

Introduction to Biotechnology

Interactive Lesson

PRINT and DIGITAL

Agriculture

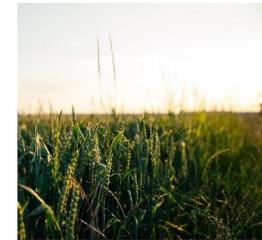
Examples of biotechnology in agriculture:

Resistant Crops

- Crops are made to be **more resistant to pests and diseases.**

Microorganisms

- Mycorrhizal fungi and rhizobacteria form symbiotic relationships with plants. This **improves nutrient uptake and disease resistance.**



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Compatible with Google Slides and PPT

Modern Biotechnology

It uses more advanced techniques at the **cellular and molecular level**.

For example:

- genetic engineering
- recombinant DNA technology
- bioprocess
- stem cell



A key is also included!

Dr
wer.
Recombinant DNA technology has been used to create vaccines.

True

False

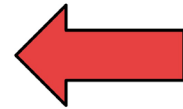
Drag and Drop

Drag the circle to the correct response.

Which biotechnology technique can be used to create DNA profiles from crime scene samples?

- mitochondrial DNA
- protein sequencing
- PCR
- genomic mapping

Drag the arrow to the correct answer.



Biotechnology allows for the development of techniques to edit genes.

True

False

Type in the Text Box

Click [here](#) to watch this short clip
about biotechnology.

In the text box below, describe the most interesting thing you
learned in this video.

Type here.

In the text box below, in your own
words, explain how biotechnology is
used for industry.

Type here.

and more!

Genetics

Examples of biotechnology in genetics:

Genetic Testing and Screening

- There are tests to **detect genetic disorders** such as cystic fibrosis and hereditary cancer risk.



Gene Therapy

- There are biotechnology techniques that involve editing genes to **prevent diseases** such as sickle cell anemia and muscular dystrophy.

In the text boxes below, in the 1st Column, type in what you already **KNOW** about biotechnology. In the 2nd column, type in what you **WANT** to learn about biotechnology. The last column will be completed at the end of the lesson (what you've learned).

Last Slide

K

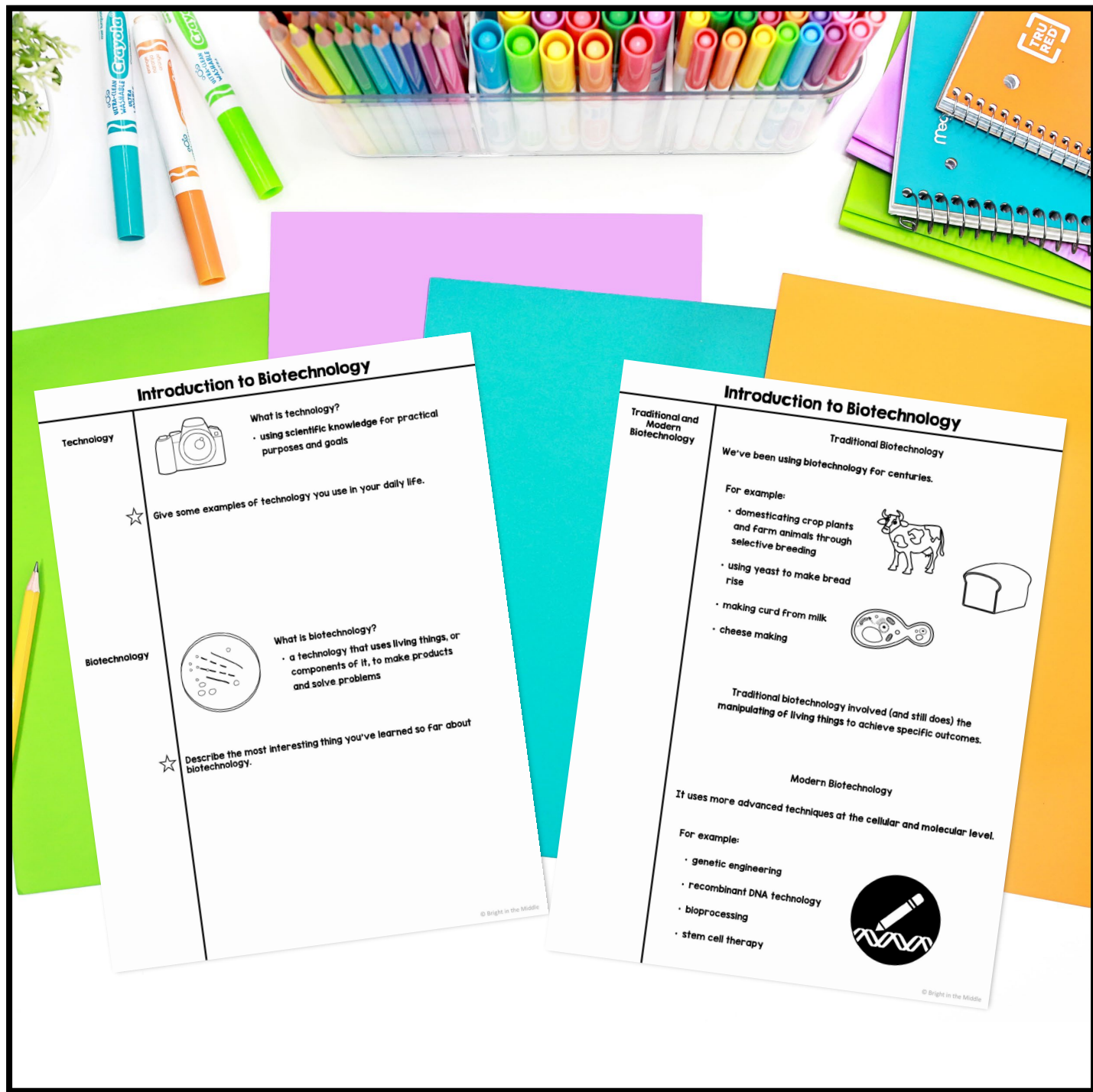
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W

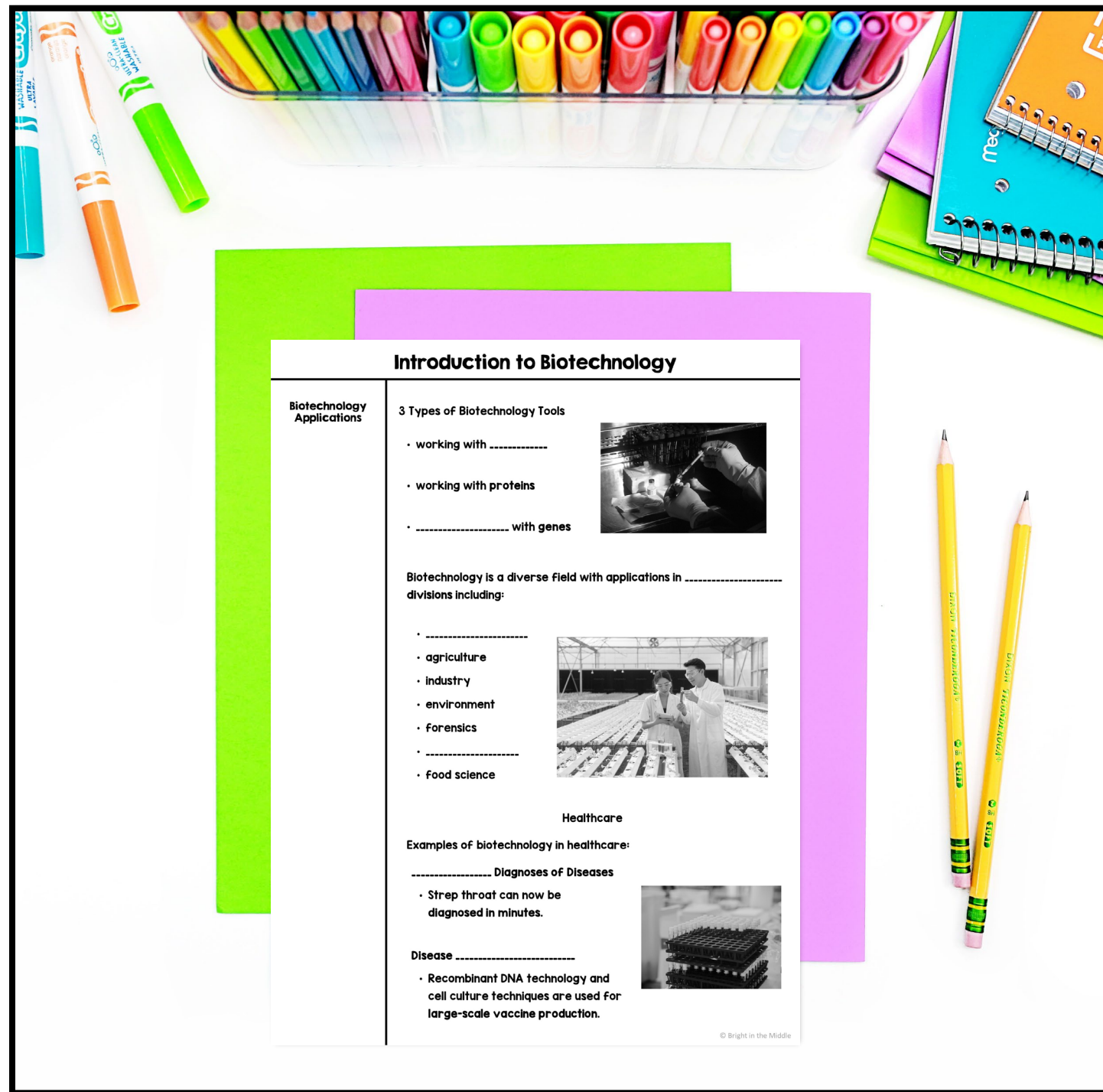
- Type here.

L




A paper version is also included with interactive activities embedded.



**Guided
Cornell
notes are
included as
well!**



Introduction to Biotechnology

Biotechnology Applications	<p>3 Types of Biotechnology Tools</p> <ul style="list-style-type: none">• working with• working with proteins• with genes  <p>Biotechnology is a diverse field with applications in divisions including:</p> <ul style="list-style-type: none">•• agriculture• industry• environment• forensics•• food science  <p>Healthcare</p> <p>Examples of biotechnology in healthcare:</p> <p>..... Diagnoses of Diseases</p> <ul style="list-style-type: none">• Strep throat can now be diagnosed in minutes.  <p>Disease</p> <ul style="list-style-type: none">• Recombinant DNA technology and cell culture techniques are used for large-scale vaccine production. <p><small>© Bright in the Middle</small></p>
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Ways to Use Digital Interactive Lessons

Science digital interactive lessons are a great way to teach or review science content with your students for many reasons.

They are fun. They are engaging. Another reason, which I think is the most important, is that they help decrease the cognitive load. The way that digital interactive lessons are set up is first, a little bit of content, and then practice with that content, and repeat the process.

Students can digest small chunks of information a little at a time, apply that information, and then learn more! This will help keep their attention.

So, now, what are some ways that you can use them in your middle school science classroom?



Individual Learning

One way that interactive lessons can be used in the classroom is just for individual learning. These are digital lessons, so students can pull up the lesson on their computer, either via Google Classroom, Microsoft Teams, PowerPoint, or whatever you use in your classroom.



Students read through the lessons themselves and **work through the practice** at their own pace.

The benefits of doing this are that students can work at their own pace and you, as the teacher, can walk around the classroom as they are learning to answer any questions that they have. In addition, you can see what that particular student is learning. As you walk around the room and view their work, you can use it as a formative assessment to see if they are understanding the material.

You can also bump it up a notch. Since students will be working using the computer, you can embed related YouTube videos in the lesson for extra enrichment!

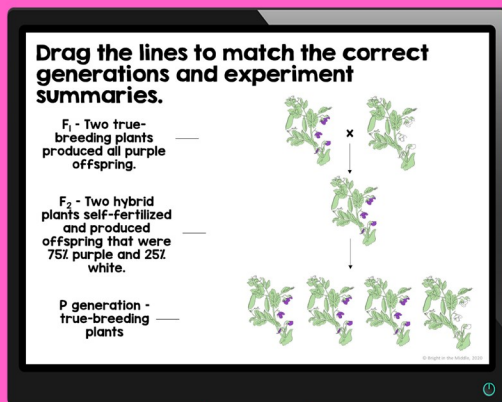
**Digital Science
INTERACTIVE
Lessons
for**

INDIVIDUAL LEARNING



Distance Learning

Digital interactive science lessons are a great tool to use for individual learning at a distance for the middle school science classroom.



Students can read through the material, and after digesting chunks at a time, they can apply the information with embedded practice slides.

After completing the lessons, students can submit their work to their teacher.

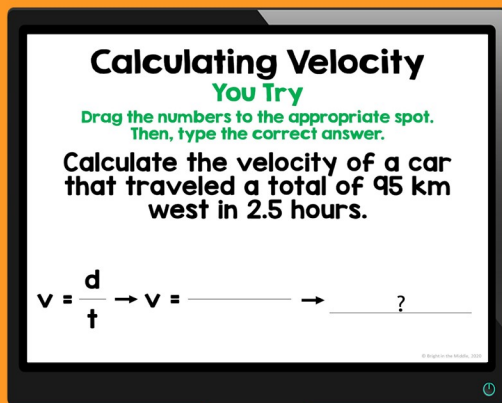
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DISTANCE LEARNING



Small Groups/ Partners

This works similarly to having students working as individuals except that students have the opportunity to work with one another. I think that this an awesome approach to differentiated learning in the classroom.



Calculating Velocity
You Try
Drag the numbers to the appropriate spot.
Then, type the correct answer.
Calculate the velocity of a car that traveled a total of 95 km west in 2.5 hours.

$$v = \frac{d}{t} \rightarrow v = \text{---} \rightarrow \text{---} ?$$


In small groups, or in partners, students are able to read the lesson together, discuss each practice slide, and apply the information together.

I prefer this method in many ways because I believe in the power of cooperative learning. As a teacher, you still have the opportunity to walk around and help the individual students as needed, but students also have each other for support.

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**SMALL GROUPS/
PARTNERS**



Direct Instruction

As mentioned, digital interactive lessons are set up as a lesson with embedded practice to help decrease the cognitive load. If teachers choose to, they can pull up the lesson and teach it to their students and still take pieces of content and digest them bit by bit.



For example, when teaching about **pedigree charts**, the teacher can first discuss what a square and a circle represent in a pedigree chart.

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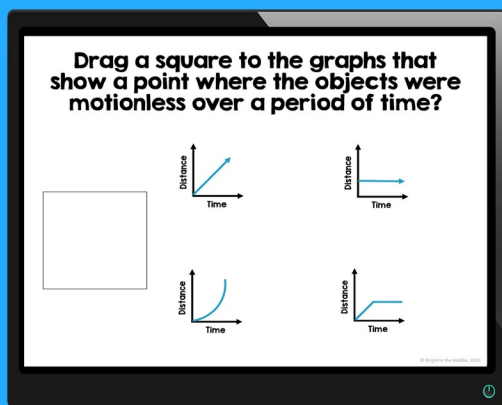
DIRECT INSTRUCTION

After students digest this material, the teacher can ask students to discuss how they will remember this information and then apply the information in practice.



Science Centers

Digital interactive science lessons can be used in one of two ways for science centers. First, science centers on a particular topic. For example, say you are teaching distance-time graphs, and you are ready for students to complete science centers on this topic. You can have a center for a [digital interactive lesson](#) (make groups in Google Classroom, or another platform), [task cards](#), [story match](#), and a reading passage.



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SCIENCE CENTERS

Another way that you can use interactive science lessons for science centers is only using digital interactive lessons. Time to review for a [genetics](#) test? You can have stations set up where students will move around the room.

They can work through individual lessons such as Gregor Mendel and an Introduction to Genetics, Asexual and Sexual Reproduction, Mitosis and the Cell Cycle, Meiosis, Punnett Squares, Pedigree Charts, and Variation of Traits and Genetics Disorders. This route may take more than one day. It just depends on how long your classes are and how much time you can devote to review. I personally like the first approach to using digital interactive lessons as a science center.



For ELL Students

With technology, there are so many awesome opportunities for students that do not speak English as their primary language to learn science content in schools that speak predominantly English. That goes vice versa as well. If you are trying to learn in any language you are unfamiliar with, technology is here to help!



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Lessons**
for

ELL STUDENTS

There are many options that students can use to learn science material. As a teacher that only speaks English, you can imagine how difficult it is to teach a student that speaks another language. I'm sure there are other teachers out there with the same dilemma.

With technology, I have been able to give my students the science lesson and have them use Google translate in order to understand what the lesson is saying. Now, I'm working on creating digital science lessons in Spanish, so that one step is taken out.



Enrichment/ Tutoring

I know that many schools set up a time during the day just for enrichment/tutoring.



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**ENRICHMENT/
TUTORING**

Many schools only set up this time for reading/math, but some do science too! Especially those that test in science. Interactive lessons are a great way to review standards-based science material and practice!

