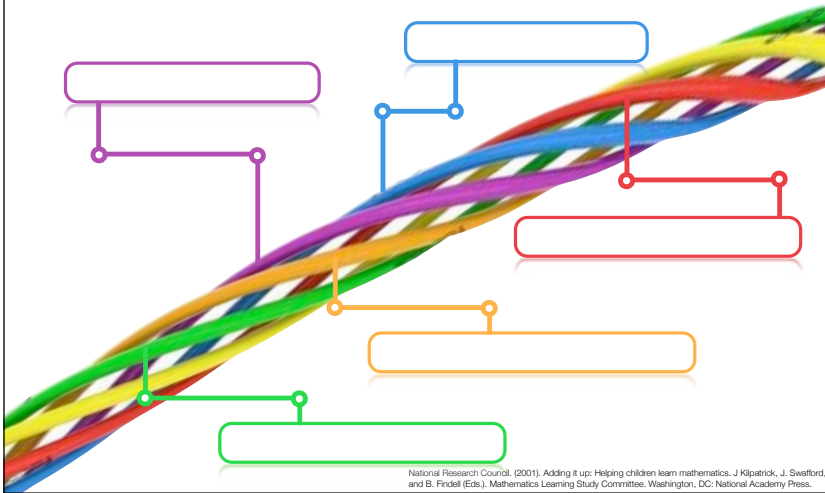




## ATTRIBUTES OF STATISTICAL PROFICIENCY



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## REASONING AND SENSE MAKING

“Reasoning and Sense Making are the foundations for the processes of mathematics...”

...teachers must *judiciously select tasks* that require students to figure things out for themselves and ask *probing questions*.”



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## REASONING AND SENSE MAKING

“Assessment that focuses primarily on students’ abilities to...perform basic statistical computations will lead students to believe that reasoning and sense making are not important... We must ask students to explain their thinking.”

NCTM Focus in High School Mathematics: Reasoning and Sense Making



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## FREE RESPONSE QUESTIONS

“Statistics is a discipline in which clear and complete communication is an essential skill.

The free-response questions require students to use their analytical, organizational, and communication skills to formulate cogent answers.”

Students must...



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## FREE RESPONSE QUESTIONS

Relate two or more different content areas...as they formulate a complete response or solution to a statistics problem.

**Conceptual Understanding**

Demonstrate their mastery of statistics in a format that permits them to determine how they will organize and present each response.

**Clear Communication**

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## WHAT HAVE WE LEARNED AS READERS?



- ✓ AP FRQ's are **QUALITY** assessment items.
- ✓ **COLLABORATION** is critical for success.
- ✓ There are 4 things that will maximize a student's score on a Free Response Question.

- 1.
- 2.
- 3.
- 4.



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## Part 2:

- ✓What is Formative Assessment?
- ✓Strategies of Assessment for Learning
- ✓The Purpose of the FRAPPY



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## WHAT IS FORMATIVE ASSESSMENT?

How do we increase Conceptual Understanding and Communication Skills {ie. Statistical Proficiency}?

**Formative Assessment**  
Formal and informal \_\_\_\_\_  
teachers AND students use to gather  
evidence for the \_\_\_\_\_.



Stiggins, R., (2006) Classroom Assessment for Learning.  
Assessment Training Institute, Educational Testing Service, Portland, Oregon.

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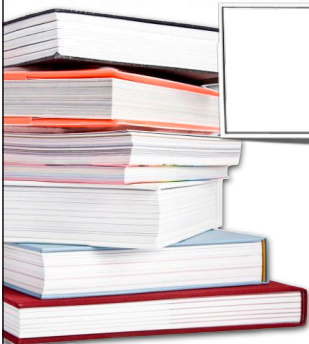
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## STRATEGIES OF ASSESSMENT FOR LEARNING



Chappuis, J., (2009) Seven Strategies of Assessment for Learning.  
Assessment Training Institute, Educational Testing Service, Portland, Oregon.

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## ...NOT ROCKET SCIENCE

To improve, students must:

- ✓ Know what good work looks like
- ✓ Compare their work to that standard



The **POWER** is in the INTENTIONAL,  
STUDENT-INVOLVED use of FRAPPYs as  
LEARNING TOOLS!

Sadler, R. - Presented by Rick Stiggins  
Assessment Training Institute

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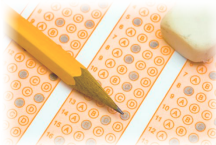
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## THE PURPOSE OF THE FRAPPY

- Important Note #1: We over-TEST our kids.



- Important Note #2: AP Statistics is **NOT** a test-preparation course.



*The primary intent of the FRAPPY process is NOT to prepare for the AP exam or assign grades...*

*...its purpose is to help develop students' conceptual understanding and communication skills.*

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## Part 3:

### The FRAPPY Process

- ✓ Step 1
- ✓ Step 2
- ✓ Step 3
- ✓ Step 4
- ✓ When Should I FRAPPY?



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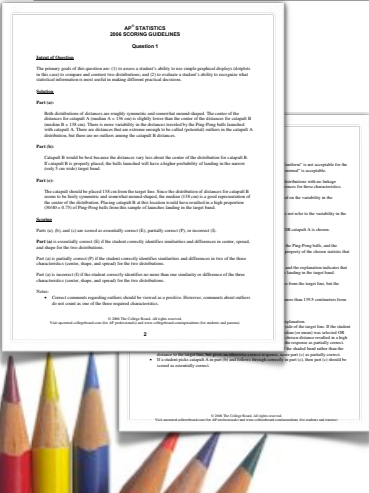
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# WHERE AM I NOW?

# STEP 3



- \_\_\_\_\_ Rubric/Scoring Guideline
- \_\_\_\_\_ Intent of Question
- \_\_\_\_\_ “model solution” for each part
- \_\_\_\_\_ your papers with a partner
- Each part receives
- **Essentially Correct,**
- **Partially Correct, or**
- **Incorrect**
- \_\_\_\_\_ 1–4 score using a holistic approach

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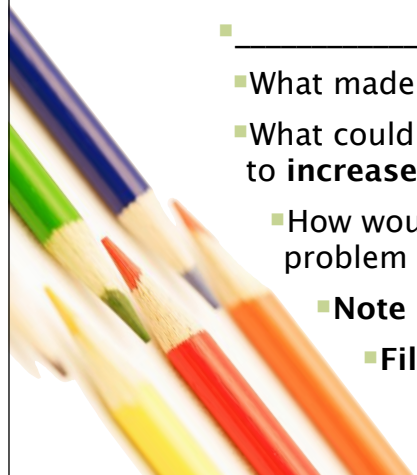
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# HOW CAN I CLOSE THE GAP?

# STEP 4



- \_\_\_\_\_ is critical
- What made each part an E, P, or I?
- What could you have done differently to **increase** your score?
  - How would you approach a similar problem in the future?
  - **Note** key items on your FRAPPY.
  - **File** for Review and Prep.

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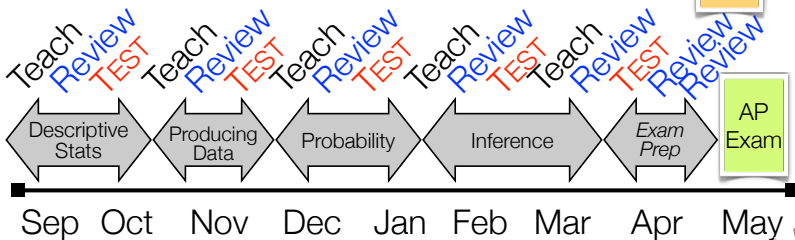
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# WHEN SHOULD YOU FRAPPY?

FRQs as “Test Preparation”



Sep Oct Nov Dec Jan Feb Mar Apr May




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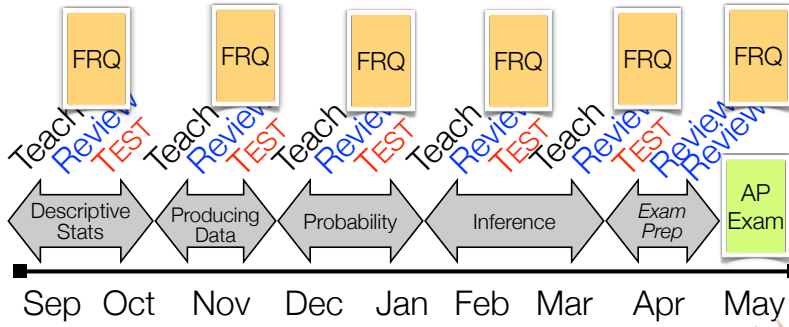
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# WHEN SHOULD YOU FRAPPY?

## FRQs as Formative Assessment



FRAPPY early. FRAPPY often.

## RESOURCES



- Past Free Response Question and Student Samples

[http://apcentral.collegeboard.com/apc/members/exam/exam\\_information/8357.html](http://apcentral.collegeboard.com/apc/members/exam/exam_information/8357.html)



- StatsMonkey Resource Clearinghouse, FRAPPYs

<http://web.mac.com/statsmonkey/>



- Pearson Assessment Training Institute

<http://www.assessmentinst.com/>



- NCTM Focus in High School Mathematics, Assessment Handbook

<http://www.nctm.org/>



## CONCLUDING THOUGHTS

**"Innovations that include strengthening the practice of formative assessment produce significant and often substantial learning gains."**

Black & William, "Inside the Black Box: Raising Standards Through Classroom Assessment."

