Topic 4.1 Species, Communities & Ecosystems Review

**Essential Idea: The continued survival of living organisms including humans depends on sustainable communities.**

**4.1.U1 Species are groups of organisms that can potentially interbreed to produce fertile offspring.​**

Describe limitations of the biological species concept.

(Describe: Give a detailed account)

Define species according to the biological species concept.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

**4.1.U2 Members of a species may be reproductively isolated in separate populations.**

Define population.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

Outline how reproductive isolation can lead to speciation.

(Outline: Give a brief account or summary)

**4.1.U3 Species have either an autotrophic or heterotrophic method of nutrition (a few species have both methods).**

Define autotroph and heterotroph.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

**4.1.U4 Consumers are heterotrophs that feed on living organisms by ingestion.**

Describe the feeding behaviors of consumers.

(Describe: Give a detailed account)

List three example consumer organisms.​

(List: Give a sequence of brief answers with no explanation.)

**4.1.U5 Detrivores are heterotrophs that obtain organic nutrients from detritus by internal digestion.**

Describe the feeding behaviors of detritivores.

(Describe: Give a detailed account)

List two example detritivore organisms.

(List: Give a sequence of brief answers with no explanation.)

**4.1.U6 Saprotrophs are heterotrophs that obtain organic nutrients from dead organisms by external digestion.​**

Describe the feeding behaviors of saprotrophs.

(Describe: Give a detailed account)

List two example saprotroph organisms.

(List: Give a sequence of brief answers with no explanation.)

**4.1.U7 A community is formed by populations of different species living together and interacting with each other.​**

Define species, population and community.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

Give an example of a community of organisms.

**4.1.U8 A community forms an ecosystem by its interactions with the abiotic environment.**

Define abiotic and ecosystem.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

**4.1.U9 Autotrophs obtain inorganic nutrients from the abiotic environment.**

Define nutrient.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

List the common nutrients needed by organisms.

(List: Give a sequence of brief answers with no explanation.)

Outline how nutrients enter living systems.

(Outline: Give a brief account or summary)

**4.1.U10 The supply of inorganic nutrients is maintained by nutrient recycling.**

State that chemical elements can be recycled but energy can not.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Outline the generalized flow of nutrients between the abiotic and biotic components of an ecosystem. ​

(Outline: Give a brief account or summary)

**4.1.U11 Ecosystems have the potential to be sustainable over long periods of time.**

Define sustainability.​

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

Give an example of an unsustainable practice.

Outline three requirements of a sustainable ecosystem.

(Outline: Give a brief account or summary)

**4.1.S1 Classifying species as autotrophs, consumers, detrivores or saprotrophs from a knowledge of their mode of nutrition.**

Use a dichotomous key to identify the mode of nutrition of an organism.​

**4.1.S2 Testing for association between two species using the chi-squared test with data obtained from quadrat sampling.​**

Outline why sampling must be random.

(Outline: Give a brief account or summary)

Explain methods of random sampling, including the use of a quadrat.

(Explain: Give a detailed account including reasons or causes)

State the null and alternative hypothesis of the chi-square test of association.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Use a contingency table to complete a chi-square test of association.

**4.1.S3 Recognizing and interpreting statistical significance**.

Calculate a chi-square statistic based on observed and expected values.

(Calculate: Obtain a numerical answer showing the relevant stages in the working(unless-instructed not to do so).

State the null and alternative hypothesis of statistical tests.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Determine if the null hypothesis is supported or rejected given a critical value and a calculated statistic.

(Determine: Obtain the only possible answer)

State the minimum acceptable significance level (p value) in published research.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Explain the meaning of a “statistically significant” result, including the probability of chance having a role in the result.

(Explain: Give a detailed account including reasons or causes)

**4.1.S4 Setting up sealed mecocosms to try to establish sustainability. (Practical 5)**

Define mesocosm.

(Define: Give the precise meaning of a word, phrase, or physical quantity.)

List three example mesocosms.

(List: Give a sequence of brief answers with no explanation.)

Outline requirements of setting up a mesocosm.

(Outline: Give a brief account or summary)

**4.1.NOS Looking for patterns, trends and discrepancies- plants and algae are mostly autotrophic but some are not.**

State the trend found in the nutritional patterns of plants and algae.

(State: Give a specific name, value or other brief answer without explanation or calculation.)

Describe the discrepancy in the nutritional pattern of parasitic plants and algae.

(Describe: Give a detailed account)

**Key Terms**

|  |  |  |
| --- | --- | --- |
| ​ecologyecosystemcommunitybioticbiomeheterotrophcrossbreedingrandom numbers |  | ​ |

nutrient cycling

food web

habitat

​omnivore

​autotroph

tropic level

inorganic nutrients

​sustainable communities

autotroph

detritivore

saprotroph

communities

​interdependence

interbreeding

​Line Transect

|  |  |
| --- | --- |
| ​abioticspeciespopulationinterbreeding​hybrid​energy flowmesocosmrecycledecomposerconsumerhabitat​isolationChi-squared test​Quadrat samplingabioticbioticinorganic | ​ |