

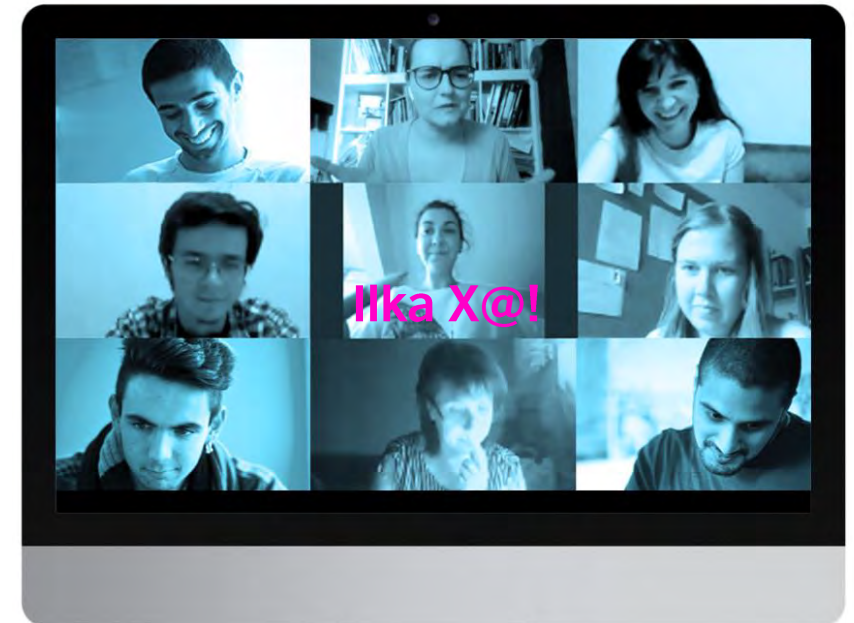
Asteroids and meteorites

Theme:
Science, Space and Technology



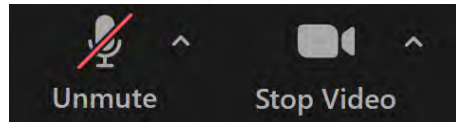
Before we start, please make sure...

- ✓ your name on Zoom is clear (use Latin letters)
- ✓ your camera is on and mic is **off** (unmute when needed)
- ✓ you are in a quiet area that helps you focus
- ✓ you have a notebook or a note app ready to take notes

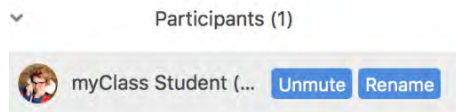


Zoom features

Check your audio and video settings

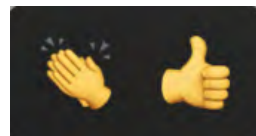
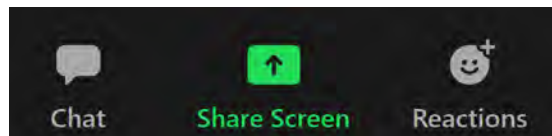


Use Latin letters for your name

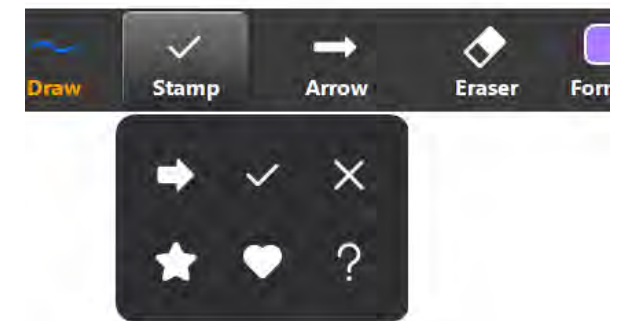
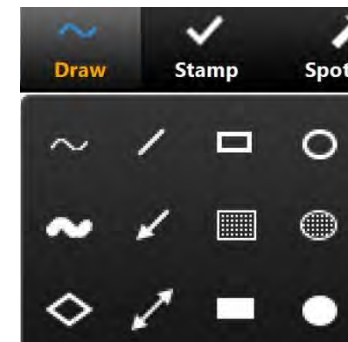


Ask questions in the Chat or use Reactions

Share Screen when the teacher asks



Use Annotate when a screen is shared



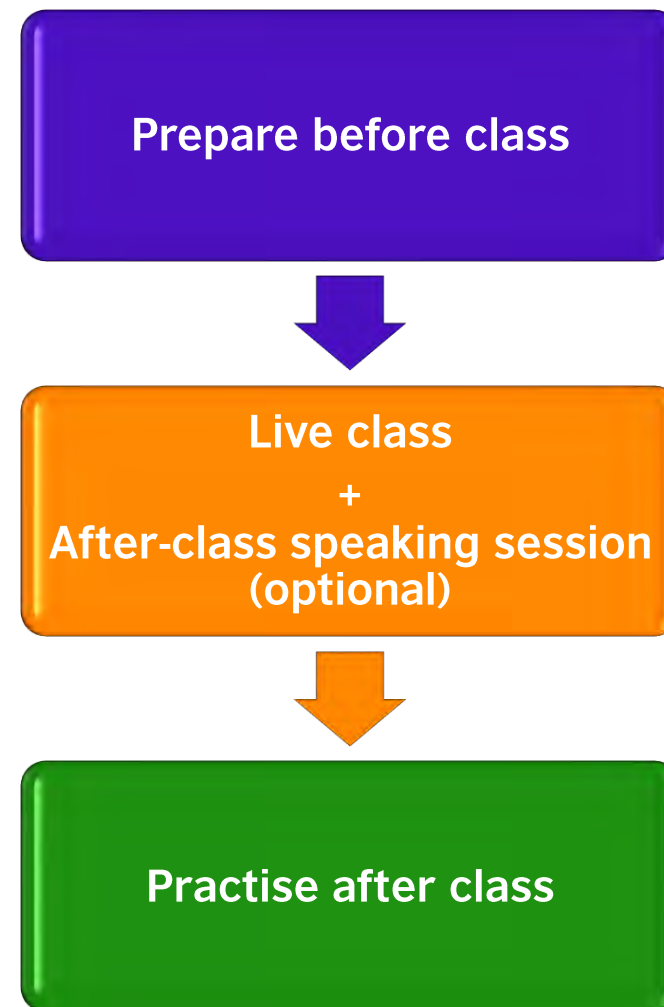
Use Save to make screenshots

Welcome to English Online



How does it work?

You need to complete all three parts to get the most out of English Online.



After-class speaking session

Stay back after class for 5 or 10 minutes to talk to your classmates from around the world.

This extra speaking practice will help you...

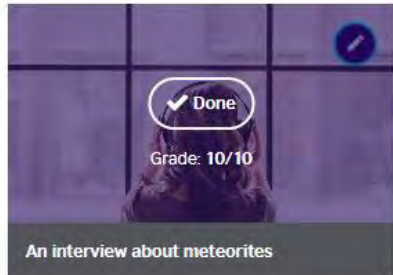
- improve your conversation skills
- practise using language learnt in class
- support and help your fellow students
- practise using English in a natural context
- become a part of a global learning community



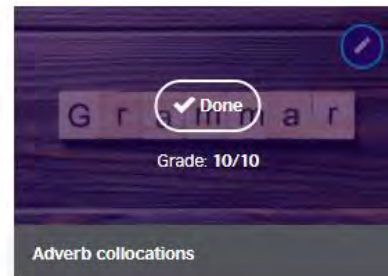
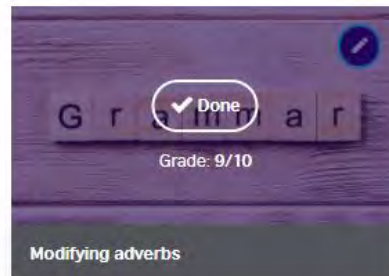
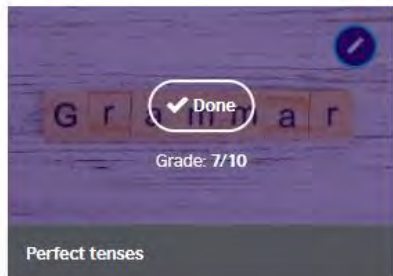
After-class
speaking
sessions

Pre-Class activities

Prepare



Practise



Lesson objective

In this lesson you will take part in a think tank discussion on the best strategies for avoiding a disaster through a meteorite hitting your city.

You will look at the present perfect and present continuous, modifying adverbs and discourse markers for managing conversation.



Warmer

How much space vocabulary do you know?

Can you think of 10 items? *E.g. comet, black hole....*



Lead-in

Discuss these questions with your partner(s):

- 1) How much fascination does space hold for you? Would you star gaze or use a telescope?**
- 2) Have you ever thought of space as a threat? Are we in danger of invasion or collision?**



— Language focus 1

Look at the sentences below. (They are from the recording that you listened to before the class) **correct answers in pink**

- 1) What verb forms are used?
- 2) Underline the form that was used in the audio.
- 3) Is the other form possible? If so, how does it change the meaning?

1) I'm here with Chuck Larsson ***who's brought out*** / *who's just been bringing out* a book. **Single event**

2) ***I've basically spent*** / ***I've basically been spending*** the last 30 years studying meteorites. Both options possible – **continuous emphasises duration**

3) Nasa ***has up to now detected*** / ***has up to now just been detecting*** the most lethal giant rocks. **Continuous emphasises duration**

4) How come nobody ***has ever been killed*** / *has ever been being killed* by one?

5) Well, I certainly think ***you've given*** / ***you've been giving*** our listeners food for thought / **both possible, simple sounds more natural in this idiomatic expression**

6) Chuck Larson ***who's been campaigning*** / ***who has campaigned*** relentlessly to

Language focus 1

Put the expressions into the correct group, according to whether the modifying adverb is followed by a verb, adjective or noun.

Verb	Adjective	Noun
<p>Put the expressions into the correct group, according to whether the <u>modifying adverb</u> is followed by a verb, adjective or noun.</p>		
<p>Verb:</p> <ul style="list-style-type: none">basically spentpotentially destroydefinitely thinkeffectively creating	<p>Adjective:</p> <ul style="list-style-type: none">completely rivetingtotally complacentslightly steeperpersonally involved	<p>Noun:</p> <ul style="list-style-type: none">hardly anythingbasically anythingpossibly a city killerprecisely 26

Language focus 2

Think: Which collocations are least or not possible (in pink)? (there is only one correct answer)

- 1) bitterly – cold / ashamed / disappointed / **hot**
- 2) barely – alive / legible / **healthy** / comprehensible
- 3) completely – serious / open / honest / **funny**
- 4) deeply – **miserable** / hurt / saddened / upset
- 5) entirely – **clever** / convinced / clear / satisfactory
- 6) pretty – doubtful / **beautiful** / hopeless / bad
- 7) perfectly – capable / aware / **bad** / reasonable.
- 8) seriously – alarmed / worried / hurt / **sincere**

Language Focus 2

Here are some discourse markers from the audio which are often used in conversation. Match them with their more common use.

- a) To show we are considering what someone said ___ **Well** _____.
- b) To show we are taking up an invitation to enter a conversation ___ **Ok** _____.
- c) To show we understand or agree ___ **Right** _____.
- d) To suggest the listener is already familiar with something **You know** _____.
- e) To show we are expressing personal feelings or opinions ___ **I mean** _____.
- f) To show what we are going to say is related to the topic **So** _____.
- g) To show we are about to disagree with someone ___ **Actually** _____.
- h) To show we are getting back to the main topic **Anyway** _____.

Task



Pre Task

A large asteroid has been detected by an amateur enthusiast on a collision course for the nation's capital.

On its present trajectory it is due to impact in roughly ten years' time.

You belong to a think tank that has been urgently convened to discuss the situation and report to the head of state and an anxious public informing them about the nature of the threat and how it can be best avoided.



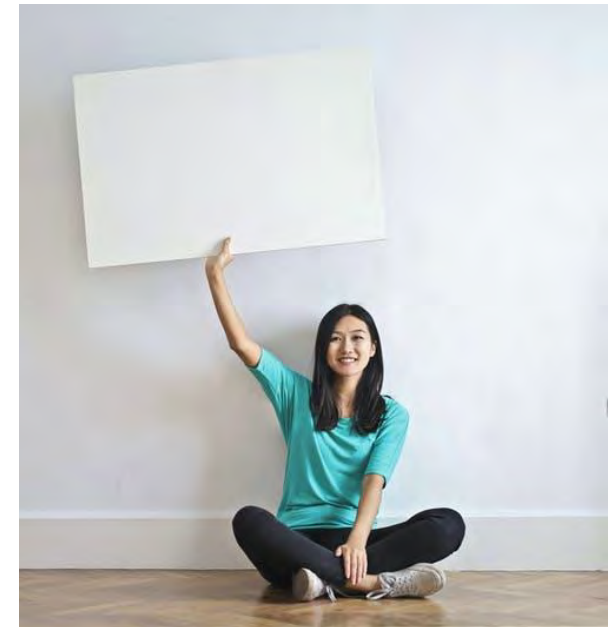
Task

Work in groups. Read the information on asteroid advance strategies the teacher gives you.

Tell your group about what you have read and discuss the different options in terms of viability, effectiveness, time and cost.

Decide on the best three options and prepare to report on the nature of the threat and how it can be best avoided.

Each group presents to the whole class.



Card A

A

Nuclear weapons

This might seem a drastic option bringing out our most deadly armaments. But the intention here would not be to pulverise the asteroid but rather to deflect its collision course. Otherwise, the danger is that you could generate masses of deadly debris – still heading for Earth. So the radiation from a nearby blast alone ought to be enough to steer it clear of Earth.

Kinetic interceptor

A milder alternative to ‘nuking’ the asteroid might be to give it a small nudge. Paradoxically, a one-mile-an-hour impact from a rocket could do the trick. That alone would be sufficient to divert the asteroid by 170,000 miles. Mind you, we would need to hit it 20 years before its collision has been predicted.

Card B

B

Painting it

Again, this is a surprising idea and has to do with the science of absorbed and reflected radiation. It is common sense that white reflects more solar radiation whereas dark colours absorb it. Logically, if you 'paint' a section of the asteroid white, then the remaining darker part will receive more of a push from solar radiation, gradually knocking it off course. The white 'paint' could be light coloured dust or chalk.

Solar sail

This involves sending a spacecraft to land a giant solar sail on the incoming asteroid. Once unfurled, the fact that it reflects solar radiation would enable it to push the asteroid away from Earth. The sail could even be adjusted to give it an element of remote control. Some experts have doubts about the complexity of setting up a working sail on a tumbling rock in space.

Card C

C

Netting

NASA has given serious thought to the notion of netting an asteroid in a carbon fibre mesh. This would need to weigh about 250 kilograms to divert the course of an earth bound asteroid. The net material would alter the amount of solar radiation that is absorbed and emitted and thereby nudge it off course. Merely 18 years would be enough to deflect a giant rock.

Mirrors

Mirrors positioned strategically could concentrate the sun's solar rays and thereby heat the surface of the asteroid. This concentrated heat would cause the asteroid to spew vapours into space. This would provide enough thrust to change the asteroid's path of destruction. The use of mirrors is also called laser sublimation.

Card D

Gravitational tractor

This strategy is a little controversial. Every object with sufficient mass will exert a gravitational pull, however small. Theoretically, navigating a heavy spacecraft close to the asteroid would be enough to tow it away with its gravitational force. However, some scientists feel that some thrust might be needed to stop the craft crashing into the asteroid which would cancel out any towing action.

MADMEN

The NASA funded Modular Asteroid Deflection Mission Ejector Node project involves sending nuclear powered robots to land on and start 'mining' on the surface of the threatening asteroid. The mined fragments would then be ejected into space at high speed by means of electromagnets, again providing enough thrust to alter its course. This idea is in its initial stages of research and development.

Feedback

Review

Lesson materials

Make sure you have

- downloaded the *.pdf with this presentation
- saved the Zoom Chat



What's next?

Check the most common collocations on this fun website:

<https://inspirassion.com/en/adj/chat>

Use a dictionary to check which words often go with the word you've learned:

<https://www.ldoceonline.com/>

Review the flashcards from Progress every week and try to remember the collocates!

Book your next English lesson and make sure you do the Prepare and Practise activities before your next lesson!

After-class speaking session

You can talk about any topic that interests you!

Use these questions as a guide, if needed.

- Do you like science fiction?
- Do you think mankind will ever colonise other planets?
- Do you think there is other intelligent life in the universe?
- Would you like to go into outer space?
- Do you agree with the Big Bang Theory to explain the creation of the universe? Why/Why not?

For help, contact:

support.englishonline@britishcouncil.org

English Online | www.britishcouncil.org

Dos

- ✓ Treat everyone with respect
- ✓ Keep your camera on and participate
- ✓ Let others share ideas too
- ✓ Listen to everyone
- ✓ Click 'Leave' if you cannot stay back

Don'ts

- ✗ Don't take pictures or record
- ✗ Don't share personal details
- ✗ Don't let your children be visible onscreen

After-class
speaking
sessions



This slide deck was created by Jake Steels.