Environmental Effects on Mitosis

Concepts:

Biotic and abiotic factors, cell cycle, plant hormones, chi-square analysis

Use the following recommendations to increase and/or decrease the challenge difficulty for your students.

Short-on-time Inquiry Lab:

In this lab, students carry out an investigation on how the addition of the auxin indole-3-acetic acid, IAA, impacts the rate of mitosis in an onion plant root. They will get the opportunity to compare onion roots grown with and without this additional IAA hormone.

Guided Inquiry Lab:

In this lab, students carry out an investigation on how the addition of the auxin indole-3-acetic acid, IAA, impacts the rate of mitosis in an onion plant root. They will get the opportunity to compare onion roots grown with and without this additional IAA hormone. Students will perform a chi-squared analysis on the class results.

Open Inquiry Lab:

In this lab, students carry out an investigation on how the addition of the auxin indole-3-acetic acid, IAA, impacts the rate of mitosis in an onion plant root. They will get the opportunity to compare onion roots grown with and without this additional IAA hormone. Students will perform a chi-squared analysis on the class results. Using the addition of IAA as the new control, the students will design an experiment to further promote the mitosis rate of the onion. Results will be analyzed and compared to the original experiment.

Advanced Inquiry Lab:

In this lab, students carry out an investigation on how the addition of the auxin indole-3-acetic acid, IAA, impacts the rate of mitosis in an onion plant root. They will get the opportunity to compare onion roots grown with and without this additional IAA hormone. Students will perform a chi-squared analysis on the class results. Using the addition of IAA as the new control, the students will design an experiment to further promote the mitosis rate of the onion. Results will be analyzed and compared to the original experiment. Students will research the concerns scientists and farmers have about global climate change in regard to the impact of drought conditions on plant productivity and how IAA may play a role.

Outcomes:

The students will conclude that environmental factors can impact cell growth. They will discover that the onion roots grown with additional IAA will spend more time in mitosis when compared to the onion roots grown without additional IAA.

Associated Phenomena:

Farm to Table

Standards

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and using models	HS-LS1.B: Growth and Development of Organisms	Systems and System Models

Performance Expectations

HS-LS1-4: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.