Guiding Questions use by WWU; please modify to fit your institution.

i. What programs, policies, and practices of WWU and organizations/institutions connected to WWU are currently supporting underrepresented students in becoming STEM teachers?

ii. What do the demographics of WWU's graduating STEM teacher candidates look like, and how do they compare to:

1) WWU's graduating STEM students
2) WWU's overall student body
3) Whatcom and Skagit counties' K-12 student population
4) WA state's K-12 student population

And how have the demographics of each of these populations changed over the past 10 years?

iii. What are potential barriers to underrepresented students becoming STEM teachers through WWU programs?

iv. What are current WA state needs for diverse STEM teachers? Do these needs differ by region and/or by specific STEM endorsement?

Questions within Guiding Questions:

i. What programs, policies, and practices of WWU and organizations/institutions connected to WWU are currently supporting underrepresented students in becoming STEM teachers?

Questions used to identify programs, policies, and practices to look into:

a. What evidence is there of a long-term commitment to enhancing the representation of minoritized* communities in STEM/STEM teaching? For example, is there language in strategic planning documents or college or school district missions statements that reflect such a commitment? If not, what is a plan to include such language? How is this showing up through various stakeholders? IHE's? Schools? Districts? Partners? Others? What voices/stakeholders are missing?

    *minoritized: racial, ethnic, religious, or social subdivision of a society that is subordinate to the dominant group in political, financial, or social power without regard to the size of these groups

b. In addition to articulating long-term commitments and outreach efforts, how else do you listen and act upon minoritized student voices in teaching, STEM, and STEM teaching? How is this showing up through various stakeholders? IHE's? Schools? Districts? Partners? Families? Others? What voices/stakeholders are missing?

c. What current pathways (traditional and alternative) exist specifically designed for minoritized students wanting to enter into the following, and how do you/might you listen and act upon minoritized student voices in the improvement and/or development of such programs?
d. How do you use research/data that informs your team's understandings about the policies, practices, and behaviors that enable or act as barriers for minoritized student access to and persistence in STEM/STEM teaching to challenge current norms, values, and beliefs that inform policies and practices that create barriers for minoritized groups in STEM and STEM teaching?
e. Do you know if minoritized students easily navigate your team's institutions, interactions with faculty and teachers, and interactions with staff? What evidence from student voices do you have of such strategies?
f. To what extent do our courses (e.g., methods) address issues of diversity and inclusion in STEM and prepare future teachers to work with diverse populations?
g. How do students currently learn about our programs in STEM teacher ed? To what extent are we already reaching diverse students?
h. Are there scholarships within SMATE and/or College of Education that specifically support minoritized students pursuing STEM teaching degrees?
i. NSTA student chapters play a key role in "belonging"? Is its membership diverse? What other events do we hold that bring STEM teaching students together as a community?
j. What are other mechanisms for early engagement/"marketing" of STEM teaching possibilities early in the college career (1st year) to provide clearer strands and pathways to the endorsement programs and reasons that the teaching career is worth considering? Example: Having an early pathway/interest would allow students to take the science education and math education series for science and math GURs rather than general science courses with less intentional and aligned pedagogies.
k. Do all of our students have an opportunity for a clinical placement in a highly diverse school?
l. At WWU, there are outreach units like Extended Education and Compass to Campus that serve underrepresented groups (Title I schools, international students, girls in STEM)-- to what extent are our students currently taking advantage of these opportunities to enhance their learning? Could these also serve as 'clinical' placements for STEM teaching?
m. In what ways do we currently learn about the experiences of our students, and particularly students from minoritized groups, regarding their experiences in our program? (Could the exit surveys of recent grads yield useful data?)

Questions asked of College of Education staff member to identify potential supports (guiding question i) and potential barriers (guiding question iii) for underrepresented students pursuing STEM teaching:

1. Who advises students not yet accepted into a Program, but are interested in a STEM teaching career?
2. Who advises students who have been accepted into College of Education and are pursuing either a STEM teaching endorsement or an elementary ed certification with a STEM major?
3. Are there any course maps for students who plan to get a STEM secondary ed endorsement? (ie a calendar that states which courses to take each quarter that includes GURs, major requirements, and endorsement requirements)
4. Are students interested in elementary education told about the option to major in earth science, general science, or math?
5. any other resources that are provided to students who are interested in becoming STEM teachers (such as information about alternative routes to get certified)?

Questions asked of a biology faculty member regarding curriculum changes made in 200 level (introductory) biology courses aimed at increasing the courses' student-centered learning:

1. To what extent have the 200-level courses been changed in the ways you mentioned below? (are all faculty teaching this way, is there a timeline for gradual changes?)
2. How are faculty incentivized to make these changes to their courses?
3. Is there a standard curriculum for the 200-level courses?
4. Has there been any data collected to determine if changes have improved student success?

Questions asked of a chemistry advisor and physics advisor to identify potential supports (guiding question i) and potential barriers (guiding question iii) for underrepresented students pursuing STEM teaching:

1. Who advises students who are pursuing a chemistry/physics teaching endorsement?
2. Do you know which degree they are suggested to do?
3. Are there any course plans that map out GURs, chemistry major requirements, and teaching endorsement requirements together?

Questions asked of two WWU undergraduates who developed and led STEM Inclusive Culture workshops to identify potential supports (guiding question i) and potential barriers (guiding question iii):

1. What were the goals of the workshop?
2. What impacts did the workshops have on:
    - The students who participated?
    - The culture of Western's STEM department?
3. What do you see the future of these workshops being? Is there any type of support that would make continuing these workshops more realistic?
4. Any questions for me or anything else you'd like to share about the workshops/other?

5. Any other input about support or barriers to underrepresented students pursuing STEM?
6. Do you think faculty and staff at Western are in agreement with students about what needs to be done to make STEM more inclusive?

Questions asked of a faculty member who was part of the College of Science and Engineering's Equity, Inclusion, and Diversity Committee to identify potential supports (guiding question i) and potential barriers (guiding question iii):

1. What input you have received from CSE students, staff and faculty regarding issues of equity, inclusion, and diversity?
2. What other work does the committee do that might be related?
3. What other work is being done in the math department that might be related?

Questions asked of several staff members of the Student Outreach Services (SOS) to identify potential supports (guiding question i) and potential barriers (guiding question iii):

1. What kind of supports and services does the SOS provide to students it serves?
2. Are there any barriers you have observed to be common amongst students you work with, particularly students pursuing STEM and/or teaching degrees?
3. Is there anything else you feel would be helpful to share with me?

Questions asked of a Whatcom Community College (WCC) transfer student advisor to identify potential supports (guiding question i) and potential barriers (guiding question iii) for WCC transfer students pursuing STEM teaching:

1. How does advising at WCC work? (how often, who does initial advising vs. advising for specific degree interests)
2. How well are advisers able to inform students about transferring to Western? (is information about required courses and transferable courses accessible)
3. How well would WCC's transfer degrees align with the various STEM teacher pathways?
    - Associate in Arts and Sciences (DTA)
    - Associate in Science (AST)
4. Are there any resources WCC provides to students interested becoming a STEM teacher? (scholarships, course pathways, club information, etc)
5. Do you have any suggestions for WCC programs, classes, staff, faculty I should look into or talk to that are relevant to the project?

Many other questions about supports were asked to many other WWU staff and faculty via email

ii. What do the demographics of WWU's graduating STEM teacher candidates look like, and how do they compare to:

1. ***WWU's graduating STEM students***
2. ***WWU's overall student body***
3. ***Whatcom and Skagit counties' K-12 student population***
4. ***WA state's K-12 student population***

And how have the demographics of each of these populations changed over the past 10 years?

Meaning behind guiding question: To what extent does the diversity among our future STEM teachers reflect the diversity of the university? Our community/state?

Request put in to WWU's Office of Institutional Research (OIR) and College of Education College of Education related to guiding question ii AND iii (in blue):
Going back to 2008, for each category, by year, disaggregate by

a. Pell-status
b. gender
c. race and
d. ethnicity
f. first-generation (yes/no)

STEM Undergraduates:

1. How many students graduated with a degree in (all undergraduate degrees that could reasonably lead to a STEM endorsement for secondary education and STEM elementary education undergraduate degrees):
2. From each of the above degrees, what was average number of credits earned by graduation:
    a. Total
    b. Earned at WWU
    c. Earned outside of WWU
3. How many of those students in the above degree categories transferred from a 2-year college?
    - Running Start and non-running start?
    - Which community colleges?
4. How many of these students failed (any grade below a C- or D or W or Z) a math class?
    - Which classes (M99, M112, M107, M114, M115, M118, M124, M125, M134, M156, M157)?
5. How many of these students failed (any grade below a C- or D or W or Z) any other class in Biology, Geology, Chemistry, Physics?

Secondary Education STEM endorsements:

Going back to 2008, for each category, by year, disaggregate by:

a. Pell-status
b. gender

c. race and
d. ethnicity
f. first-generation (yes/no)

6. How many students {disaggregate} graduated with one of the following secondary endorsements:
    a. Biology with option to add science
    b. Chemistry with option to add science
    c. Chemistry and Biology
    d. Chemistry and Mathematics
    e. Chemistry and Physics
    f. Earth and space science with option to add science
    g. Mathematics
    h. Middle level science
    i. Physics with option to add science
    j. Physics and mathematics

11. For each endorsement area, what was the number of credits earned by graduation?
12. How many of these students failed (any grade below a C- or D or W or Z) a math class?
    - Which classes (M99, M112, M107, M114, M115, M118, M124, M125, M134, M156, M157)?
13. How many of these students failed (any grade below a C- or D or W or Z) any other class in Biology, Geology, Chemistry, Physics?

Elementary STEM Degrees:

Going back to 2008, for each category, by year, disaggregate by:

a. Pell-status
b. gender
c. race and
d. ethnicity
e. zip code
f. first-generation (yes/no)

17. How many students {disaggregate} graduate with an elementary certificate (any)?
18. How many students graduate with an Elementary certificate and one of the following degrees:
    a. General science - Elementary, BAE
    b. Earth science - Elementary, BAE
    c. Math - Elementary, BAE
19. How many of these students transferred from a 2-year college?
    - Running start and non running start?
    - Which college?
20. What was time to degree? (how can this include years at a Community College?)
21. How many of these students failed (any grade below a C- or D or W or Z) a math class?

- Which classes (M99, M112, M107, M114, M115, M118, M124, M125, M134, M156, M157)?

22. How many of these students failed (any grade below a C- or D or W or Z) any other class in Biology, Geology, Chemistry, Physics?
23. What was the number of credits earned by graduation?

iii. What are potential barriers to underrepresented students becoming STEM teachers through WWU programs?

a. What research/data informs your team's understandings about the Policies, Practices, and Behaviors that enable or act as barriers for minoritized student access to and persistence in STEM/STEM teaching?
b. Do you know if minoritized students easily navigate your team's institutions, interactions with faculty and teachers, and interactions with staff? What evidence from student voices do you have of such strategies?
c. What assumptions are there about those aspirations, experiences, and assets of minoritized communities? How do you/might you listen and act upon minoritized student voices? How is this showing up through various stakeholders -- IHE's, Schools, Districts, Partners, Families, Others? What voices/stakeholders are missing?
d. To what extent do our courses (STEM introductory and science education) address issues of diversity and inclusion in STEM and prepare future teachers to work with diverse populations?
e. What is our overall retention rate for STEM teaching majors/certification? Does that rate differ for minoritized groups?
f. In what ways do we currently learn about the experiences of our students, and particularly students from minoritized groups, regarding their experiences in our program? (Could the exit surveys of recent grads yield useful data?)

Requests made to the Office of Institutional Research and College of Education, outlined in section ii, included requests for data that would identify barriers to underrepresented students pursuing STEM teaching degrees.

Questions asked of a chemistry advisor and physics advisor regarding program capacities:

1. Over the past 10 years, how many students do you accept into your program each year?
2. Over the past 10 years, how many students apply to your program each year?
3. If there is a cap on the number of students accepted into the program, what criteria are used to determine who is accepted?

4. What are the reasons for the cap? Do you foresee the program being able to expand in the next 10 years?

iv. What are current WA state needs for diverse STEM teachers? Do these needs differ by region and/or by specific STEM endorsement?

Request made to WA State Office of Superintendent of Public Instruction (OSPI) to answer this question:

- Total production of each of the following endorsements (Biology, Chemistry, Physics, Earth and Space Science, Science, Math, Middle Level Math, Middle Level Science) by Washington teacher training institutions from 2007-2018.
- Teacher attrition rates by endorsement (Biology, Chemistry, Physics, Earth and Space Science, Science, Math, Middle Level Math, Middle Level Science) from 2007-2018, disaggregated by educational service districts if possible.
- Emergency substitute certificate issuance, disaggregated by educational service district, for 2007-2018.
- The number of out of field teachers by core content area (Biology, Chemistry, Physics, Earth and Space Science, Science, Math, Middle Level Math, Middle Level Science) for 2007-2018, disaggregated by educational service districts.
- The number of inexperienced teachers by core content area (Biology, Chemistry, Physics, Earth and Space Science, Science, Math, Middle Level Math, Middle Level Science) for 2007-2018, disaggregated by educational service districts.
- The number of unqualified teachers by core content area (Biology, Chemistry, Physics, Earth and Space Science, Science, Math, Middle Level Math, Middle Level Science) for 2007-2018, disaggregated by educational service districts.