

**PVPHS AVID Juniors
SAT/ACT Prep
2017/2018**



**STUDY HUT
TUTORING**

**Packet #7: ACT Science
Part A**

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ACT Science Passage Topics

Biology: Botany, Cell Biology, Ecology, Evolution, Genetics, Microbiology, Zoology

Chemistry: Acids and Bases, Biochemistry, Kinetics and Equilibria, Nuclear Chemistry, Organic Chemistry, Thermochemistry

Physics: Electromagnetism, Fluids, Mechanics, Optics, Solids, Thermodynamics

Earth/Space Sciences: Astronomy, Environmental Science, Geology, Meteorology, Oceanography

Science Reasoning Skills and Applications

Graphs/Tables/Diagrams:

Understand different types of graphs:

bar, line, pie, scatter, combination

Utilize information in keys

Utilize axis scale, labels and units

Note data type: distance/rate/volume

Understand dual-axis graphs

Interpret multiple datasets in one plot

Sketch graph from table

Interpret diagrams

Data Representation:

Find information in graphs/tables/diagrams

Relate diagrams to data presented

Dependent/independent variables

Recognize direct/inverse variation

Identify trends in data

Correlate data in different formats

Compare new data with existing data

Extrapolate/interpolate

Research Summaries:

Identify hypotheses being tested

Recognize assumptions being made

Understand experimental design

Assess strength/weakness of experimental design

Identify controls and variables

Compare experiments

Understand analyses

Make conclusions

Interpret new information in context

Consider changes in experimental design

Make predictions and new hypotheses

Conflicting Viewpoints:

Compare disparate interpretations of data

Identify strengths/weaknesses of arguments

Make note of logic holes in arguments

Critically evaluate hypotheses

Consider new information

Assess validity of conclusions



Strategy & Tips for ACT Science



1. Know where to look.

The most important part of doing well on the ACT Science section is knowing *where to look* for the correct answer. Watch for these important phrases that will guide you to your answer:

"Based on Table 1..." "Based on Figure 2..." Etc.

Passages will often tell you where to look for the answer. It's not a trick. Look there.

"Based on the results of the study..."

This generally means you'll find the answer in the data, not the text of the passage.

"Based on the study..."

This generally means you'll find the answer in the text of the passage, not the tables or figures.

"Based on the passage/text/information provided..."

This generally means you'll find the answer in the text of the passage, not the tables or figures.

2. Know what to look for.

There's a reason why it's a bad idea to go grocery shopping when you're hungry: you'll buy a bunch of junk that's not on your list. For the same reason, you should never let your eyes wander around the page aimlessly. If you do, you'll be more likely to waste time and fall for a trap answer. Instead, use these indicators to determine what you're looking for:

The Answer Choices

Look for words or phrases that are repeated in the answer choices.

Units of Measurement: distance, temperature, energy, mass, pressure, etc.

If a question mentions a unit of measurement, you can usually zero in on your answer by finding that unit of measurement in the figure or table that features that measurement.

Science Jargon

If a question features some science jargon, then the answer is often found near that same jargon in the passage.

The Axes Labels

These are an especially good spot to start for problems that ask about trends in the data.

3. Forget the numbers. Pay attention to the trends in the data.

You can't use a calculator on the Science section of the ACT. That's because you don't need one. You don't have to mess with numbers. You don't even need to know numbers for the most part. You only need to know the *trends in the numbers*.

For example, it's more important that you know whether pressure went up or down over time than what the pressure was at the 2-minute mark.

4. Don't do the math. Estimate.

The answer choices are never designed to require you to calculate your answer. A decent estimate will almost always do the job. For example, if you can see from the data that a value doubled from 4.98667cm, don't do the math. Just select the answer that's closest to 10 and move on.

5. Mark up tables and figures.

Many questions will ask you to extrapolate or interpolate based on the data.

To extrapolate, just extend the line off the chart or add another box to the table to predict what the value you are asked to find will be at that point. Make sure you don't deviate from the trend. For example, don't draw a linear increase at the end of a graph that shows an exponential increase.

To interpolate, simply find the range for your answer by identifying the points on either side of that answer. For example, if you're asked to find the temperature of a liquid at 11-minutes and was recorded as 80°C at 10 minutes and 84°C at 12 minutes, then your answer should fall between 80°C and 84°C.

6. Replace complicated jargon with simpler words.

This section is riddled with specialized terminology, or jargon. These words are *italicized* the first time they are used in a passage. Usually, you can use the context to figure out the meaning of these words. For example, a passage may mention the *Aedes aegypti* in one sentence and then describe it as a mosquito in the next. Just think "mosquito" each time you see the jargon in the passage.

If that doesn't work, try re-reading the sentence using the word "blank" or "x" in place of the word you don't recognize. You'll be surprised how well this actually works!

The ACT "Science" Test

... isn't really a Science Test!

- The Science Reasoning Section combines reading comprehension with technical diagrams and simple math. Basically, this means you'll need to be able to interpret a lot of charts, graphs, and tables. These are skills you that a good scientist should have, but they require no scientific knowledge.
- Very few questions – three or so per test – require any outside knowledge at all. Those that do typically only require simple scientific knowledge. For example, you might be asked a question that requires you to know that heating a gas causes it to expand. Simple, right?
- As a result, your prep for the ACT Science section should not include spending time memorizing scientific knowledge. Quite frankly, there are better ways to spend your ACT prep time.
- ACT Science Passages and problems are not intended to trick you. Generally, the passages are written straightforwardly with very little superfluous information.
- You will encounter some scientific jargon, but it is usually italicized and can be understood if you consider the context.
- Given that you've got to answer 40 questions in just 35 minutes, the most difficult part of the ACT Science section is managing your time. Be sure to practice your pacing as you work through the passages in this section.



Prepare to be short on time!

- 40 questions in 35 minutes = not a whole lot of time per question.
- Practice completing passages in around 5 minutes.
- NEVER leave a question blank! There is no penalty for wrong answers. Be sure that you have bubbled in an answer for every single question before time is called.
- Use the process of elimination before you make an educated guess. Even if you can only exclude one answer, you're still better off.
- Guessing blindly to finish a section? Pick ONE pair of letters (A/F, B/G, C/H, D/J, E/K) and stick with it.



If you get stuck on a problem, bubble in a guess and move on. Be sure to answer or guess on all the problems for one passage before moving on to the next one.

ACT Science problems don't get easier when you return to a passage in a hurry. Plus, you'll have to refamiliarize yourself with the passage after thinking about a different one.

SOCIAL SCIENCE: Passage A is adapted from a news article on sociological jurisprudence. Passage B is taken from the archives of the International Spy Museum in Frankfurt, Germany.

Passage A

On June 19, 1953, Julius Rosenberg and his wife, Ethel, were electrocuted at Sing Sing prison in New York. Their crime: espionage. Julius claimed the case was a political frame-up, while Ethel refused to answer questions throughout the proceedings. Nevertheless, Judge Irving Kaufman described their work as Russian spies as “worse than murder,” asserting that the pair had “altered the course of history” by enabling the Russians to perfect the atomic bomb years sooner than would have been possible without the information stolen by the Rosenbergs.

The path authorities followed to the Rosenbergs originated with one Klaus Fuchs, a nuclear physicist at Los Alamos Laboratory who was conducting research on the plutonium bomb. Fuchs, a spy who had once been a member of the Young Communist League, identified as his courier an individual named Harry Gold. Upon Gold's arrest, he confessed to his collusion with Fuchs and identified a third man, David Greenglass, as another source of secret information. Greenglass, Ethel Rosenberg's brother and a machinist working on the Manhattan Project developing the atomic bomb, pointed the finger at Julius Rosenberg as his recruiter.

Authorities determined that Julius Rosenberg had started spying while working at Emerson Radio, producing military guidance systems and fuses manufactured for the War Department, between 1940 and 1945. Over the course of several years, he supplied the Russians with thousands of classified documents and recruited multiple additional spies to the effort. Ethel Rosenberg was implicated by her sister-in-law, Rose Greenglass, who reported that Ethel had typed up David's notes, which Julius then passed on to the Russians. Ethel remained silent throughout the investigation and trial, and her brother initially refused to speak against her, but he eventually joined his wife in testifying to Ethel's role as a transcriptionist. All of these conspirators were affiliated with the Young Communist League, further proving their connections to one another.

International outrage at the death sentence was spearheaded by such luminaries as Pope Pius XII, renowned artist Pablo Picasso, acclaimed novelist Dashiell Hammett, and Nobel Prize winners Albert Einstein and Jean-Paul Sartre; however, U.S. President Dwight Eisenhower refused to stay the Rosenbergs' execution. In spite of these protests, the courts' ruling and President Eisenhower's position were widely accepted as appropriate and in the best interests of American security.

Passage B

Judge Kaufman, in condemning both Julius and Ethel Rosenberg to death for espionage, was influenced by American anti-communist hysteria. Historians now regard the conviction of Julius Rosenberg as factually accurate, however unjustly obtained. Ethel's conviction, on the other hand, has become increasingly controversial in the years since her execution.

The evidence against Ethel Rosenberg was always weak, hinging on her association with the Young Communist League – an organization which was never conclusively linked to espionage – and the testimony of her brother, David Greenglass, and his wife, Ruth. Ethel's refusal to testify was interpreted at the time as an attempt to avoid incriminating herself; however, released records now show that Ethel stood silent in order to protect her husband.

Specifically, grand jury testimony reveals that David Greenglass initially testified that he “never spoke to my sister about this at all.” This is a stark contrast to his testimony at the trial itself, when he implicated Ethel, claiming that she had participated in two separate meetings by typing notes to be passed to Russian spies. Many years later, Greenglass admitted to perjuring himself at his sister's trial, defiantly stating, “I would not sacrifice my wife and my children for my sister.”

United States prosecutors have even recognized publicly the weakness of their case against Ethel Rosenberg. An assistant attorney general told the Federal Bureau of Investigation that they had “insufficient evidence” to charge her, but proceeded anyway in order to pressure her husband into cooperating. In an interview shortly before his death, U.S. Attorney General William Rogers acknowledged that prosecutors never intended to put the couple to death – instead, they believed that Ethel's loyalty to her young children would supersede her loyalty to her husband or to the Soviet Union. When asked, then, why things turned out as they did, his response was chilling: “She called our bluff.”

In light of this new evidence, the two children of Julius and Ethel Rosenberg, Michael and Robert Meeropol – their surname is that of their adoptive parents – launched a campaign to have their mother exonerated. Their efforts reached a major milestone on September 28, 2015 (Ethel's 100th birthday), when members of the New York City Council and the Manhattan Borough President issued proclamations condemning Ethel Rosenberg's unjust conviction and execution. While the brothers continue their quest for a federal exoneration, it is clear that history views this episode through a different lens than that through which it was initially painted.

Questions 1-4 ask about Passage A.

1. Which of the following statements best characterizes the evidence gathered against the Rosenbergs?
 - A. It was comprised of eyewitness testimony and largely based upon confessions from the Rosenbergs themselves.
 - B. It primarily consisted of information provided to investigators by courier Harry Gold.
 - C. It was built on a combination of statements from the Rosenbergs' accomplices and reports of their membership in a suspicious organization.
 - D. It was supported by notes intercepted from Ethel Rosenberg concerning David Greenglass's work on the Manhattan Project.
2. Of the following individuals, which most directly connected investigators to Julius Rosenberg?
 - F. Harry Gold
 - G. David Greenglass
 - H. Dwight Eisenhower
 - J. Ethel Rosenberg
3. As it is used in line 41, the word *luminaries* refers to individuals who are:
 - A. upheld as paragons of excellence within their fields.
 - B. well known as left-wing agitators.
 - C. established as prolific authors.
 - D. respected as political thought leaders.
4. The summary of Judge Kaufman's statements in lines 6-11 primarily serves to:
 - F. define the specific charges levelled against the Rosenbergs.
 - G. chastise the Rosenbergs for refusing to testify.
 - H. corroborate Julius Rosenberg's claim that he had been wrongly convicted.
 - J. emphasize the gravity of the Rosenbergs' crimes.

Questions 5-7 ask about Passage B.

5. According to Passage B, the evidence against Ethel Rosenberg is now considered "insufficient" for each of the following reasons EXCEPT:
 - A. The Young Communist League was never found to have connections to spy activity.
 - B. Although he confessed to his own involvement, Julius Rosenberg maintained his testimony that his wife was innocent.
 - C. Ethel Rosenberg never confessed or made any type of incriminating statements regarding her participation in the scheme.
 - D. David Greenglass's testimony at trial was inconsistent with his sworn statements in front of the grand jury.
6. The primary purpose of the last paragraph in Passage B is to:
 - F. praise the actions of the New York City Council and Manhattan Borough President in proclaiming the wrongful nature of Ethel Rosenberg's conviction and execution.
 - G. pressure federal authorities to issue a formal exoneration of Ethel Rosenberg from the charges of espionage.
 - H. describe the Rosenberg children's efforts to clear their mother's name.
 - J. recognize the significance of the Rosenberg children's adoptive parents in shaping the Rosenbergs' legacy.
7. According to the passage, the statement "She called our bluff," (line 87) most likely refers to:
 - A. Prosecutors' belief that threatening Ethel Rosenberg with the death penalty would convince her to testify against her husband.
 - B. William Rogers' surprise that Ethel Rosenberg did not believe that her brother could be persuaded to testify against her.
 - C. The strategy Russian agents used to recruit Ethel Rosenberg to join her husband as a spy.
 - D. Ruth Greenglass's refusal to respond to questioning before or during the trial.

Questions 8-10 ask about both passages.

8. A similarity between the two passages is that they both:
- F. suggest that David Greenglass committed perjury in testifying against his sister.
 - G. acknowledge the controversy around the Rosenbergs' conviction and execution.
 - H. highlight the sentencing judge's convictions regarding the severity of the Rosenbergs' crimes.
 - J. call attention to the incomplete evidence used to convict Ethel Rosenberg.
9. Harvard Law Professor Alan Dershowitz has been quoted as saying that the Rosenbergs were "guilty – and framed." This statement is most consistent with which passage?
- A. Passage A, because it presents the clear line of evidence that prosecutors used to demonstrate the Rosenbergs' guilt.
 - B. Passage A, because it references the protests that took place at the time of the convictions and sentencing.
 - C. Passage B, because it explains that Ethel proved more loyal to her young children than to her husband or the Soviet Union.
 - D. Passage B, because it demonstrates the ways the prosecution moved forward with its case despite recognizing that the evidence was inadequate.
10. One way in which Passage A differs from Passage B is that Passage A names the:
- F. date on which New York City officials publicly acknowledged Ethel Rosenberg's innocence.
 - G. reason David Greenglass gave to explain his changed testimony.
 - H. profession of each collaborator named in the scheme.
 - J. federal judge who handed down the Rosenbergs' sentence.