

TIGAS Draft Framework 2023

Trends in International Geography Assessment Study

Table of Contents

Table of Contents	1
Introduction	2
Geography Content Domains	4
Earth's structure and physical environments	4
The earth's atmosphere and hydrosphere	4
The earth's landforms	4
The earth's biosphere	5
People and Settlements	5
Society and Economy	5
People and Society	5
Human-environment interactions	6
The world in spatial terms	6
Geography Cognitive Domains – Eighth Grade	7
Knowing	7
Applying	8
Reasoning	9
Geographic practices	10

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Introduction

“Geography is a vital subject and resource for 21st century citizens living in a tightly interconnected world. It enables us to face questions of what it means to live sustainably in this world. Geographically educated individuals understand human relationships and their responsibilities to both the natural environment and to others. Geographical education helps people to learn how to exist harmoniously with all living species.” (Commission on Geographical Education, 2016 p. 5)

Specifically, arguments for geography education include the following:

- As location is a key factor in life, especially in an era of globalization and the internet, geography with its focus on spatial variability provides a very practical and useful perspective on everyday life.
- Geography is the discipline where knowledge about locations and regions has its base. The appreciation of unique contexts and circumstances in an interconnected world helps deepen our understanding of human diversity.
- Geography is concerned with both the local and the global and the interconnections between these scales of human experience.
- Geography is concerned with human-environment interactions in the context of specific places and locations.
- Geography is a bridge between natural and social sciences and encourages the ‘holistic’ study of our world.
- Geography helps people to think critically about sustainable living locally and globally and how to act accordingly.
- Geography is much more than learning many facts and concepts. Its focus is on the patterns and processes that help us to understand an ever-changing planet.
- Geographic knowledge and skills, especially when mediated through geospatial technologies, offer unique opportunities to make sense of the modern world. Together they form an invaluable 21st century skill set for today and tomorrow.

(Commission on Geographical Education, 2016 p. 10)

The development of an understanding of geography is important for young people if they are to become citizens who can make informed decisions about themselves and take action for their world (Jones,

Wheeler & Centurino, 2015) today and in a future characterized by volatility, uncertainty, complexity and ambiguity. They will be inundated with information, and will need to discern fact from fiction as well as how an author's interests or viewpoints will influence their selection of information about social, economic, and environmental issues. This requires a deep geographic understanding of issues such as managing urbanisation, population change, sustainable development, climate change, poverty, globalisation, food security and conflict.

These geographic understandings can also be viewed as an essential part of a broader skill set required in workplaces. As with the framework for Civics and Citizenship “these understandings are not only of interest to political and community leaders, but are also valued by a growing number of employers“ (Gould, 2011 cited in Schulz, Ainley, Fraillon, Losito & Agrusti, 2016 p. 1). Young people are increasingly expected to develop skills that allow them to pursue careers such as those in spatial sciences, environmental management, planning and governance. Geography is a critical component in students' preparation to meet workforce and societal expectations during the 21st century. Geography provides students with the knowledge necessary to understand a dynamic world. It is an important building block in the development of responsible citizens in their respective countries.

This chapter contains the framework for the IGAS 2023 at the eighth grade. In general, the framework is adapted from the principles used in TIMSS 2011 (Mullis et al., 2012) and 2015 (Jones et al, 2015). Consideration was given to current international research and initiatives in geographic education, such as the International Charter on Geographical Education (CGE, 2016).

At grade 8, the geography assessment framework for (IGAS 2023) is organized around two domains adapted from the TIMSS frameworks for Science:

1. the content domain, specifying the subject matter to be assessed, including
 - Earth's structure, physical environments and natural systems
 - Human environments and socio-economic systems
 - Human-environment interactions and systems
 - The world in spatial terms

2. the cognitive domain, specifying the thinking processes to be assessed for
 - Knowing
 - Applying
 - Reasoning

The IGAS 2023 will also assess geographic practices, such as asking geographic questions, understanding core concepts and using geographic tools and interpretations. These are important parts of geography curricula in many countries.

Background questionnaire

(Items for the country questionnaire are currently being developed).

Geography Content Domains

Content domain	Percentage
Earth's structure and physical environments	30
Human environments/ Socio-economic Systems	30
Human-environment interactions	30
The world in spatial terms	10

Earth's structure and physical environments

The earth's atmosphere and hydrosphere

1. Explain how the Earth-Sun relationships result in weather and seasons (e.g. day-and-night, radiation balance, water cycle, etc.).
2. Explain weather phenomena (e.g. wind systems, precipitation) and weather hazards (e.g. hurricanes)
3. Describe the difference between weather and climate
4. Classify climate zones, and relate the climate and seasonal variations in weather patterns to global, regional and local factors.

The earth's landforms

1. Describe the structure of the Earth.
2. Explain how the movement of tectonic plates and geomorphological processes (e.g. glaciation, weathering) result in various landforms.
3. Relate the distribution and types of volcanic eruptions and earthquakes.
4. Describe the rock cycle and soils formation.
5. Explain the distribution of resources (e.g. oil, precious metals/stones, etc.).

The earth's biosphere

1. Relate the distribution of different types of vegetation to climate zones.
2. Explain the functioning of ecosystems (e.g. factors that influence plant and animal growth and adaptation to climate).

Human environments/ Socio-economic systems

People and Settlements

1. Identify different population patterns based on factors (e.g. age, educational level, ethnicity) and explain population processes (e.g. reasons for and consequences of migration)
2. Describe processes of settlement that result in distinct spatial patterns (e.g. urbanization, rural landscapes) and evaluate suggestions for spatial planning.
3. Identify the possibilities for management through planning and appropriate public policies (e.g. urban planning)

Society and Economy

1. Describe economic processes (e.g. trade, tourism, transport, structural change) that shape society.
2. Relate spatial patterns and disparities of social and economic phenomena within and among countries.
3. Describe patterns of inequality and how these impact society (e.g. wealth, poverty, economic development).
4. Identify the possibilities for management through planning and appropriate public policies (transportation management)

People and Society

1. Describe societal systems and the development of identities (e.g. national, religious, racial, gender, cultural), and the consequences thereof (e.g. stereotyping, discrimination, poverty, power, cultural imperialism, cultural assimilation).
2. Explain patterns of conflict (crises regions, resource/land use conflicts, religious and cultural conflicts).
3. Identify areas of international cooperation (e.g. developmental aid, globalization)
4. Compare different aspects of globalization (e.g. economic, cultural, political) and describe the diffusion and influence of global changes on different regions.
5. Identify the possibilities for management through planning and appropriate public policies (e.g. aid).

Human-environment interactions

1. Explain the impact that humans have on the atmosphere, hydrosphere and biosphere (e.g. human-induced climate change, deforestation, water pollution, agriculture, tourism, sedimentation).
2. Describe the social, political and economic impacts that the atmosphere, biosphere and hydrosphere have on humans (e.g. settlement patterns, climatic hazards, agriculture, human health).
3. Describe the social, political and economic impacts that earth processes have on humans
4. Explain the impact of humans on earth processes and landforms (e.g. land degradation, mining . . .)
5. Describe the interaction between humans and the environment over space and time (e.g., implications for population growth, settlement patterns, etc.).
6. Identify the possibilities for management through planning, education and appropriate public policies (sustainable land use policy, resource management, conservation, food security, coastal management).

The world in spatial terms

1. Formulate or identify geographic questions and hypotheses.
2. Read a variety of print and electronic maps and satellite images
3. Identify ways in which cartographic information can be manipulated (e.g. through choice of colour)
4. Explain how “mental maps are shaped by individual perceptions of people, places, regions, and environments” (US standards grade 8)
5. Explain ... that representations of space are always constructed to serve a purpose (e.g. dot vs. aggregated maps) or convey a message (e.g. maps of conflict regions, tourism photographs).
6. Synthesise information from different geographic/general sources (e.g. a photograph and diagram).
7. Explain “the advantages and disadvantages of using different geographic representations—such as maps, globes, graphs, diagrams, aerial and other photographs, remotely sensed images, and geographic visualizations for analyzing spatial distributions and patterns” (US standards grade 8)
8. Describe locations in relation to a variety of geographic frameworks of reference (e.g. latitude/longitude, climate zones, N/S/E/W, elevation, near the sea, spatial orientation ...).
9. Identify and/or describe an appropriate method for answering geographic questions or testing geographic hypotheses (e.g. selecting appropriate data, maps, field locations, population samples, methods).
10. Draw conclusions in the context of geographic knowledge, distinguish between specific and general results.....

Geography Cognitive Domains – Eighth Grade

The cognitive domain is divided into three dimensions that describe the thinking processes students are expected to engage in the IGAS 2023. The first domain, knowing, addresses the student’s ability to recall, recognize, describe, and provide examples of facts, concepts, and procedures that are necessary for a solid foundation in geography. The second domain, applying, focuses on using this knowledge to compare, contrast and classify concepts; relating knowledge of a geography concept to a specific context; generating explanations; and solving practical problems. The third domain, reasoning, includes using evidence and geographic understanding to analyze, synthesize, and generalize, often in unfamiliar situations and complex contexts.

While there is some hierarchy in the thinking processes across the three cognitive domains (from knowing to applying to reasoning), each cognitive domain contains items representing a full range of difficulty. Table 1 shows the target percentages in terms of assessment time for each of the three cognitive domains at the eighth grade.

Table 1: Target Percentages of the IGAS 2023 Assessment Devoted to Cognitive Domains at the Eighth Grade

Cognitive Domain	Percentages
Knowing	35%
Applying	35%
Reasoning	30%

Each content domain includes items developed to address each of the three cognitive domains. The following sections further describe the thinking processes that define the cognitive domains.

Knowing

Items in this dimension assess students’ knowledge of facts, concepts, relationships and processes. Accurate and broad-based factual and conceptual knowledge enables students to successfully engage in the more complex cognitive activities essential to geographic understanding.

Recall/Recognize	Identify or state facts, relationships, and concepts; recognize and use geographic vocabulary, symbols, abbreviations, units, and scales.
Describe	Describe or identify descriptions of physical and human environments and their interaction.
Provide Examples	Provide or identify examples of physical and human environments and their interaction.

Applying

Items in this dimension require students to engage in applying knowledge of facts, concepts, relationships, procedures and methods in contexts likely to be familiar in the teaching and learning of geography (e.g. global climate zones) or where the item stem contains the essential information that students need to familiarize themselves with a specific spatial example.

¹ Compare/ ² Contrast/ Classify	Identify or describe similarities and differences between physical and human environments and their interaction.
Relate	Relate knowledge of an underlying geographic concept to physical and human environments and their interaction.
Use Models	Use a diagram or model to demonstrate knowledge of geographic concepts, to illustrate a process, cycle, relationship, or system, or to find solutions to geographic problems.
Interpret Information	Use knowledge of geographic concepts to interpret relevant visual, verbal, numerical, textual and spatial information.

¹ Identify similarities and differences

² Identify differences only

Explain	Provide or identify an explanation for an observation or a natural or human phenomenon using a geographic concept or principle.
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Reasoning

Items in this dimension require students to engage in reasoning to analyze data and other information, draw conclusions, and extend their understandings to new contexts. In contrast to the more direct applications of geographic facts and concepts exemplified in the applying dimension, items in the reasoning dimension likely involve more complicated contexts. Answering such items can involve more than one approach or strategy. Geographic reasoning also encompasses developing hypotheses and designing geographic inquiries.

Analyze	Identify the elements of a geographic problem and use relevant information, concepts, relationships, and data patterns to answer questions and solve problems.
Synthesize	Answer questions that require consideration of a number of different factors or related concepts.
Formulate Questions/ Hypothesize/Predict	Formulate questions that can be answered by inquiry and predict results of an investigation given information about the design; formulate testable assumptions based on conceptual understanding and knowledge from experience, observation, and/or analysis of geographic information; and use evidence and conceptual understanding to make predictions about the effects of changes in physical and human environments.
Design Inquiry	Plan (field) inquiries or procedures appropriate for answering geographic questions.
Evaluate	Evaluate alternative explanations; weigh advantages and disadvantages to make decisions about alternative processes; and evaluate results of inquiry with respect to sufficiency of data to support conclusions.

Draw Conclusions	Make valid inferences on the basis of observations, evidence, and/or understanding of geographic concepts; and draw appropriate conclusions that address questions or hypotheses, and demonstrate understanding of cause and effect.
Generalize	Make general conclusions that go beyond the inquiry or given conditions; apply conclusions to new situations.
Justify	Use evidence and geographic understanding to support the reasonableness of explanations, solutions to problems, and conclusions from inquiry based on explicit criteria

Geographic practices

Geographers engage in geographic inquiry by following key geographic practices that enable them to investigate physical and human environments and their interaction to answer questions about them. Students of geography must become adept at these practices to develop an understanding of geographic inquiry. These practices include skills from daily life and school studies and are fundamental to the discipline of Geography. Three practices that are fundamental to geographic inquiry represented in IGAS 2023 are:

1. Asking geographic questions

Geographers are interested in asking questions about how humans interact with space, place, environment and regions across scale and time. In particular geographers ask questions such as:

- Where is it?
- What impact does or could it have?
- When did it happen?
- What is it like?
- Why is it there?
- What if this would happen?
- Who is involved?
- How did it happen?
- Whose perspective is this?
- How could it be managed sustainably for the mutual benefit for humanity and the natural environment?
- How does that relate to my life?

These questions enable them to investigate physical and human environments and their interaction as well as how these interactions can be managed.

2. Understanding core concepts in geography

The content domains of the IGAS 2023 are organized around core concepts in geography. These concepts are (big) ideas that are systematically recurring” (Fogele, 2015 p. 56) giving students a “powerful way of seeing the world” (Jackson, 2006 p. 203) that goes beyond facts by showing the interconnections between these ideas. These include:

- Location and distribution
- Place
- People-environment relationships
- Spatial interaction
- Region
- Scale and time.

3. Using geographic representations for interpreting reality

Geographers typically use information that is represented visually, spatially, numerically, in text form and verbally to collect, analyze, visualize, interpret and disseminate geographic data. These representations are used in geographic inquiry to help young people make informed decisions about themselves and take action for their world.

Thus, students are expected to be able to use a variety of geographic tools and representations, for example:

- Maps
- Geospatial technologies
- Remote sensing data
- Field methods
- Text documents
- Statistical data
- Photographs

These geographic practices are assessed in the context of the geography content domains, and by utilizing the thinking processes specified in the cognitive domains. Some items in the IGAS 2023 assessment at the eighth grade assess one or more of these important practices in content and cognitive domains.

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