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All FRQ scoring guides created by Jordan Dischinger-Smedes are designated at the bottom of each page and subject to the following usage guidelines:

SUGGESTED SKILL

Concept Explanation

1.B

Explain environmental concepts and processes.

FRQ Practice 3.1

Identify ONE characteristic of specialist species and **explain** how that characteristic makes them more likely to become extinct than generalist species. (1 pt.)

Identify Characteristic	Explanation
Narrow/specific food needs	Less likely to be able to adapt to new food source if preferred resource is disturbed by climate change, human activity, competition, invasive species
Narrow/specific habitat needs	Less likely to be able to adapt to new habitat if preferred habitat is disturbed by climate change, human activity, competition, invasive species
Narrow ecological niche	Less likely to be able to adapt to new food source, habitat, or ecological role if ecological role is disrupted by invasive species, competition, climate change, human disturbance

SUGGESTED SKILL

Concept Explanation

1.B

Explain environmental concepts and processes.

FRQ Practice 3.2

Identify ONE characteristic of an r-selected species that could increase the likelihood of the r-selected species becoming a more successful invasive species than K-selected species

ID (1 pt.)

- **High rate of reproduction**
- **Large number of offspring per reproductive event**
- **Faster generation time leading to more rapid adaptation to new environment**

FRQ Practice 3.3

SUGGESTED SKILL
Data Analysis
5.A
Describe patterns or trends in data.

Describe the trend in survivorship shown in this graph. **Justify** which type of survivorship curve these data represent.

Describe (1 pt.)

- Survivorship drops very early in the lifespan, and then decreases gradually as the years go on

Justify (1 pt.)

- Type III survivorship - There is very high infant mortality, or a very high number of young individuals of this species dying early in life, with only about 35% of these organisms making it past 2 years of life. Then there is a gradual, steady decrease in survivorship from 2 years to 12 years

FRQ Practice 3.4

SUGGESTED SKILL

Data Analysis

5.E

Explain what the data implies or illustrates about environmental issues.

Explain the impact that the canine virus had on the moose population based on the graph.

Explain (1 pt.)

- **The wolf population dramatically declined due to the canine virus, causing the moose population to grow rapidly as there were fewer wolves to prey on them**

FRQ Practice 3.5

SUGGESTED SKILL

Mathematical Routines

6.B

Apply appropriate mathematical relationships to solve a problem, with work shown (e.g., dimensional analysis).

Calculate the percent change in the population size of a 14 wolf pack that experiences 5 deaths, 3 births, and 4 new wolves released into the pack from a nearby wildlife sanctuary.

Calculate (1 pt. for correct setup with units, 1 pt. for correct answer with units)

14 wolves - 5 deaths + 3 births + 4 from sanctuary = 16 wolves

((16 wolves - 14 wolves)/14 wolves) * 100 = 14.286% increase (final answer)

FRQ Practice 3.6

SUGGESTED SKILL

Data Analysis

5.C

Explain patterns and trends in data to draw conclusions.

Identify the country with the slowest pop. growth rate and **explain** your answer

Identify (1 pt.) & Explain (1 pt.) - Must correctly identify Country Y

- **Country Y has the smallest portion of its population in the pre-reproductive age cohort/0-14 age cohort, indicating that it has the lowest birth rate of the three countries**

- **Country Y has the smallest difference between its pre-reproductive and reproductive age cohorts, which indicates that is has a lower birth rate than the other three countries**

***** Can't just say "it has the smallest base" without indicating what that base refers to***

FRQ Practice 3.7

SUGGESTED SKILL

Data Analysis

5.A

Describe patterns or trends in data.

Identify and **discuss** TWO of the causes for the trend in worldwide TFR. (1 pt. for cause, 1 pt. For discussion)

Cause	Discussion
Increased/improved family planning	• Fewer pregnancies/control of fertility/choice in number of children born
Increased education for women (stay in school longer)/improved social status of women	• Delay having children/choosing to have fewer children
More women enter the workforce	• Delay having children
Reduced need for children in workforce/on farm	• More industrialization/less agriculture/increased urbanization
More industrialization/less agriculture/increased urbanization	• Reduced need for children in workforce/on farm

Cause	Discussion
Improved health care (lower infant mortality)	• More children will survive to adulthood
People marry later	• Childbearing delayed/fewer children
Changing cultural values	• Socially acceptable to have fewer children
Government policies that restrict number of children allowed per woman	• Countries are facing overpopulation issues
Increased cost of raising children	• Standard of living and education costs have increased
Increased urbanization	• Lessens living space for more children

FRQ Practice 3.8

SUGGESTED SKILL

Environmental Solutions

7.A

Describe environmental problems.

Describe one human activity related to a rapidly growing human population that is having an impact on biodiversity. **Propose a solution** a government could take to slow population growth.

Describe (1 pt.)

- Deforestation for the following purpose destroys habitats and reduces biodiversity (may use two activities for 1 point each):
  - farming (i.e., creation of monocultures);
  - housing/development (i.e., urbanization);
  - fuel (wood);
  - fossil-fuel recovery (mining and drilling).
- Fossil-fuel burning releases carbon dioxide resulting in climate change, altering global/regional/local temperature and precipitation patterns leading to reduction of biodiversity within ecosystems where organisms have very specific climatic requirements for survival.
- Pollution (student must identify specific contaminants linked to human activity that have a negative impact on species and biodiversity).
- Intensive fish farming spreads parasites and disease to native species, reducing biodiversity.
- Diversion of freshwater for agricultural, municipal, and industrial use reduces water supply for biodiverse freshwater ecosystems.
- Damming of rivers makes it difficult for species that breed/spawn upstream (e.g., salmon) to reproduce, reducing biodiversity.
- Overfishing leads to small, unsustainable populations of fish species, reducing biodiversity.
- Building landfills for increased amounts of trash destroys habitat, reducing biodiversity.
- Poaching of wild animals (e.g., bush meat) due to increased human population and demand for food leads to dwindling populations that may not be sustainable.
- Using genetically modified crops to increase yield of food crops can negatively impact other species (e.g., monarch butterfly larvae can be killed when they ingest toxin-containing genetically modified corn pollen that has settled on milkweed leaves near genetically modified corn fields).

FRQ Practice 3.8

SUGGESTED SKILL

Environmental Solutions

7.A

Describe environmental problems.

Describe one human activity related to a rapidly growing human population that is having an impact on biodiversity. **Propose a solution** a government could take to slow population growth.

Propose a solution (1 pt.)

- Free/more accessible/government-subsidized family planning -- must be linked to specific example, such as: free clinical services like birth control, free education about birth control, birth spacing, etc.
- Economic rewards or penalties -- must be linked to specific example, such as:
  - payment for sterilization
  - eliminating income tax deductions for more than one child
  - free health-care benefits for families with 0-1 children
  - free higher education for women/child of single-child family
  - increased social security or pension benefits for couples with 0-1 children
  - better job opportunities for women/couples with 0-1 children
  - monetary bonus at end of year if only have 0-1 children
  - giving free counseling to teenagers that have had a child
  - government subsidized housing if have 0-1 children
  - bonus at end of year if woman remains under single-child limit
  - couples pay a tax for each child after the first one
  - other logical methods of negative economic incentives or rewards.
- Raising legal marriage age
- Specific examples with explanation (e.g., China)
  - paid leave to women for fertility operations
  - monthly subsidy to single-child families
  - job priorities for only children
  - housing preferences for single-child families
  - additional food rations for one-child families
  - monetary compensation for single-child families

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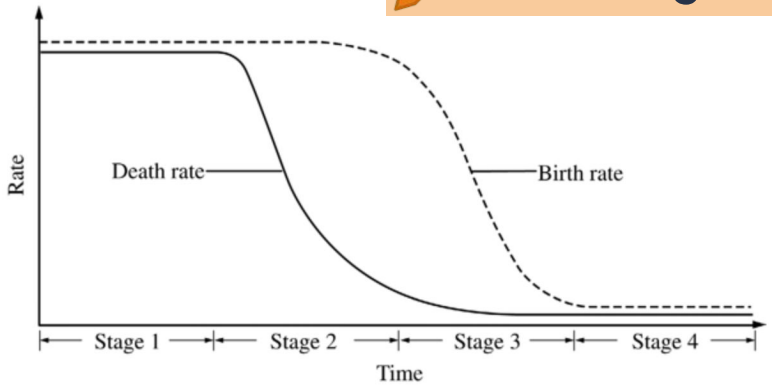
FRQ Practice 3.9



SUGGESTED SKILL

Concept Explanation

1.C

Explain environmental concepts, processes, or models in applied contexts.

Identify the stage of this graph in which population grows the fastest and **explain** why this is the case. **Describe** one economic or societal indicator of a country in this phase.

ID & Explain (1 pt.)

- **Stage 2; population growth is the difference between birth rate and death rate and since birth rate remains high in stage 2, while death rate drops, population grows rapidly**
- **Stage 2; there is the greatest difference between births and deaths in stage 2, and with more births than deaths, population grows**

Describe econ/societal indicator (1 pt.) - needs additional detail beyond just identifying

Improving health care access	Improving access to clean water	Low per. cap. GDP/income	Short life expectancy
High infant mortality rate	High TFR	Low educational access for girls	Low family planning access

FRQ Practice 3.9

SUGGESTED SKILL

Concept Explanation

1.C

Explain environmental concepts, processes, or models in applied contexts.

Identify the stage of this graph in which population grows the fastest and **explain** why this is the case. **Describe** one economic or societal indicator of a country in this phase.

Identify & Explain (1 pt.) - Must correctly identify stage 2

- **Population growth is fastest in stage 2 because the death rate declines dramatically while the birth rate remains high; leading to a greater difference between births and deaths than in any other stage**
- **Population growth is fastest in stage 2 because the death rate declines dramatically while the birth rate remains high; meaning that people are added to the population at a faster rate than they are dying, leading to a faster rate of population growth than in any of the other stages**

FRQ Practice 3.9

SUGGESTED SKILL

Concept Explanation

1.C

Explain environmental concepts, processes, or models in applied contexts.

Identify the stage of this graph in which population grows the fastest and **explain** why this is the case. Besides population growth rate, **describe** one economic or societal indicator of a country in this phase.

Describe (1 pt.) -

- **A relatively low per-capita GDP indicates a country that has not yet become fully industrialized**
- **A high birth rate/TFR well above replacement-level/2.1 or 2 births per woman indicates a population that is still growing rapidly**
- **A declining death rate indicates a country that is in phase 2**
- **An increase in access to improved water sources/clean drinking water indicates that a country is in phase 2**
- **An increase in access to healthcare services indicates that a country is in phase 2**
- **A high infant mortality rate indicates that a country has yet to fully industrialize**
- **A low educational life expectancy/low literacy rate for women**