

DERIVED CONTEXT VARIABLES

Science Teacher Questionnaire – Grade 8

Derived Variable Name:

BTDSMSE

Variable Label:

Teachers Majored in Science and Science
Education

International Report Exhibits

Exhibits 5.1.12 – 5.1.13: Teachers Majored in Science and Science Education – Teachers' Reports

Procedure

Based on responses to the following questions in the Science Teacher Questionnaire:

TQG-04: What is the highest level of formal education you have completed? (BTBG04)

Response options: 1 = "Did not complete <Upper secondary education—ISCED Level 3>"

2 = "<Upper secondary education—ISCED Level 3>"

3 = "<Post-secondary, non-tertiary education—ISCED Level 4>"

4 = "<Short-cycle tertiary education—ISCED Level 5>"

5 = "Bachelor's or equivalent level—ISCED Level 6>"

6 = "Master's or equivalent level—ISCED Level 7>"

7 = "Doctor or equivalent level—ISCED Level 8>"

TQG-05a-i: During your <post-secondary> education, what was your major or main area(s) of study?

"Biology" (BTBG05B)

"Physics" (BTBG05C)

"Chemistry" (BTBG05D)

"<Earth Science>" (BTBG05E)

"Education—Science" (BTBG05G)

Response options: 1 = "Yes"

2 = "No"

Derive BTDSMSE:

1 = "Major in Science and Science Education" = IF ((BTBG05B = 1 OR BTBG05C = 1 OR BTBG05D = 1 OR BTBG05E = 1) AND BTBG05G = 1)

2 = "Major in Science but No Major in Science Education" = IF ((BTBG05B = 1 OR BTBG05C = 1 OR BTBG05D = 1 OR BTBG05E = 1) AND BTBG05G = 2)

3 = "Major in Science Education but No Major in Science" = IF ((BTBG05B = 2 AND BTBG05C = 2 AND BTBG05D = 2 AND BTBG05E = 2) AND BTBG05G = 1)

4 = "All other majors" = IF (BTBG05B = 2 AND BTBG05C = 2 AND BTBG05D = 2 AND BTBG05E = 2 AND BTBG05G = 2)

5 = "No formal education beyond upper-secondary" = IF (BTBG04 = 1 OR 2)

Otherwise, set to missing.

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- 1 = "Major in Science and Science Education"
 - 2 = "Major in Science but No Major in Science Education"
 - 3 = "Major in Science Education but No Major in Science"
 - 4 = "All other majors"
 - 5 = "No formal education beyond upper-secondary"
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Trend Comments

See BTDSMSE in TIMSS 2019.

Derived Variable Name:

BTDSBIO

Variable Label:

Percent of Students Taught Biology Topics

Procedure

Based on responses to the following questions in the Science Teacher Questionnaire:
 TQS-22Aa-Ap: The following list includes topics and concepts addressed by the TIMSS science test. Choose the response that best describes when each topic or concept is taught for students in this class.

If a topic or concept was in the curriculum before <eighth grade>, choose “Mostly taught before this year.” If you have taught a topic this year, choose “Mostly taught this year.” If a topic is not in the <eighth grade> curriculum for this year or you have not yet taught a topic, choose “Not yet taught.”

- “Defining characteristics of major taxonomic groups or organisms” (BTBS22AA)
- “Structures and functions of major organs and organ systems” (BTBS22AB)
- “How animals maintain stable body conditions” (BTBS22AC)
- “Major structures and functions in plant and animal cells” (BTBS22AD)
- “Basic processes of photosynthesis” (BTBS22AE)
- “Basic processes of cellular respiration” (BTBS22AF)
- “Life cycles of mammals, birds, amphibians, insects, and plants” (BTBS22AG)
- “Processes for reproduction and inheritance in plants and animals” (BTBS22AH)
- “How variation in traits relates to natural selection and changes in life on Earth over time” (BTBS22AI)
- “Interpreting food web diagrams and the flow of energy in ecosystems” (BTBS22AJ)
- “Cycling of water, oxygen, and carbon through ecosystems” (BTBS22AK)
- “Predation, competition, and symbiosis in ecosystems” (BTBS22AL)
- “How changes in an ecosystem affect the populations of organisms that live there” (BTBS22AM)
- “How human actions can positively or negatively impact the environment” (BTBS22AN)
- “How to prevent transmission of common diseases among humans” (BTBS22AO)
- “Importance of diet, exercise, and lifestyle choices for maintaining good human health” (BTBS22AP)

Response options: 1 = “Mostly taught before this year”
 2 = “Mostly taught this year”
 3 = “Not yet taught”

Derive BTDSBIO:

Step 1: Compute average percent for each topic area:

For each variable, compute the percent of students whose teachers selected 1 = “Mostly taught before this year” OR 2 = “Mostly taught this year.”

Step 2: Compute average percent for content domain:

Compute average across the topic area percentages from Step 1.

Set BTDSBIO to missing if three or more source variables are missing.

Trend Comments

See BTDSBIO in TIMSS 2019. Modifications were made to source variables in TIMSS 2023.

Derived Variable Name:

BTDSCHE

Variable Label:

Percent of Students Taught Chemistry Topics

Procedure

Based on responses to the following questions in the Science Teacher Questionnaire:

TQS-22Ba-Bj: The following list includes topics and concepts addressed by the TIMSS science test. Choose the response that best describes when each topic or concept is taught for students in this class.

If a topic or concept was in the curriculum before <eighth grade>, choose “Mostly taught before this year.” If you have taught a topic this year, choose “Mostly taught this year.” If a topic is not in the <eighth grade> curriculum for this year or you have not yet taught a topic, choose “Not yet taught.”

“Structure of atoms (i.e., protons, neutrons, electrons) and molecules” (BTBS22BA)

“Differences among elements, compounds, and mixtures” (BTBS22BB)

“How to interpret the periodic table of elements” (BTBS22BC)

“Classifying matter according to physical and chemical properties” (BTBS22BD)

“Methods for separating mixtures” (BTBS22BE)

“Solution concentration and rate of dissolving” (BTBS22BF)

“Properties of acids and bases” (BTBS22BG)

“Matter and energy in chemical reactions, including evidence of chemical change” (BTBS22BH)

“How to change the rate of chemical reactions” (BTBS22BI)

“Chemical bonds (e.g., role of electrons)” (BTBS22BJ)

Response options: 1 = “Mostly taught before this year”

2 = “Mostly taught this year”

3 = “Not yet taught”

Derive BTDSCHE:

Step 1: Compute average percent for each topic area:

For each variable, compute the percent of students whose teachers selected 1 = “Mostly taught before this year” OR 2 = “Mostly taught this year.”

Step 2: Compute average percent for content domain:

Compute average across the topic area percentages from Step 1.

Set BTDSCHE to missing if three or more source variables are missing.

Trend Comments

See BTDSCHE in TIMSS 2019. Modifications were made to source variables in TIMSS 2023.

Derived Variable Name:

BTDSPHY

Variable Label:

Percent of Students Taught Physics Topics

Procedure

Based on responses to the following questions in the Science Teacher Questionnaire:
 TQS-22Ca-Cm: The following list includes topics and concepts addressed by the TIMSS science test. Choose the response that best describes when each topic or concept is taught for students in this class.

If a topic or concept was in the curriculum before <eighth grade>, choose “Mostly taught before this year.” If you have taught a topic this year, choose “Mostly taught this year.” If a topic is not in the <eighth grade> curriculum for this year or you have not yet taught a topic, choose “Not yet taught.”

“Separation and motion of atoms/molecules in solids, liquids, and gases“ (BTBS22CA)

“Characteristics of matter and energy during state changes” (BTBS22CB)

“Types of energy (e.g., kinetic, potential, thermal) and examples of energy transformations” (BTBS22CC)

“Thermal conductivity and the transfer of thermal energy between objects of different temperatures” (BTBS22CD)

“Reflection, refraction, or absorption of light” (BTBS22CE)

“Characteristics of sound (i.e., amplitude, frequency) and its transmission, reflection, and absorption” (BTBS22CF)

“Electrical conductors and simple electrical circuits” (BTBS22CG)

“Polarity, strength, and uses of permanent magnets and electromagnets” (BTBS22CH)

“Speed as distance changing over time” (BTBS22CI)

“Acceleration as speed changing over time” (BTBS22CJ)

“Effects of common forces on speed and direction of motion” (BTBS22CK)

“Density and buoyancy” (BTBS22CL)

“Functioning of simple machines (e.g., levers, inclined planes, pulleys)” (BTBS22CM)

Response options: 1 = “Mostly taught before this year”

2 = “Mostly taught this year”

3 = “Not yet taught”

Derive BTDSPHY:

Step 1: Compute average percent for each topic area:

For each variable, compute the percent of students whose teachers selected 1 = “Mostly taught before this year” OR 2 = “Mostly taught this year.”

Step 2: Compute average percent for content domain:

Compute average across the topic area percentages from Step 1.

Set BTDSPHY to missing if three or more source variables are missing.

Trend Comments

See BTDSPHY in TIMSS 2019. Modifications were made to source variables in TIMSS 2023.

Derived Variable Name:

BTDSEAR

Variable Label:

Percent of Students Taught Earth Science Topics

Procedure

Based on responses to the following questions in the Science Teacher Questionnaire: TQS-22Da-DI: The following list includes topics and concepts addressed by the TIMSS science test. Choose the response that best describes when each topic or concept is taught for students in this class.

If a topic or concept was in the curriculum before <eighth grade>, choose “Mostly taught before this year.” If you have taught a topic this year, choose “Mostly taught this year.” If a topic is not in the <eighth grade> curriculum for this year or you have not yet taught a topic, choose “Not yet taught.”

“Earth’s structure and distribution of water on its surface” (BTBS22DA)

“Gases present in Earth’s atmosphere and their relative abundance” (BTBS22DB)

“Changes in temperature and pressure based on altitude” (BTBS22DC)

“How geological events impact Earth’s surface” (BTBS22DD)

“Processes in the rock cycle (e.g., lava cooling, weathering)” (BTBS22DE)

“How fossils form and what they show about Earth’s history” (BTBS22DF)

“Processes in Earth’s water cycle” (BTBS22DG)

“Differences between weather and climate and geographic factors affecting climate” (BTBS22DH)

“Evidence for climate change” (BTBS22DI)

“Use and conservation of Earth’s resources, including land, water, and renewable and nonrenewable energy sources” (BTBS22DJ)

“Phenomena caused by the motion of Earth and the Moon (e.g., seasons, tides, Moon phases)” (BTBS22DK)

“The Sun as a star and physical features of the Earth, Moon, and other planets” (BTBS22DL)

Response options: 1 = “Mostly taught before this year”

2 = “Mostly taught this year”

3 = “Not yet taught”

Derive BTDSEAR:

Step 1: Compute average percent for each topic area:

For each variable, compute the percent of students whose teachers selected 1 = “Mostly taught before this year” OR 2 = “Mostly taught this year.”

Step 2: Compute average percent for content domain:

Compute average across the topic area percentages from Step 1.

Set BTDSEAR to missing if two or more source variables are missing.

Trend Comments

See BTDSEAR in TIMSS 2019. Modifications were made to source variables in TIMSS 2023.

Derived Variable Name:

BTDSHW

Variable Label:

Science Instruction Hours per Week

Procedure

Based on responses to the following question in the Teacher Questionnaire:
TQS-14: In a typical week, how much time do you spend teaching science to the students in this class? (BTBS14)
(Open-response item; response in terms of minutes)

Derive BTDSHW:
Step 1: Divide BTBS14 by 60.

Set BTDSHW to missing if source variable is missing.
This variable is derived only for Integrated Science and Natural Science teachers.

Derived Variable Name:

BTDBHW

Variable Label:

Biology Instruction Hours per Week

Procedure

Based on responses to the following question in the Teacher Questionnaire:
TQS-14: In a typical week, how much time do you spend teaching science to the students in this class? (BTBS14)
(Open-response item; response in terms of minutes)

Derive BTDBHW:
Step 1: Divide BTBS14 by 60.

Set BTDBHW to missing if source variable is missing.
This variable is derived only for Biology teachers.

Derived Variable Name:

BTDCHW

Variable Label:

Chemistry Instruction Hours per Week

Procedure

Based on responses to the following question in the Teacher Questionnaire:
TQS-14: In a typical week, how much time do you spend teaching science to the students in this class? (BTBS14)
(Open-response item; response in terms of minutes)

Derive BTDCHW:
Step 1: Divide BTBS14 by 60.

Set BTDCHW to missing if source variable is missing.
This variable is derived only for Chemistry teachers.

Derived Variable Name:

BTDPHW

Variable Label:

Physics Instruction Hours per Week

Procedure

Based on responses to the following question in the Teacher Questionnaire:
TQS-14: In a typical week, how much time do you spend teaching science to the students in this class? (BTBS14)
(Open-response item; response in terms of minutes)

Derive BTDPHW:
Step 1: Divide BTBS14 by 60.

Set BTDPHW to missing if source variable is missing.
This variable is derived only for Physics teachers.

Derived Variable Name:

BTDEHW

Variable Label:

Earth Science Instruction Hours per Week

Procedure

Based on responses to the following question in the Teacher Questionnaire:
TQS-14: In a typical week, how much time do you spend teaching science to the students in this class? (BTBS14)
(Open-response item; response in terms of minutes)

Derive BTDEHW:
Step 1: Divide BTBS14 by 60.

Set BTDEHW to missing if source variable is missing.
This variable is derived only for Earth Science teachers.