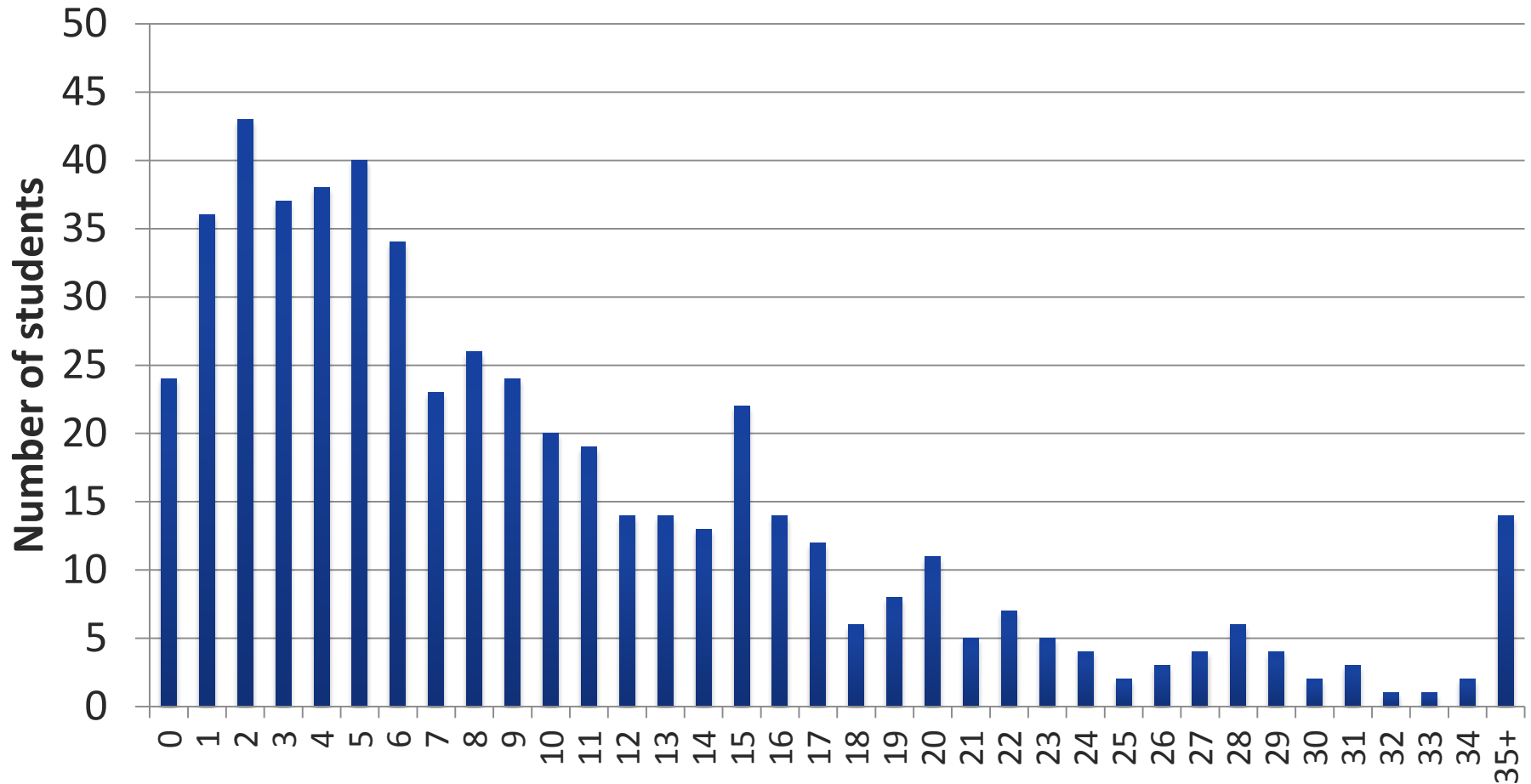
Making meaning of data together

- (0) **UNDERSTAND:** Walk through the data
- (1) **DESCRIBE:** What do you notice?
- (2) **INTERPRET:** What hypotheses or explanations do you have about what you see? What are alternative hypotheses?
- (3) **ACT:** What will you do next?

- Teams of 4-5
- Identify the documents manager
- Distribute new data display



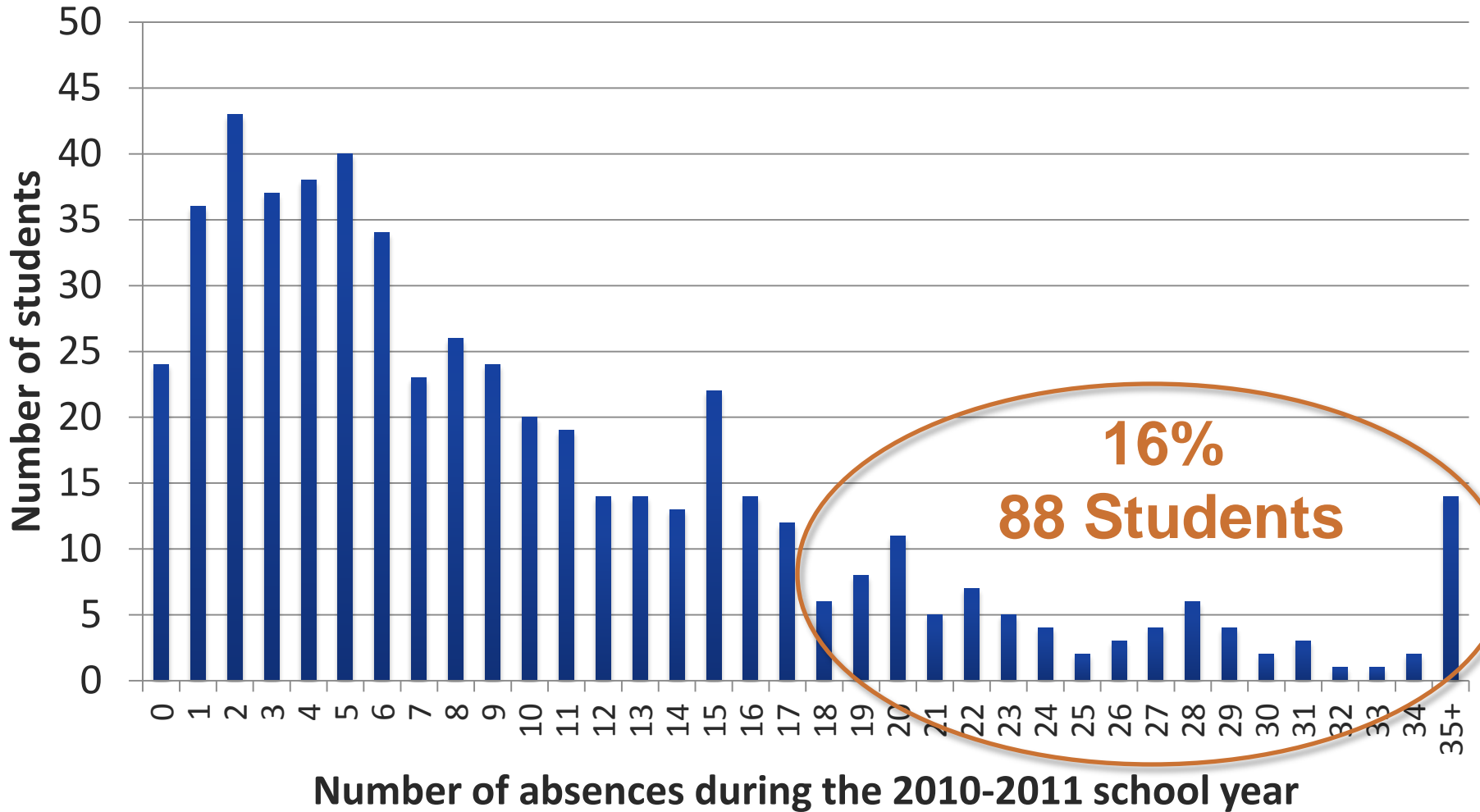
Number of Students by Absence (2010-2011 School Year)



Number of absences during the 2010-2011 school year

(0) UNDERSTAND (1) DESCRIBE (2) INTERPRET (3) ACT

Number of Students by Absence (2010-2011 School Year)



“Chronically Absent” = Misses more than 10%

The Problem

- Problem Statement: **88 students (16%)** were chronically absent last year!
- You decide to launch an improvement project focused on reducing chronic absenteeism



Your Improvement Team

Your improvement team is composed of the following 4-5 members:

- Principal
- Dean of Students
- Attendance Office Manager
- 1-2 Teachers

Your team has training and experience in improvement science.



Your Improvement Team

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- Principal
- Dean of Students
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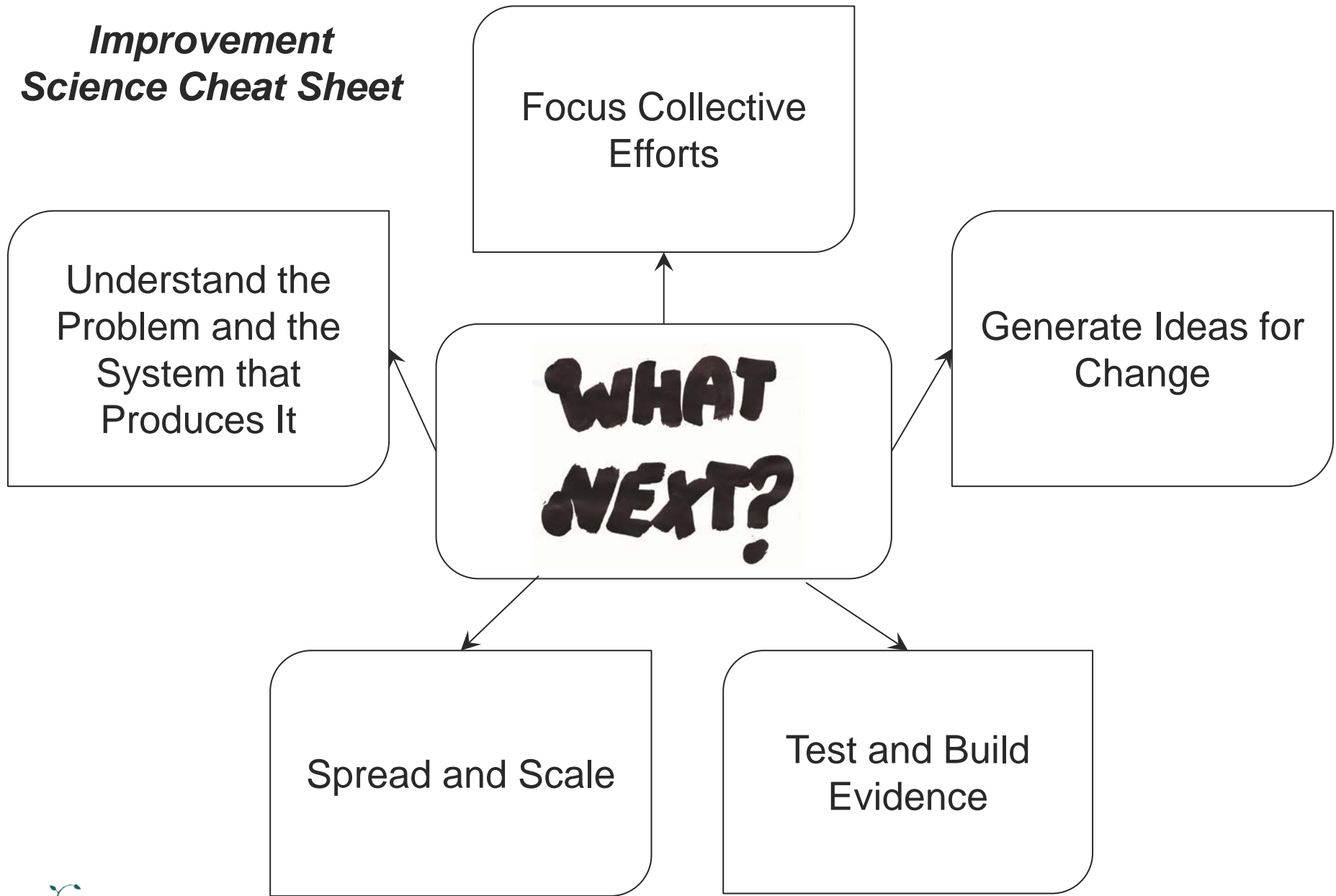
Your team has training and experience in improvement science.

INSTRUCTIONS:

- 1. Grab a label & put it on**
- 2. Introduce yourself to your team: Your name & Simulation Role**

**WHAT
NEXT?**

Improvement Science Cheat Sheet



Improvement Science Cheat Sheet

Understand the
Problem and the
System that
Produces It

Focus collective
efforts

**WHAT
NEXT?**

Generate ideas for
change

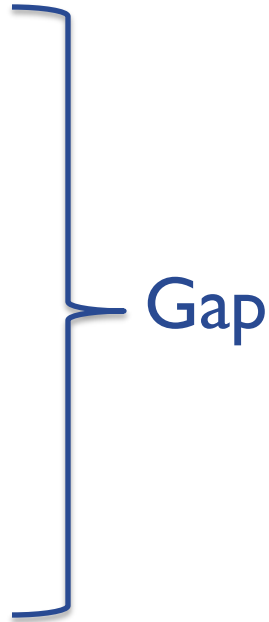


Spreading

An interdependent set of interactions among people, the tools, and materials they have at their disposal, and the processes through which they all join together to accomplish work.

Aspirations

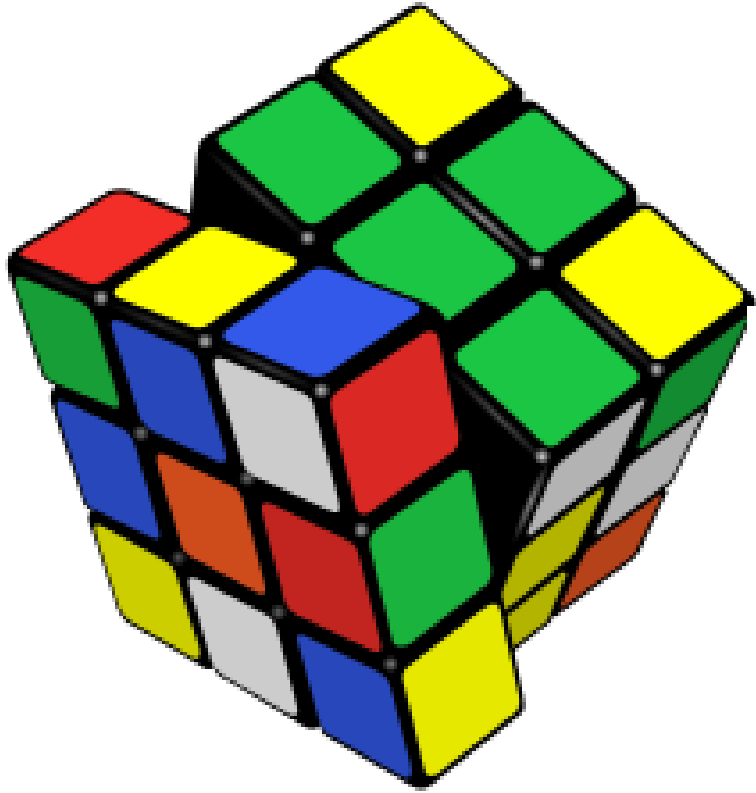
Current performance



Why are we getting the outcomes we are currently getting?

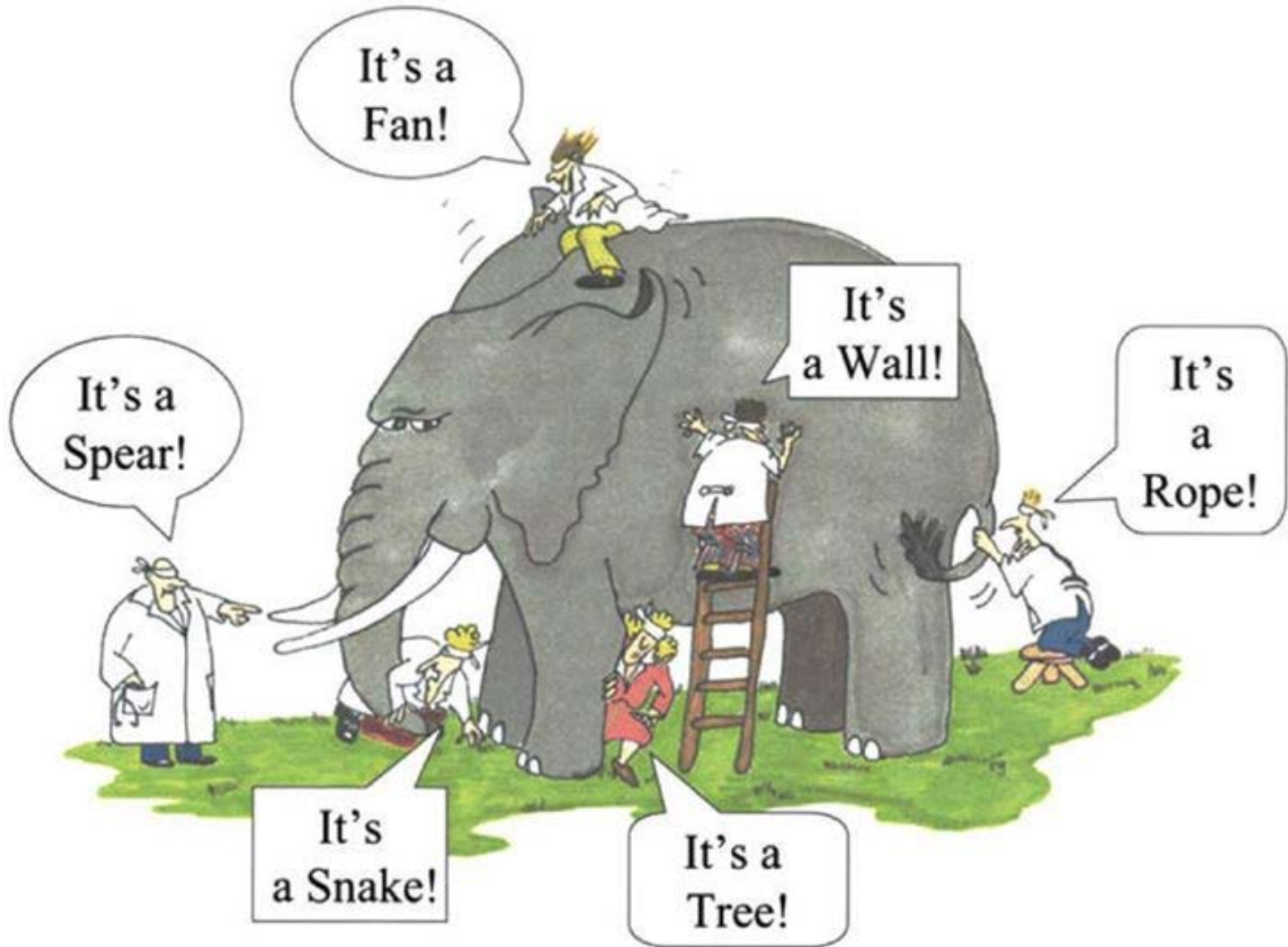
Let's go investigate.

We can continue to turn the data...

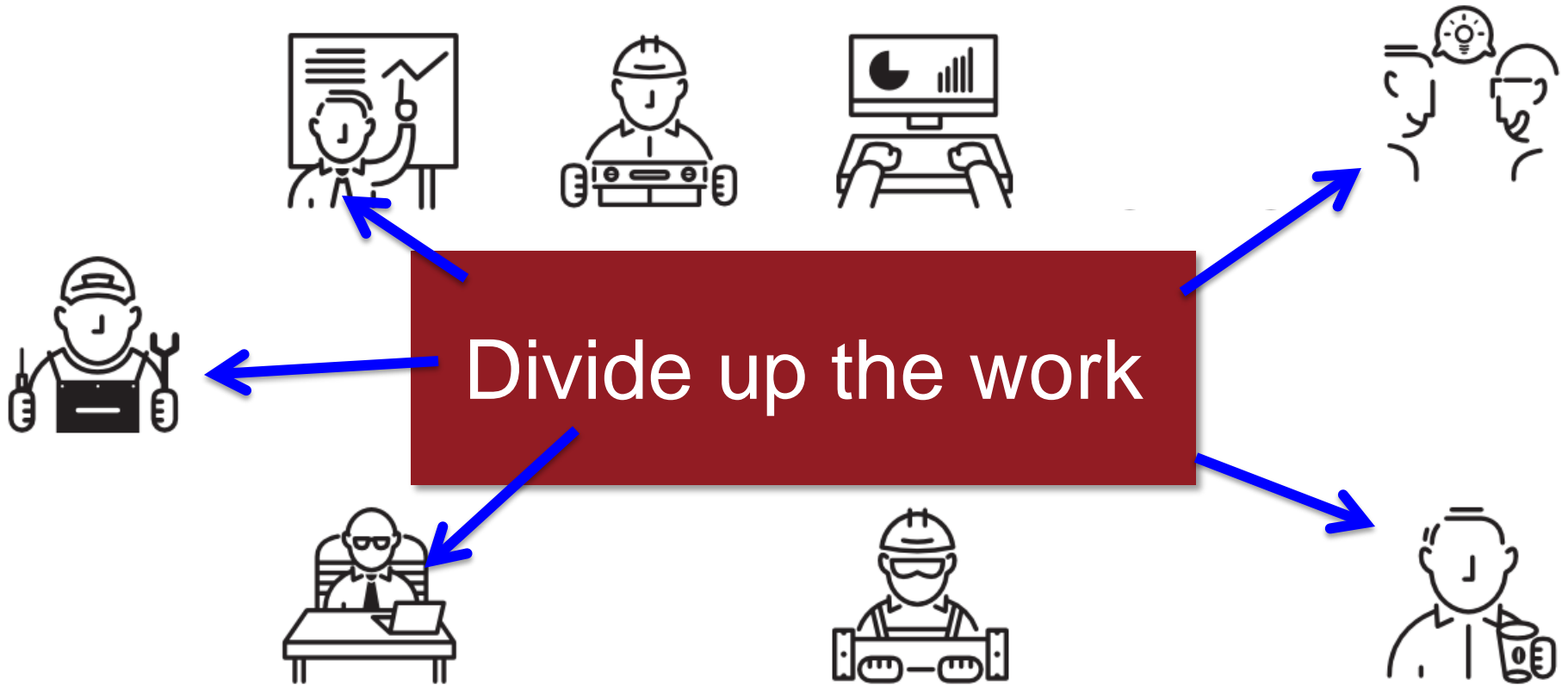


...but we also must become system detectives!





Investigating a Problem as a Team



Learning as a Team



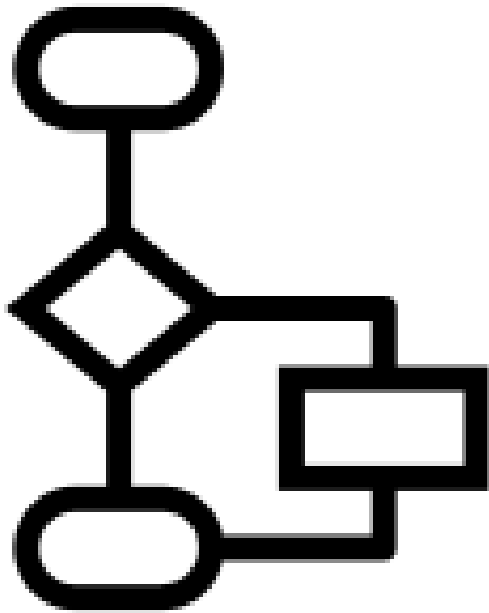
I. How do users experience our problem?

Conduct an **empathy interview** focused on finding out as much as possible about a student's experience. We want to understand emotions, thoughts, and needs.



Team Member Responsible:
DEAN OF STUDENTS

2. What is our current practice?



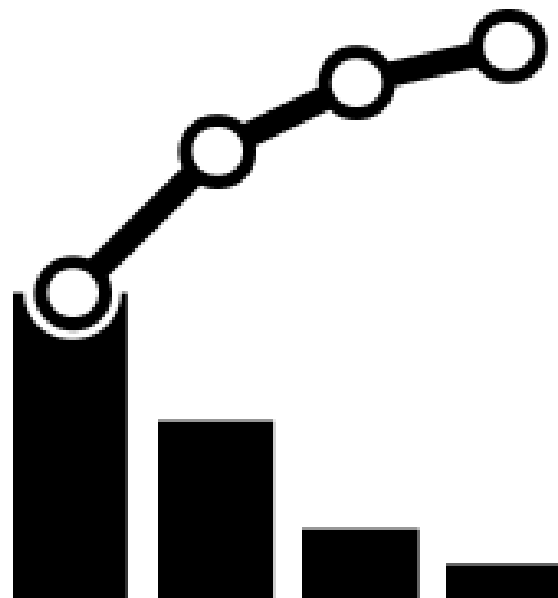
Create a visual representation of the way work is currently done using a **process map**. Annotate the map with the major issues or barriers that arise in the work.

Team Member Responsible:
**ATTENDANCE OFFICE
MANAGER**

3. What are the most common reasons for our problem?

Collect and analyze data about the problem to identify key causes.

Team Member Responsible:
TEACHERS



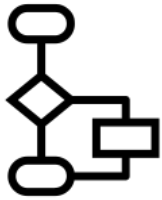
4. What does research & practice knowledge have to say about our problem?



Scan research and other relevant literature to find information about the problem or how it may be solved.

Team Member Responsible:
PRINCIPAL

Strategies for Investigating the Problem



TEAM MEMBER	WE WANT TO UNDERSTAND
Dean of Students	The problem from the user's perspective
Attendance Office Manager	Our current practice, by creating a shared picture of "what is"
Teachers	The types and frequency of causes
Principal	What is research and practice knowledge say about our problem of interest

SIMULATION: Investigating the Problem

1. Grab the packet for your assigned role.
2. Complete the problem investigation activity inside.
3. Identify your top 1-2 insights about the problem & write them on sticky notes. (1 per sticky note)

Time: 10 minutes



SIMULATION: Learning Consolidation

Task: Run the Affinity Protocol
Facilitator: Dean of Students

Affinity Protocol:

- I-by-I Share:** What did you learn about the problem of chronic absenteeism AND where did it come from? *[Read post-it aloud and stick on the 11x17 paper]*
- Cluster:** After everyone has gone, move post-its into clusters based on similar themes (if any).
- Insights:** Discuss and record major learning from looking across the insights.





This work
is messy!

Improvement Science Cheat Sheet

Understand the
Problem and the
System that
Produces It

Focus Collective
Efforts

**WHAT
NEXT?**

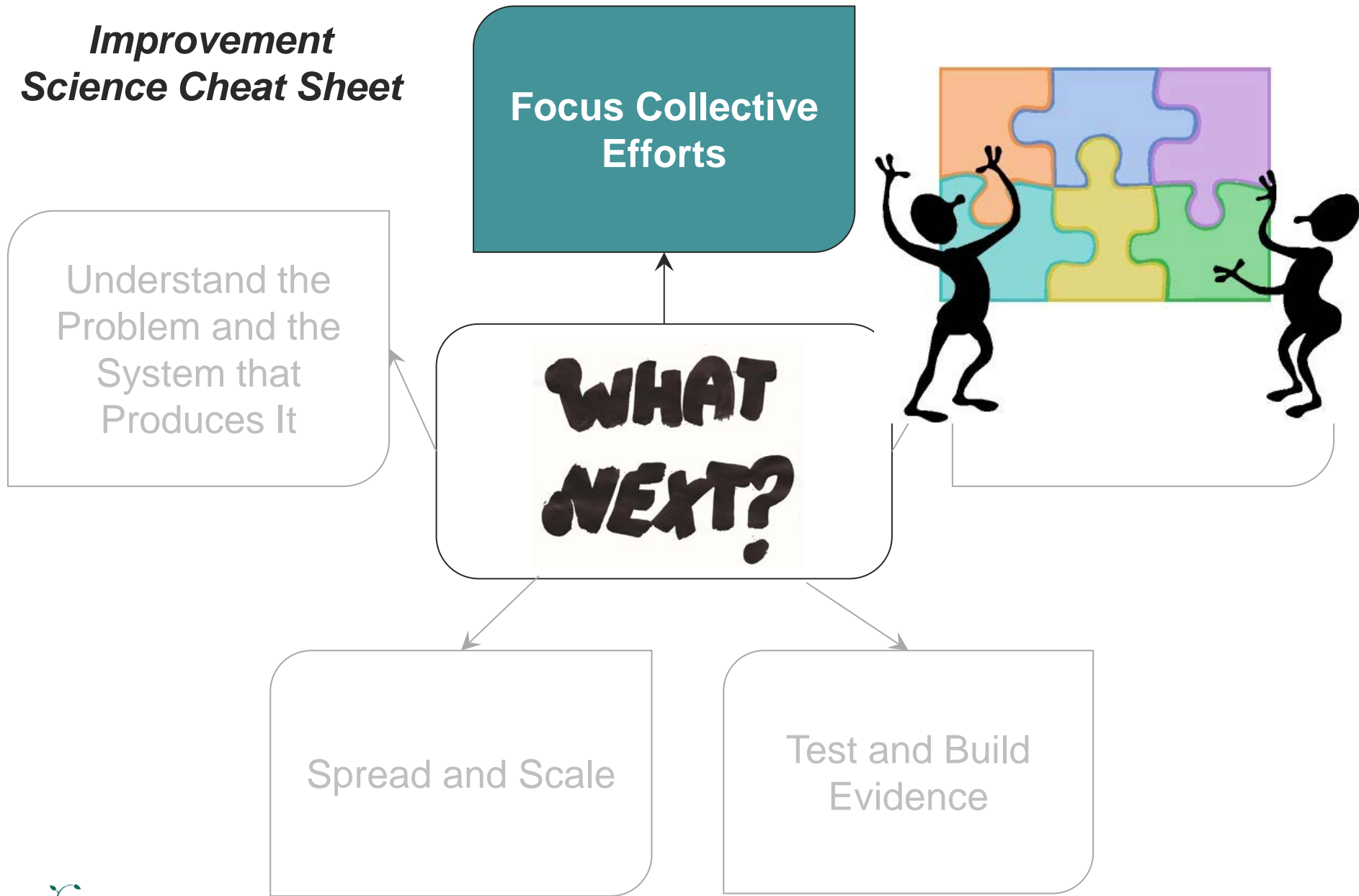
Generate Ideas for
Change

and Scale

Test and Build
Evidence



Improvement Science Cheat Sheet



Examples of Improvement Aims

- A.** By June 2018, decrease the yearly number of our students who are chronically absent from 88 to 50.

- B.** By June 2018, decrease from 20% to 10% the percentage of 9th grade students who miss school more than 5 days per year due to health reasons.

Tool: Aim Statement

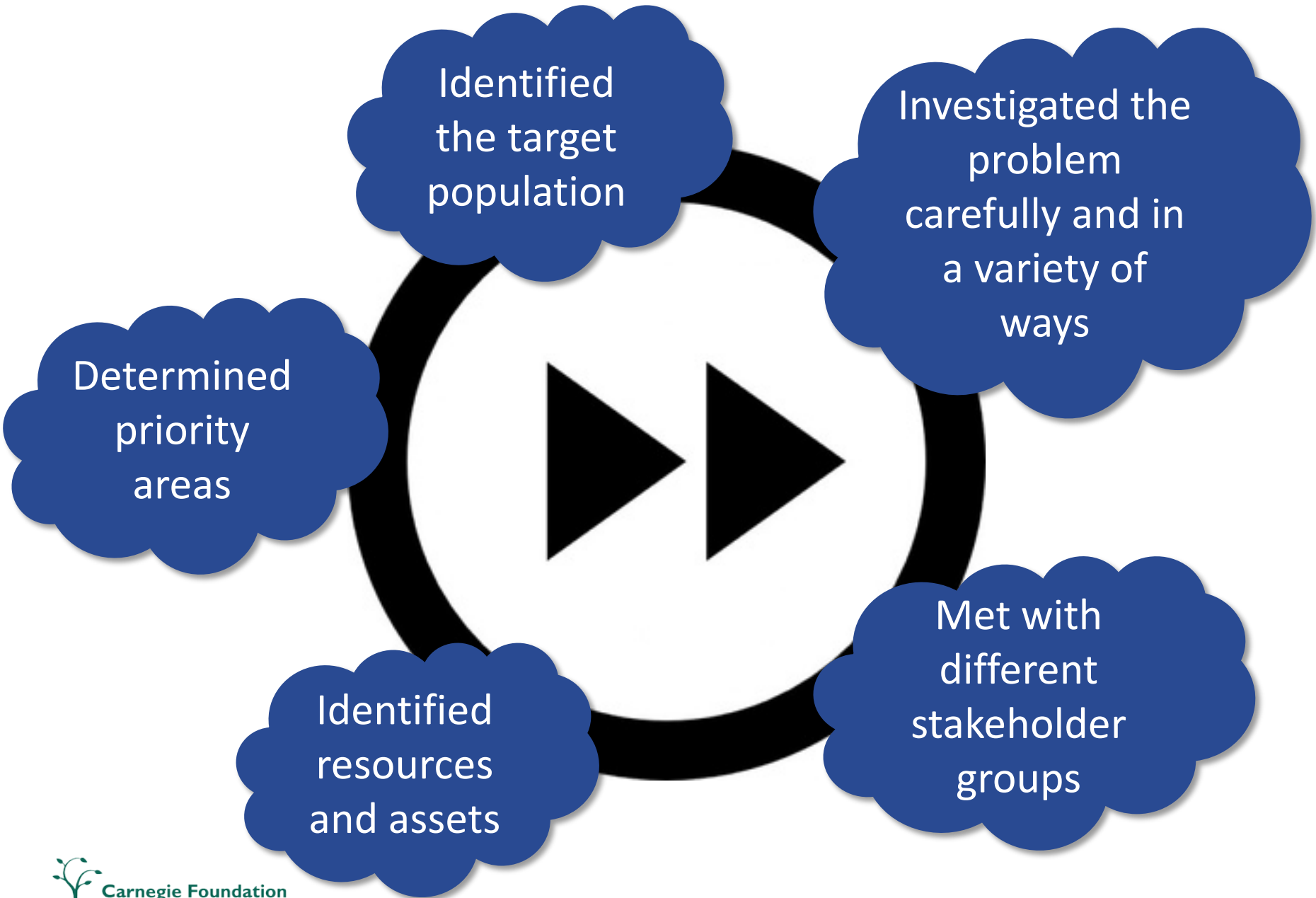
What specifically
are we trying to
accomplish?

What will be improved?
(clear operational definitions)

How much? (measureable,
specific, numerical goals)

By when? (time frame)

For what/whom? (target
population/setting or
system/process)

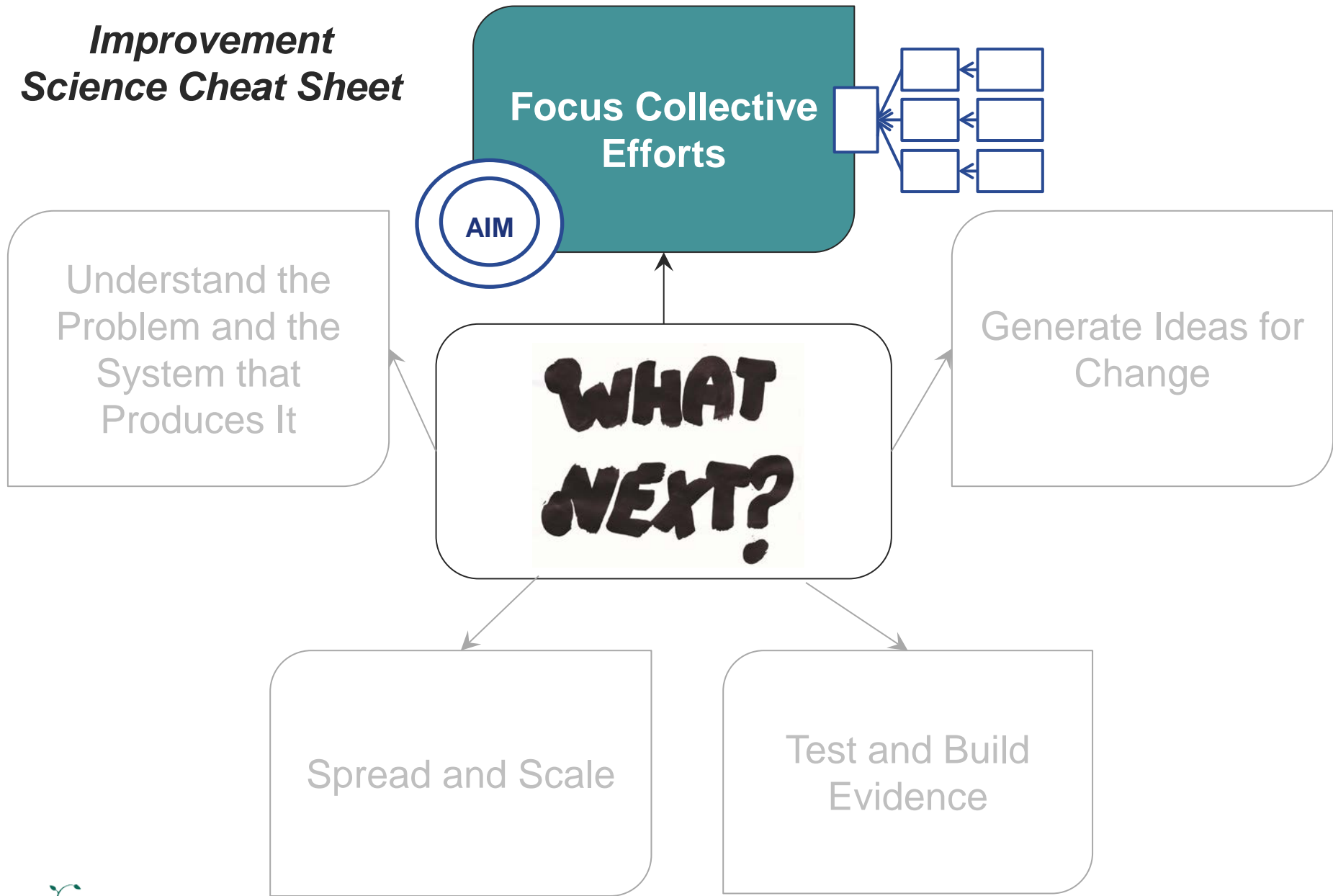


Our Simulation Aim

**What specifically
are we trying to
accomplish?**

*By June 2014, we will reduce
chronic absenteeism at our
school from 16% to 8%.*

Improvement Science Cheat Sheet



Improvement Science Cheat Sheet

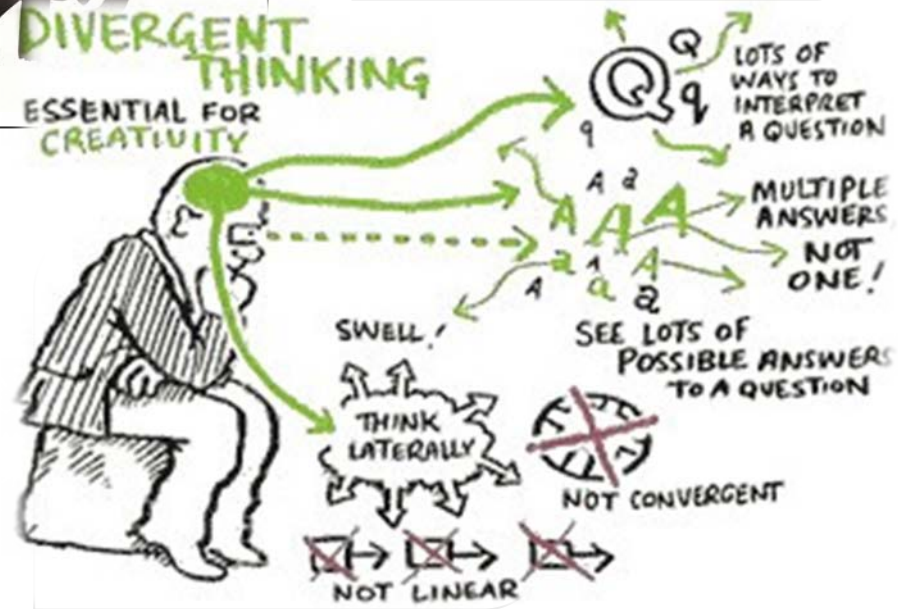
Focus collective efforts

Understand the Problem and the System that Produces it

WHAT NEXT?

Generate ideas for change

Spread and Scale



Change Ideas

**What specifically
are we trying to
accomplish?**

*By June 2014, we will reduce
chronic absenteeism at our
school from 16% to 8%.*

**What changes
might we make
and why?**

Change Ideas

What specifically
are we trying to
accomplish?

*By June 2014, we will reduce
chronic absenteeism at our
school from 16% to 8%.*

What **changes**
might we make
and why?

What is a “Change Idea”?

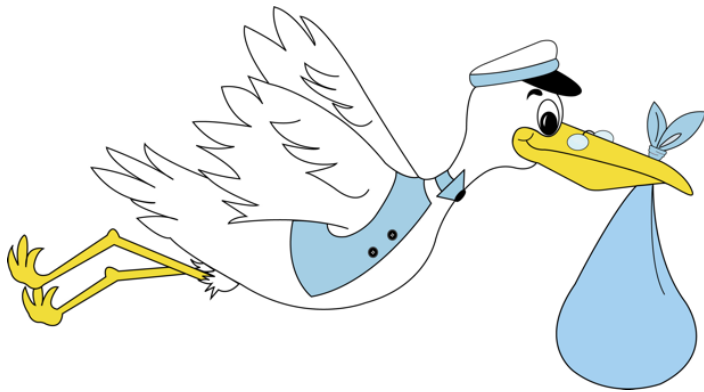
What specifically are we trying to accomplish?

By June 2014, we will reduce chronic absenteeism at our school from 16% to 8%.

What **changes** might we make and why?

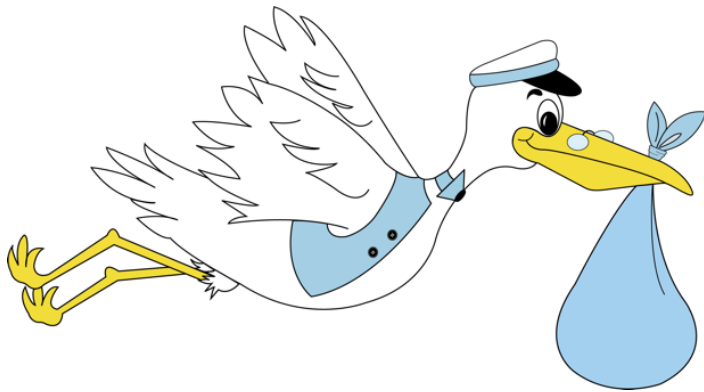
Specific work practices or interventions that represent an **alteration** to how work is currently done.

Where Do Change Ideas Come From?



- 1. Research knowledge:** What does academic literature have to say about solving this problem?
- 2. Practice knowledge:** What have other organizations in the field done to solve this problem?
- 3. Design/Creative Thinking:** What new solutions might we design to address this problem?
- 4. Analysis of the problem:** What does our analysis of the problem indicate may be a helpful solution?

Where Do Change Ideas Come From?



- 1. Research knowledge:** What does academic literature have to say about solving this problem?
- 2. Practice knowledge:** What have other organizations in the field done to solve this problem?
- 3. Design/Creative Thinking:** What new solutions might we design to address this problem?
- 4. Analysis of the problem:** What does our analysis of the problem indicate may be a helpful solution?

SIMULATION: Develop Changes

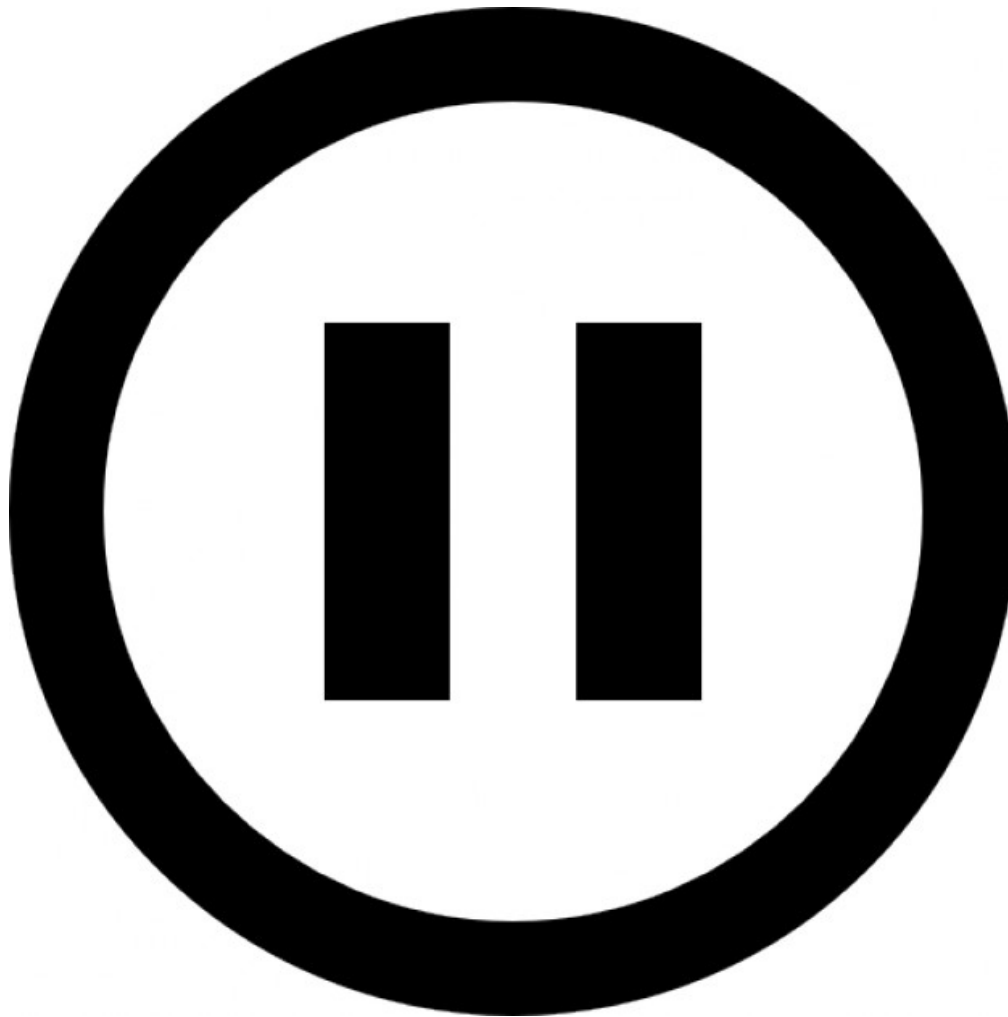
Task: Develop change idea(s)

Facilitator: Principal

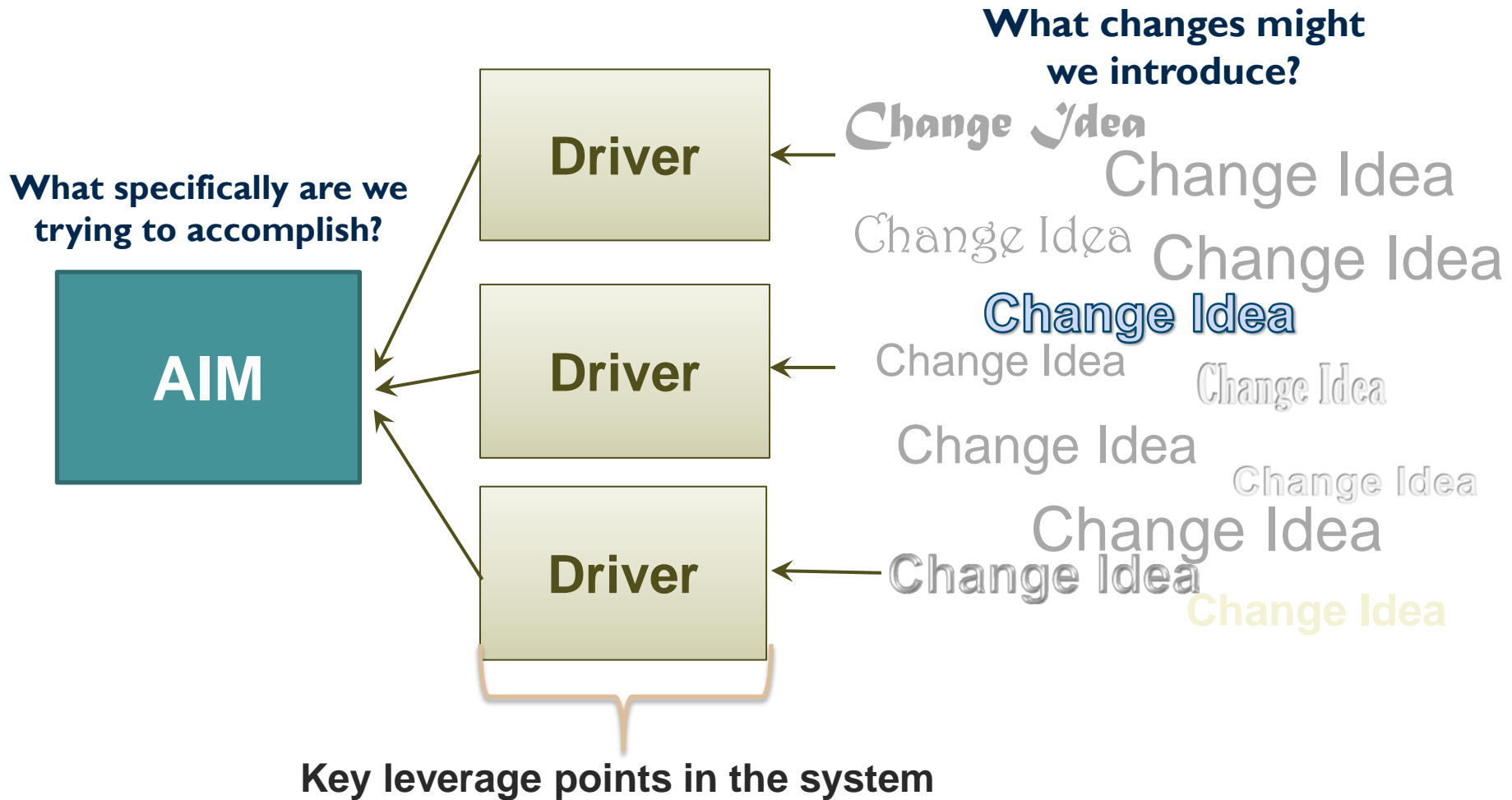
PART I: Individually

Refer back to your baseline performance and your problem analysis.

Generate at least **one specific change** you might make in your school that you have reason to believe would contribute towards reaching your aim.



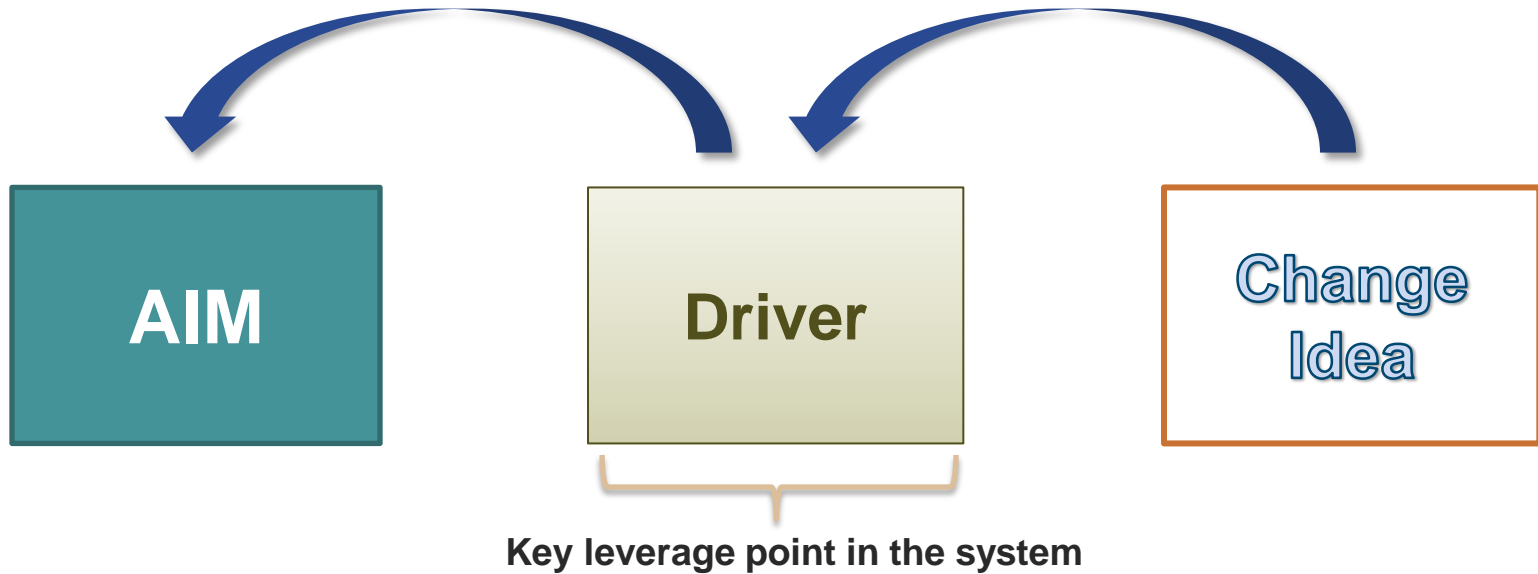
Theory of Practice Improvement

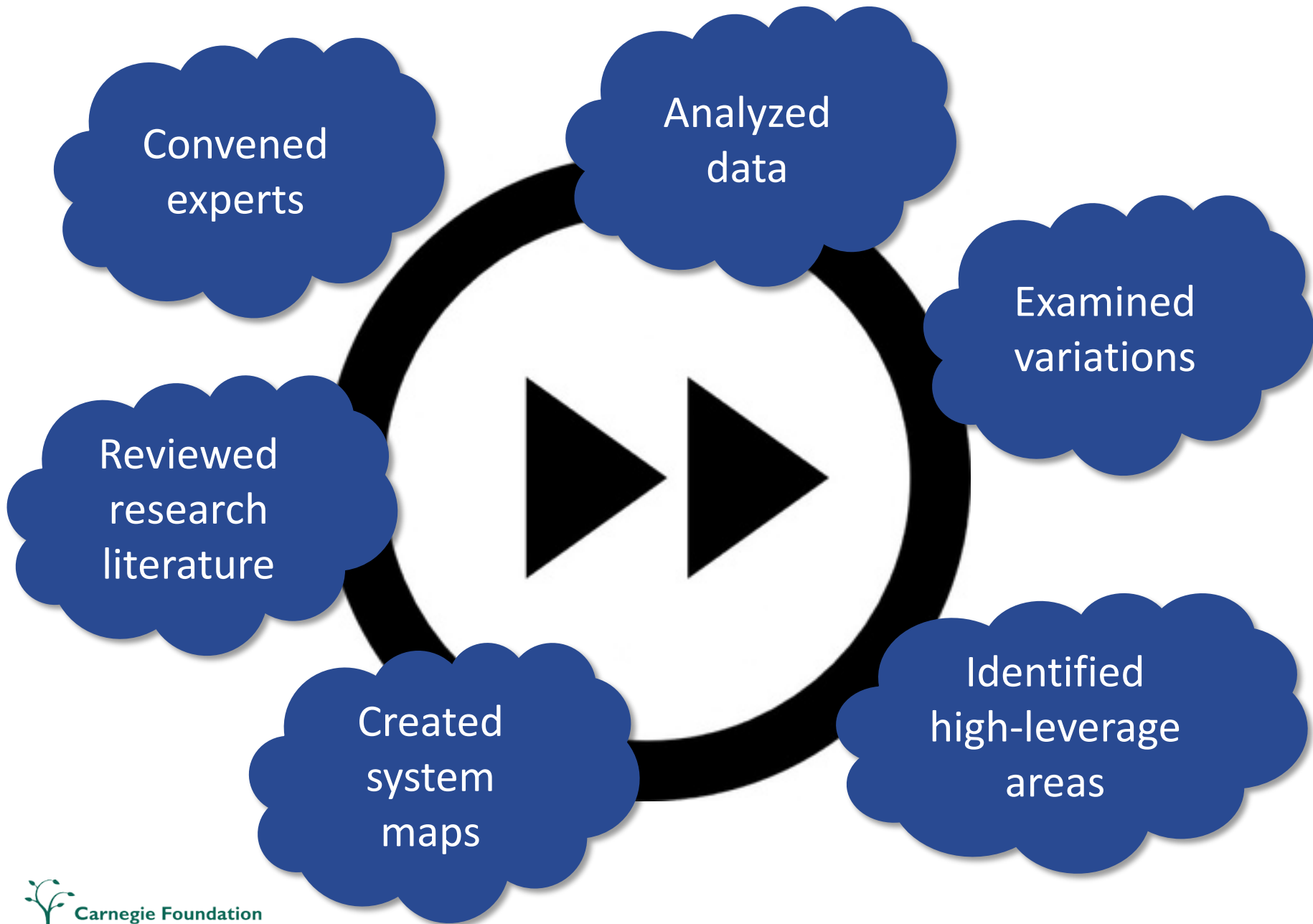


...which in turn will...

...that will impact...

If I do...





Theory of Improvement Version 1.0

Aim

By June 2014, we will reduce chronic absenteeism at our school from 16% to 8%.

Drivers

Parent Awareness & Engagement

Students' Basic Needs

Attendance Data Tracking & Use

In-School Relationships

Change Ideas

Send home handouts at start of year with information and tips about attendance

Family meeting protocol for discussing and addressing chronic absences

Provide transportation vouchers

Weekly attendance data review for detecting students on path to chronic absence

Assign adult mentor to check-in regularly with student

If we [change idea], that will impact [driver/key leverage point], which in turn will lead to [aim].

SIMULATION: Develop Changes

Task: Develop change idea(s)

Facilitator: Principal

PART II: As a team

Refer to your first draft of a theory of improvement for improving chronic absenteeism. Select one of the change ideas that you generated and articulate it as a hypothesis on your driver diagram.

Go around and share your hypotheses with your team.

*If we [change idea], that will impact [driver],
which in turn will lead to [aim].*

Theory of Improvement Version 1.0

Aim

By June 2014, we will reduce chronic absenteeism at our school from 16% to 8%.

Drivers

Parent Awareness & Engagement

Students' Basic Needs

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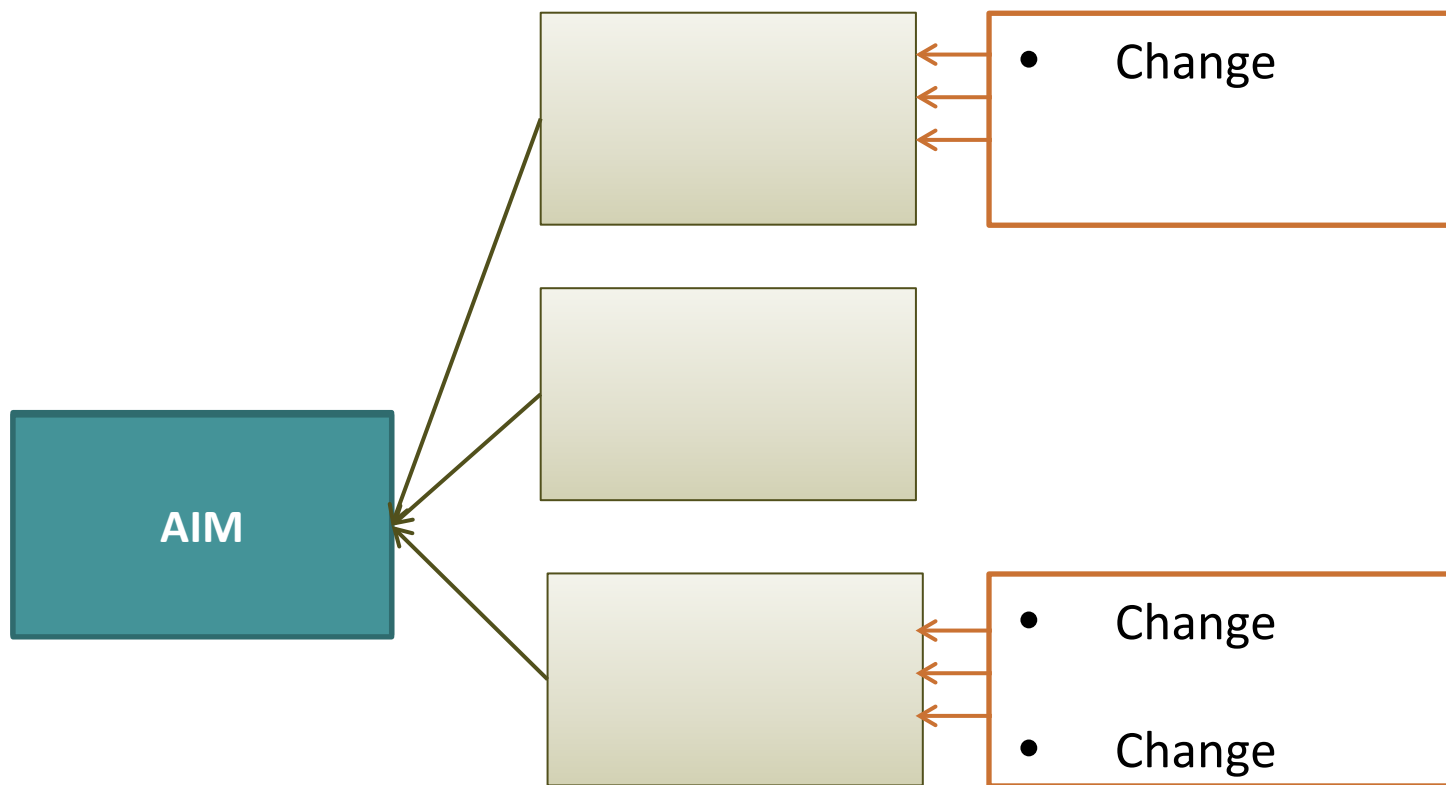
Weekly attendance data review for detecting students on path to chronic absence

Assign adult mentor to check-in regularly with student

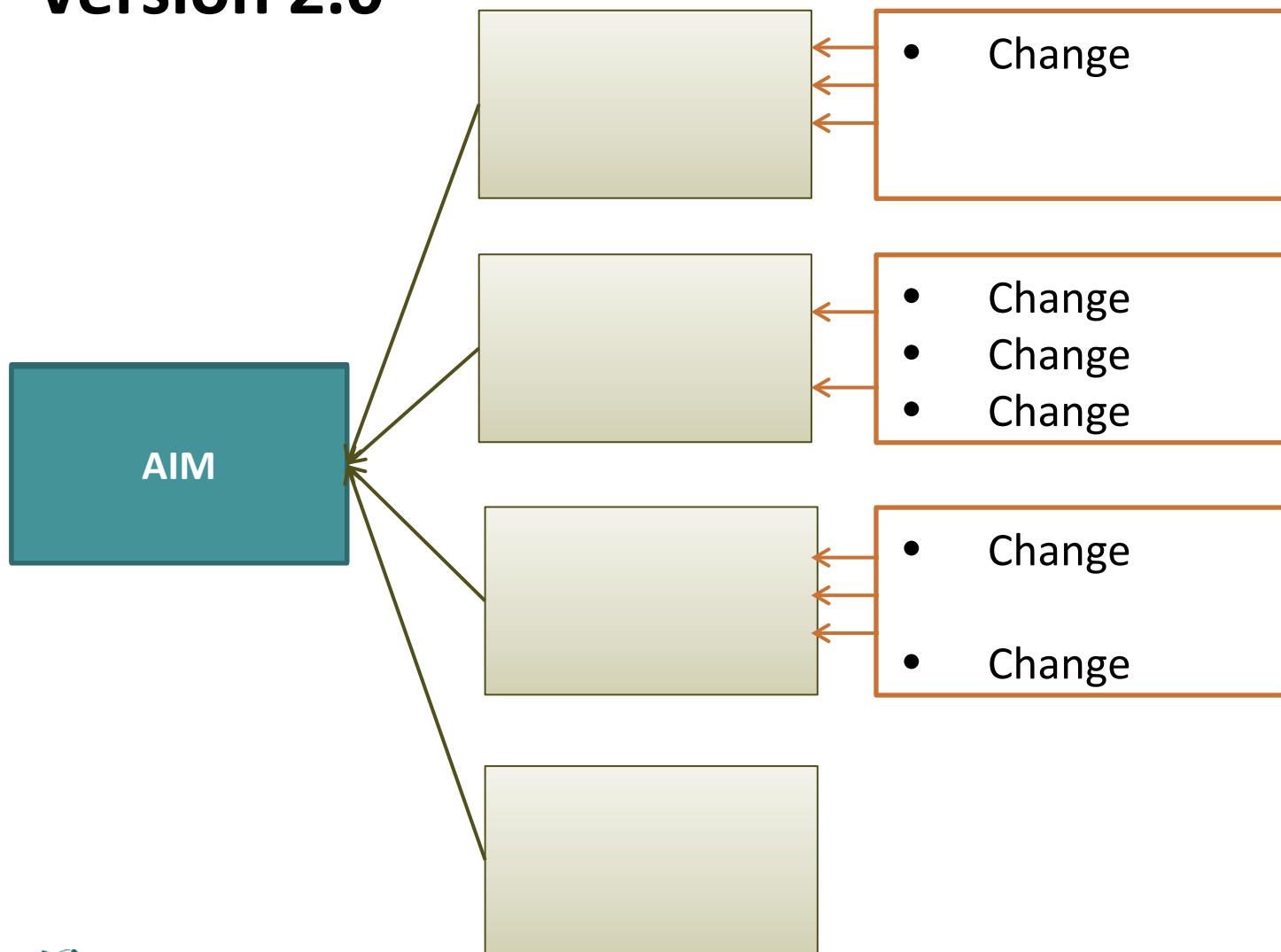
*Possibly wrong,
definitely incomplete...*



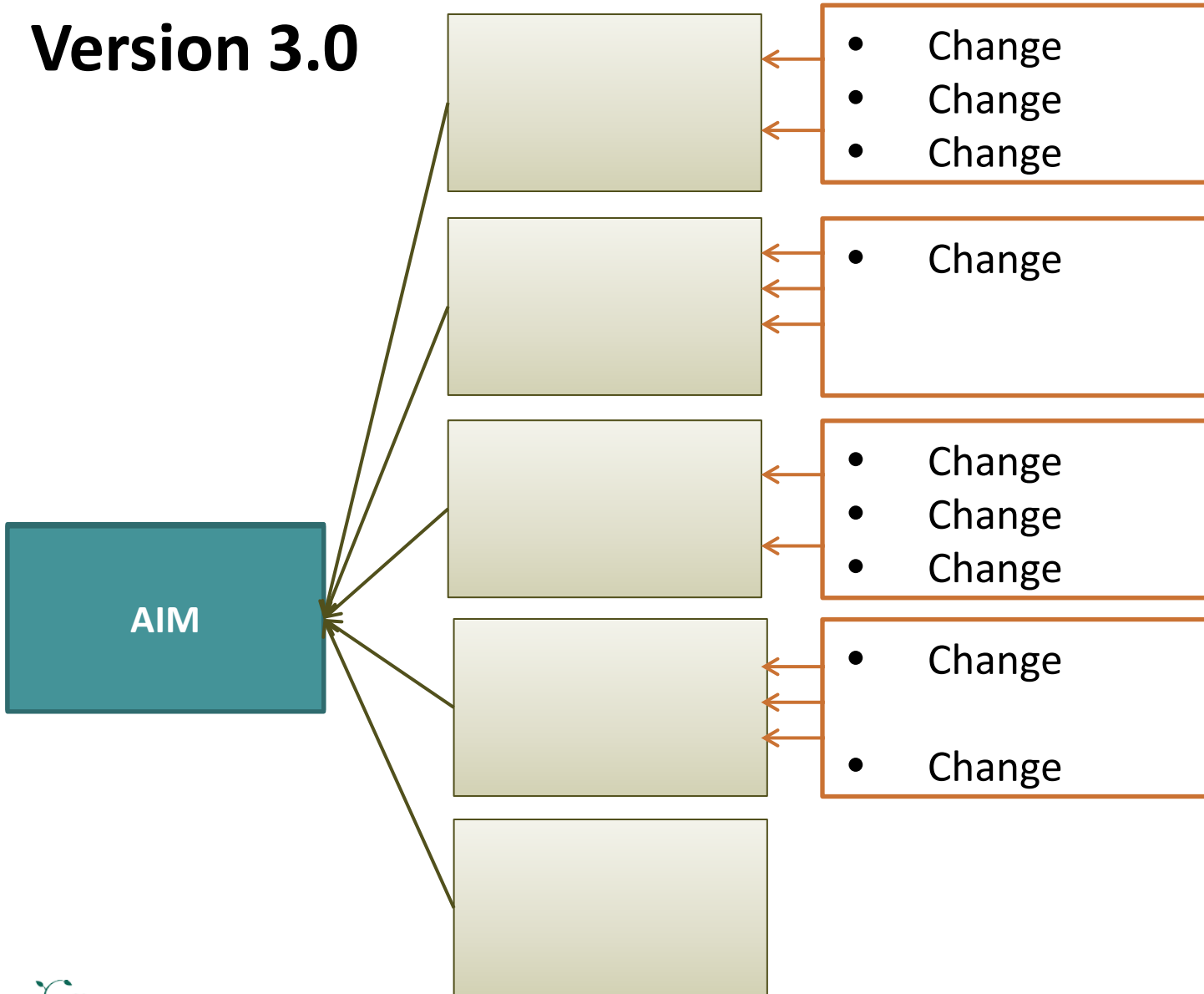
Version 1.0



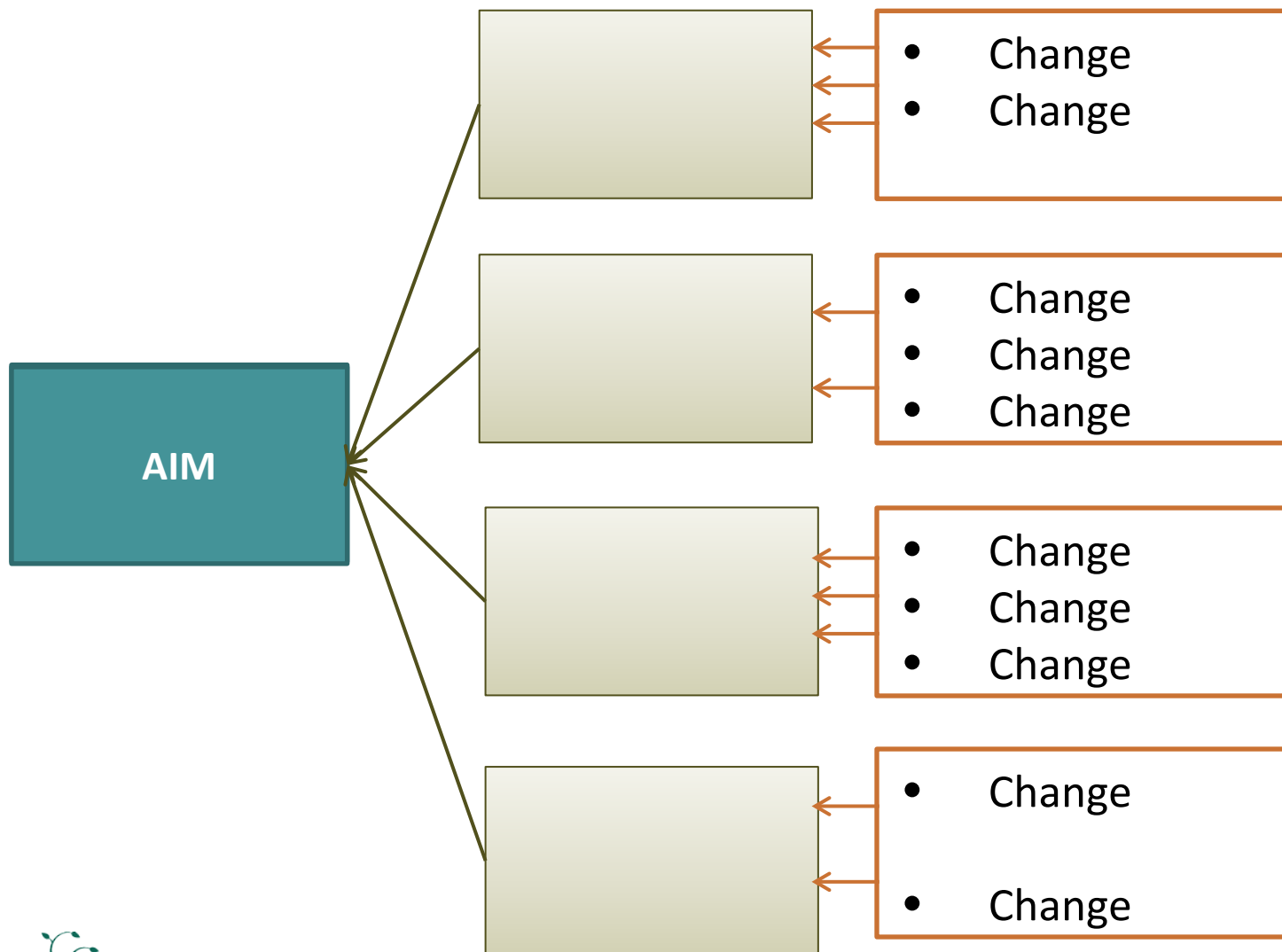
Version 2.0



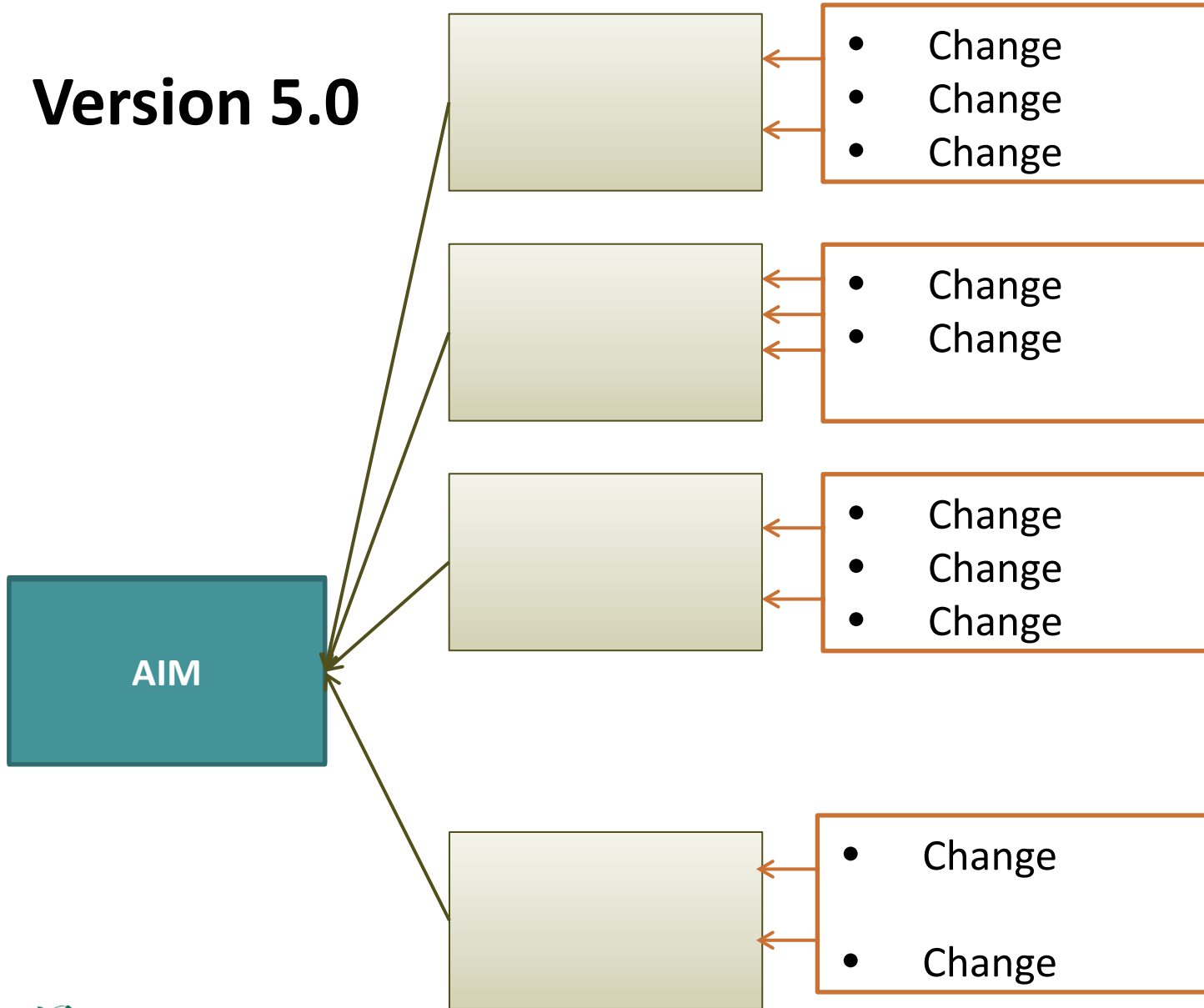
Version 3.0



Version 4.0



Version 5.0



Team
consensus on
a shared aim

Identified measures
and documentation of
progress, as well as
measures for
improvement

Theorized
cause-and-
effect
relationships

Brainstorm
change ideas

Identified system
elements (the
what and where)

Theory of Improvement Version 1.0

Aim

By June 2014, we will reduce chronic absenteeism at our school from 16% to 8%.

Drivers

Parent Awareness & Engagement

Students' Basic Needs

Attendance Data Tracking & Use

In-School Relationships

Change Ideas

Send home handouts at start of year with information and tips about attendance

Family meeting protocol for discussing and addressing chronic absences

Provide transportation vouchers

Weekly attendance data review for detecting students on path to chronic absence

Assign adult mentor to check-in regularly with student

SIMULATION: Your change idea!

Family Meeting Protocol

Use to structure the meeting held with absent students and their families.

Inspired by School Attendance Review Board (SARB) meeting process AND your best knowledge of parent conversations

- Welcome and thank parent & student for coming
- Explain the purpose of the meeting: Student has been absent X times
- Ask why the student has been absent
- Explain the importance of attendance in high school
- Explain consequences of additional absences
- Ask if the student or parent have any questions or concerns
- Thank parent & student again and adjourn the meeting

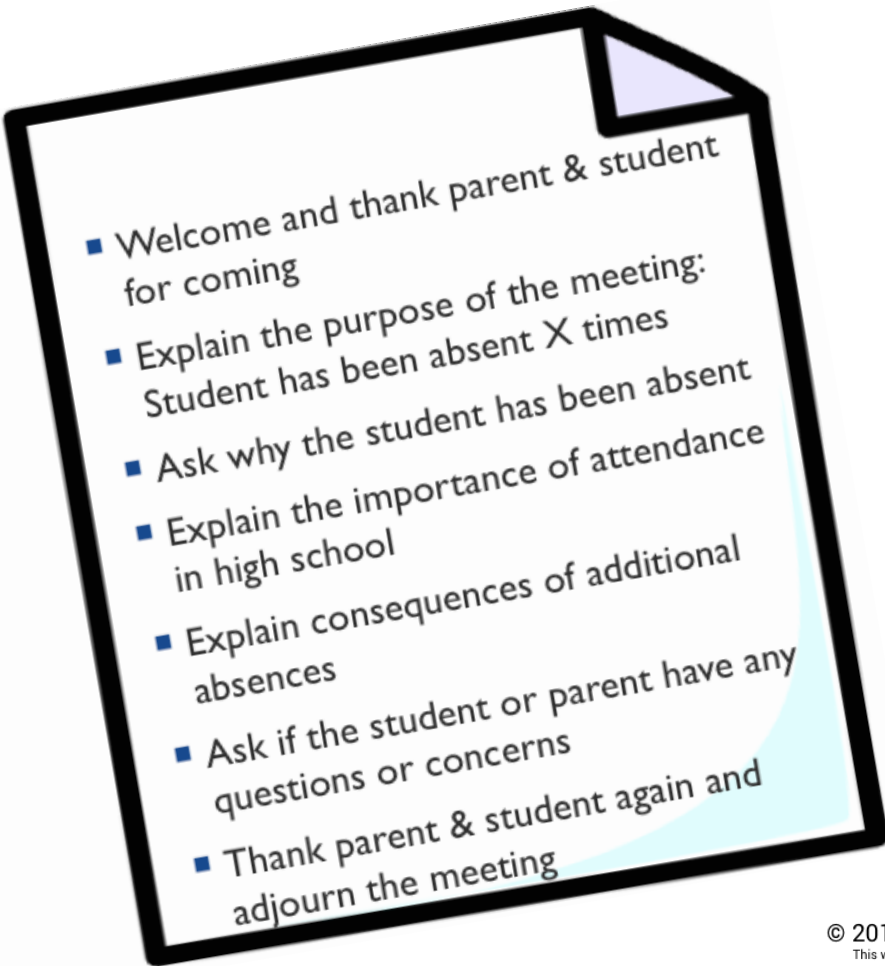
Family Meeting Protocol v. 1

- Welcome and thank parent & student for coming
- Explain the purpose of the meeting: Student has been absent X times
- Ask why the student has been absent
- Explain the importance of attendance in high school
- Explain consequences of additional absences
- Ask if the student or parent have any questions or concerns
- Plus/Deltas

SIMULATION: An opportunity to test

You have a parent meeting scheduled for today with a student who has been absent quite a bit lately.

Your team decides this would be a great opportunity to test out your new protocol...

- 
- Welcome and thank parent & student for coming
 - Explain the purpose of the meeting:
Student has been absent X times
 - Ask why the student has been absent
 - Explain the importance of attendance in high school
 - Explain consequences of additional absences
 - Ask if the student or parent have any questions or concerns
 - Thank parent & student again and adjourn the meeting

Improvement Science Cheat Sheet

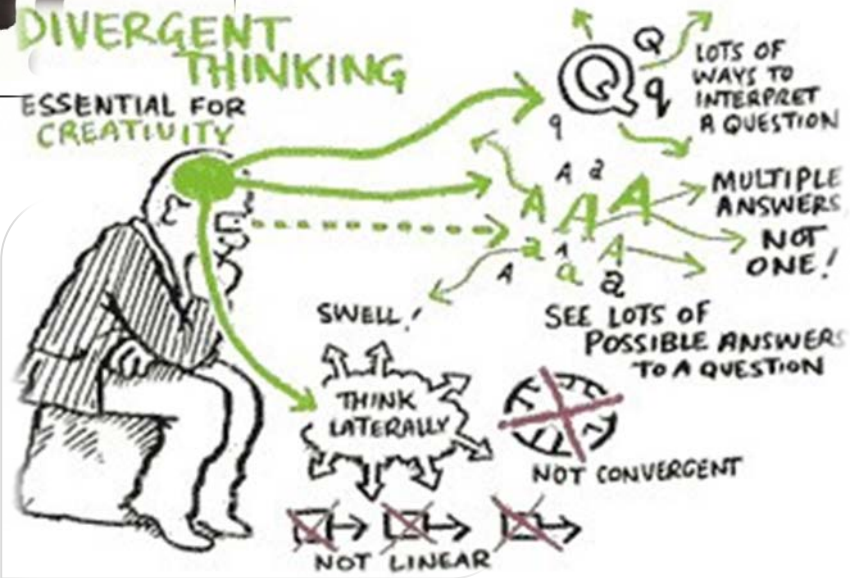
Focus collective efforts

Understand the Problem and the System that Produces it

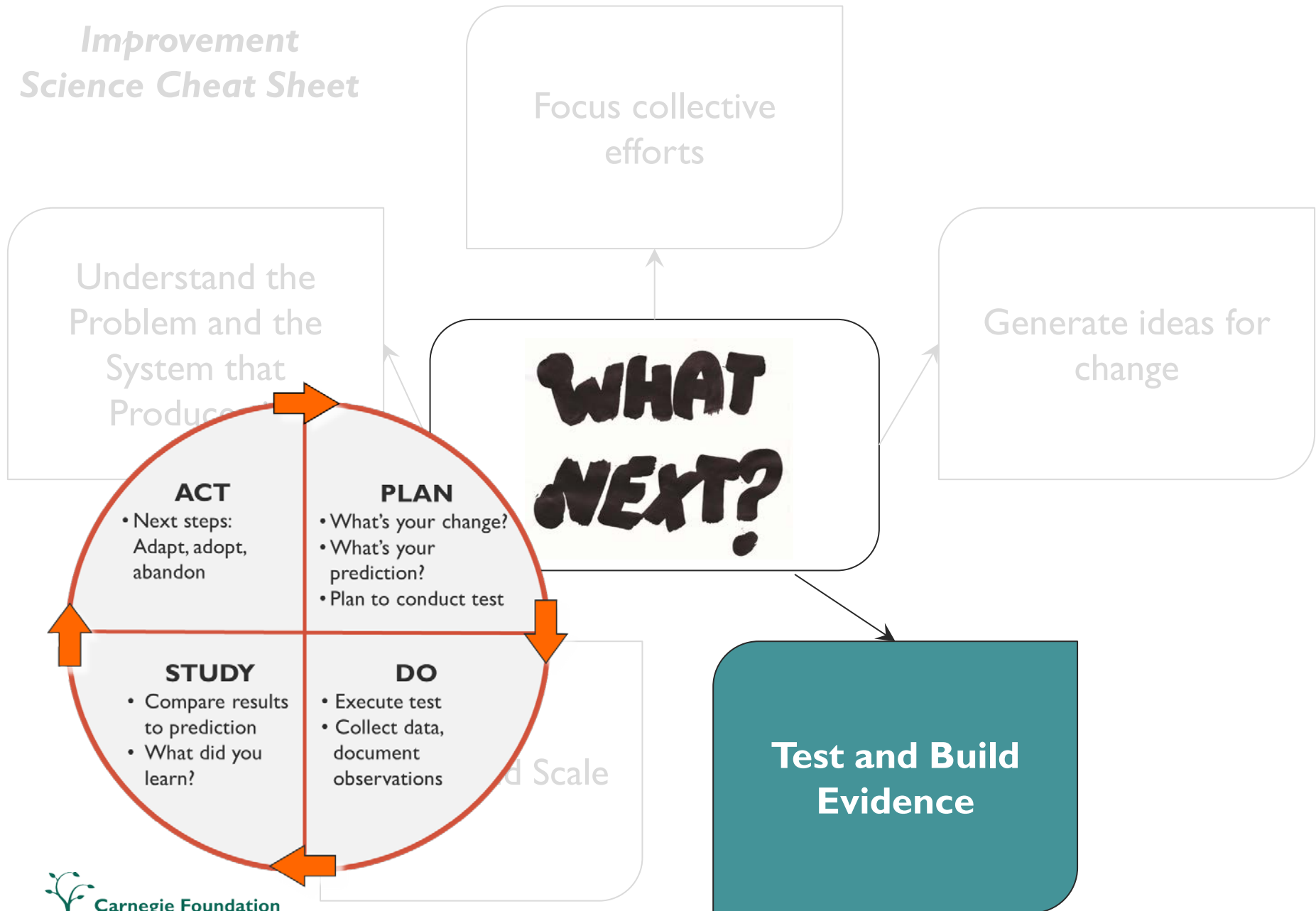
WHAT NEXT?

Generate ideas for change

Spread and Scale



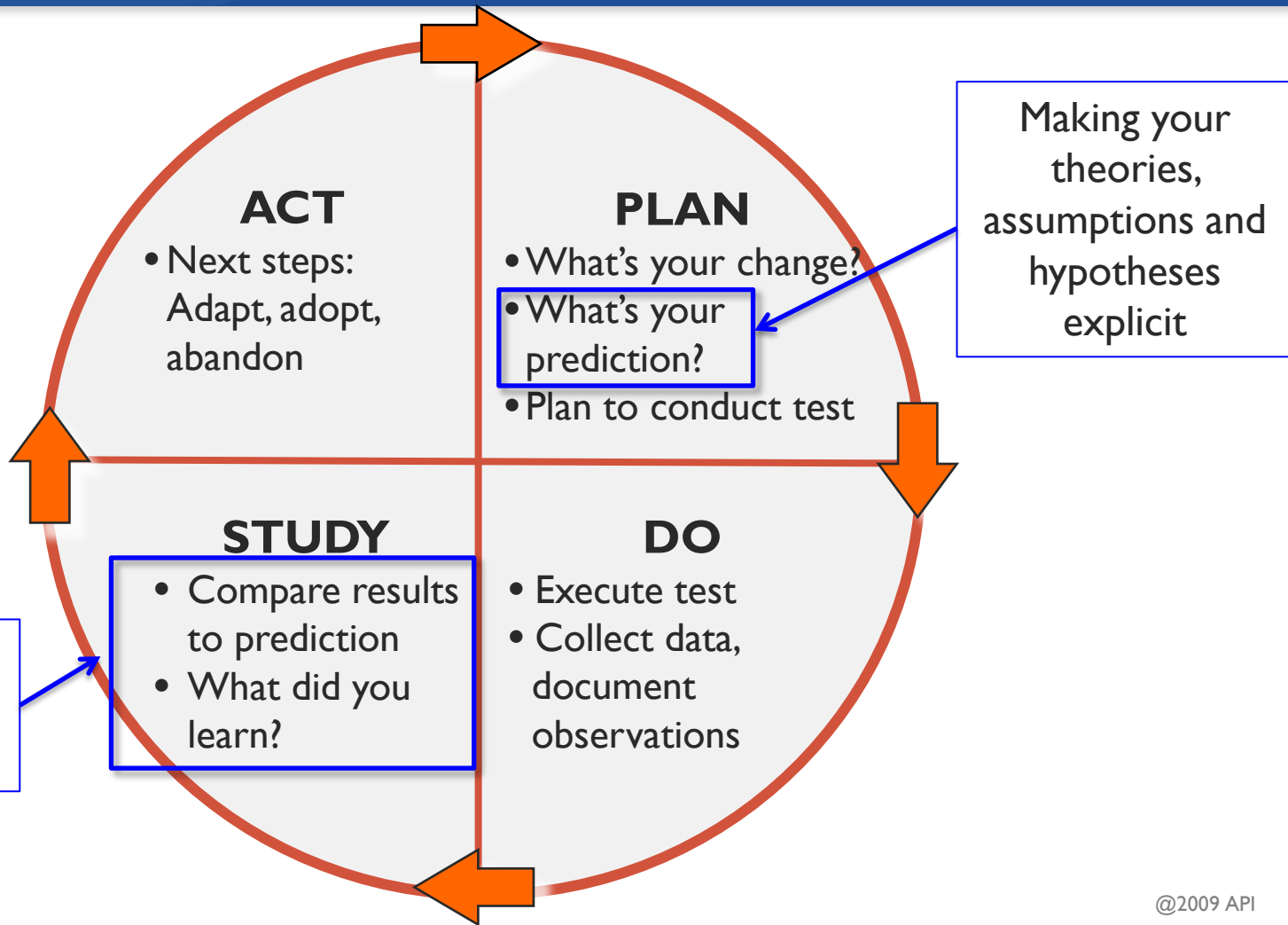
Improvement Science Cheat Sheet



The Plan-Do-Study-Act (PDSA) Cycle



The Plan-Do-Study-Act (PDSA) Cycle



SIMULATION: Run your first PDSA

Task: Complete an entire PDSA cycle

Facilitator: Attendance Office Manager

PLAN

1. Read the family meeting protocol
2. Review the Plan section of your PDSA form
3. Generate predictions for each of the items in the Plan Section.

What do you think will happen when you test this protocol in a family meeting?

PLAN

- What's your change?
- What's your prediction?
- Plan to conduct test



DO

- Execute test
- Collect data, document observations

SIMULATION: Run the test

DO

1. Watch the family meeting unfold
2. Record observations in the “Do” section of your form

Observe from the perspective of your “role”!

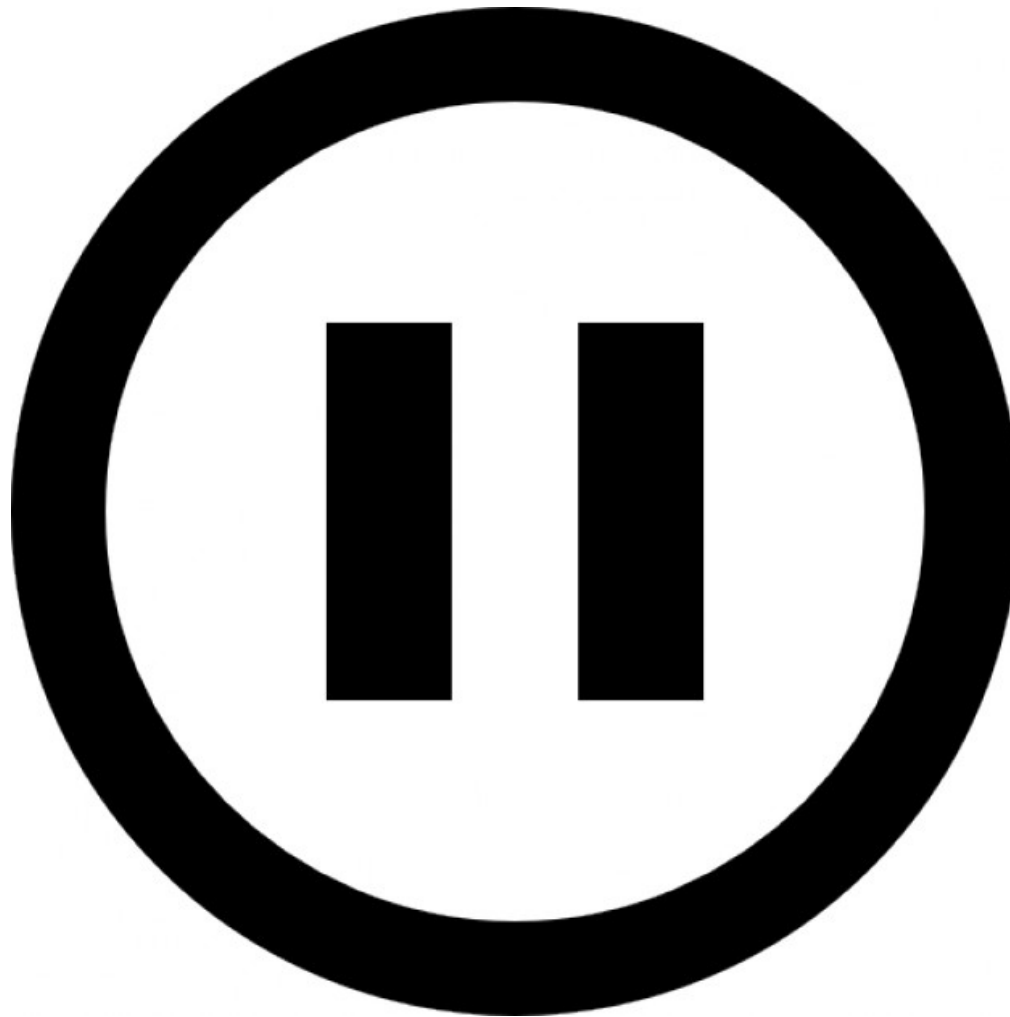
SIMULATION: Study the results

STUDY

1. Collaboratively review your observations from the “Do” section
2. Record the results relevant to each prediction you made
3. Summarize your team’s major learnings from the test

STUDY

- Compare results to prediction
- What did you learn?



SIMULATION: Decide how to act

ACT

Based on what you learned, decide what you plan to do next with this change idea:

- ADOPT – Make this change a permanent part of our practice
- ADAPT – Revise this change and test it again
- ABANDON – Discard this idea entirely

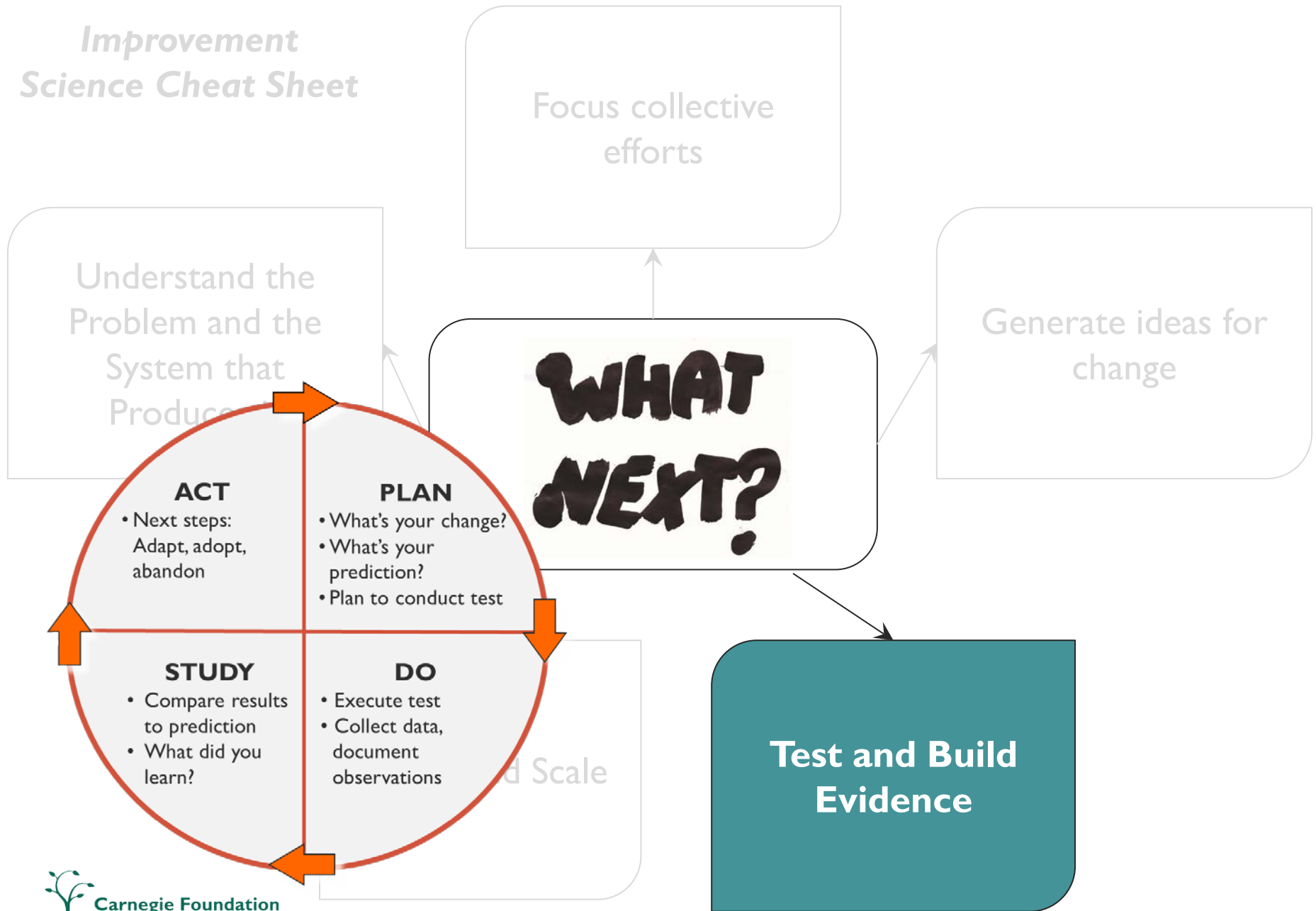
ACT

- Next steps:
Adapt, adopt,
abandon

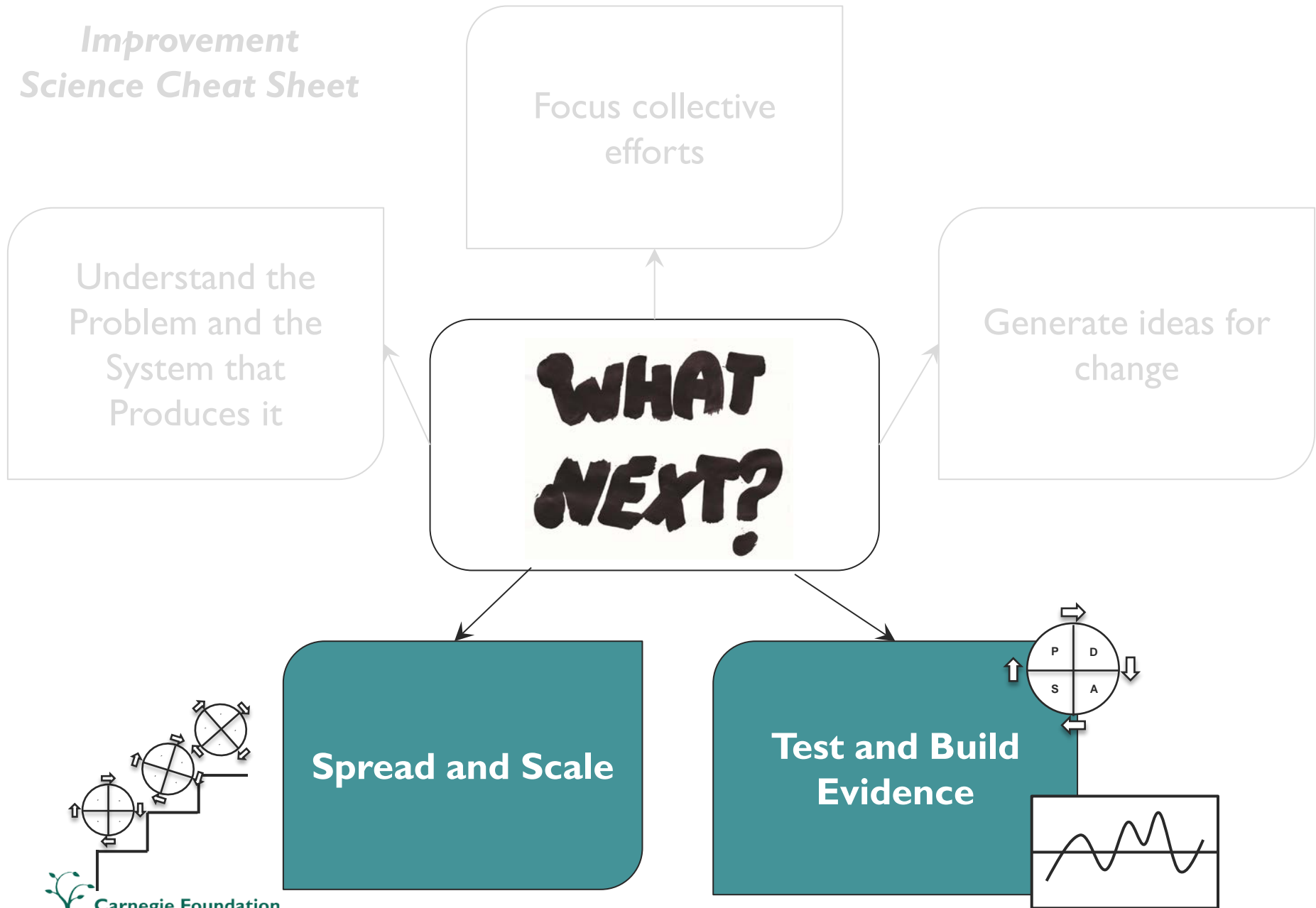
Family Meeting Protocol V. 6

- Welcome and thank parent and student for coming
- Review attendance record with family & explain how to interpret report
- Review social & academic consequences of absenteeism
- Discuss possible interventions school may undertake to support student
- Answer any additional questions & review next steps
- Thank parent again and adjourn the meeting

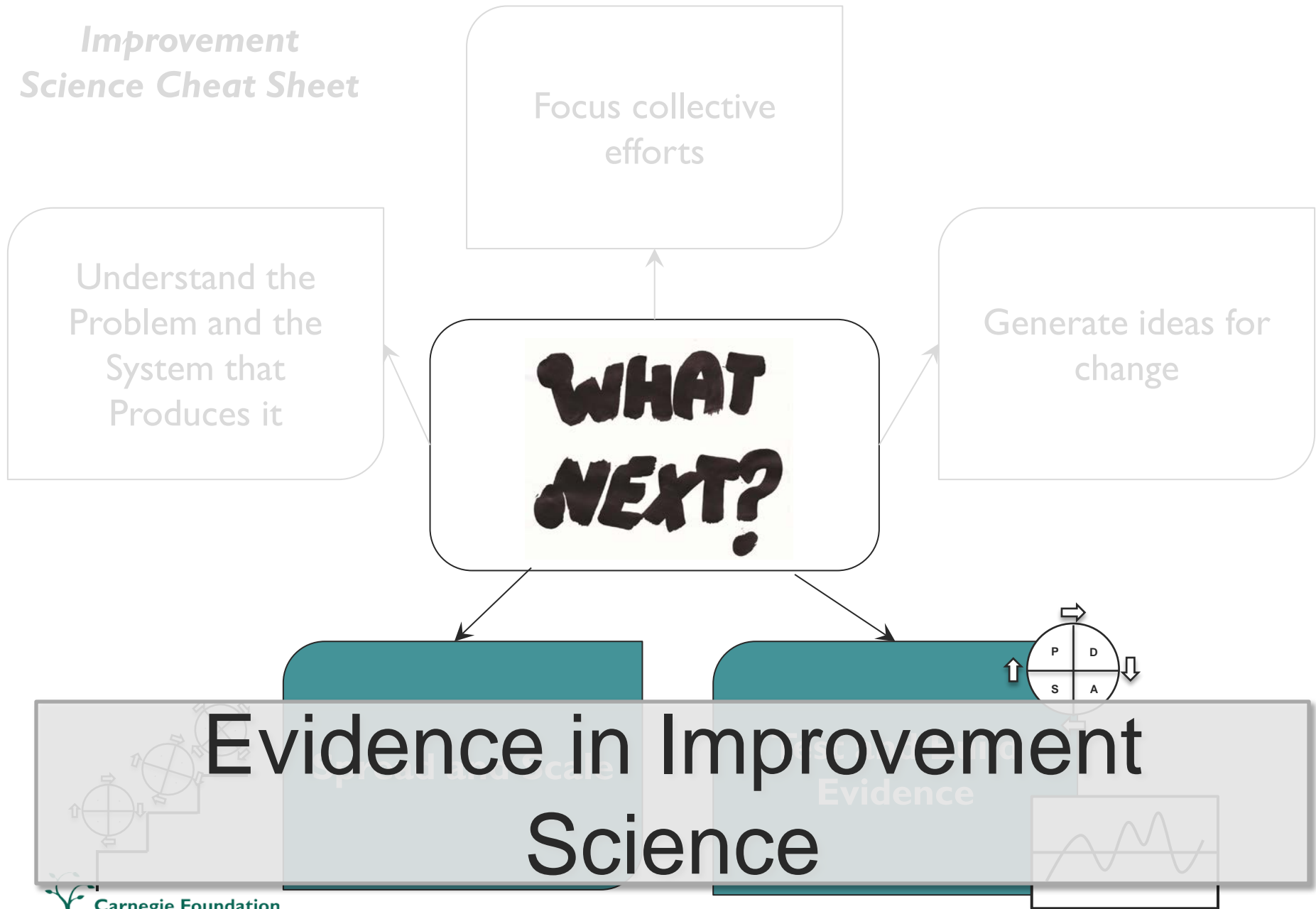
Improvement Science Cheat Sheet



Improvement Science Cheat Sheet



Improvement Science Cheat Sheet

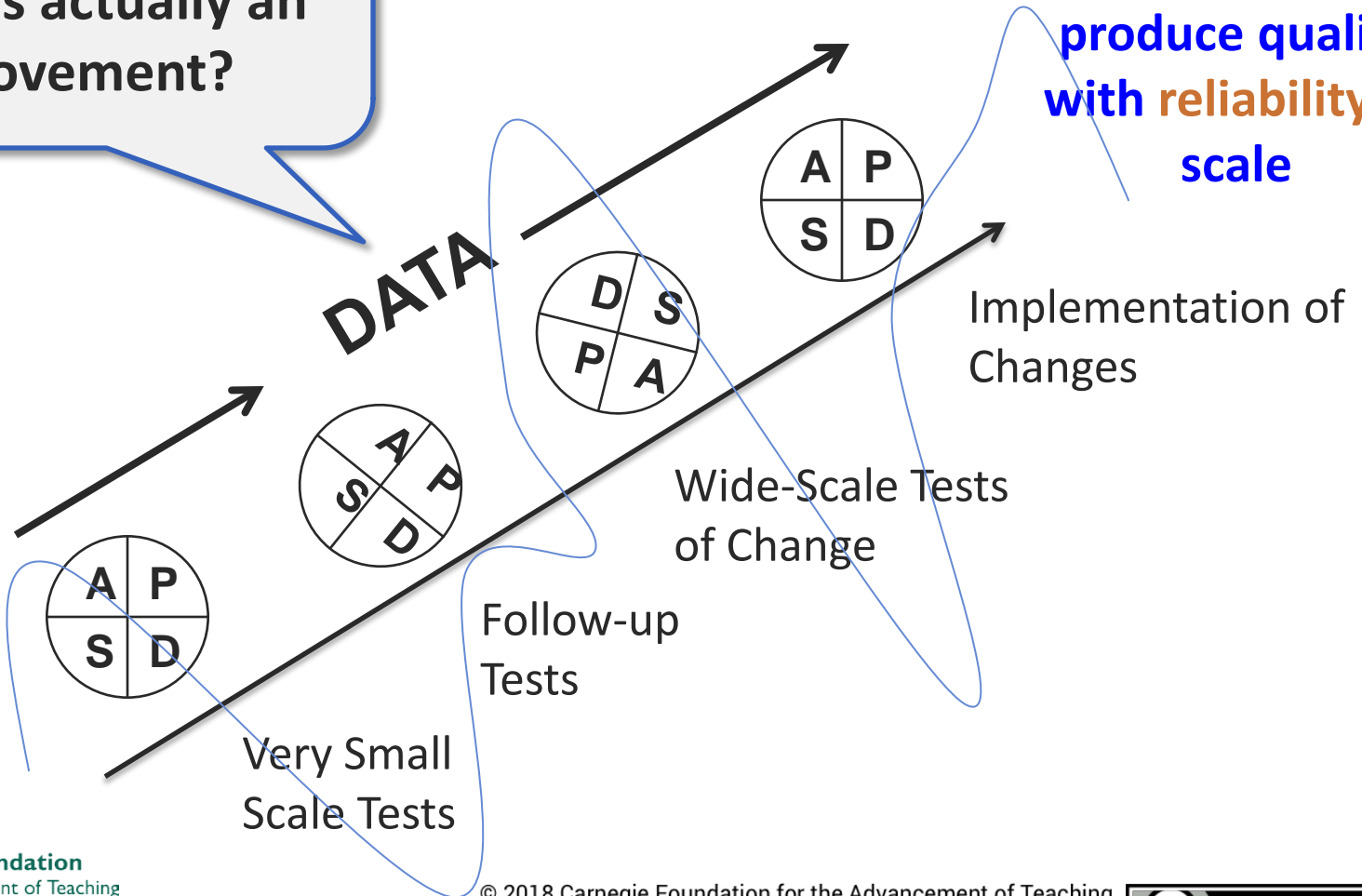


Building Evidence for a Change

How will we know this change is actually an improvement?

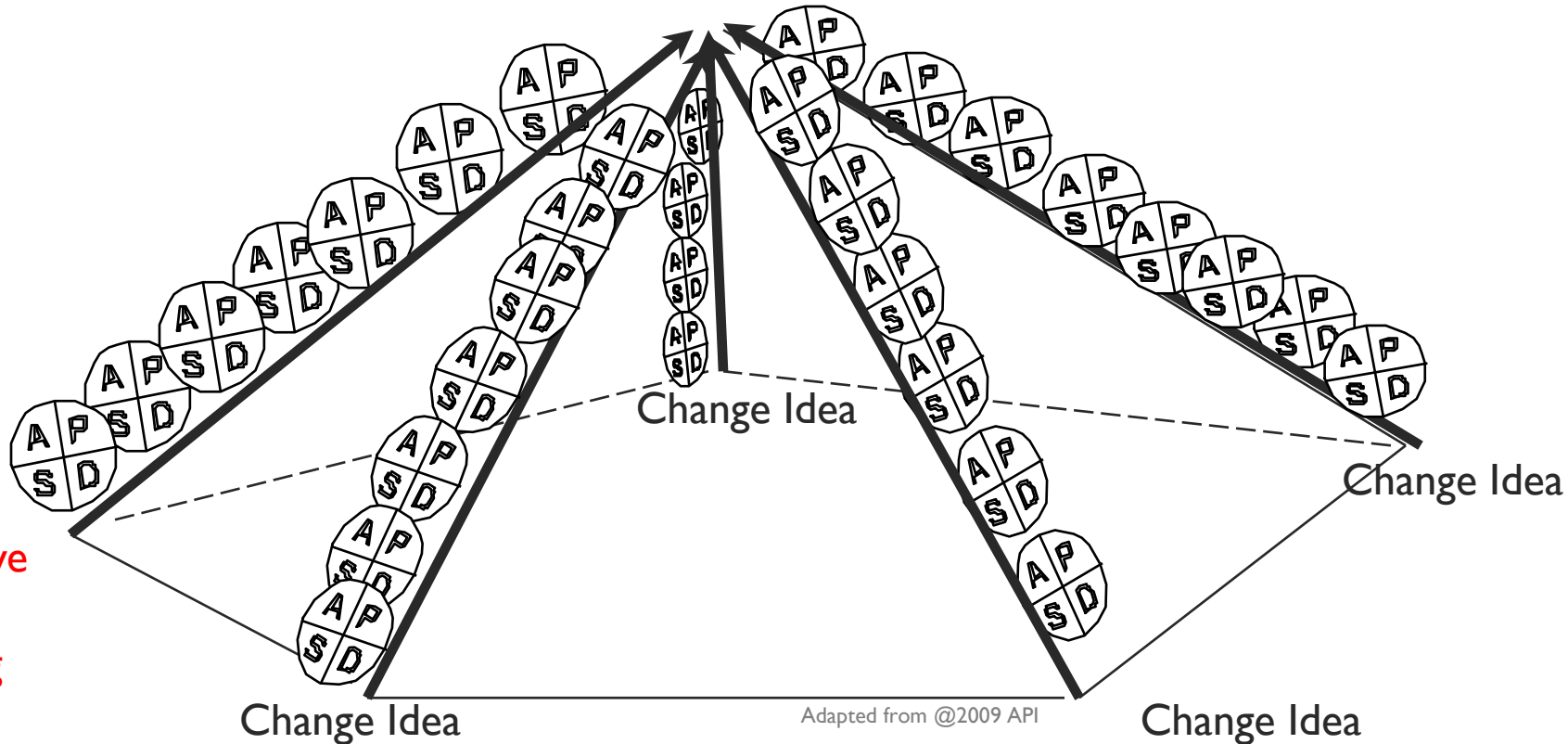
Changes that produce quality with reliability at scale

Initial Hunches & Ideas

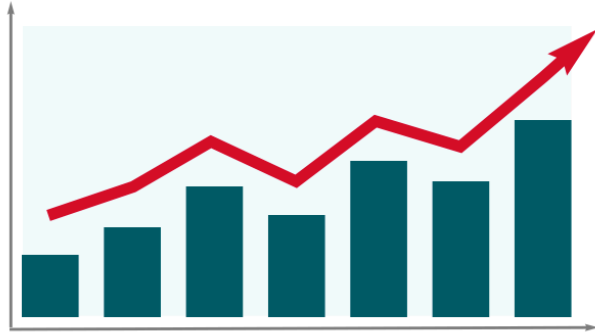


Managing multiple ramps of PDSAs

Reduced Chronic Absenteeism



What's are the "End" Goals?



Measurable improvement

Specified changes that led to the improvement

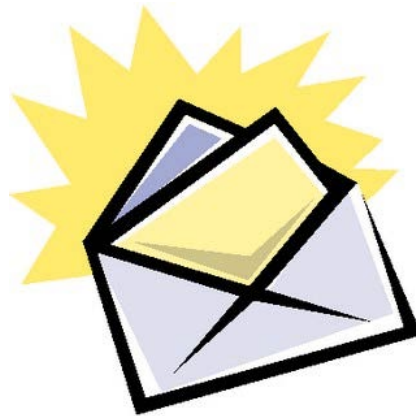


Improvement capacity to apply to future work

Chronic Absenteeism Bundle



Regular routine
for reviewing
attendance data



5 absences =
letter home



10 absences =
supportive family
conversation

- Note: primary strategy is engaging coursework

Key Dimensions to Consider When Testing

LOW confidence that the change will lead to an improvement	
HIGH confidence that the change will lead to an improvement	

Key Dimensions to Consider When Testing

		Participants' Will		
		Resistant	Indifference	Ready
LOW confidence that the change will lead to an improvement				
HIGH confidence that the change will lead to an improvement				

Key Dimensions to Consider When Testing

		Participants' Will		
		Resistant	Indifference	Ready
LOW confidence that the change will lead to an improvement	Cost of failure large			
	Cost of failure small			
HIGH confidence that the change will lead to an improvement	Cost of failure large			
	Cost of failure small			

Key Dimensions to Consider When Testing

		Participants' Will		
		Resistant	Indifference	Ready
LOW confidence that the change will lead to an improvement	Cost of failure large	Very Small Scale	Very Small Scale	Very Small Scale
	Cost of failure small	Small Scale Test	Small Scale Test	Moderate Scale Test
HIGH confidence that the change will lead to an improvement	Cost of failure large	Small Scale Test	Moderate Scale Test	Large Scale Test
	Cost of failure small	Moderate Scale Test	Large Scale Test	System-wide Implementation!

SIMULATION:

Assessing your confidence in the change bundle



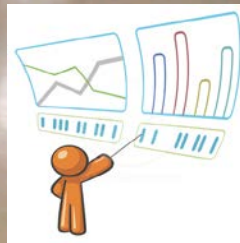
Should we
IMPLEMENT the
chronic absenteeism
bundle in our school?

LOW
confidence

SOME
confidence

HIGH
confidence

Right now, how
confident are you in the
change bundle?



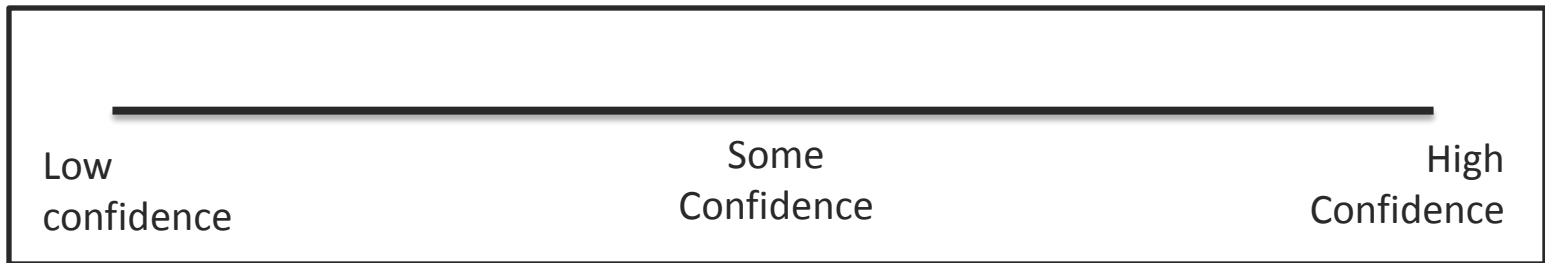
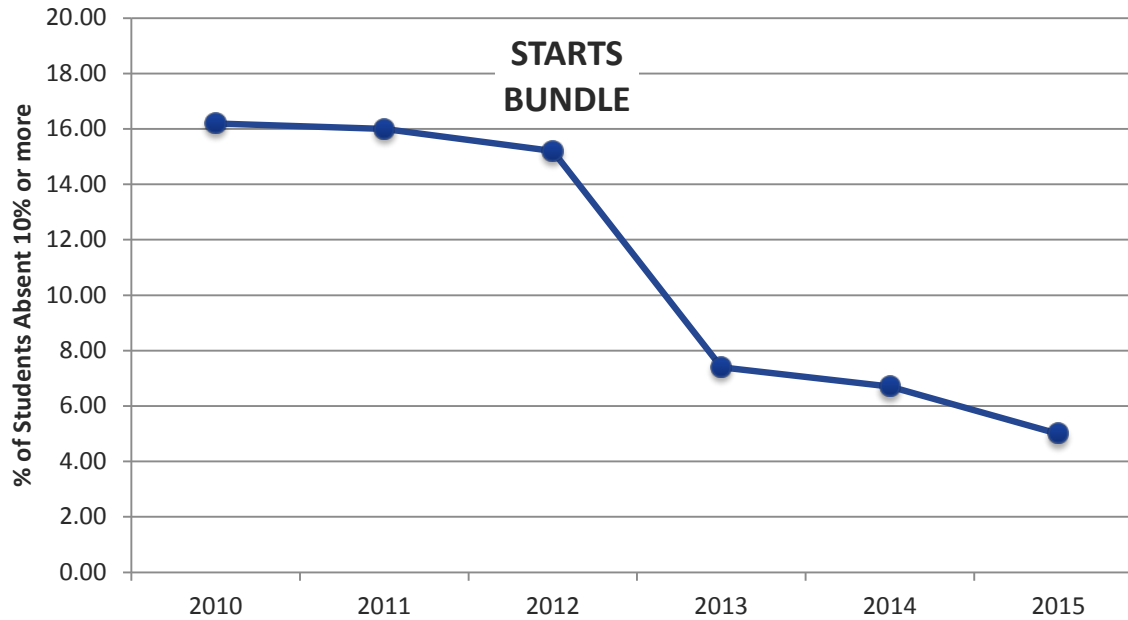
SIMULATION:

Assessing your confidence in the change bundle

Your team has generated the following data display. Use this display to assess your level of confidence in the change bundle.

- 1. Individual Task:** Rate your confidence on the scale
- 2. Team Discussion:** (The 2nd teacher facilitates)
 - Why did you rate it where you did?
 - What could you do to increase your confidence in the bundle?

High School #1: Our School





SIMULATION:

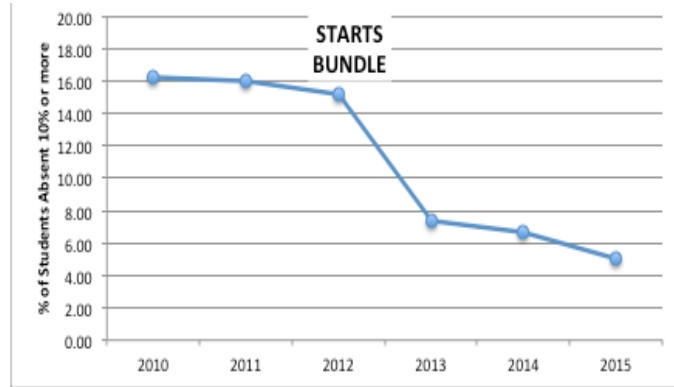
Assessing your confidence in the change bundle:

Now you are **the leaders of the whole network.**

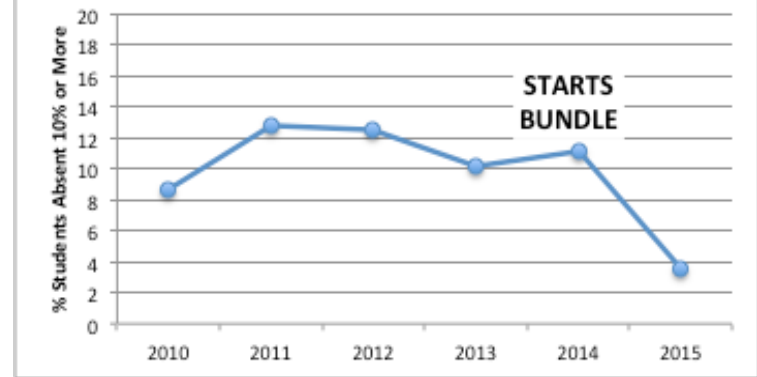
Based on these new data, are you ready to implement the change bundle network-wide?

- 1. Individual Task:** Rate your confidence on the scale
- 2. Team Discussion:** (The 2nd teacher facilitates)
 - Why did you rate it where you did?
 - What would you do next?

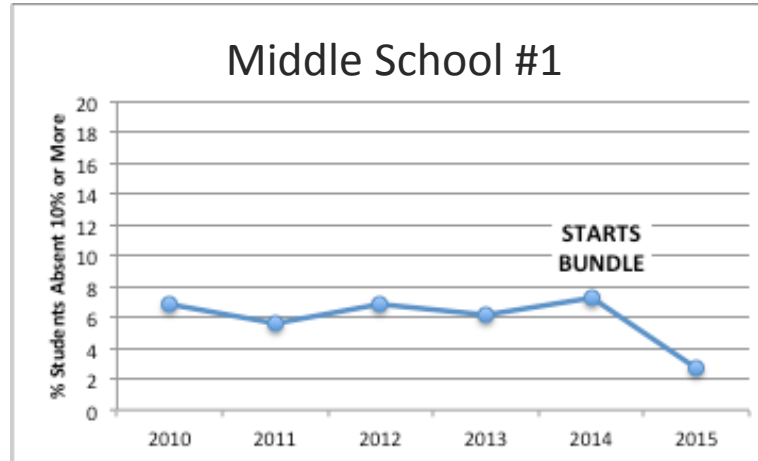
High School #1 (Our School)



High School #2



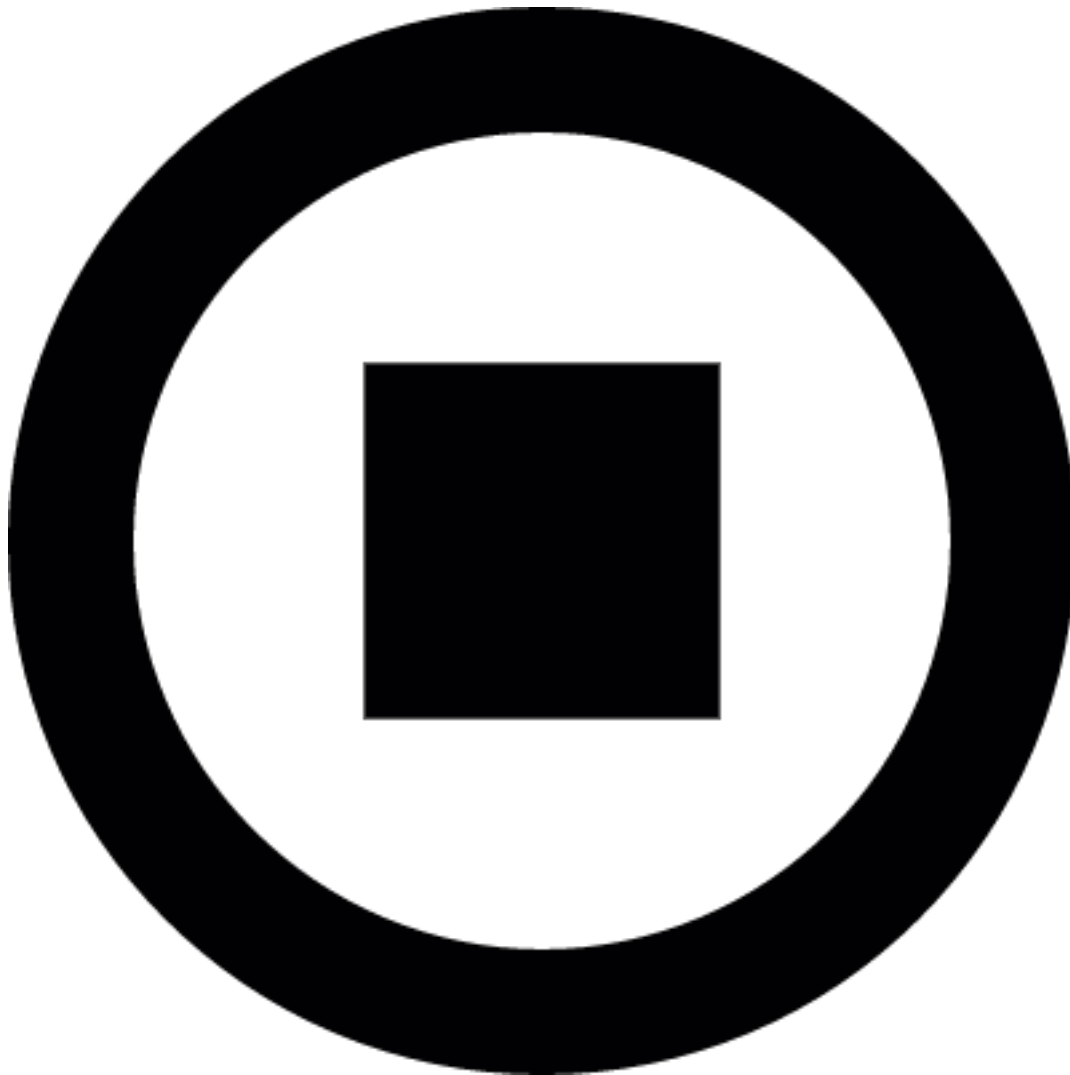
Middle School #1



Low confidence

Some Confidence

High Confidence



Theory of improvement

Primary Drivers

Changes

Aim

Increase the 4yr college going rate from 66.1% (2012) to 90% by June 2017


Pathway to College

FAFSA completion workshops

Personal statements as junior English assignment

Family Engagement

Academic Preparation & Eligibility

Conferences with students that miss 2 HW assignments in a row 

Learning mindsets and skills to succeed post graduation

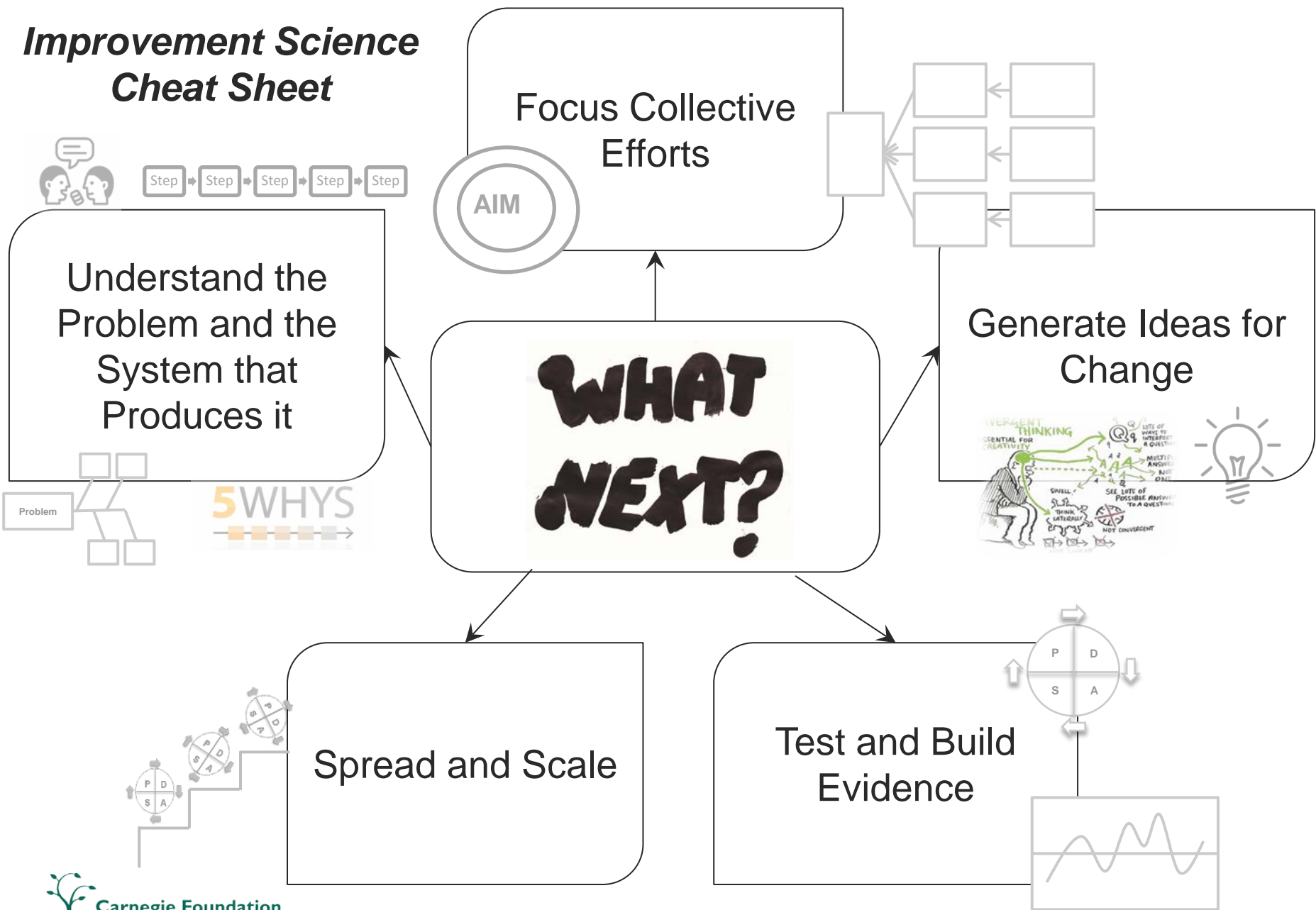
Equitable group work

Chronic Absenteeism Bundle

Support groups for men of color

WHAT
NEXT?

Improvement Science Cheat Sheet





Reflections & Closing Remarks

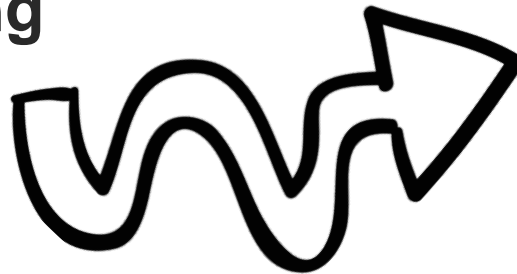
Improvement Science



Social learning



Systems-focused



Nonlinear



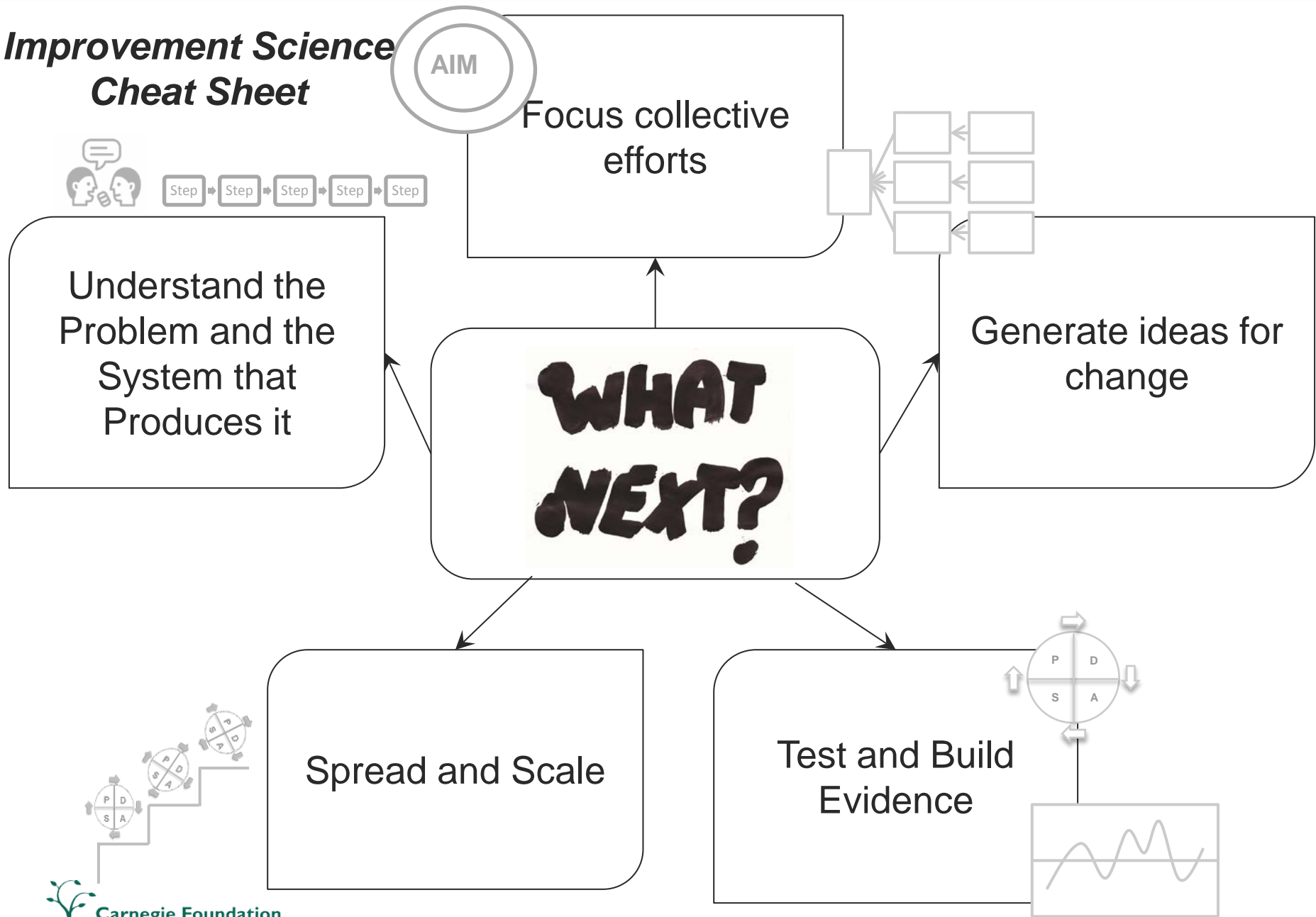
Disciplined

Building Your Improvement Toolkit



- Data Conversation Protocol
- Empathy Interview
- Scanning
- Process Map Analysis
- Cause Analysis
- Affinity Protocol
- Aim Statement
- PDSA Cycle
- Chart of Data Over Time
- Driver Diagram

Improvement Science Cheat Sheet



Reflections

- From your perspective, how is improvement science different from other approaches in tackling problems? What would enable or constrain the work of improvement in your context?
- Where do you want to learn more in the remaining time at the Summit?

Top 7 Ways to Get Started

7. Ask other people at the Summit how they got started!

6. Next time someone wants to make a change, run it as a PDSA!

5. Use a problem investigation tool to understand a problem.

4. Next time you are setting a goal, ask, "How will we know?"

3. Read *Learning to Improve* and start a book club with colleagues.

2. Run a personal improvement project on your own life!

1. Start before you're ready.

Evaluation

Thank you for your feedback!



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