



WHAT IS RESEARCH?

LET'S PRETEND THAT YOU'RE WALKING DOWN THE STREET AND SOMEONE STANDING ON THE CORNER TELLS YOU THAT HE HAS SOME IMPORTANT INFORMATION FOR YOU. "AN ASTEROID IS GOING TO HIT THE EARTH IN THREE DAYS," HE SAYS. HE HANDS YOU A FLYER THAT SAYS A NUMBER OF PROMINENT SCIENTISTS HAVE CONFIRMED IT.

SO WHAT DO YOU DO NEXT? DO YOU IGNORE HIM? RUN FOR COVER? BUY ASTEROID INSURANCE?

YOU FIGURE THAT BEFORE YOU MAKE ANY DECISIONS, YOU SHOULD PROBABLY DO SOME RESEARCH. AFTER A BASIC INTERNET SEARCH, HOWEVER, YOU DISCOVER A LOT OF CONFLICTING INFORMATION, AND YOU'RE NOT SURE WHOM TO BELIEVE.



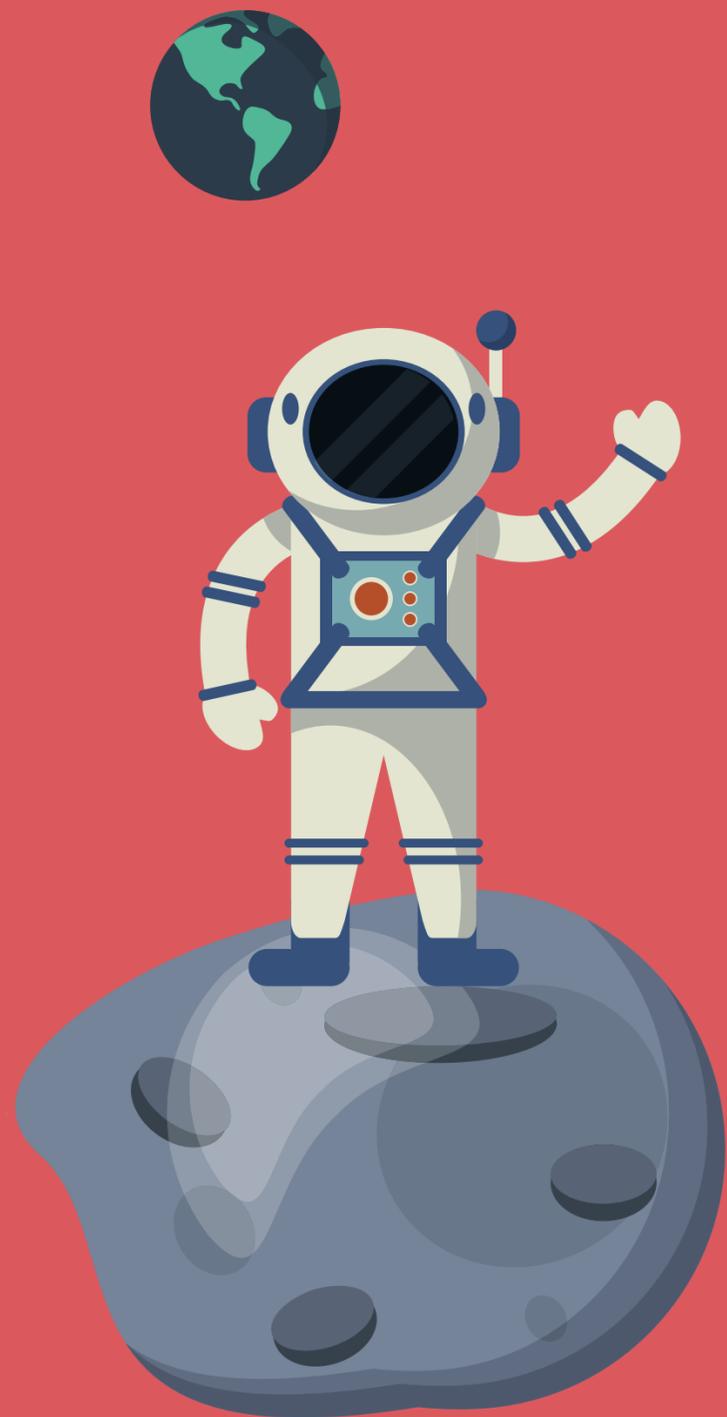
TEXT FROM "BEYOND PLAGIARISM" ON U MICH SWEETLAND CENTER FOR WRITING RESOURCE PAGE.

FOR EXAMPLE, THE WIKIPEDIA PAGE ON ASTEROIDS TELLS YOU WHAT AN ASTEROID IS, BUT NOT WHETHER ONE IS GOING TO HIT IN THREE DAYS. YOU FIND A BLOG POST FROM SOMEONE WHO WARNS OF AN ASTEROID STRIKE IN THREE YEARS, NOT THREE DAYS. ANOTHER WEBSITE, WWW.BACKYARDBOMBSHELTERS.COM, WARNS OF A STRIKE IN TWELVE DAYS AND HAS A SALE ON A PARTICULAR BRAND OF BOMB SHELTER.

A BLOG POST BY SOMEONE CLAIMING TO BE A “SEMI-PROFESSIONAL SCIENTIST” REFUTES ALL CLAIMS ABOUT ASTEROID STRIKES. YOU FIND A FEW BOOKS ABOUT ASTEROID STRIKES THAT INITIALLY SEEM PROMISING, BUT ON CLOSER INSPECTION YOU REALIZE THESE ARE FICTION, AND THEY ARE MOSTLY ABOUT POST-ASTEROID ZOMBIE ATTACKS. THIS SEARCH HAS MADE YOU MORE CONFUSED THAN EVER!



TEXT AND IMAGES FROM "BEYOND PLAGIARISM" ON U MICH SWEETLAND CENTER FOR WRITING RESOURCE PAGE.



YOU REALIZE YOU HAVE TO FIGURE OUT WHO THE FOREMOST EXPERT ON ASTEROIDS IS SO THAT YOUR INFORMATION COMES FROM AN AUTHORITATIVE SOURCE. AFTER LIMITING YOUR SEARCH TO NEWS SITES WITH RECENT ARTICLES ON ASTEROIDS, YOU FIND AN NYT PROFILE OF A PROMINENT SCIENTIST WHO HAS PUBLISHED IN ACADEMIC JOURNALS ON THIS TOPIC. THIS MEANS THAT THE SCIENTIST NOT ONLY HAS THE DEGREE SHE CLAIMS TO HAVE, BUT ALSO THAT HER SCIENTIFIC WORK IS WELL RESPECTED AMONG A COMMUNITY OF PEOPLE WITH SIMILAR QUALIFICATIONS. SO YOU GO TO YOUR UNIVERSITY LIBRARY'S WEBSITE, ACCESS AN ACADEMIC DATABASE LIKE WEB OF SCIENCE, AND SEARCH FOR THAT SCIENTIST'S NAME. TEN ACADEMIC ARTICLES COME UP, TWO OF WHICH ARE ABOUT ASTEROID STRIKES. ONE IS FROM 1972, AND THE OTHER IS FROM 2013. YOU DOWNLOAD AND READ BOTH OF THEM. YOU GO BACK TO THE FLYER AND REALIZE THAT THE FLYER IS CITING A FEW FACTS TAKEN OUT OF CONTEXT FROM THE 1972 ARTICLE. THE 2013 ARTICLE LARGELY REFUTES THEM THANKS TO NEW DATA THAT THE SCIENTIST HAS COLLECTED OVER THE LAST 40 YEARS. READING ALL OF THIS HELPS YOU DETERMINE THAT THE FLYER IS NOT A USEFUL SOURCE WITH WHICH TO PREDICT A FUTURE ASTEROID STRIKE. YOU ARE SAFE!

ONLINE AND DATABASE IS ONE KIND OF RESEARCH, BUT THERE ARE A LOT OF OTHERS-- AND PART OF THE JOB OF A RESEARCHER (YOUR JOB) IS FIGURING OUT WHAT IS MOST USEFUL FOR THE PROJECT AHEAD OF YOU. THESE THINGS ALL COUNT AS RESEARCH:

INTERVIEWS!



**ANALYZING MEDIA
(LIKE TV AND VIDEO)**



**READING BOOKS AND
ARTICLES!**



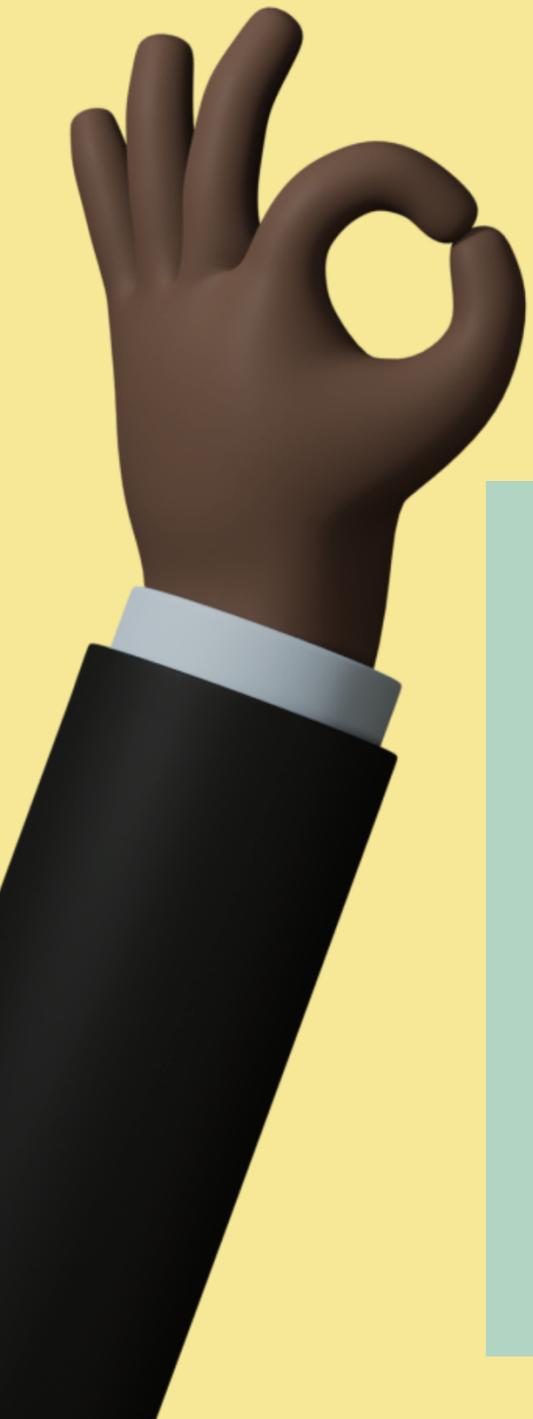
THINGS LIKE TASTE TESTS AND SCIENCE EXPERIMENTS ALSO COUNT AS RESEARCH, THOUGH THEY MAY NOT FIT WITH THIS PROJECT.

WHAT KIND OF SOURCE DO YOU NEED?

TERTIARY SOURCES ARE OVERVIEW SOURCES, LIKE DICTIONARIES OR ENCYCLOPEDIAS (LIKE WIKIPEDIA.)

TERTIARY SOURCES PROVIDE YOU WITH BASIC INFORMATION THAT YOU MIGHT NEED TO PROCEED WITH YOUR PROJECT, AND THEY CAN HELP YOU HONE YOUR RESEARCH QUESTION. OFTEN THEY CAN ALSO LEAD YOU TO OTHER VALUABLE SOURCES. MOST LIKELY, YOU'LL BEGIN WITH THIS BROAD OVERVIEW BUT LATER DRILL DOWN INTO SOMETHING MORE SPECIFIC.

WIKIPEDIA IS CROWD-SOURCED, WHICH MEANS THAT ANYONE—ANYONE!—CAN CHANGE AND EDIT ENTRIES. USUALLY PEOPLE EDIT ENTRIES TO MAKE THEM MORE ACCURATE, BUT SOMETIMES PEOPLE DO SO AS A JOKE. AND SOMETIMES EVEN FACTUALLY ACCURATE ENTRIES ARE POORLY ORGANIZED OR POORLY WRITTEN. WIKIPEDIA CAN BE A USEFUL PLACE TO START, THOUGH, BECAUSE IT CAN GIVE YOU GENERAL BACKGROUND ON A TOPIC. ALSO, SINCE THE STRONGEST WIKIPEDIA ENTRIES REFERENCE THE INFORMATION THEY USE, THEY CAN POINT YOU TO OTHER, MORE TRUSTWORTHY SOURCES. LOOK AT THE LIST OF CITATIONS AT THE BOTTOM OF AN ARTICLE: DO ANY OF THE LISTED SOURCES SEEM USEFUL TO YOU? IT'S ALWAYS BETTER TO EXAMINE MULTIPLE SOURCES INSTEAD OF RELYING ON ONE SOURCE ALONE.

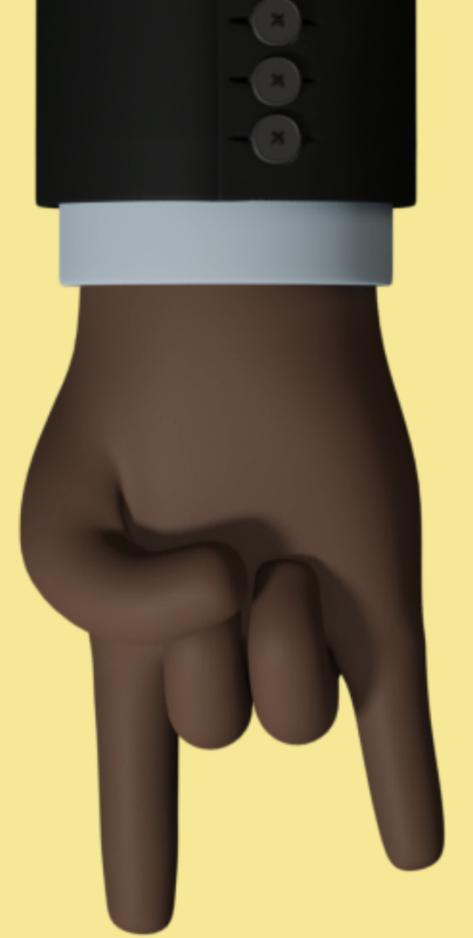


SECONDARY SOURCES!

DO YOU NEED ANALYSIS THAT SYNTHESIZES MULTIPLE FIRST-HAND ACCOUNTS AND THE WORK OF MULTIPLE SCHOLARS?

SECONDARY SOURCES USUALLY ANALYZE RAW DATA AND PRESENT CONCLUSIONS ABOUT IT. BEFORE YOU CAN TRUST THOSE CONCLUSIONS, YOU HAVE TO KNOW WHETHER OTHER EXPERTS ON THIS TOPIC WOULD VIEW THEM AS REPUTABLE. THIS ISN'T THE SAME AS AGREEING OR DISAGREEING WITH THE AUTHOR'S CONCLUSIONS. BEFORE YOU CAN EVEN GET TO THAT POINT, YOU HAVE TO KNOW THAT THE CONCLUSIONS WERE REACHED BY SOMEONE WHO HAS ENOUGH EXPERTISE TO DRAW VALID CONCLUSIONS ON THIS TOPIC.

THAT'S WHAT THE PERSON DID IN EVALUATING THE METEOR RESEARCH IN THE FIRST FEW SLIDES. WE HAVE TO MAKE CHOICES ABOUT WHO WE SHOULD LISTEN TO-- AND WHY.



PRIMARY SOURCES!

IF YOUR PROJECT REQUIRES FIRST-HAND EXPERIENCE OR RAW DATA, YOU'LL WANT TO LOOK AT PRIMARY SOURCES. PRIMARY SOURCES WERE GENERALLY CREATED AT THE TIME THAT PEOPLE EXPERIENCED AN EVENT. IN THE SCIENCES, THEY INCLUDE DATABASES AND EXPERIMENT RESULT DATA. IN THE HUMANITIES, THEY INCLUDE LETTERS, DIARIES, NEWSPAPER ACCOUNTS, INTERVIEWS, POEMS, NOVELS, VISUAL ART, AND MOVIES.

I'M NOT SAYING PRIMARY SOURCES ARE BETTER THAN SECONDARY OR TERTIARY-- THEY JUST ALL DO DIFFERENT THINGS! THINK ABOUT WHAT YOU WANT FROM YOUR RESEARCH.



DON'T JUST LOOK FOR SOURCES THAT AGREE WITH YOU!

ONE OF THE REASONS THAT WE DON'T HAVE YOU START WITH A THESIS STATEMENT BUT WITH A QUESTION IS BECAUSE WE WANT YOU TO DISCOVER INFORMATION THAT MAY SURPRISE YOU. SOMETIMES WHEN WE START WITH A THESIS, WE ARE JUST TRYING TO PROVE THAT THESIS RIGHT. THIS DOESN'T MEAN YOU WON'T GET TO A MAIN POINT EVENTUALLY, IT JUST MEANS YOU'LL BE VERY WELL-INFORMED BY THE TIME YOU GET THERE.

THOSE YOU DISAGREE WITH CAN (AND OFTEN SHOULD) BE YOUR SOURCES TOO. IF YOU IGNORE MAJOR INFORMATION BECAUSE IT DISPUTES YOUR CLAIMS, YOUR CLAIMS DON'T END UP LOOKING VERY CREDIBLE. IT IS WORTH YOUR TIME TO UNDERSTAND WHAT ALL SIDES ARE SAYING ON YOUR ISSUE.

